RA 9514

THE FIRE CODE OF THE PHILIPPINES

Revised Implementing Rules and Regulations

Revised 2019

BUREAU OF FIRE PROTECTION
SERVICE
HONOR
COURAGE
FIRE CODE
PHILIPPINES
SAVE LIVES AND PROPERTIES

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Preface

In a country where tragic fires leave people devastated but not resolute in preventing them, and at a time when firefighting capability hardly catches up with socio-economic and technological advancements, a proactive and effective fire safety enforcement is crucial. And so, the enactment of *Republic Act No. 9514*, amending *Presidential Decree No. 1185*, otherwise known as the *Fire Code of the Philippines,* was celebrated as much as it was awaited in the realm of fire service and in fire protection industry. Many of the problems that had beset the era of *PD 1185* came to an end with the advent of *RA 9514*, although there remained issues that seem to evolve with time.

Over a decade of enforcement, these evolving issues, as well as new challenges, impelled the *Bureau of Fire Protection (BFP)* to go back to the drawing board. The reconstituted Fire Code Technical Working Group (TWG) for the Revision of the Implementing Rules and Regulations of RA 9514, under the leadership of *Chief Superintendent Leonides Perez*, who was also the vice chairperson of the Fire Code TWG (2008-2009) that gave us the 2009 IRR, carried out the undertaking of producing this edition from 2016 to 2019.

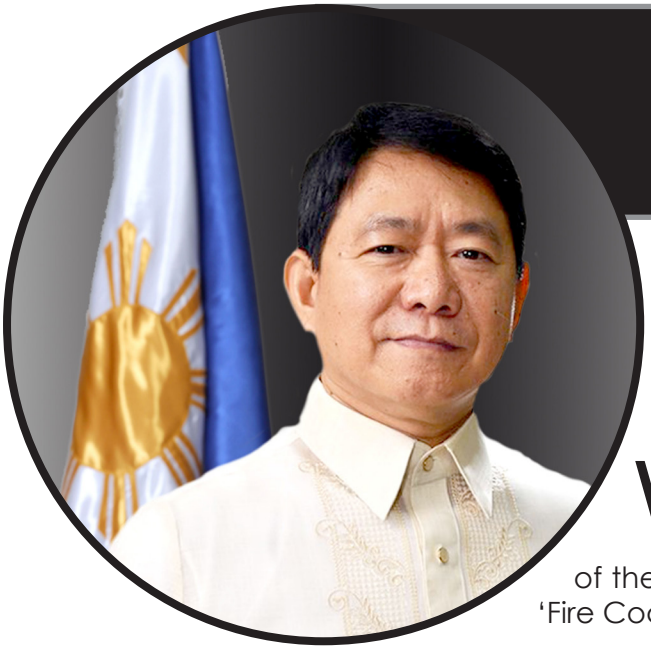
In collaboration with stakeholders and field experts from professional organizations and fire protection industry, we crafted this edition of the IRR with a combination of hindsight and foresight. In response to issues regarding ramps and location of the critical hospital facilities in existing healthcare occupancies, emergency rooms, operating rooms, intensive care units (ICUs), delivery rooms and similar facilities located up to five (5) floors from the level of exit discharge are now allowed subject to certain conditions under *Section 10.2.11.1*. The occupant load factor for concentrated-use business occupancies is reduced from 9.3 m^2/person to 4.6 m^2/person *(Section 10.2.16.1)*, considering the prevalence of such occupancies in certain special economic or free port zones encompassed by the authority of the BFP to enforce the Fire Code as mandated by recently enacted laws.

Not only did we try to address the problems and gaps that emerged during the implementation of the 2009 IRR. We went the extra mile of looking to the foreseeable future, anticipating latent needs, as well as potential causes and sources of ambiguity in interpreting and applying the 2019 IRR. With the rising number of industries having structures and facilities that were unknown in the Philippines ten years ago, we incorporated in this edition the fire safety standards for day care centers; residential board and care facilities; fixed guideways; historical structures; off-shore energy facilities; wind turbine energy-generating facilities; solar photovoltaic systems; and motion picture and television production studio, soundstages and certain production facilities. The competency requirements for and responsibilities of fire safety enforcers, fire safety practitioners, fire volunteers and fire volunteer organizations are also clarified and enhanced. The growing presence of hazardous materials (HazMat) in the country prompted us to prescribe maximum allowable quantities (MAQ) and increase regulatory fees for handling, storage and use of such materials, as well as for performing hazardous operations (HazOps).

Another novel feature of this edition is the set of original fire safety standards we developed based on Philippine experience in handling, storage and use of liquefied petroleum gas (LPG). You will find these standards, alongside internationally accepted standards, in *Section 10.3.7.8*.

Undoubtedly, all the Fire Code TWGs have given every version of the Fire Code and its IRR their respective and collective best, building upon the achievements and legacies of one another. Notwithstanding the resources, care and expertise devoted to its development, we offer the 2019 IRR to the public with ample room for continuing improvement. Until every better edition becomes best, it is our fervent hope that our edition will indeed serve as a reliable reference and effective tool for achieving a fire-safe nation.

— The Fire Code Technical Working Group (2016-2019)



Message

EDUARDO M. AÑO
Secretary
Departmen of the Interior and Local Government

Warm greetings to the Bureau of Fire Protection (BFP) for the publication of the revised Implementing Rules and Regulations (IRR) of the Republic Act 9514 of 2008 otherwise known as the 'Fire Code of the Philippines' on July, this year.

The law's IRR is the blueprint that guides the BFP in the implementation of the law to ensure public safety, promotes economic development through the prevention and suppression of all kinds of destructive fires.

These are challenging times and the demands to update and review the IRR is not just timely but necessary. While strictly implementing the law is primordial, we do not stop in identifying issues and concerns that need to be addressed, and deficiencies which can be improved.

I laud the BFP for amending the IRR of the Fire Code, a commendable initiative in adapting to the ever-changing landscape of firefighting and consequent challenges that go with it. The BFP's commitment to finish the improvements after undergoing thorough and careful study is commendable. These include stringent qualification requirements for personnel in order to recruit more qualified firefighters together with the increase in resources and manpower for the Bureau. Procedures on the use of HAZMAT equipment and rescue strategies to enhance the capacity of BFP firefighters in saving others and themselves were also Included.

Now the next step after its publication is to strictly monitor compliance to the new IRR to improve fire prevention, response, and rescue. While we all envisioned a true fire-safe Philippines, we also encourage our communities to be aware and practice responsible fire safety and prevention.

The Department of the Interior and Local Government (DILG) is one with the BFP in its noble undertakings including your continuous professionalization of the fire service and your unrelenting drive to ensure that the Filipino people are far from the harmful impacts of destructive fires.

May this publication help in the improvement of fire services and ultimately, in saving more precious lives and properties during fire emergencies.

Congratulations to the BFP on this new published IRR! *Mabuhay ang BFP!*

SECRETARY EDUARDO M. AÑO

Message

NESTOR F. QUINSAY, JR.
Undersecretary for Public Safety
Departmen of the Interior and Local Government

My heartfelt greetings to the Bureau of Fire Protection (BFP) for the successful revision of the Implementing Rules and Regulations (IRR) of Republic Act No. 9514 of 2008 otherwise known as the Fire Code of the Philippines.

The collaborated efforts of the officers and personnel behind this exemplary work manifest the true heart of public service, a complete dedication to provide the prime duty of the Government to protect and serve the people, their life and property and promote its general welfare. The revision of the IRR is a commendable initiative of the BFP in adapting and modernizing all aspects of firefighting. It will serve as a tool for the BFP to efficiently and effectively enforce the Fire Code of the Philippines and other fire related laws.

The Office of the Public Safety remains adamant in the belief that a fire safe nation is well within reach and we are ready to stand alongside the BFP in the pursuit of that vision.

Again, my congratulations to the men and women of BFP.

More power and Mabuhay!

USEC NESTOR F. QUINSAY, JR.

Message

DIRECTOR LEONARD R BAÑAGO, PME
Fire Chief
Bureau of Fire Protection

The revision of the Implementing Rules and Regulations (IRR) of Republic Act No. 9514, otherwise known as the "Fire Code of the Philippines of 2008", is one of the many initiatives that our agency is conducting to keep itself abreast with the changing times.

The Bureau of Fire Protection – with our commitment to public safety – continues to upgrade and improve the IRR of our Fire Code to ensure that we deliver our optimum value to the people. We are doing this to improve efficiency, transparency, and public involvement as we perform our mandates. The Fire Code, being the heart and soul of the organization, serves as our guide in everything that we do in the BFP. All our actions and decisions are based on the existing rules and regulations of the Fire Code and coming up with the most appropriate amendments in the IRR is a manifestation of our commitment to provide the quality fire service to the Filipino people as embodied in our oath as public servants - "*Patuloy kong daragdagan ang aking Kaalaman upang walang tigil na mapaunlad ang uri ng serbisyo na aking ihahandog sa mamayan*".

Let me take this opportunity to commend all the people behind this initiative. This initiative is a validation that team work and unity lead to the progress of an organization. Let us continue to join hands and work together for a bigger and better BFP!

Paths don't move, we do. So let us all move forward. Move the right way.

Mabuhay ang Bureau of Fire Protection!

FIRE DIRECTOR LEONARD R BAÑAGO, PME

Message

CSUPT LEONIDES P PEREZ, PME
Deputy Chief for Administration /
Chairperson, Fire Code Technical Staff
Bureau of Fire Protection

Republic Act No. 9514, popularly known as "The Fire Code of the Phillipines of 2008" has achieved the purpose of enforcing fire safety laws and standards as well as providing avenues for modernization and maintenance of firefighting equipment.

The original rules and regulations have evidently helped firefighters improve their capabilities in saving lives and properties and similarly gave more intense power to the BFP in implementing fire safety and standards.

The need to update and intensify various provisions of the existing IRR has become vital for it to be realistic and relevant in the present time due to the demand of the technological changes in building designs and constructions, development of cities characterized by high-rise buildings/structures and amongst others and the evolution of relevant requirements and related laws of other government agencies.

This amendment includes additional provisions so that each of the rules, divisions and sections of RA 9514 has clarity to ensure adherence to the standards of fire prevention and safety measures, and promote utmost accountability in the fire service.

The realization of this revised IRR is made possible through the efforts of the Fire Code Technical Staff and its Board of Consultants.

It is therefore longed that this publication will contribute to a uniform and clearer interpretation and understanding of the Code for its effective enforcement.

CSUPT LEONIDES P PEREZ, PME

Milestones

FIRE CODE OF THE PHILIPPINES
REVISED IMPLEMENTING RULES AND REGULATIONS

14 April, 2014

The first intention to amend the IRR surfaced after all regional directors were asked to submit their comments and suggestions in the implementation of the IRR. The comments submitted become the basis for the first round of committee meetings.

26 January, 2016

Signing of Bureau Order Number COM-2016-005 re: Composition of the Fire Code Technical Committee with SSUPT ROEL JEREMY G DIAZ as the Chairman. One of the functions of the FCTC was to review and amend the IRR as necessary

The amendment of the Implementing Rules and Regulations of RA 9514 of 2008 spurted from the alleged violations of the Petronas Energy Philippines, Inc on the Fire Code to which DILG gave a directive to the Chief, BFP to revisit the LPG Provisions, subsequently revisiting all provisions of the IRR.

09 July, 2016

Resource persons from various agencies, as well as all, City Fire Marshals and Chief, FSES within NCR, were invited during the preliminary deliberations on the amendment of the Implementing Rules and Regulations.

Constitution of sub-committees were also initiated to facilitate the revision of IRR.

Amendment to the RA 9514 Basic Law was also revisited and amendments were then initiated

17 August, 2017

An offshoot to the House of Representative's inquiry regarding the Resort's World Manila Fire Incident, which paved the way for the amendment of Section 9 of RA 7916 or the PEZA Law was amended, assigning to BFP the sole authority to enforce the Fire Code.

FCTS-TWG Resolution No. 1 series of 2017 under SSUPT FELIXBERTO ABRENICA was signed enforcing RA 9514 of the Fire Code of the Philippines of to PEZA-owned, administered, registered Ecozones and setting guidelines in the imposition thereof.

01 September, 2017 – 17 January, 2018

Series of consultation and coordination meetings with PEZA began under the chairmanship of SSUPT ABRENICA, up until January of 2018 when the MOA between the BFP and PEZA was finally signed with SSUPT DOLOT as the FCTS Chairperson.

18 January, 2018	Signing of Memorandum of Agreement between the Bureau of Fire Protection and the Philippine Economic Zone Authority.
19 March, 2018	Series of roll-out meetings thru Fire Service Conventions and orientation seminars to all regional C,FSES regarding the implementing guidelines of the BFP-PEZA MOA were conducted
22 March, 2018	MC No. 2018-006, The Implementing Guidelines for the conduct of Fire Safety Inspection and Issuance of Certificates and Licenses for PEZA-registered Enterprises was signed and cascaded to all regions, provincial/district and city/municipal fire stations
01 April, 2018	Constitution of BFP-PEZA Central Liaison Unit from different PEZA established Administrative Regions/Units
May – August 2018	Series of deliberations on the amendment of RA 9514 (Basic Law) were also conducted along with the major issues until August 22, 2018 when it was finally submitted to the Secretary of the Interior and Local Government for review. Similarly, review of the provisions and continuous deliberations on the proposed amendment of the IRR were also being conducted
03 September – 14 September, 2018	An in-house workshop on the proposed amendment was slated to fast track the amendments of its provisions
19 November, 2018	a Public Consultation to all stakeholders was arranged for further scrutiny of the revisions made thereafter effecting their comments and suggestions thru FCTS-TWG meeting
February 2019	Presentation to the DILG for comments and suggestions, eventually incorporating it in the revision after final deliberation among the TWG.
May – June 2019	Final proofreading of the RIRR prior to submission to the Chief, BFP for approval.
09 July, 2019	Submission of the final draft of the Revised Implementing Rules and Regulations to the Secretary of the Interior and Local Government for approval.
07 August, 2019	Approval and signature of the Revised Implementing Rules and Regulations by the Secretary of the Interior and Local Government.

Acknowledgements

STEERING COMMITTEE

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SPECIAL THANKS TO THE FOLLOWING

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11 August 2017 (BO COM-2017-068)

Chairman, IRR-TWG
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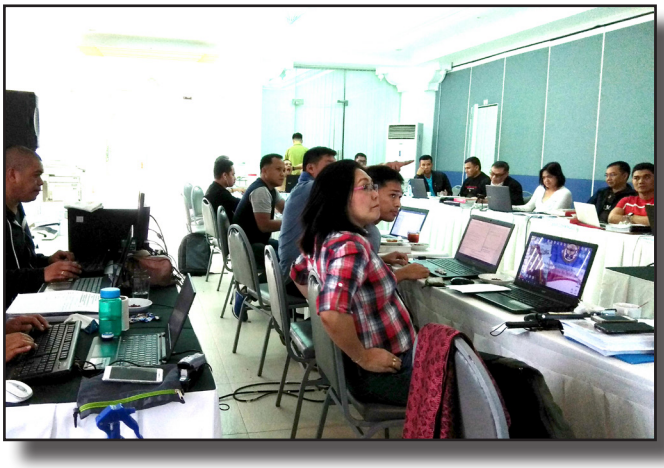
Preparation for RIRR

Finalization of the RIRR



RIRR Public Consultation

RA 9514 Basic Law

S. No. 2553
H. No. 4115

Republic of the Philippines
Congress of the Philippines
Metro Manila

Fourteenth Congress

Second Regular Session

Begun and held in Metro Manila, on Monday, the twenty-eighth day of July, two thousand eight.

[REPUBLIC ACT NO. 9514]

AN ACT ESTABLISHING A COMPREHENSIVE FIRE CODE OF THE PHILIPPINES, REPEALING PRESIDENTIAL DECREE NO. 1185 AND FOR OTHER PURPOSES

Be it enacted by the Senate and House of Representatives of the Philippines in Congress assembled:

SECTION 1. This Act shall be known as the "Fire Code of the Philippines of 2008".

SEC. 2. It is the policy of the State to ensure public safety, promote economic development through the prevention and suppression of all kinds, of destructive fires, and promote the professionalization of the fire service as a profession. Towards this end, the State shall enforce all laws, rules and regulations to ensure adherence to standard fire prevention and

safety measures, and promote accountability in the fire protection and prevention service.

SEC. 3. *Definition of Terms.* — As used in this Fire Code, the following words and phrases shall mean and be construed as indicated:

Abatement — Any act that would remove or neutralize a fire hazard.

Administrator — Any person who acts as agent of the owner and manages the use of a building for him.

Blasting Agent — Any material or mixture consisting of a fuel and oxidizer used to set off explosives.

Cellulose Nitrate or Nitro Cellulose — A highly combustible and explosive compound produced by the reaction of nitric acid with a cellulose material.

Cellulose Nitrate Plastic (Pyroxylin) — Any plastic substance, materials or compound having cellulose nitrate (nitro cellulose) as base.

Combustible Flammable or Inflammable — Descriptive of materials that are easily set on fire.

Combustible Fiber — Any readily ignitable and free burning fiber such as cotton, oakum, rags, waste cloth, waste paper, kapok, hay, straw, spanish moss, excelsior and other similar materials commonly used in commerce.

Combustible Liquid — Any liquid having a flash point at or above 37.8°C (100°F).

Corrosive Liquid — Any liquid which causes fire when in contact with organic matter or with certain chemicals.

Curtain Board — A vertical panel of non-combustible or fire resistive materials attached to and extending below the bottom chord of the roof trusses, to divide the underside of

the roof into separate compartments so that heat and smoke will be directed upwards to a roof vent.

Cryogenic — Descriptive of any material which by its nature or as a result of its reaction with other elements produces a rapid drop in temperature of the immediate surroundings.

Damper — A normally open device installed inside air duct system which automatically closes to restrict the passage of smoke or fire.

Distillation — The process of first raising the temperature in separating the more volatile from the less volatile parts and then cooling and condensing the resulting vapor so as to produce a nearly purified substance.

Duct System — A continuous passageway for the transmission of air.

Dust — A finely powdered substance which, when mixed with air in the proper proportion and ignited will cause an explosion.

Electrical Arc — An extremely hot luminous bridge formed by passage of an electric current across a space between two conductors or terminals due to the incandescence of the conducting vapor.

Ember — A hot piece or lump that remains after a material has partially burned, and is still oxidizing without the manifestation of flames.

Finishes — Materials used as final coating of a surface for ornamental or protective purposes.

Fire — The active principle of burning, characterized by the heat and light of combustion.

Fire Trap — A building unsafe in case of fire because it will burn easily or because it lacks adequate exits or fire escapes.

Fire Alarm — Any visual or audible signal produced by a device or system to warn the occupants of the building or fire fighting elements of the presence or danger of fire to enable them to undertake immediate action to save life and property and to suppress the fire.

Fire Door — A fire resistive door prescribed for openings in fire separation walls or partitions.

Fire Hazard — Any condition or act which increases or may cause an increase in the probability of the occurrence of fire, or which may obstruct, delay, hinder or interfere with fire fighting operations and the safeguarding of life and property.

Fire Lane — The portion of a roadway or public-way that should be kept opened and unobstructed at all times for the expedient operation of fire fighting units.

Fire Protective and Fire Safety Device — Any device intended for the protection of buildings or persons to include, but not limited to, built-in protection system such as sprinklers and other automatic extinguishing system, detectors for heat, smoke and combustion products and other warning system components, personal protective equipment such as fire blankets, helmets, fire suits, gloves and other garments that may be put on or worn by persons to protect themselves during fire.

Fire Safety Constructions — Refers to design and installation of walls, barriers, doors, windows, vents, means of egress etc. integral to and incorporated into a building or structure in order to minimize danger to life from fire, smoke, fumes or panic before the building is evacuated. These features are also designed to achieve, among others, safe and rapid evacuation of people through means of egress on construction which are sealed from smoke or fire, the confinement of fire or smoke in the room or floor of origin and delay their spread to other parts of the building by means of smoke sealed and fire resistant doors, walls and floors. It shall also mean to include the treatment of building components or contents with flame retardant chemicals.

Flash Point — The minimum temperature at which any material gives off vapor in sufficient concentration to form an ignitable mixture with air.

Forcing — A process where a piece of metal is heated prior to changing its shape or dimensions.

Fulminate — A kind of stable explosive compound which explodes by percussion.

Hazardous Operation/Process — Any act of manufacturing, fabrication, conversion, etc., that uses or produces materials which are likely to cause fires or explosions.

Horizontal Exit — Passageway from one building to another or through or around a wall in approximately the same floor level.

Hose Box — A box or cabinet where fire hoses, valves and other equipment are stored and arranged for fire fighting.

Hose Reel — A cylindrical device turning on an axis around which a fire hose is wound and connected.

Hypergolic Fuel — A rocket or liquid propellant which consists of combinations of fuels and oxidizers which ignite spontaneously on contact with each other.

Industrial Baking and Drying — The industrial process of subjecting materials to heat for the purpose of removing solvents or moisture from the same, and/or to fuse certain chemical salts to form a uniform glazing on the surface of materials being treated.

Jumper — A piece of metal or an electrical conductor used to bypass a safety device in an electrical system.

Occupancy — The purpose for which a building or portion thereof is used or intended to be used.

Occupant — Any person actually occupying and using a building or portions thereof by virtue of a lease contract with

the owner or administrator or by permission or sufferance of the latter.

Organic Peroxide — A strong oxidizing organic compound which releases oxygen readily. It causes fire when in contact with combustible materials especially under conditions of high temperature.

Overloading — The use of one or more electrical appliances or devices which draw or consume electrical current beyond the designed capacity of the existing electrical system.

Owner — The person who holds the legal right of possession or title to a building or real property.

Oxidizing Material — A material that readily yields oxygen in quantities sufficient to stimulate or support combustion.

Pressurized or Forced Draft Burning Equipment — Type of burner where the fuel is subjected to pressure prior to discharge into the combustion chamber and/or which includes fans or other provisions for the introduction of air at above normal atmospheric pressure into the same combustion chamber.

Public Assembly Building — Any building or structure where fifty (50) or more people congregate, gather, or assemble for any purpose.

Public Way — Any street, alley or other strip of land unobstructed from the ground to the sky, deeded, dedicated or otherwise permanently appropriated for public use.

Pyrophoric — Descriptive of any substance that ignites spontaneously when exposed to air.

Refining — A process where impurities and/or deleterious materials are removed from a mixture in order to produce a pure element or compound. It shall also refer to partial distillation and electrolysis.

Self-closing Doors — Automatic closing doors that are designed to confine smoke and heat and delay the spread of fire.

Smelting — Melting or fusing of metallic ores or compounds so as to separate impurities from pure metals.

Sprinkler System — An integrated network of hydraulically designed piping installed in a building, structure or area with outlets arranged in a systematic pattern which automatically discharges water when activated by heat or combustion products from a fire.

Standpipe System — A system of vertical pipes in a building to which fire hoses can be attached on each floor, including a system by which water is made available to the outlets as needed.

Vestibule — A passage hall or antechamber between the outer doors and the interior parts of a house or building.

Vertical Shaft — An enclosed vertical space of passage that extends from floor to floor, as well as from the base to the top of the building.

SEC. 4. *Applicability of the Code.* – The provisions of the Fire Code shall apply to all persons and all private and public buildings, facilities or structures erected or constructed before and after its effectivity.

SEC. 5. *Responsibility for the Enforcement of this Code.* – This Code shall be administered and enforced by the Bureau of Fire Protection (BFP), under the direct supervision and control of the Chief of the Bureau of Fire Protection, through the hierarchy of organization as provided for in Chapter VI of Republic Act No. 6975. With the approval of the Secretary of the Department of the Interior and Local Government (DILG), the Chief, BFP, is hereby authorized to:

(a) Issue implementing rules and regulations, and prescribe standards, schedules of fees/fire service charges and

administrative penalties therefor as provided in the pertinent provisions of this Code;

(b) Reorganize the BFP as may be necessary and appropriate;

(c) Support and assist fire volunteers, practitioners and fire volunteer organizations in the country who shall undergo mandatory fire suppression, inspection, rescue, emergency medical services and related emergency response trainings and competency evaluations to be conducted by the BFP. In the case of the fire practitioners, they shall undergo mandatory continuous professional education and competency evaluation of their expertise, knowledge and skills in the area of fire science, engineering and technology to be conducted by the BFP.

The BFP may enter into external party agreements for the conduct of trainings, education and evaluation of fire volunteers, practitioners and fire volunteer organizations, which shall be under the full control and supervision of the BFP: *Provided, however,* That during fire fighting operations, fire volunteer organizations shall be under the direct operational control of the fire ground commanders of the BFP;

(d) Enter into long-term agreement, either through public biddings or negotiations, in accordance with the provisions of Republic Act No. 9184, otherwise known as the Government Procurement Reform Act of 2003, for the acquisition of fire prevention, fire protection and fire fighting investigation, rescue, paramedics, hazardous material handling equipment, supplies, materials and related technical services necessary for the fire service;

(e) Enter into memoranda of agreement with other departments, bureaus, agencies, offices and corporations of the government, as well as private institutions, in order to define areas of cooperation and coordination and delineate responsibility on fire prevention education, fire safety, fire prevention, fire suppression and other matters of common concern;

(f) Call on the police, other law enforcement agencies, and local government assistance to render necessary assistance in the enforcement of this Code;

(g) Designate a fire safety inspector through his/her duly authorized representative, who shall conduct an inspection of every building or structure within his area of responsibility at least once a year and every time the owner, administrator or occupant shall renew his/her business permit or permit to operate.

No occupancy permit, business or permit to operate shall be issued without securing a Fire Safety Inspection Certificate (FSIC) from the Chief, BFP or his/her duly authorized representative;

(h) Inspect at reasonable time, any building, structure, installation or premises for dangerous or hazardous conditions or materials as set forth in this Code: *Provided,* That in case of single family dwelling, an inspection must be upon the consent of the occupant or upon lawful order from the proper court. The Chief, BFP or his/her duly authorized representative shall order the owner/occupant to remove hazardous materials and/or stop hazardous operation/process in accordance with the standards set by this Code or its implementing rules and regulations or other pertinent laws;

(i) Where conditions exist and are deemed hazardous to life and property, to order the owner/occupant of any building or structure to summarily abate such hazardous conditions;

(j) Require the building owner/occupant to submit plans and specifications, and other pertinent documents of said building to ensure compliance with applicable codes and standards; and

(k) Issue a written notice to the owner and/or contractor to stop work or portion of any work due to absence, or in violation of approved plans and specifications, permit and/or clearance or certification as approved by the Chief, BFP or

his/her duly authorized representative. The notice shall state the nature of the violation and no work shall be continued on that portion until the violation had been corrected.

SEC. 6. *Technical Staff.* – The Chief, BFP shall constitute a technical staff of highly qualified persons who are knowledgeable on fire prevention, fire safety, and fire suppression. They may be drawn not only from the organic members of the BFP and other government offices and agencies, but also from other sources. In the latter case, they will either be appointed into the service or hired as consultants in accordance with law. The technical staff shall study, review and evaluate latest developments and standards on fire technology; prepare plans/programs on fire safety, prevention and suppression and evaluate implementation thereof; develop programs on the professionalization of the fire service; coordinate with appropriate government and private institutions for the offering of college courses on fire technology and fire protection engineering; propose amendments to the Fire Code; advise the Chief, BFP on any matter brought to his/her attention; and perform such other functions as directed on any matter brought to his/her attention and perform such other functions as directed by higher authorities.

SEC. 7. *Inspections, Safety Measures, Fire Safety, Constructions and Protective and/or Warning Systems.* – As may be defined and provided in the rules and regulations, owners, administrators or occupants of buildings, structures and their premises or facilities and other responsible persons shall be required to comply with the following, as may be appropriate:

(a) Inspection Requirement — A fire safety inspection shall be conducted by the Chief, BFP or his/her duly authorized representative as prerequisite to the grants of permits and/or licenses by local governments and other government agencies concerned, for the:

(1) Use or occupancy of buildings, structures, facilities or their premises including the installation of fire protection

and fire safety equipment, and electrical system in any building structure or facility; and

(2) Storage, handling and/or use of explosives or of combustible, flammable, toxic and other hazardous materials.

(b) Safety Measures for Hazardous Materials — Fire safety measures shall be required for the manufacture, storage, handling and/or use of hazardous materials involving:

(1) cellulose nitrate plastic of any kind;

(2) combustible fibers;

(3) cellular materials such as foam, rubber, sponge rubber and plastic foam;

(4) flammable and combustible liquids or gases of any classification;

(5) flammable paints, varnishes, stains and organic coatings;

(6) high-piled or widely spread combustible stock;

(7) metallic magnesium in any form;

(8) corrosive liquids, oxidizing materials, organic peroxide, nitromethane, ammonium nitrate, or any amount of highly toxic, pyrophoric, hypergolic, or cryogenic materials or poisonous gases as well as material compounds which when exposed to heat or flame become a fire conductor, or generate excessive smoke or toxic gases;

(9) blasting agents, explosives and special industrial explosive materials, blasting caps, black powder, liquid nitroglycerine, dynamite, nitro cellulose, fulminates of any kind, and plastic explosives containing ammonium salt or chlorate;

(10) firework materials of any kind or form;

(11) matches in commercial quantities;

(12) hot ashes, live coals and embers;

(13) mineral, vegetable or animal oils and other derivatives/by-products;

(14) combustible waste materials for recycling or resale;

(15) explosive dusts and vapors;

(16) agriculture, forest, marine or mineral products which may undergo spontaneous combustion; and

(17) any other substance with potential to cause harm to persons, property or the environment because of one or more of the following: i) The chemical properties of the substance; ii) The physical properties of the substance; iii) The biological properties of the substance. Without limiting the definition of hazardous material, all dangerous goods, combustible liquids and chemicals are hazardous materials.

c) Safety Measures for Hazardous Operations/Processes — Fire safety measures shall be required for the following hazardous operations/processes:

(1) welding or soldering;

(2) industrial baking and drying;

(3) waste disposal;

(4) pressurized/forced-draft burning equipment;

(5) smelting and forging;

(6) motion picture projection using electrical arc lamps;

(7) refining, distillation and solvent extraction; and

(8) such other operations or processes as may hereafter be prescribed in the rules and regulations.

(d) Provision on Fire Safety Construction, Protective and Warning System — Owners, occupants or administrators of buildings, structures and their premises or facilities, except such other buildings or structures as may be exempted in the rules and regulations to be promulgated under Section 5 hereof, shall incorporate and provide therein fire safety construction, protective and warning system, and shall develop and implement fire safety programs, to wit:

(1) Fire protection features such as sprinkler systems, hose boxes, hose reels or standpipe systems and other fire fighting equipment;

(2) Fire alarm systems;

(3) Fire walls to separate adjoining buildings, or warehouses and storage areas from other occupancies in the same building;

(4) Provisions for confining the fire at its source such as fire resistive floors and walls extending up to the next floor slab or roof, curtain boards and other fire containing or stopping components;

(5) Termination of all exits in an area affording safe passage to a public way or safe dispersal area;

(6) Stairway, vertical shafts, horizontal exits and other means of egress sealed from smoke and heat;

(7) A fire exit plan for each floor of the building showing the routes from each room to appropriate exits, displayed prominently on the door of such room;

(8) Self-closing fire resistive doors leading to corridors;

(9) Fire dampers in centralized airconditioning ducts;

(10) Roof vents for use by fire fighters; and

(11) Properly marked and lighted exits with provision for emergency lights to adequately illuminate exit ways in case of power failure.

SEC. 8. *Prohibited Acts.* – The following are declared as prohibited act and omission:

(a) Obstructing or blocking the exit ways or across to buildings clearly marked for fire safety purposes, such as, but not limited to, aisles in interior rooms, any part of stairways, hallways, corridors, vestibules, balconies or bridges leading to a stairway or exit of any kind, or tolerating or allowing said violations;

(b) Constructing gates, entrances and walkways to building components and yards, and temporary or permanent structures on public ways, which obstruct the orderly and easy passage of fire fighting vehicles and equipment;

(c) Prevention, interference or obstruction of any operation of the fire service, or of duly organized and authorized fire brigades;

(d) Obstructing designated fire lanes or access to fire hydrants;

(e) Overcrowding or admission of persons beyond the authorized capacity in movie houses, theaters, coliseums, auditoriums or other public assembly buildings, except in other assembly areas on the ground floor with open sides or open doors sufficient to provide safe exits;

(f) Locking fire exits during period when people are inside the building;

(g) Prevention or obstruction of the automatic closure of fire doors or smoke partitions or dampers;

(h) Use of fire protective or fire fighting equipment of the fire service other than for fire fighting except in other emergencies where their use are justified;

(i) Giving false or malicious fire alarms;

(j) Smoking in prohibited areas as may be determined by fire service, or throwing of cigars, cigarettes, burning objects in places which may start or cause fire;

(k) Abandoning or leaving a building or structure by the occupant or owner without appropriate safety measures;

(l) Removing, destroying, tampering or obliterating any authorized mark, seal, sign or tag posted or required by the fire service for fire safety in any building, structure or processing equipment; and

(m) Use of jumpers or tampering with electrical wiring or overloading the electrical system beyond its designated capacity or such other practices that would tend to undermine the fire safety features of the electrical system.

SEC. 9. *Violations, Penalties and Abatement of Fire Hazards.* – Fire hazards shall be abated immediately. The Chief, BFP or his/her duly authorized representative, upon the report that a violation of this Code or other pertinent laws, rules and regulations is being committed, shall issue notice/ order to comply to the owner, administrator, occupant or other person responsible for the condition of the building or structure, indicating among other things, the period within which compliance shall be effected, which shall be within ten (10) to fifteen (15) days after the receipt of the notice/order, depending on the reasonableness to adequately comply with the same.

If after the lapse of the aforesaid period, the owner, administrator, occupant or other responsible person failed to comply, the Chief, BFP or his/her duly authorized representative shall put up a sign in front of the building or structure that it is a fire hazard. Specifically, the notice shall bear the words "WARNING: THIS BUILDING/STRUCTURE IS A FIRE HAZARD", which shall remain posted until such time that the owner, administrator, occupant or other person

responsible for the condition of the building, structure and their premises or facilities abate the same, but such period shall not exceed fifteen (15) days from the lapse of the initial period given in the notice/order to comply.

Finally, with the failure of the owner, administrator, occupant or other persons responsible for the condition of the building, structure and their premises or facilities to comply within the period specified above, the Chief, BFP may issue order for such abatement. If the owner, administrator or occupant of building, structure and their premises or facilities does not abate the same within the period fixed in said order, the building, structure, premises or facilities shall be ordered closed by the Chief, BFP or his/her duly authorized representative notwithstanding any permit, clearance or certificate earlier issued by the local authorities.

Any building or structure assessed and declared by the Chief, BFP or his/her duly authorized representative as a fire trap on account of the gravity or palpability of the violation or is causing clear and present imminent fire danger to adjoining establishments and habitations shall be declared a public nuisance, as defined in the Civil Code of the Philippines in a notice to be issued to the owner, administrator, occupant or other person responsible for the condition of the building, structure and their premises or facilities. If the assessed value of the nuisance or the amount to be spent in abating the same is not more than One hundred thousand pesos (P100,000.00), the owner, administrator or occupant thereof shall abate the hazard within fifteen (15) days, or if the assessed value is more than One hundred thousand pesos (P100,000.00), within thirty (30) days from receipt of the order declaring said building or structure a public nuisance; otherwise, the Chief, BFP or his/her duly authorized representative shall forthwith cause its summary abatement. Failure to comply within five (5) days from the receipt of the notice shall cause the Chief, BFP or his/her duly authorized representative to put up a sign in front of the building or structure, at or near the entrance of such premises, notifying the public that such building or structure is a "FIRE TRAP", which shall remain until the owner, administrator, occupant or other person responsible for the condition of the building,

structure and their premises or facilities abate the same within the specified period.

Summary abatement as used herein shall mean all corrective measures undertaken to abate hazards which shall include, but not limited to, remodeling, repairing, strengthening, reconstructing, removal and demolition, either partial or total, of the building or structure. The expenses incurred by the government for such summary abatement shall be borne by the owner, administrator or occupant. These expenses shall constitute a prior lien upon such property.

SEC. 10. *Enforcement of the Lien.* – If the owner, administrator or occupant fails to reimburse the government of the expenses incurred in the summary abatement within ninety (90) days from the completion of such abatement, the building or structure shall be sold at public auction in accordance with existing laws and rules. No property subject of lien under Section 9 hereof, may be sold at a price lower than the abatement expenses incurred by the government. The property shall be forfeited in favor of the government if the highest bid is not at least equal to the abatement expenses.

SEC. 11. *Penalties.* –

(1) Against the private individual:

(a) Administrative fine – Any person who violates any provision of the Fire Code or any of the rules and regulations promulgated under this Act shall be penalized by an administrative fine of not exceeding Fifty thousand pesos (P50,000.00) or in the proper case, by stoppage of operations or by closure of such buildings, structures and their premises or facilities which do not comply with the requirements or by both such administrative fine and closure/stoppage of operation to be imposed by the Chief, BFP: *Provided,* That the payment of the fine, stoppage of operations and/or closure of such buildings, structures, and their premises or facilities shall not absolve the violator from correcting the deficiency or abating the fire hazard. The decision of the Chief, BFP, under this subsection, may be appealed to the Secretary of the Interior

and Local Government. Unless ordered by the Secretary of the Interior and Local Government, the appeal shall not stay the execution of the order of the Chief, BFP. The decision of the Secretary of the Interior and Local Government shall be final and executory.

(b) Punitive – In case of willful failure to correct the deficiency or abate the fire hazard as provided in the preceding subsection, the violator shall, upon conviction, be punished by imprisonment of not less than six (6) months nor more than six (6) years, or by a fine of not more than One hundred thousand pesos (P100,000.00) or both such fine and imprisonment: *Provided, however,* That in the case of a corporation, firm, partnership or association, the fine and/or imprisonment shall be imposed upon its officials responsible for such violation, and in case the guilty party is an alien, in addition to the penalties herein prescribed, he shall immediately be deported: *Provided, finally;* That where the violation is attended by injury, loss of life and/or damage to property, the violator shall be proceeded against under the applicable provisions of the Revised Penal Code.

Any person who, without authority, maliciously removes the sign that a building or structure is a fire hazard/fire trap placed by the authorized person in this Code shall be liable for imprisonment for thirty (30) days or a fine not exceeding One hundred thousand pesos (P100,000.00) or both in the discretion of the court.

Any person who disobeys the lawful order of the fire ground commander during a fire fighting operation shall be penalized with imprisonment of one (1) day to thirty (30) days and a fine of Five thousand pesos (P5,000.00).

(2) Against the public officer/employee:

(a) Administrative – The following acts or omissions shall render the public officer/employee in charge of the enforcement of this Code, its implementing rules and regulations and other pertinent laws, administratively liable, and shall be punished by reprimand, suspension or removal in the discretion of the

disciplining authority, depending on the gravity of the offense and without prejudice to the provisions of other applicable laws:

(1) Unjustified failure of the public officer/employee to conduct inspection of buildings or structures at least once a year;

(2) Deliberate failure to put up a sign in front of the building or structure within his/her area of responsibility found to be violating this Code, its implementing rules and regulations or other pertinent laws, that the same is a "FIRE HAZARD" or a "FIRE TRAP";

(3) Endorsing to the Chief, BFP or his/her duly authorized representative for the certification, or submitting a report that the building or structure complies with the standards set by this Code, its implementing rules and regulations or other pertinent laws when the same is contrary to fact;

(4) Issuance or renewal of occupancy or business permit without the fire safety inspection certificate issued by the Chief, BFP or his/her duly authorized representative;

(5) Failure to cancel the occupancy or business permit after the owner, administrator, occupant or other person responsible for the condition of the building, structure and other premises failed to comply with the notice/order for compliance with the standards set by this Code, its implementing rules and regulations and other pertinent laws, within the specified period;

(6) Failure to abate a public nuisance within fifteen (15) days after the owner, administrator, occupant or other responsible person failed to abate the same within the period contained in the notice to abate;

(7) Abusing his/her authority in the performance of his/her duty through acts of corruption and other unethical practices; or

(8) Other willful impropriety or gross negligence in the performance of his/her duty as provided in this Act or its implementing rules and regulations.

(b) Punitive – In case of willful violation involving the abovementioned acts or omissions enumerated under Section 11 subparagraph 2(A), the public officer/employee shall, upon conviction, be punished by imprisonment of not less than six (6) months nor more than six (6) years, or by a fine of not more than One hundred thousand pesos (P100,000.00) or both such fine and imprisonment: *Provided*, That where the violation is attended by injury, loss of life and/or property, the violator shall be proceeded against under the applicable provisions of the Revised Penal Code.

SEC. 12. *Appropriation and Sources of Income.* –

(a) To support the manpower, infrastructure and equipment needs of the fire service of the BFP, such amount as may be necessary to attain the objectives of the Fire Code shall be appropriated and included in the annual appropriation of the BFP.

(b) To partially provide for the funding of the fire service, the following taxes and fees which shall accrue to the general fund of the National Government, are hereby imposed:

(1) Fees to be charged for the issuance of certificates, permits and licenses as provided for in Section 7(a) hereof;

(2) One-tenth of one *per centum* (0.1%) of the verified estimated value of buildings or structures to be erected, from the owner thereof, but not to exceed Fifty thousand pesos (P50,000.00), one half to be paid prior to the issuance of the building permit, and the balance, after final inspection and prior to the issuance of the use and occupancy permit;

(3) One-hundredth of one *per centum* (0.10%) of the assessed value of buildings or structures annually payable upon payment of the real estate tax, except on structures used as single family dwellings;

(4) Two *per centum* (2%) of all premiums, excluding reinsurance premiums for the sale of fire, earthquake and explosion hazard insurance collected by companies, persons or agents licensed to sell such insurances in the Philippines;

(5) Two *per centum* (2%) of gross sales of companies, persons or agents selling fire fighting equipment, appliances or devices, including hazard detection and warning systems; and

(6) Two *per centum* (2%) of the service fees received from fire, earthquake, and explosion hazard reinsurance surveys and post loss service of insurance adjustment companies doing business in the Philippines directly through agents.

SEC. 13. *Collection of Taxes, Fees and Fines.* – All taxes, fees and fines provided in this Code shall be collected by the BFP: *Provided,* That twenty percent (20%) of all such collections shall be set aside and retained for use by the city or municipal government concerned, which shall appropriate the same exclusively for the use of the operation and maintenance of its local fire station, including the construction and repair of fire station: *Provided, further,* That the remaining eighty percent (80%) shall be remitted to the National Treasury under a trust fund assigned for the modernization of the BFP.

SEC. 13-A. *Assessment of Fire Code Taxes, Fees and Fines.* – The assessment of fire code taxes, fees and fines is vested upon the BFP. The BFP shall, subject to the approval of the DILG, prescribe the procedural rules for such purpose.

SEC. 13-B. *Collection and Assessment of Local Taxes, Fees and Fines.* – The collection and assessment of taxes, fees and fines as prescribed in the Local Government Code, except those contained in this Code, shall be the function of the concerned local government units.

SEC. 13-C. *Use of Income Generated from the Enforcement of the Fire Code.* – The Chief, BFP is authorized, subject to the approval of the Secretary of the Interior and

Local Government, to use the income generated under the Fire Code for procurement of fire protection and fire fighting investigation, rescue, paramedics, supplies and materials, and related technical services necessary for the fire service and the improvement of facilities of the BFP and abatement of fire hazards.

The BFP shall determine the optimal number of equipment, including, but not limited to, fire trucks and fire hydrants, required by every local government unit for the proper delivery of fire protection services in its jurisdiction.

In the procurement of fire fighting and investigation supplies and materials, the Bureau of Product Standards of the Department of Trade and Industry shall evaluate, determine and certify if the supply so procured conforms to the product standards fixed by the BFP. For this purpose, the BFP shall submit to the Bureau of Product Standards a detailed set of product standards that must be complied with in the procurement of fire fighting and investigation supplies and materials within six (6) months from the effectivity of this Act.

SEC. 13-D. *Monitoring the Implementation of the Fire Code and the Amount of the Fees Collected.* – The Chief, BFP shall, within six (6) months from the effectivity of this Code, submit to the Secretary of the Interior and Local Government for his/her approval, a management tool or mechanism that would ensure effective monitoring of the enforcement of the Fire Code to include the amount of Fire Code fees collected.

SEC. 14. Within sixty (60) days from the effectivity of this Act, the Secretary of the Interior and Local Government shall issue the rules and regulations for its effective implementation.

SEC. 15. Presidential Decree No. 1185 is hereby repealed. All laws, presidential decrees, letters of instruction, executive orders, rules and regulations insofar as they are inconsistent with this Act, are hereby repealed or amended as the case may be.

SEC. 16. In case any provision of this Act or any portion thereof is declared unconstitutional by a competent court, other provisions shall not be affected thereby.

SEC. 17. This Act shall take effect fifteen (15) days after its publication in the *Official Gazette* or in two (2) national newspapers of general circulation.

Approved,

PROSPERO C. NOGRALES
Speaker of the House of Representatives

MANNY VILLAR
President of the Senate

This Act which is a consolidation of Senate Bill No. 2553 and House Bill No. 4115 was finally passed by the Senate and the House of Representatives on October 6, 2008 and October 8, 2008, respectively.

MARILYN B. BARUA-YAP
Secretary General
House of Representatives

EMMA LIRIO-REYES
Secretary of the Senate

Approved: DEC 19 2008

GLORIA MACAPAGAL-ARROYO
President of the Philippines

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LIST OF ABBREVIATIONS AND ACRONYMS

AC	Alternating Current
AFFF	Aqueous Film Forming Foam
AFSS	Automatic Fire Suppression System
AGDB	Authorized Government Depository Bank
AGSB	Authorized Government Servicing Bank
AIR	After Inspection Report
ASA	Australia Standards Association
ASHRAE	American Society of Heating and Refrigerating and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASSS	Approved, Supervised Sprinkler System
ASTM	American Society for Testing and Materials
BCVs	Backflow Check Valves
BFP	Bureau of Fire Protection
BJMP	Bureau of Jail Management and Penology
BPLO	Business Processing and Licensing Office
BPO	Business Process Outsourcing
C/MFM	City/Municipal Fire Marshal
CAAP	Civil Aviation Authority of the Philippines
CAF	Compressed Air Foam
CCTV	Closed-Circuit Television
CE or CEN	European Committee for Standardization
CFRS	Consumer Fireworks Retail Sales
CHED	Commission on Higher Education
CNG	Compressed Natural Gases
COA	Commission on Audit
COC	Certificate of Competency
CRO	Customer Relations Officer
DBD	Design Basis Document
DC	Direct Current
DENR	Department of Environment and Natural Resources
DepEd	Department of Education
DICT	Department of Information Communication and Technology
DIFFS	Deck Integrated Foam Firefighting System
DILG	Department of Interior and Local Government
DOE	Department of Energy
DOH	Department of Health
DOLE	Department of Labor and Employment
DOTr	Department of Transportation
DTI	Department of Trade and Industry
EER	Evacuation Escape and Rescue
EPSS	Emergency Power Supply System
ESD	Emergency Shutdown
ESVs	Emergency Shutoff Valves
FFFP	Film Forming Fluoro-Protein
FM	Factory Manual, Incorporated
FPA	Fertilizer and Pesticide Authority
FSCP	Fire Alarm Control Panel
FSC	Fire Safety Clearance
FSCCR	Fire Safety Compliance and Commissioning Report
FSCR	Fire Safety Compliance Report

FSCS	Firefighters' Smoke-Control Station
FSEC	Fire Safety Evaluation Clearance
FSES/U	Fire Safety Enforcement Section/Unit
FSI	Fire Safety Inspector
FSIC	Fire Safety Inspection Certificate
FSMR	Fire Safety Maintenance Report
FVO	Fire Volunteer Organization
GHS	Global Harmonized System Classification and Labeling of Chemicals
GLS	Gas Leak Sensor
GLDS	Gas Leak Detection System
GRP	Glass Reinforced Plastic
HLO	Helicopter Landing Officer
HMIS	Hazardous Materials Identification Systems
HPG	Highway Patrol Group
IDLH	Immediately Dangerous to Life and Health
IEC	International Electrotechnical Commission
IO	Inspection Order
IRR	Implementing Rules and Regulations
IT	Information Technology
JIS or JISC	Japan Industrial Standard Committee
KFI	Korea Fire Industry Technology Institute
LE/FL	Lower Explosive/Flammability Limit
LFL	Lower Flammable Limit
LGU	Local Government Unit
LNG	Liquefied Natural Gases
LNG	Liquefied Natural Gas
LPC or LPCB	Loss Prevention Certification Board
LPG	Liquefied Petroleum Gas
LTO	Land Transportation Office
MAQ	Maximum Allowable Quantity
MAWP	Maximum Allowable Working Pressure
MCC	Motor Control Center
MDPE	Medium Density Poly Ethylene
MEC	Minimum Explosive Concentration
MGB	Mines and Geosciences Bureau
MSDS	Material Safety Data Sheet
NBI	National Bureau of Investigation
NCA	Notice of Cash Allocation
NEMA	National Electrical Manufacturers Association
NHCP	National Historical Commission of the Philippines
NOD	Notice of Disapproval
NTC	Notice to Comply
NTCV	Notice to Correct Violation
NUI	Normally Unmanned Installation
OBO	Office of the Building Official
OEM	Original Equipment Manufacturers
OPS	Order of Payment Slip
PAI	Permit Authorizing Individual
PCG	Philippine Coast Guard
PEL	Permissible Exposure Limit
PEZA	Philippine Economic Zone Authority
PFP	Passive Fire Protection

PNP	Philippine National Police
PNRI	Philippine Nuclear Research Institute
PPA	Philippine Port Authority
PPE	Personal Protective Equipment
PSM	Process Safety Management
PV	Photovoltaic
RA	Republic Act
REE	Registered Electrical Engineer
RIRR	Revised Implementing Rules and Regulations
RFF	Residential Fueling Facility
SARO	Special Allotment Release Order
SDS	Safety Data Sheet
SILG	Secretary of Interior and Local Government
TESDA	Technical Education Skills Development Authority
TR	Temporary Refuge
UE/FL	Upper Explosive/Flammability Limit
UL	Underwriters Laboratories
UL 1975	Fire Tests for Foamed Plastics Used for Decorative Purpose
VFA	Vehicle Fueling Appliances

REFERRAL CODES AND STANDARDS

ANSI, American National Standards Institute

ANSI/ASME B31.3, *Chemical Plant and Petroleum Refinery Piping*

ANSI/IAS NGV1, *Standard for Compressed Natural Gas Vehicle (NGV) Fueling Connection Devices*

ANSI/IIAR 7, *Developing Operating Procedures for Closed-Circuit Ammonia Mechanical Refrigerating Systems*

ANSI/UL 296A, *Standard for Waste Oil-Burning Air-Heating Appliances*

ANSI/UL 790, *Standard for Standard Test Methods for Fire Tests of Roof Coverings*

API RP 2003, *Protection Against Ignitions Arising Out of Static, Lightning, and Stray Currents*

ASTM E 108, *Standard Test Methods for Fire Tests of Roof Covering*

ASME A17.1, *Safety Code for Elevators and Escalators*

ASTM D 3699, *Standard Specification for Kerosene*

ASTM D 396, *Standard Specification for Fuel Oils*

ASTM D 6448, *Industrial Burner Fuels from Used Lube Oils*

ASTM D 6751, *Standard Specification for Biodiesel Fuel Blend Stock (B100) for Middle Distillate Fuel*

ASTM D 6823, *Commercial Burner Fuels from Used Lube Oils*

ASTM D 92, *Standard Test Method for Flash and Fire Points by Cleveland Open Cup*

ASTM E 108, *Standard Test Methods for Fire Tests of Roof Coverings*

ASTM E 119, *Standard Test Methods for Fire Tests of Building Construction and Materials*

ASTM E 2393, *Standard Practice for On-Site Inspection of Installed Fire Resistive Joint Systems and Perimeter Fire Barriers*

CE or CEN, *European Committee for Standardization*

DENR Administrative No. 2000-02, *Chemical Control Order for Asbestos*

IEC, *International Electrotechnical Commission*

IEC TR 61400-24, *Wind Turbine Generator Systems—Part 24, Lightning Protection*

IMC, *International Mechanical Code*

NFPA 1, *Fire Code*

NFPA 11, *Standard for Low-, Medium-, and High-Expansion Foam Systems*

NFPA 12, *Standard on Carbon Dioxide Extinguishing Systems*

NFPA 13, *Standard for the Installation of Sprinkler Systems*

NFPA 13R, *Standard for the Installation of Sprinkler Systems Low Rise Residential Occupancies*

NFPA 14, *Standard for the Installation of Standpipe, Private Hydrant and Hose Systems*

NFPA 15, *Standard for Water Spray Fixed Systems for Fire Protection*

NFPA 16, *Standard for the Installation of Foam-Water Sprinkler and Foam-Water Spray Systems*

NFPA 17, *Standard for Dry Chemical Extinguishing Systems*

NFPA 17 A, *Standard for Wet Chemicals Extinguishing System*

NFPA 20, *Standard for the Installation of Stationary Pumps for Fire Protection*

NFPA 22, *Standard for Water Tansk for Private Fire Protection*

NFPA 25, *Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems*

NFPA 30, *Flammable and Combustible Liquids Code*

NFPA 31, *Standard for the Installation of Oil-Burning Equipment*

NFPA 33, *Standard for Spray Application Using Flammable or Combustible Materials*

NFPA 34, *Standard for Dipping, Coating, and Printing Processes Using Flammable or Combustible Liquids*

NFPA 35, *Standard for the Manufacture of Organic Coatings*

NFPA 37, *Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines*

NFPA 45, *Standard on Fire Protection for Laboratories Using Chemicals*

NFPA 50A, *Standard for Gaseous Hydrogen Systems at Consumer Sites*

NFPA 51, *Standard for the Design and Installation of Oxygen-Fuel Gas Systems for Welding, Cutting, and Allied Processes*

NFPA 51A, *Standard for Acetylene Cylinder Charging Plants*

NFPA 51B, *Standard for Fire Prevention during Welding, Cutting, and Other Hot Work*

NFPA 52, *Vehicular Fuel Systems Code*

NFPA 54, *National Fuel Gas Code*

NFPA 55, *Standard for the Storage, Use, and Handling of Compressed and Liquefied Gases in Portable Cylinders*

NFPA 58, *Liquefied Petroleum Gas Code*

NFPA 59A, *Standard for the Production, Storage, and Handling of Liquefied Natural Gas*

NFPA 68, *Explosion Venting*

NFPA 69, *Standard on Explosion Prevention Systems*

NFPA 72, *National Fire Alarm and Signaling Code*

NFPA 76, *Standard for the Fire Protection of Telecommunications Facilities*

NFPA 77, *Recommended Practice on Static Electricity*

NFPA 80, *Standard for Fire Doors and Fire Windows*

NFPA 86, *Standard for Ovens and Furnaces*

NFPA 90A, *Standard for the Installation of Air-Conditioning and Ventilating Systems*

NFPA 90B, *Standard for the Installation of Warm Air Heating and Air-Conditioning Systems*

NFPA 91, *Standard for Exhaust Systems for Air Conveying of Vapors, Gases, Mists, and Particulate Solids*

NFPA 92, *Standard for Smoke Control Systems*

NFPA 96, *Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations*

NFPA 99, *Standard for Health Care Facilities*

NFPA 101, *Life Safety Code*

NFPA 102, *Standard for Grandstands, Folding and Telescopic Seating, Tents, and Membrane Structures*

NFPA 105, *Standard for the Installation of Smoke Door Assemblies and Other Opening Protectives*

NFPA 110, *Standard for Emergency and Standby Power System*

NFPA 130, *Standard for Fixed Guideway Transit and Passenger Rail Systems*

NFPA 160, *Standard for the Use of Pyrotechnics efore a Proximate Audience*

NFPA 170, *Standard for Signs and Symbols*

NFPA 204, *tandard for Smoke and Heat Venting*

NFPA 211, *Standard for Chimneys, Fireplaces, Vents, and Solid Fuel–Burning Appliances*

NFPA 220, *Standard on Types of Building Construction*

NFPA 221, *Standard for High Challenge Fire Walls, Fire Walls and Fire Barrier Walls*

NFPA 241, *Standard for Safeguarding Construction, Alteration, and Demolition Operations*

NFPA 251, *Standard Method of Test of Fire Resistance of Building Construction and Materials*

NFPA 253, *Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source*

NFPA 255 , *Method of Test of Surface Burning Characteristics of Building Materials*

NFPA 259, *Standard Test Method for Potential Heat of Building Materials*

NFPA 289, *Standard Method of Fire Test for Individual Fuel Packages*

NFPA 385, *Standard for Tank Vehicles for Flammable and Combustible Liquid*

NFPA 395, *Standard for the Storage of Flammable and Combustible Liquids at Farms and Isolated Sites*

NFPA 400, *Hazardous Materials Code*

NFPA 407, *Aircraft Fuel Servicing Tank Vehicles*

NFPA 409, *Standards for Aircraft Hangars*

NFPA 430, *Code for the Storage of Liquid and Solid Oxidizers*

NFPA 432, *Code for the Storage of Organic Peroxide Formulations*

NFPA 490, *Code for the Storage of Ammonium Nitrate*

NFPA 495, *Explosive Materials Code*

NFPA 502, *Standard for Road Tunnels, Bridges, and Other Limited Access Highways*

NFPA 505, *Fire Safety Standard for Powered Industrial Trucks Including Type Designations, Areas of Use, Conversions, Maintenance, and Operations*

NFPA 654, *Standard for the Prevention of Fires for Dust Explosions from the Manufacturing, processing, and Handling of Combustible Particular Solids*

NFPA 664, *Standard for the Prevention of Fires and Explosions in Wood Processing and Woodworking Facilities*

NFPA 701, *Standard Methods of Fire Tests for Flame Propagation of Textiles and Films*

NFPA 703, *Standard for Fire Retardant-treated wood and Fire Retardant Coatings for Building Materials*

NFPA 704, *Standard System for the Identification of the Hazards of Materials for Emergency Response*

NFPA 750, *Standard on Water Mist Fire Protection Systems*

NFPA 780, *Standard for the Installation of Lightning Protection Systems*

NFPA 801, *Standard for Fire Protection for Facilities Handling Radioactive Materials*

NFPA 850, *Recommended Practice for Fire Protection for Electric Generating Plants and High Voltage Direct Current Converter Stations*

NFPA 914, *Code for Fire Protection of Historic Structures*

NFPA 1124, *Code for the Manufacture, Transportation, Storage, and Retail Sales of Fireworks and Pyrotechnic*

NFPA 1126, *Standard for the Use of Pyrotechnics Before a Proximate Audience*

NFPA 1963, *Standard for Fire Hose Connections*

NFPA 2001, *Standard on Clean Agent Fire Extinguishing Systems*

NFPA 5000, *Building Construction and Safety Code*

PD 1096 / NBCP, *National Building Code of the Philippines*

PD 1866, *Codifying The Laws on Illegal/Unlawful Possession, Manufacture, Dealing in, Acquisition or Disposition of Firearms, Ammunition or Explosives or Instruments Used in the Manufacture of Firearms, Ammunition or Explosives, and Imposing Stiffer Penalties for Certain Violations Thereof and for Relevant Purposes and its Rules and Regulations*

PEC, *Philippine Electrical Code*

Philippine Electronics Code

PMEC, *Philippine Mechanical Engineering Code*

PNS, *Philippine National Standard*

RA 6969, *Toxic Substances and Hazardous and Nuclear Wastes Control Act of 1990*

RA 6975, *Department of the Interior and Local Government Act of 1990*

RA 7183, *An Act Regulating the Sale, Manufacture, Distribution and Use of Firecrackers and other Pyrotechnic Devices, as Amended*

RA 8749, *Clean Air Act of 1999*

RA 9184, *Government Procurement Reform Act of 2003*

RA 9292, *Electronics Engineering Act of 2004*

RA 9263, *Bureau of Fire Protection and Bureau of Jail Management and Penology Professionalization Act of 2004*

UL 1975, *Fire Tests for Foamed Plastics Used for Decorative Purpose*

UL 263, *Standard for Fire Tests of Building Construction and Material*

UL 790, *Tests for Fire Resistance of Roof Covering Materials*

REVISED IMPLEMENTING RULES AND REGULATIONS (RIRR) OF REPUBLIC ACT NO. 9514, OTHERWISE KNOWN AS THE FIRE CODE OF THE PHILIPPINES OF 2008

Pursuant to the provision of Section 14, in relation to Section 5 of Republic Act No. 9514, entitled "AN ACT ESTABLISHING A COMPREHENSIVE FIRE CODE OF THE PHILIPPINES, REPEALING PRESIDENTIAL DECREE NO. 1185, AND FOR OTHER PURPOSES," the following Rules and Regulations are hereby adopted in order to carry out the provisions of this Code.

RULE 1. INTERPRETATION

This RIRR shall be interpreted in light of the Declaration of Policy found in Section 2 of this Code:

> "It is the policy of the State to ensure public safety, promote economic development through the prevention and suppression of all kinds of destructive fires, and promote the professionalization of the Fire Service as a profession. Towards this end, the State shall enforce all laws, rules and regulations to ensure adherence to standard fire prevention and safety measures, and promote accountability in the fire protection and prevention service."

RULE 2. COVERAGE

This RIRR shall cover the following:

A. All persons, either natural or juridical;

B. All buildings, facilities or structures and their premises, erected or constructed before and after the effectivity hereof;

C. Design and installation of mechanical, electronics and electrical systems relative to fire protection;

D. Manufacturing, storage, handling and/or use, and transportation of explosives and/or combustible/flammable liquids and gases, toxic and other hazardous materials and operations, and their wastes;

E. Fire safety planning, design, construction, repair, maintenance, rehabilitation and demolition;

F. Fire protective and warning equipment or systems;

G. All land transportation vehicles and equipment, ships or vessels docked at piers or wharves or anchored in seaports; and

H. Petroleum industry installations.

RULE 3. DEFINITION OF TERMS

For purposes of this RIRR, the following terms, words and phrases shall mean or be understood as follows:

Abatement. Any act that would remove or neutralize a fire hazard.

Aerodrome. Any place where flight operations (takeoff, landing and maintenance of civil aircrafts) can take place.

Aircraft Engine. Any engine used, or intended to be used, for the propulsion of an aircraft. This includes all parts, appurtenances, and accessories thereof other than propellers.

Aircraft. Any machine that is able to fly by gaining support from the air. It counters the force of gravity by using either static lift or by using the dynamic lift of an airfoil.

Airfoil. The basic form of the wings, fins, and horizontal stabilizer of most aircraft.

Airport. A complex of runways and buildings for the takeoff, landing, and maintenance of civil aircraft with facilities for passengers.

Alternative and/or Remedial Fire Safety Measures. Set of fire safety rules, regulations, and standards specifically applied to existing public or private buildings, structures or facilities and their premises or portion thereof constructed or erected prior to the implementation of RA 9514, where compliance with the fire safety requirements as specified in the RIRR of RA 9514 will compromise the structural stability/integrity of the said buildings, facilities or structures.

Apartment Building. A building containing three (3) or more living units with independent cooking and bathroom facilities, whether designated as condominium, row house, apartment house, tenement, or by any other name.

Approved. Acceptable to the authority having jurisdiction.

Approved Supervised Sprinkler System (ASSS). An integrated network of hydraulically designed piping system installed in a building, structure or facility with outlets arranged in a systematic pattern. It automatically discharges water when activated by heat or combustion products of fire.

Authorized Government Depository Bank (AGDB) or Authorized Government Servicing Bank (AGSB). Government servicing banks such as Land Bank of the Philippines (LBP), Development Bank of the Philippines (DBP), United Coconut Planters Bank (UCPB), and Philippine Veterans Bank (PVB), wherein Fire Code revenues are deposited for subsequent remittance to the Bureau of Treasury (BTr).

Automatic Fire Suppression System (AFSS). An integrated system of underground or overhead piping connected to a source of extinguishing agent or medium, designed in accordance with fire protection engineering standards to include, but not limited to Automatic Fire Sprinkler System which when actuated by its automatic detecting device suppresses fire within the area protected even without human intervention.

Automotive Service Station. That portion of property where liquids used as motor fuels are stored and dispensed from fixed equipment into the fuel tanks of motor vehicles and shall include any facilities available for the sale and service of tires, batteries and accessories, and for minor automotive maintenance work.

Baffle. A non liquid-tight transverse partition in a cargo tank.

Bale. A large bundle or package of hay or a raw material such as cotton, tightly bound with string or wire to keep it in shape during transportation or storage.

Blasting Agent. Any material or mixture consisting of a fuel and oxidizer used to set off explosives.

Blowout. A sudden release of oil and gas from a well.

Boiling point. The temperature at which the vapor pressure of a liquid equals the pressure surrounding the liquid, and the liquid changes into a vapor.

Brush. Land covered with a dense undergrowth of small trees and brushes.

Building. Any structure built for the support, shelter, or enclosure of persons, animals, chattels, or property of any kind.

Building Administrator. Any person who is authorized to act as an agent or representative of the owner of the building and performs duties and responsibilities necessary for the effective management, maintenance, and proper use of said building.

Bulk Oxygen System. An assembly of equipment, such as oxygen storage containers, pressure regulators, safety devices, vaporizers, manifolds, and interconnecting piping, for supplying a regulated flow of oxygen to a pipeline.

Bulk Plant. Portion of a property where liquids are received by tank vessel, pipelines, tank cars, or tank vehicle, and are stored or blended in bulk for the purpose of distributing such liquids by tank vessels, pipeline, tank car, tank vehicle, portable tank or container.

Bulkhead. A liquid-tight closure between compartments of a cargo tank.

Cargo Tank. Any tank having a liquid capacity more than four hundred fifty liters (450L) used for carrying flammable and combustible liquids and mounted permanently or otherwise upon a tank vehicle. The term "cargo tank" does not apply to any container used solely for the purpose of supplying fuel for the propulsion of the tank vehicle upon which it is mounted.

Cathodic Protection. A technique to resist corrosion o a metal surface by making the surface cathode of an electrochemical cell.

Cellulose Nitrate or Nitro Cellulose. A highly combustible and explosive compound produced by the reaction of nitric acid with a cellulose material.

Cellulose Nitrate Plastic (Pyroxylin). Any plastic substance, materials or compound having cellulose nitrate (nitro cellulose) as base.

City/Municipal Fire Marshal (C/MFM). The duly designated head of the City or Municipal Fire Station including those designated as "Officer-in-Charge" or in "Acting" capacity. This shall also apply to highly urbanized Cities and Stations where by its approved organization the head is the District Fire Marshal or Station Commander as the case may be.

Chemical Plant. A large integrated plant or that portion of such plant other than a refinery or distillery where flammable or combustible liquids are produced by chemical reactions or used in chemical reactions.

Closed Container. Any container so sealed by means of a lid or other device that neither liquid nor vapor will escape from it at ordinary temperatures.

Collecting Officer. An accountable officer responsible in the collection, deposit and remittance of Fire Code revenues from all Fire Code taxes, fees/charges and fines with AGDB or AGSB.

Combustible Fiber. Any readily ignitable and free-burning fibers, such as but not limited, to cocoa fiber, cotton, excelsior, hay, hemp, henequen, istle, jute, kapok, oakum, rags, sisal, Spanish moss, straw, tow, waste cloth, waste paper, certain synthetic fibers commonly used in commerce, or any material in a fibrous or shredded form that will readily ignite when heat sources are present.

Combustible Liquid. Any liquid having a flash point at or above thirty-seven and eight tenths degrees Celsius (37.8 °C), and classified as follows:

Class II Liquid. Any liquid that has a flash point at or above thirty-seven and eight tenths degrees Celsius (37.8 °C) and below sixty degrees Celsius (60 °C).

Class IIIA Liquid. Any liquid that has a flash point at or above sixty degrees Celsius (60 °C), but below ninety-three degrees Celsius (93 °C).

Class IIIB Liquid. Any liquid that has a flash point at or above ninety-three degrees Celsius (93 °C).

Combustible Waste. Also known as loose waste material, are those generated by an establishment or process and, being salvageable, are retained for scrap or reprocessing on the premises where generated. These include, but not limited to, all combustible fibers, hay, straw, hair, feathers, down, wood shavings, turnings, styrofoam, all types of plastics, all types of paper products, soiled cloth trimmings and cuttings, rubber trimmings and buffing, metal fines, used oil and any mixture of the above items, or any other salvageable combustible waste material.

Common Atmosphere. A common atmosphere exists between rooms, spaces or area within a building, which are not separated by an approved smoke partition.

Compressed Air Foam (CAF). A homogeneous foam produced by the combination of water, foam concentrate, and air or nitrogen under pressure.

Compressed Gas. One that exists solely in the gaseous state under pressure in the range of two hundred seventy-three kilopascals (273 kPa) to twenty-four thousand nine hundred twenty-three kilopascals (24,923 kPa) at all normal atmospheric temperature ranging from twenty degrees Celsius (20 °C) to thirty-seven and eight tenths degrees Celsius (37.8 °C) inside its container.

Compressed Gas Container. A pressure container designed to hold compressed gases at pressures greater than one (1) atmosphere at twenty degrees Celsius (20 °C).

Compressed Gas System. An assembly of components, such as containers, reactors, pumps, compressors and connecting piping and tubing, designed to contain, distribute or transport compressed gases.

Concourse. A large open passageway in a public building, such as in a rail station or airport terminal that people meet in or pass through.

Container. Any vessel of less than two hundred twenty-seven liters (227 L) capacity used for transporting or storing liquids.

Control Area. A building or portion of a building or outdoor area within which hazardous materials are allowed to be stored, dispensed, used or handled in quantities not exceeding the maximum allowable quantities (MAQ).

Conservation. All the processes and measures of maintaining the cultural significance or value of a cultural heritage or property, including but not limited to, preservation, restoration, reconstruction, protection, adaptation, documentation, examination, research, treatment, education, or any combination thereof.

Corrosive Liquid. Any liquid which causes fire when in contact with organic matter or with certain chemicals.

Crude Oil. Any naturally-occurring, unrefined petroleum liquid.

Cryogenic. Any material which, by its nature or as a result of its reaction with other elements, produces a rapid drop in temperature of the immediate surroundings.

Cryogenic Container. A pressure or low-pressure or atmospheric container of any size designed or used for the transportation, handling or storage of a cryogenic fluid, and which utilizes venting, insulation, refrigeration or a combination thereof to maintain the pressure within the design parameters for such container and to keep the contents in a liquid state.

Cryogenic Fluids. Fluids produced or stored at very low temperatures and that have normal boiling point below negative fifty-five degrees Celsius (-55 °C).

Cryogenic Inground Container. A container in which the maximum liquid level is below the normal surrounding grade and is constructed of natural materials, such as earth and rock and pendent upon the freezing of water-saturated earth materials for its tightness or impervious nature.

Curtain Board. A vertical panel of non-combustible or fire resistive materials attached to and extending below the bottom chord of the roof trusses to divide the underside of the roof into separate compartments so that heat and smoke will be directed upwards to a roof vent.

Customer Relations Officer (CRO). An organic member of the BFP who is tasked to attend to the immediate needs and concerns of the customer, applicant or any taxpayer transacting business with a unit/station/office.

Damper. A device used in heating, ventilating and air conditioning (HVAC) ducts to prevent the spread of fire or smoke inside the ductwork. It automatically closes upon detection of heat and smoke. They can be opened or closed from a remote fire command station if required.

Fire Damper. A device used to interrupt migratory airflow, resist the passage of flame, and maintain the integrity of the fire rated separation. Its primary function is to prevent the passage of flame from one side of a fire-rated separation to the other, upon detection of flame via duct temperature.

Smoke Damper. A device used to prevent the passage of smoke from one side of a fire-rated separation to the other, upon detection of smoke via smoke detector.

Combination Fire and Smoke Damper. A device that meets both the heat and smoke damper requirements where a wall, floor, or ceiling is required to have both a fire damper and smoke damper.

Derrick. A framework that is constructed over a mine or oil well for the purpose of boring or lowering pipes.

Detearing. A process for rapidly removing excess wet coating material from a dipped or coated object or material by passing it through an electrostatic field.

Dip Tank. A tank, vat or container of flammable or combustible liquid in which articles or materials are immersed for purposes of coating, finishing, treating, or similar processes.

Dispensing Device. An equipment used to deliver petroleum products such as gasoline, diesel and kerosene: installed in a fore court/curve area within the retail outlet. Dispensing device can either be a self-contained or with a remote/submersible pump.

Distillation. The process of first raising the temperature to separate the more volatile from the less volatile parts, and then cooling and condensing the resulting vapor so as to produce a nearly purified substance.

Distillery. A plant or that portion where liquids produced by fermentation and distillation are concentrated, and where the concentrated products may also be mixed, stored, or packaged.

Dormitories. Buildings where group sleeping accommodation are provided for persons, not members of the same family group in one room or in series of closely associated room under joint occupancy and single management, as in college dormitories, convents, fraternity houses, military barracks, and the like.

Drum. A container which has a total capacity of two hundred twenty-seven liters (227 L) used in storing liquid.

Dry Standpipe. A type of standpipe system in which the pipes are normally not filled with water. Water is introduced into the system thru Fire Service connections when needed.

Duct System. A continuous passageway for the transmission of air.

Dust. Any finely divided solid, four millimeters (4 mm) or less in diameter (that is, material capable

of passing through a U.S. No. 40 standard sieve) which, if mixed with air in proper proportion, becomes explosive and may be ignited by a flame, spark or other source of ignition.

Electrical Arc. An extremely hot luminous bridge formed by the passage of an electric current across a space between two conductors or terminals.

Electrostatic Fluidized Bed. A container holding powder coating material that is aerated from below so as to form an air-supported and expanded cloud of such material that is electrically charged with a charge opposite to that of the object to be coated. Such object is transported through a container immediately above the charged and aerated materials in order to be coated.

Ember. A hot piece or lump that remains after a material has partially burned, and is still oxidizing without the manifestation of flames.

Enclosed Platform. A partially enclosed portion of an assembly room the ceiling of which is not more than one and fifty-five hundredths meters (1.55 m) above the proscenium opening of which is designed or used for the presentation of plays, demonstrations, or other entertainment wherein scenery, drops, decorations or other effects may be installed or used.

Explosive. Any chemical compound or mechanical mixture that is commonly used or intended for the purpose of producing an explosion.

Exit. That portion of means of egress that is separated from all other spaces of a building or structure by construction, location, or equipment as required to provide a protected way of travel to the exit discharge.

Exit Access. That portion of means of egress that leads to an exit.

Exit Discharge. That portion of a means of egress between the termination of an exit and a public way.

Finishes. Materials used as final coating of a surface for ornamental or protective purposes.

Fire. The active principle of burning, characterized by the heat and light of combustion.

- ***Class A Fire.*** Fires involving ordinary combustible materials such as wood, cloth, rubber and plastics.
- ***Class B Fire.*** Fires involving flammable liquids and gases.
- ***Class C Fire.*** Fires involving energized electrical equipment.
- ***Class D Fire.*** Fires involving combustible materials, such as sodium, magnesium, potassium, and other similar materials.
- ***Class K Fire.*** Fires in cooking appliances that involve combustible cooking media (vegetable or animal oils and fats).

Fire Alarm. Any visual or audible signal produced by a device or system to warn the occupants of the building or firefighting elements of the presence or danger of fire.

Fire Alerting System. A fire alarm system activated by the presence of fire, where the signal is transmitted to designated locations instead of sounding a general alarm.

Fire Area. The aggregate floor area enclosed and bounded by fire walls, fire barriers, exterior walls or fire resistance-rated horizontal assemblies of a building.

Fire Barrier. A continuous membrane or a membrane with discontinuities created by protected openings with a specified fire protection rating, where such membrane is designed and constructed with a specified fire resistance rating to limit the spread of fire, that also restricts the movement of smoke.

Fire Barrier Wall. Interior wall that extends from floor to floor or floor to roof, including concealed and interstitial spaces. They are designed to sub-divide portions of the building, and can be supported by structures, such as roofs, columns or floors. All support structures should have a fire-resistance rating no less than that of the fire barrier they support. Fire barriers restrict the initial flow of heat within the area of origin, which provides building occupants with adequate time to evacuate to safe areas. These walls shall have at least three (3) hours fire resistance rating.

Fire Brigade. A collective term that refers to a group of firefighters, primarily performing fire suppression activities in specified areas such as, but not limited to, community/barangay, company, and other government and non-government establishments.

Fire Code Fees/Charges. Charges for regulation, inspection and other Fire Service activities in the enforcement of RA 9514 and its RIRR.

Fire Code Fines. Amount imposed for violators of RA 9514 and its RIRR.

Fire Code Fee Collection/Revenues. Collective income derived from the collection of Fire Code taxes, fees/charges and fines.

Fire Code Taxes. Taxes prescribed in para A.1 through A.6 of Section 12.0.0.2 of this RIRR.

Fire Compartment. A space within a building that is enclosed by fire barriers on all sides, including the top and bottom.

Fire Department Access Road. The road or other means developed to allow access and operational setup for firefighting and rescue apparatus.

Fire Detection and Alarm System. A system that detects fire at the earliest stage, and gives an alarm to alert the occupants so that appropriate action can be taken.

Fire Door. A fire resistive door prescribed for openings in fire separation walls or partitions.

Fire Exit Drill. A practice drill for the orderly and safe evacuation of occupants in the buildings.

Fire Hazard. Any condition or act which increases or may cause an increase in the probability of the occurrence of fire, or which may obstruct, delay, hinder or interfere with firefighting operations and the safeguarding of life and property.

Fire Lane. The portion of a roadway or public way that should be kept open and unobstructed at all times for the expedient conduct of firefighting operations.

Fire Protective and Fire Safety Device. Any device intended for the protection of buildings or persons to include, but not limited to, built-in protection system such as sprinklers and other automatic extinguishing system, detectors for heat, smoke and combustion products, and other warning system components, personal protective equipment such as fire blankets, helmets, fire suits, gloves and other garments that may be put on or worn by persons to protect themselves during fire.

Fire Protective Assembly. An assembly incorporated in the structure designed to prevent the spread of fire, such as dampers, curtain boards, fire stoppers and the like.

Fire Resistance Rating. The duration that a material or construction can withstand the effect of a standard fire test.

Fire Safety Compliance Report (FSCR). A written report composed of plans, specifications and design analysis per building prepared by its Engineer/Architect-of-Record and Fire Safety Practitioner.

Fire Safety Compliance and Commissioning Report (FSCCR). A compilation report of all approved submittals, test and acceptance forms of all fire protection and life safety features, which shall form part of the "as-built" documents turned over by the contractor to the building owner.

Fire Safety Construction. Refers to the design and installation of walls, barriers, doors, windows, vents, means of egress and other elements integral to and incorporated into a building or structure in order to minimize danger to life from fire, smoke, fumes or panic before the building is evacuated. These features are also designed to achieve, among others, safe and rapid evacuation of people and properties through means of egress on construction, which are sealed from smoke or fire; and confinement of fire or smoke in the room or floor of origin and delay their spread to other parts of the building by means of smoke-sealed and fire resistant doors, walls and floors. It shall also mean to include the treatment of building components or contents with flame retardant chemicals.

Fire Safety Evaluation Clearance (FSEC). A document issued by the BFP as a prerequisite for the grant of Building Permit by the Office of Building Official having jurisdiction upon determination that the evaluated plans are compliant with RA 9514 and its RIRR.

Fire Safety Inspector (FSI). A uniformed/non-uniformed personnel of the BFP responsible for fire safety inspection and assessment of fire hazards, and whose function, duties and responsibilities are defined under Division 1, Chapter 2, Rule 8 of this RIRR.

Fire Safety Inspection Certificate (FSIC). A document issued by the BFP as a prerequisite for the grant of Certificate of Occupancy, Business Permit, Certificate of Annual Inspection from PEZA and other licenses and permits being issued by other government agencies upon determining that the required fire safety construction are in place, and fire protective and/or warning systems are properly installed in accordance with the approved plans and specifications and in compliance with RA 9514 and its RIRR.

Fire Safety Maintenance Report (FSMR). A written report prepared by the building owner, his/her fire safety practitioner or authorized representative. This is a compilation of the maintenance

and testing records kept by the building's engineering and maintenance department, as a prerequisite for the issuance of FSIC for Business or Mayor's Permit renewal, Certificate of Annual Inspection, Permit to Operate, PHILHEALTH Accreditation for Hospitals, DOH License to Operate and other permits or licenses being issued by other government agencies.

Fire Safety Practitioner. Any qualified person, recognized by the BFP, engaged in, but not limited to, the design, construction, installation, repair and maintenance, assessment, and rehabilitation of fire safety construction, suppression and control systems, protective and warning systems and life safety related services, or employed as a safety officer of public and private establishments/companies.

Fire Trap. A building unsafe in case of fire because it will burn easily or because it lacks adequate exits or fire escapes.

Fire Volunteer Organization (FVO). An organized group of private firefighters recognized by the BFP, who have voluntarily formed themselves to perform fire-related activities.

Fire Volunteer. A person who voluntarily enters into firefighting service through a Fire Volunteer Organization (FVO) and undergoes the same discipline as that of BFP firefighters.

Fire Wall. An exterior wall designed to prevent the spread of fire, having a fire resistance rating of not less than four (4) hours with sufficient structural stability to remain standing even if construction on either side collapses under fire condition. Fire walls particularly erected above or along property lines shall have absolutely no openings and shall extend above the roof to one meter (1 m).

Fixed Guideway Transit System. An electrified transportation system, utilizing a fixed guideway, operating on right-of-way for the mass movement of passengers within a metropolitan area, and consisting of its fixed guideways, transit vehicles, and other rolling stock; power systems; buildings; stations; and other stationary and movable apparatus, equipment, appurtenances, and structures.

Flame Retardant. Any compound or mixture which when applied properly improves the resistivity or fire resistance quality of fabrics and other materials.

Flame Spread Rating. The time in which flame will spread over the surface of a burning material.

Flammability. The characteristic of a material on how easily it will burn or ignite, causing fire or combustion.

Flammable Cryogenic Fluids. Cryogenic fluids which are flammable in their vapor state.

Flammable Finishes. Material coatings in which the material being applied is a flammable liquid, combustible liquid, combustible powder, or flammable or combustible gel coating.

Flammable Liquids. Liquids having flash points below thirty-seven and eight tenths degrees Celsius (37.8 °C), except any mixture having components with flash points of thirty-seven and eight tenths degrees Celsius (37.8 °C) or higher, the total of which make up ninety-nine percent (99%) or more of the total volume of the mixture. Flammable liquids are classified as follows:

Class IA Liquid. Liquid having flash points below twenty-two and eight tenths degrees Celsius (22.8 °C), and having a boiling point below thirty-seven and eight tenths degrees Celsius (37.8 °C).

Class IB Liquid. Liquid having flash points below twenty-two and eight tenths degrees Celsius (22.8 °C), and having a boiling point at or above thirty-seven and eight tenths degrees Celsius (37.8 °C).

Class IC Liquids. Liquid having flash points at or above twenty-two and eight tenths degrees Celsius (22.8 °C), and below thirty-seven and eight tenths degrees Celsius (37.8 °C).

Flammable Vapor Area. An area in which the concentration of flammable constituents (vapor, gas, fume, mist or dust) in air exceeds twenty-five percent (25%) of their Lower Flammable Limit (LFL) because of the flammable finish processes operation. It shall include the interior of spray booths; the interior of ducts exhausting from spraying processes; any area in the direct path or any area containing dangerous quantities of air-suspended powder, combustible residue, dust, deposits, vapor or mists as a result of spraying operations; and the area in the vicinity of dip tanks, drain boards or associated drying, conveying or other equipment during operation or shutdown periods.

Flash Point of a Liquid. The lowest temperature a liquid at which sufficient vapor is given off to form an ignitable mixture with air, near the surface of the liquid or within the vessel used.

Flexible Plan Buildings. Buildings that have movable corridor walls and movable partitions of full height construction with doors leading from rooms to corridors. Flexible plan buildings

without exit access doors between rooms and corridors shall be classified as open plan buildings.

Fogging. The creation of a cloud of ultra-fine droplets, which are airborne and readily picked up by the insect as it flies through the swathe of insecticide, fog or mist.

Forging. A process where a piece of metal is heated prior to changing its shape or dimensions.

Fluidized Bed. A container holding powder coating material that is aerated from below so as to form an air-supported expanded cloud of such material through which the preheated object to be coated is immersed and transported.

Fulminate. A kind of stable explosive compound which explodes by percussion.

Fumigant. Any substance which, by itself or in combination with any other substance, emits or liberates a gas, fume or vapor used for the destruction or control of insects, fungi, vermin, germs, rats, or other pests, and shall be distinguished from insecticides and disinfectants which are essentially effective in the solid or liquid phases. Examples are methyl bromide, ethylene dibromide, hydrogen cyanide, carbon disulphide and sulfuryl fluoride.

Fumigation. The utilization within an enclosed space of a fumigant in concentrations that are hazardous or acutely toxic to humans.

Fumigators. Persons or establishments engaged in fumigation and thermal insecticidal fogging.

Globally Harmonized System (GHS). A system developed by the United Nations that defines and classifies the hazards of chemical products, and communicates health and safety information on labels and safety data sheets.

Gross Floor Area. The floor area within the inside perimeter of the outside walls of the building under consideration with no deduction for hallways, stairs, closets, thickness of interior walls, columns, elevator and building services shafts, or other features, but excluding floor openings associated with atriums and communicating spaces.

Hangar. A large building in which aircrafts are kept or repaired.

Hazard Evaluation. Identification of potential hazards which includes risk evaluation that takes into account the likelihood of the hazard resulting in a fire or explosion.

Hazardous Fire Area. Any area covered with dry grass, cogon, reeds, brush, and other highly combustible growth or any area used for stockpiling of used or waste materials that, by virtue of exposure to environment, may cause its deterioration, decomposition or other conditions that fires are likely to occur therein and hard to suppress.

Hazardous Operation/Process. Any act of manufacturing, fabrication, conversion, or other similar operations that use or produce materials which are likely to cause fires or explosions.

Heavy Casting. Casting greater than eleven and three tenths kilograms (11.3 kg) with walls of large cross-sectional weights six and four tenths millimeters (6.4 mm). Castings less than eleven and three tenths kilograms (11.3 kg) are considered light.

Heliport. An area of land, water or a structural surface that is used or intended for landing and taking off of helicopters, and any appurtenant areas which are used or intended for use as heliport buildings and other heliport facilities.

Helistop. Same as "heliport" except that fueling, defueling, maintenance, repairs or storage of helicopters are not permitted.

High Piled Storage. Combustible materials on pallets or in racks more than four meters (4 m) high. For highly combustible materials such as rubber goods and certain plastics, the critical height of piling may be as low as two and four tenths meters (2.4 m). Buildings shall be deemed to be used for the storage of high piled combustible stock when the floor area used for such purpose exceeds either one tenth (0.1) of the total floor area, or at least two hundred thirty-two square meters (232 m^2).

High Rise Building. Building, structure or facility in which the distance between the floor of the topmost storey and the ground level is fifteen meters (15 m) or more. Building height shall be measured from the lowest level of fire department vehicle access to the floor of the highest occupiable storey.

Historic Center. Historic zone, district, core, precinct, town, legacy zones, heritage area, zone or town; a designated area with historical and other special significance, consisting of buildings or group of buildings, and their environs that collectively contribute to the area's importance and character; a place where a significant event in history occurred; any town, district or ancient settlement site with special historic and/or cultural significance. Historic centers are sometimes called living museums, outdoor museums or museum preserves whether inhabited or uninhabited, historic centers and preservation areas.

Horizontal Channel. Any uninterrupted space between horizontal layers of stored commodities. Such channels may be formed by pallets, shelves, racks or other storage arrangements.

Horizontal Exit. A passageway from one building to another, or through or around a wall in approximately the same floor level. A way of passage from one building to an area of refuge and another building on approximately the same level, or a way of passage through or around a fire barrier to an area of refuge on approximately the same level in the same building that affords safety from fire and smoke originating from the area incidence and areas communicating therein.

Hose Box. A box or cabinet where fire hoses, valves and other equipment are stored and arranged for firefighting.

Hose Reel. A cylindrical device turning on an axis around which a fire hose is wound and connected.

Hospital. A place devoted primarily to the maintenance and operation of health facilities for the diagnosis, treatment and care of individuals suffering from illness, disease, injury or deformity, or in need of obstetrical or other surgical, medical and nursing care. It shall also be constructed as any institution, building or place where there are installed beds, cribs or bassinets for twenty-four hour (24-hr) use or longer by patients in the treatment of diseases.

Hotels. Buildings or group of buildings under the same management in which there are more than fifteen (15) sleeping accommodations for hire, primarily used by transients who are lodged with or without meals, whether designated as a hotel, inn, motel, or by any other name. So-called appartelle, condotel or pension houses shall be classified as hotels, because they are potentially subject to transient occupancy like that of hotels.

Interior Room. A room whose only means of egress is through an adjoining or intervening room which is not an exit.

Interstitial. Any concealed space between the ceiling and the floor or roof above shall be fire-stopped for the full depth of the space along the line of support of the floor or roof structural members and, if necessary, at other locations to form areas not to exceed ninety-three square meters (93 m^2) for any space between the ceiling and floor, and two hundred eighty square meters (280 m^2) for any space between the ceiling and the roof.

Industrial Baking and Drying. Industrial process of subjecting materials to heat for the purpose of removing solvents or moisture from the same, and/or to fuse certain chemical salts to form a uniform glazing on the surface of materials being treated.

Jumper. Any piece of metal or an electrical conductor used to bypass a safety device in an electrical system.

Level of Exit Discharge. The lowest storey from which not less than fifty percent (50%) of the required number of exits and not less than fifty percent (50%) of the required egress capacity from such a storey discharge directly outside at grade; or the storey with the smallest elevation change needed to reach grade where no storey has fifty percent (50%) or more of the required number of exits and fifty percent (50%) or more of the required egress capacity from such a storey discharge directly outside at grade.

***Liquefied Petroleum Gas* (LPG).** A group of flammable hydrocarbon gases that are liquified through pressurization and commonly used as fuel heating appliances, cooking equipment, and vehicles. It is produced during natural gas processing and petroleum refining. LPG is more dense than air, at a relative density of 1.5219:1.

Lodging or Rooming Houses. Building in which separate sleeping rooms are rented providing sleeping accommodations for a total of fifteen (15) or less persons, on either a transient or permanent basis; with or without meals, but without separate cooking facilities for individual occupants.

Loose Fibers. Fibers that are not bundled or packaged in suitable bales.

Loose House. A separate detached building in which unbaled combustible fibers are stored.

Machinery Room. A specific room which is permanently installed and used for the operation of machineries. Closets solely contained within and opening only into a room shall be considered a part of such room.

Magnesium. A highly flammable metal which burns to over two thousand nine hundred eighty degrees Celsius (2,980 °C). It is used as a principal element of aluminum alloy for the manufacture of mobile phones, laptop computers, cameras, and other electronic components, beverage cans, flashlight photography, flares, pyrotechnics, fireworks sparklers, automotive and truck components.

Material Safety Data Sheet (MSDS). Also known as Safety Data Sheet (SDS). A form that contains data and information regarding the properties of a particular substance.

Maximum Allowable Quantity (MAQ). The quantity of hazardous material permitted in a control area.

Maximum Allowable Working Pressure (MAWP). The maximum pressure permissible at the top of a container in its operating position for a designated temperature, as established by the container manufacturer.

Means of Egress. A continuous and unobstructed route of exit from one point in a building, structure or facility to a public way consisting of three (3) distinct parts: exit, access and exit discharge.

Medical Air. A type of air product produced through the blending of compressed nitrogen and oxygen and used in variety of patients' application. It is also used during anesthesia as a substitute for nitrous oxide to reduce the high concentration of oxygen exposure.

Medical Gas. A type of gas used in medical and similar facilities, including oxygen, nitrous oxide, nitrogen, carbon dioxide, helium, medical air and mixtures of these gases.

Nacelle. A cover housing that houses all of the generating components in a wind turbine, including the generator, gearbox, drive train, and brake assembly.

Nesting. A method of securing flat-bottomed compressed gas containers upright in a tight mass using a contiguous three-point contact system whereby all containers within a group have a minimum of three points of contact with other containers, walls or bracing.

Normally Unmanned Installation (NUI). A type of automated offshore oil/gas platform designed to be primarily operated remotely, without the constant presence of personnel. These generally are characterized by their small size, often consisting of just a well bay with a helipad on top.

Nursing Home. A building or part thereof used for the lodging, boarding and nursing care, on a twenty-four hour (24-hr) basis, of four (4) more persons who, because of mental or physical incapacity, maybe unable to provide for their own needs and safety without the assistance of another person. Nursing home, wherever used in this RIRR, shall include nursing and convalescent homes, skilled nursing facilities, intermediate care facilities, and infirmaries of homes for the aged.

Occupancy. The purpose for which a building or portion thereof is used or intended to be used.

Occupant. Any person actually occupying and using a building or portions thereof by virtue of a lease contract with the owner or administrator or by permission or sufferance of the latter.

Occupant Load. The maximum number of persons that may be allowed to occupy a particular building, structure, or facility, or portions hereof.

Occupiable Storey. A portion or area in a building accessible to occupants and intended for use in accordance with occupancy classification defined under the RIRR of RA 9514. However, roof deck that is accessible to occupant(s) and is used mainly for providing maintenance on equipment/facilities installed therein shall not be counted for purposes in measuring the building height

Oil Burning Equipment. An oil burner of any type together with its tank, piping, wiring controls, blower, and related devices, and shall include all oil-fired units, heating and cooking appliances.

Open Plan Buildings. Buildings that have rooms and corridors delineated by use of tables, chairs, desks, bookcases, counters, low height partitions, or similar furnishings.

Organic Coating. A liquid mixture of binders such as alkyd, nitrocellulose, acrylic, or oil, and flammable and combustible solvents such as hydrocarbon, ester, ketene or alcohol, which when spread on a surface becomes a durable protective and decorative finish.

Organic Peroxide. A strong oxidizing organic compound which releases oxygen readily. It causes fire when in contact with combustible materials especially under conditions of high temperature.

Overloading. The use of one (1) or more electrical appliances or devices which draw or consume electrical current beyond the designed capacity of the existing electrical system.

Owner. The person who holds the legal right of possession or title to a building or real property.

Oxidizing Material. A material that readily yields oxygen in quantities sufficient to stimulate or support combustion.

Ozone Depleting Substance/Refrigerant. Any group of halogenated hydrocarbon chemicals which photochemically reacts in the stratosphere in a way which destroys the ozone layer.

Panic Hardware. A mechanical device consisting of linkages and horizontal bars across a door, which when pushed from the inside will cause the door to open and facilitates exit from the building, structure or facility.

Passenger Rail System. A transportation system, utilizing a rail guideway, operating on right-of-way for the movement of passengers within and between metropolitan areas, and consisting of its rail guideways, passenger rail vehicles, and other rolling stock; power systems; buildings; stations; and other stationary and movable apparatus, equipment, appurtenances, and structures.

Picking Rooms. Rooms where baled, bundled or piled materials are segregated into desired sizes or groups.

Plastics

Group A Plastics. Plastic materials having heat of combustion much higher than that of ordinary combustibles and burning rate higher than that of Group B plastics. Examples of Group A plastics include, but are not limited to, the following:

- ABS (acrylonitrile-butadiene-styrene copolymer)
- Acetal (polyformaldehyde)
- Acrylic (polymethyl methacrylate)
- Butyl rubber
- EPDM (ethylene propylene rubber)
- FRP (fiberglass-reinforced polyester)
- Natural rubber (expanded)
- Nitrile rubber (acrylonitrile butadiene rubber)
- PET or PETE (polyethylene terephthalate)
- Polybutadiene
- Polycarbonate
- Polyester elastomer
- Polyethylene
- Polypropylene
- Polystyrene (expanded and unexpanded)
- Polyurethane (expanded and unexpanded)
- PVC (polyvinyl chloride greater than fifteen (15%) percent plasticized, e.g., coated fabric unsupported film)
- SAN (styrene acrylonitrile)
- SBRr (styrene butadiene rubber)

Group B Plastics. Plastic materials having heat of combustion and burning rate higher than that of ordinary combustibles, but not as high as those of Group A plastics. Examples of Group B plastics include, but are not limited to, the following:

- Cellulosics (cellulose acetate, cellulose acetate butyrate, ethyl cellulose)
- Chloroprene rubber
- Fluoroplastics (ECTFE, ethylene-chlorotrifluoroethylene copolymer; ETFE, ethylene-tetrafluoroethylene copolymer; FEP, fluorinated ethylene-propylene copolymer)
- Natural rubber (nonexpanded)
- Nylon (nylon 6, nylon 6/6)
- PVC (polyvinyl chloride greater than five percent (5%), but not exceeding fifteen percent (15%) plasticized)
- Silicone rubber

Group C Plastics. Plastic materials having heat of combustion and burning rate similar to those of ordinary combustibles. Examples of Group C plastics include, but are not limited to, the following:

- Fluoroplastics (PCTFE, Polychlorotrifluoroethylene; PTFE, polytetrafluoroethylene)
- Melamine (melamine formaldehyde)
- Phenol
- PVC (polyvinyl chloride, rigid or plasticized less than five percent (5%), e.g., pipe, pipe fittings)
- PVDC (polyvinylidene chloride)
- PVDF (polyvinylidene fluoride)
- PVF (polyvinyl fluoride)
- Urea (urea formaldehyde)

Limited quantities of Group A plastics in mixed commodities shall be used to determine the quantity of Group A plastics allowed that can be stored in a package or carton, or on a pallet without increasing the commodity classification.

Plenum. An air compartment or chamber to which one (1) or more ducts are connected and which form part of an air distribution system.

Portable Tank. Any closed vessel having a liquid capacity over two hundred twenty-seven liters (227 L) and not intended for fixed installation.

Pressurized/Forced-Draft Burning Equipment. Any type of burner where the fuel is subjected to pressure prior to discharge into the combustion chamber and/or which includes fans or other provisions for the introduction of air at above normal atmospheric pressure into the same combustion chamber.

Propeller. An inclusive term for all parts, appurtenances, and accessories of a propeller.

Proscenium wall. A fire resistive wall which separates a stage or enclosed platform from the public or spectators' area of an auditorium or theater.

Public Way. Any street, alley or other strip of land unobstructed from the ground to the sky, deeded, dedicated or otherwise permanently appropriated for public use.

Pyrophoric. Any substance that ignites spontaneously when exposed to air.

Refining. A process where impurities and/or deleterious materials are removed from a mixture in order to produce a pure element or compound. It shall also refer to partial distillation and electrolysis.

Refrigerating System. An assembly of four (4) major components, namely the compressor, condenser, expansion valve, the evaporator, through which a very low boiling point substance (refrigerant) flow in cycle, and absorbs heat from the immediate surroundings, thereby producing the cooling effect (also known as the refrigerating effect).

Residential-Custodial Care Facility/Institution. A building, or part thereof, used for the lodging or boarding of four (4) or more persons who are incapable of self-preservation because of age, or physical or mental limitation. This includes facilities such as homes for the aged, nurseries (custodial care for children under six (6) years of age), and mentally retarded care institutions.

Roll Coating. A process of coating, spreading and impregnating fabrics, paper or other materials as they are passed directly through a tank or trough containing flammable or combustible liquids, or over the surface of a roller revolving partially submerged in a flammable or combustible liquid.

Safety Can. An approved container, of not more than eighteen and nine tenths liter (18.9 L) capacity having a spring-closing lid and spout cover and so designed that it will safely relieve internal pressure when subjected to fire exposure.

Safety Data Sheet (SDS). A document that describes composition of a material, hazardous properties and hazard mitigation, and disposal information.

Safety Factor. The ratio of the design burst pressure to the maximum working pressure and shall not be less than four (4).

Safety Officer. Any employee or officer of the company trained by the Department of Labor and Employment (DOLE); and tasked by the employer to implement an occupational safety and health program, and ensure that it is in accordance with the provisions of Occupational Safety and Health Center (OSHC) standards.

Salvage Yards. An inclusive term that refers to wrecking yards, junk yards or waste material handling plants/shops, which can be used interchangeably.

Self-Closing Fire Doors (or Self-Closing Fire-Resistive Doors). Automatic closing doors that are designed to confine smoke and heat and delay the spread of fire.

Separate Atmosphere. A separate atmosphere exits between rooms, spaces area, that are separated by an approved smoke partition.

Separate Means of Egress. A means of egress separated in such a manner from other means of egress as to provide an atmosphere separation which preclude contamination of both means of egress by the same fire. (See Section 10.2.6.7 of this RIRR).

Single and Two -Family Dwellings. Detached dwellings in which each living unit is occupied by members of a single family.

Smelting. The process of melting or fusing metallic ores or compounds so as to separate impurities from pure metals.

Smoking Area. A designated area where smoking is permitted within premises where smoking is otherwise generally prohibited.

Smoke Barrier. A continuous membrane, or a membrane with discontinuities created by protected openings, designed and constructed to restrict the movement of smoke.

Smoke Compartment. A space within a building enclosed by smoke barriers on all sides, including the top and bottom.

Solvents or Liquid Classifications. A method of classifying solvents or liquids according to the following:

Class I Solvents. Liquids having a flash point below thirty-seven and eight tenths degrees Celsius (37.8 °C).

Class II Solvents. Liquids having a flash point at or above thirty-seven and eight tenths degrees Celsius (37.8 °C) and below sixty degrees Celsius (60 °C).

Class IIIA Solvents. Liquids having a flash point at or above sixty degrees Celsius (60 °C) and below ninety-three and three tenths degrees Celsius (93.3 °C).

Class IIIB Solvents. Liquids having a flash point at or above ninety-three and three tenths degrees Celsius (93.3 °C).

Class IV Solvents. Liquids classified as non-flammable.

Source of Ignition. A source of energy sufficient to ignite a flammable atmosphere and includes open flames, smoking, incandescent material, electrical welding arcs, and electrical or mechanical equipment not suitable for use in a particular hazard zone.

Special Bank Receipt (SBR). An accountable form transferred to the AGDB or AGSB thru a Memorandum Receipt (MR) which shall be issued as a proof of payment in the collection of the fees and charges imposed in pursuit of the statutory and regulation functions of the BFP.

Spray Booth. A mechanically ventilated appliance of varying dimensions and construction provided to enclose or accommodate a spraying operation and to confine and limit the escape of spray vapor and residue and to exhaust it safely.

Spraying Area. Any area in which dangerous quantities of flammable vapors or mists, or combustible residues, dusts or deposits are present due to the operation of spraying processes.

Sprinkler System. An integrated network of hydraulically designed piping system installed in a building, structure or area with outlets arranged in a systematic pattern which automatically discharges water when activated by heat or combustion products from a fire.

Stage. A partially enclosed portion of an assembly building which is designed or used for the presentation of plays, demonstrations, or other entertainment activities wherein scenery, drops or other effects may be installed or used, and where the distance between the top of the proscenium opening and the ceiling above the stage is more than one and fifty-two hundredths meters (1.52 m).

Staircase or stairway. One (1) or more flights of stairs or steps leading from one floor to another.

Stairwell. A compartment extending vertically through a building in which stairs are placed.

Standpipe System. A system of vertical pipes in a building to which fire hoses can be attached on each floor, including a system by which water is made available to water outlets as needed.

Street Floor. A storey or floor level accessible from the street outside the building at the finished ground level, with the floor level at the main entrance located not more than three (3) risers

above or below the finished ground level, and arranged and utilized to qualify as the main floor.

Tank Truck. Any single self-propelled motor vehicle equipped with a cargo tank mounted thereon and used for the transportation of flammable and combustible liquids.

Tank Vehicle. Any vehicle carrying or towing a cargo tank used for transporting flammable fluids or hazardous chemicals.

Tank, Full-Trailer. Any vehicle with or without auxiliary motive power, equipped with a cargo tank mounted thereon or built as an integral part thereof, used for the transportation of flammable and combustible liquids, and so constructed that practically all of its weight and load rests on its own wheels.

Tank, Semi-Trailer. Any vehicle with or without auxiliary motive power, equipped with a cargo tank mounted thereon or built as an integral part thereof, used for the transportation of flammable and combustible liquids, and so constructed that, when drawn by a tractor by means of a fifth wheel connection, some part of its load and weight rests upon the towing vehicle.

Thermal Insecticidal Fogging. The utilization of any insecticidal liquids passed through thermal fog-generating units where, by means of heat, pressure and turbulence, such liquids are transformed and discharged in the form of fog or mist blown into an area to be treated.

Thermal Insecticidal Fogging Liquid. Any insecticidal liquid specifically designed for emission from a thermal fog-generating unit in the form of an aerosol fog which is lethal to pest organisms and insects. Examples of thermal insecticidal fogging liquids are permethrin, deltamethrin, cyfluthrin, malathion, pirimiphos methyl and fenithrothion.

Thrust Stage/Arena Stage. The portion of a stage which projects into the audience on the audience side of a proscenium wall or opening.

Tote Box. A box constructed for use in the handling of stocks in process or finished stocks while in tote box store rooms.

Toxicity. The degree to which a substance is able to damage an exposed organism.

Type Designation of Powered Industrial Trucks. A system for identifying types of powered industrial trucks for operation in non-classified and classified areas.

Type Designation CGH. A compressed hydrogen powered unit utilizing a fuel cell that has minimum acceptable safeguards against inherent fire and electrical shock hazards.

Type Designation CN. A compressed natural gas–powered unit that has minimum acceptable safeguards against inherent fire hazards.

Type Designation CNS. A compressed natural gas–powered unit that, in addition to meeting the requirements for Type CN units, is provided with additional safeguards to the exhaust, fuel, and electric systems.

Type Designation D. A diesel-powered unit that has minimum acceptable safeguards against inherent fire hazards.

Type Designation DS. A diesel-powered unit that, in addition to meeting all the requirements for Type D units, is provided with additional safeguards to the exhaust, fuel, and electric systems.

Type Designation DX. A diesel-powered unit in which the diesel engine and the electric fittings and equipment are so designed, constructed, and assembled that the unit can be used in atmospheres that contain specifically named flammable vapors, dusts, and, under certain conditions, fibers.

Type Designation DY. A diesel-powered unit that has all the safeguards of Type DS units and, in addition, any electric equipment is completely enclosed and equipped with temperature-limitation features.

Type Designation E. An electrically powered unit that has minimum acceptable safeguards against inherent fire and electrical shock hazards.

Type Designation EE. An electrically powered unit that, in addition to meeting all the requirements for Type E and ES units, has its electric motors and all other electric equipment completely enclosed.

Type Designation ES. An electrically powered unit that, in addition to meeting all the requirements for Type E units, is provided with additional safeguards to the electric system to prevent the emission of hazardous sparks and to limit surface temperatures.

Type Designation EX. An electrically powered unit in which the electric fittings and equipment are so designed, constructed, and assembled that the unit can be used in atmospheres containing specifically named flammable vapors, dusts, and, under certain conditions, fibers.

Type Designation G. A gasoline-powered unit that has minimum acceptable safeguards against inherent fire hazards.

Type Designation G/CN. A unit that operates on either gasoline or compressed natural gas that has minimum acceptable safeguards against inherent fire hazards.

Type Designation G/LP. A unit that operates on either gasoline or liquefied petroleum gas and that has minimum acceptable safeguards against inherent fire hazards.

Type Designation GS. A gasoline-powered unit that, in addition to meeting all the requirements for Type G units, is provided with additional safeguards to the exhaust, fuel, and electric systems.

Type Designation GS/CNS. A unit that operates on either gasoline or compressed natural gas and, in addition to meeting all the requirements for Type G/CN units, is provided with additional safeguards to the exhaust, fuel, and electric systems.

Type Designation GS/LPS. A unit that operates on either gasoline or liquefied petroleum gas and, in addition to meeting all the requirements for the Type G/LP units, is provided with additional safeguards to the exhaust, fuel, and electric systems.

Type Designation LP. An LP-Gas-powered unit that has minimum acceptable safeguards against inherent fire hazards.

Type Designation LPS. An LP-Gas-powered unit that, in addition to meeting the requirements for Type LP units, is provided with additional safeguards to the exhaust, fuel, and electric systems.

Used Water. Liquid waste generated by treatment plants, housekeeping, operation and maintenance, and laboratory activities, including but not limited to washing, flushing, and cleaning activities. It also includes the cleaning, flushing and draining water that bear dirt and sludge from sedimentation basin, settling tank, and other treatment processes and unit operation facilities, and backwash water generated in the backwashing, cleaning and flushing of filter media or beds.

Ventilation. The process of supplying or removing air by natural or mechanical means to or from any space. Such air may or may not have been conditioned. Also refers to the copious flushing of an area with fresh air for the mitigation of explosion and other fire hazards.

Vertical Shaft. An enclosed vertical space of passage that extends from floor to floor, as well as from the base to the top of a building.

Vestibule. A passage hall or antechamber between the outer doors and the interior parts of a house or building.

Water Treatment Plants. Single or compact or multi-stage units and/or combination of unit processes and operation systems, including but not limited to their facilities, appurtenances, service areas and premises, for the purification or treatment of raw water or water from a source that requires the removal and/or reduction of impurities or improvement of its quality to comply with water quality standards, as prescribed by the concerned government agency, intended for public use or for specific industrial applications.

Waste Water. Liquid waste generated by human activities that use water and/or those water that come from residential, commercial, institutional, recreational, industrial, agricultural and other facilities, similar occupancies and related activities.

Waste Water Treatment Plants. Single or compact or multi-stage units and/or combination of unit processes and operation systems, including but not limited to their facilities, appurtenances, service areas and premises, for the treatment of used water or waste water generated by residential, recreational, institutional, commercial and industrial and other similar occupancies and related activities that required the removal and/or reduction of contaminants and/or pollutants or improvement of its quality to comply with effluent water quality standards of receiving body of water or environment as prescribed by the concerned government agency.

RULE 4. AUTHORITY OF THE CHIEF, BUREAU OF FIRE PROTECTION

SECTION 4.0.0.1 GENERAL AUTHORITY TO ADMINISTER AND ENFORCE RA 9514 AND ITS RIRR

The Administration and Enforcement of the RA 9514 and its RIRR shall be under the direct supervision and control of the Chief, BFP, through the hierarchy of organization as provided for in Chapter VI of Republic Act No. 6975, the *DILG Reorganization Act of 1990* as amended by Republic Act No. 9263, the *Bureau of Fire Protection (BFP) and Bureau of Jail Management and Penology (BJMP) Professionalization Act of 2004*.

SECTION 4.0.0.2 AUTHORITY OF THE CHIEF, BFP SUBJECT TO APPROVAL OF SECRETARY OF INTERIOR AND LOCAL GOVERNMENT (SILG)

The Chief, BFP, with the approval of the Secretary, DILG, is hereby authorized to:

A. Issue Implementing Rules and Regulations, and prescribe standards, schedules of fees/fire service charges and administrative penalties therefor as provided in the pertinent provisions of the RA 9514 and its RIRR;

B. Reorganize the BFP as may be necessary and appropriate;

C. Enter into long term agreement, either through public biddings or negotiations in accordance with the provisions of Republic Act No. 9184, otherwise known as the *Government Procurement Reform Act of 2003*, for the acquisition of fire prevention, fire protection, firefighting, investigation, rescue, paramedics, hazardous material handling equipment, supplies, materials, and related technical services necessary for the fire service; and

D. Enter into Memoranda of Agreement with other departments, bureaus, agencies, offices and corporations of the government, as well as private institutions, in order to define areas of cooperation and coordination and delineate responsibility on fire prevention education, fire safety, fire prevention, fire suppression and other matters of common concern.

SECTION 4.0.0.3 SPECIFIC AUTHORITY OF CHIEF, BFP

A. Further, the Chief, BFP or his/her duly authorized representative, in accordance with organizational hierarchy, is hereby specifically authorized to:

1. Support and assist fire volunteers, fire safety practitioners and fire volunteer organizations in the country that shall undergo mandatory fire suppression, rescue, emergency medical services and related emergency response training and competency evaluations to be conducted by the BFP. In the case of fire safety practitioners, they shall undergo mandatory training on fire safety inspection, and mandatory continuous professional education and competency evaluation of their expertise, knowledge and skills in the area of fire science, engineering and technology to be conducted by the BFP;

2. Enter into external party agreements for the conduct of training, education and evaluation of fire volunteers, fire safety practitioners and fire volunteer organizations, which shall be under the full control and supervision of the BFP: Provided, however, that during firefighting operations, fire volunteer organizations shall be under the direct operational control of the fire ground commanders of the BFP;

3. Call on the police, other law enforcement agencies, and local government assistance to render necessary assistance in the enforcement of the RA 9514 and its RIRR;

4. Designate Fire Safety Inspectors (FSI) who shall conduct inspection of every building or structure within their area of responsibility at least once a year and every time the owner, administrator or occupant shall renew his/her Business Permit or Permit to Operate;

5. Issue Fire Safety Inspection Certificate (FSIC) as a prerequisite to the grants of permits and/or licenses by the local governments and other government agencies concerned;

6. Inspect at reasonable time, any building, structure, installation or premises for dangerous or hazardous conditions or materials as set forth in the RA 9514 and its RIRR, provided that in case of single family dwelling, an inspection must be upon the consent of the occupant or upon lawful order from the proper court;

7. Order the owner/occupant to summarily abate and remove hazardous materials and/or stop hazardous operations/processes in accordance with the standards set by RA 9514 and its RIRR or other pertinent laws;

8. Require the building owner/occupant to submit plans and specifications, and other pertinent documents of said building to ensure compliance with applicable codes and standards; and
9. Issue a written notice to the owner and/or contractor to stop any portion of any work due to the absence, or in violation of, approved plans and specifications, permits and/or clearances or certifications as approved by the Chief, BFP or his/her duly authorized representative. The notice shall state the nature of the violation and no work shall be continued on that portion until the violation had been corrected.

B. However, the authority granted under this Section shall not in any way diminish the power of the SILG to change, alter, modify, revise or amend the actions of the Chief, BFP.

RULE 5. FIRE CODE TECHNICAL STAFF

DIVISION 1. TECHNICAL STAFF

SECTION 5.0.1.1 CONSTITUTION AND QUALIFICATIONS

The Chief, BFP, shall constitute a technical staff of highly qualified persons who are knowledgeable on fire prevention, fire safety, and fire suppression.

SECTION 5.0.1.2 SOURCES

The Technical Staff may be drawn from the following:

A. Organic members of the BFP;

B. Other government offices and agencies; and

C. Other sources.

In the case of para "B" and/or "C" above, members may either be appointed into the service or hired as consultants in accordance with existing laws, rules and regulations.

SECTION 5.0.1.3 DUTIES AND FUNCTIONS

The Technical Staff shall:

A. Study, review and evaluate latest developments and standards on fire safety, prevention and suppression;

B. Prepare plans/programs on fire safety, prevention and suppression and evaluate implementation thereof;

C. Develop programs on the professionalization of the Fire Service;

D. Coordinate with appropriate government and private institutions for the offering of college courses on fire technology and fire protection engineering;

E. Propose amendments to the RA 9514 and its RIRR;

F. Advise the Chief, BFP on any matter brought to his/her attention; and

G. Perform such other functions as directed by the Chief, BFP.

SECTION 5.0.1.4 REMUNERATION

Remuneration for the members of the Technical Staff shall be prescribed by the Chief, BFP in accordance with existing government accounting and auditing rules and regulations, to be sourced from the Fire Code Fees Collection.

RULE 6. FIRE BRIGADES, FIRE VOLUNTEER ORGANIZATIONS AND FIRE SAFETY PRACTITIONERS

DIVISION 1. SCOPE

This Rule shall govern the organization, equipage, operation, and proficiency training of company and community fire brigades as well as continuous training and competency evaluation of fire volunteers and fire volunteer organizations in the country who shall undergo mandatory fire prevention, fire suppression, rescue, emergency medical services and other related emergency response training programs and competency evaluations to be conducted

by the BFP. This also prescribes the continuous professional education, competency evaluation and recognition of Fire Safety Practitioners, to be conducted by the BFP. For this purpose, the term "company" shall include government and/or private offices and buildings.

DIVISION 2. ORGANIZATION OF FIRE BRIGADES

SECTION 6.0.2.1 REQUIREMENTS

A. All business establishments that can accommodate at least fifty (50) persons shall, in addition to the requirements set forth under Section 7 of this Code for the grant of Fire Safety Inspection Certificate (FSIC), establish and maintain an organization of fire brigade to deal with fire and other related emergencies. The head of the company, through its duly designated safety officer shall evaluate the potential magnitude of a fire emergency within the company, and the availability of firefighting assistance from the BFP to determine the nature of the organization to be established.

B. For buildings having various occupancies, the Building Administrator and/or owner shall initiate the organization of a fire brigade in the premises irrespective of the number of occupants.

C. In cases where a fire brigade is already established for a building, said fire brigade shall be sufficient to comply with the requirements of para "A" of this Section.

D. All barangays shall likewise endeavor to organize their own fire brigades.

E. All fire volunteer organizations, barangay fire brigades, and company and industrial fire brigades may be incorporated in the Bureau of Fire Protection Auxiliary (BFPA) subject to the form and function established by the BFP.

SECTION 6.0.2.2 COMPOSITION

The organization of company fire brigades shall consist of the Fire Brigade Chief, which shall be designated by the head of the company, and shall be assisted by selected personnel. In companies where more persons are available, they must be organized into teams to function as a fire brigade established according to its needs. The organization shall be such that a fire brigade is on duty or on call at all times.

SECTION 6.0.2.3 COMPONENTS

The equipment that must be put into service during fire or other related emergencies will determine the number of men required for each operating unit or company into which the brigade is organized, and the total number may be composed of two (2) or more individuals to operate a specific item of equipment or a larger group to perform more complicated operations. Each fire brigade shall have a Leader or a Chief. In his/her absence, an Assistant Chief shall be appointed.

SECTION 6.0.2.4 DUTIES AND RESPONSIBILITIES OF A FIRE BRIGADE CHIEF

A. He/She shall be responsible for the development of fire prevention programs and plans of action for the company or organization to address possible fire situation in the plant or community, subject to the approval of the company or establishment head or fire prevention officer;

B. He/She shall initiate the procurement of necessary firefighting equipment and supplies for use of the brigades;

C. He/She shall conduct periodic evaluation of all equipment available for firefighting and be responsible for setting in motion necessary procedures for replacing missing equipment or correction of inoperative equipment;

D. He/She shall also bring to the immediate attention of the company or establishment head, or his/her fire prevention officer, any situation that would likely reduce the effectiveness of firefighting operations;

E. He/She shall ensure that the brigades are suitably staffed, conduct periodic review of the fire brigade roster and prepare recommendations on the need for additional members to be selected, appointed and made available to beef up the team;

F. He/She shall prepare training programs for the members of the fire brigade and supervise its implementation; and

In his/her absence, the Deputy Fire Brigade Chief shall assume and perform the duties and responsibilities of the Fire Brigade Chief.

SECTION 6.0.2.5 QUALIFICATION FOR MEMBERSHIP IN THE COMPANY FIRE BRIGADE

Members of the fire brigade shall consist of persons who have met qualifications appropriate for the fire brigade work. For establishments, members must be taken from the roster of its own workforce. The head of the company shall identify the persons who are fit to perform fire operation activities and further assign them to specific fire suppression positions.

SECTION 6.0.2.6 AVAILABILITY OF PERSONNEL

To qualify as a member of a fire brigade, individuals must be available to respond to fire alarms and attend required training programs. A pre-arranged schedule for availability must be established to prevent conflict of duties and to cover absences such as regular off-duty periods, vacations and sickness.

DIVISION 3. TRAINING OF FIRE BRIGADES, FIRE SAFETY PRACTITIONERS AND FIRE VOLUNTEER ORGANIZATIONS

SECTION 6.0.3.1 CERTIFICATE OF COMPETENCY

A. Certificate of Competency shall be issued to fire volunteers, fire volunteer organizations, and fire safety practitioners, except company fire brigades, after completion of the mandatory training and competency evaluation conducted by the BFP and upon submission of the following:
   1. Certificate of completion of training;
   2. Personal profile;
   3. Certificate of employment, in the case of fire safety practitioners; and
   4. Other documents the BFP may require.

B. The Certificate of Competency for Fire Safety Practitioners shall be issued by the Chief, BFP. The Certificate of Competency for Fire Volunteers and Fire Volunteer Organizations shall be issued by the Regional Directors pursuant to the guidelines issued by the Chief, BFP.

SECTION 6.0.3.2 TRAINING DESIGN

A training design shall be developed by the BFP for fire volunteers, fire volunteer organizations, fire brigades and fire safety practitioners. Members shall be required to complete the specified program of instruction.

SECTION 6.0.3.3 SCOPE OF TRAINING

A. All members of the fire brigade, fire volunteer and fire volunteer organizations shall undergo training on fire prevention, fire suppression, rescue, emergency medical services and related emergency response. The training program shall be adapted to the purpose of the particular brigade. It shall include fire suppression strategies, tactics, techniques and the use of portable fire extinguishers and other equipment, devices and tools.

B. In the case of fire safety practitioners, they shall undergo mandatory continuous professional education and competency evaluation of their expertise, knowledge and skills in the areas of fire science, engineering and technology to be conducted by the BFP.

SECTION 6.0.3.4 ASSISTANCE IN TRAINING PROGRAMS

The BFP shall assist in setting up a training program for the fire brigade and fire volunteer organization. Members of the fire brigade and fire volunteer organization shall be afforded opportunities to improve their knowledge on fire prevention and suppression through attendance in seminars and special training classes.

SECTION 6.0.3.5 IDENTIFICATION

Members of the volunteer fire brigade organization shall wear proper identification cards duly signed by the head of their organization and authenticated by the C/MFM having jurisdiction.

DIVISION 4. COMMAND, EQUIPMENT MAINTENANCE AND FIRE DRILLS

SECTION 6.0.4.1 PRACTICE DRILLS

Practice drills shall be held to check the ability of members to perform the operations they are expected to carry out. Drills shall be occasionally held under adverse weather conditions to work on special procedures needed under such circumstances.

SECTION 6.0.4.2 OPERATION OF EQUIPMENT

In practice drills, all available fire and life safety equipment, devices and tools for fire suppression and medical and rescue operation must be operated.

SECTION 6.0.4.3 REACTIVATION OF EQUIPMENT

At the conclusion of a practice drill, equipment shall be made readily available to respond to a fire call.

SECTION 6.0.4.4 INSPECTION AND SCHEDULED MAINTENANCE WORK

Inspection and maintenance of fire equipment, both fixed and portable, may be assigned to individual members of the fire brigade. However, the Fire Brigade Chief must establish the necessary schedules for such work, and assign these duties to specific personnel and ensure that these inspection and maintenance operations are carried out and reported.

SECTION 6.0.4.5 COMMAND AT FIRE SCENE

During firefighting operations, the fire brigades and fire volunteer organizations shall be under the direct operational control of the fire ground commanders subject to existing guidelines of the BFP.

RULE 7. ASSISTANCE AND SUPPORT TO THE BFP

DIVISION 1. PHILIPPINE NATIONAL POLICE AND OTHER LAW ENFORCEMENT AGENCIES

SECTION 7.0.1.1 FROM PHILIPPINE NATIONAL POLICE

Upon request, the Philippine National Police (PNP) shall render necessary assistance to the Chief, BFP or his/her duly authorized representative on the following actions:

A. Actual firefighting operations and fire scene investigation;

B. Business closure and summary abatement proceedings;

C. Installation of signs that the building/structure is a fire hazard and/or fire trap;

D. Obstruction of designated fire lanes and fire hydrants;

E. Apprehension of violators/persons removing, destroying, tampering or obliterating warning signs and similar abatement appurtenances;

F. Laboratory/physical examinations of the pieces of evidence gathered in the fire scene and submit the result thereof to the Chief, BFP or his/her duly authorized representative, as the case may be; and

G. Such other duties and functions of the BFP which would require police assistance.

SECTION 7.0.1.2 FROM OTHER LAW ENFORCEMENT AGENCIES

Other Law Enforcement Agencies, such as but not limited to, National Bureau of Investigation (NBI) shall, upon request, accommodate and render necessary assistance on the following functions of the BFP:

A. Investigation and prosecution of arson cases;

B. Appearance as expert witness;

C. Such other duties and functions of the BFP which require their expertise.

DIVISION 2. LOCAL GOVERNMENT UNITS, OTHER GOVERNMENT AGENCIES AND PRIVATE INSTITUTIONS

SECTION 7.0.2.1 FROM LOCAL GOVERNMENT UNITS

Local Government Units (LGU) shall render necessary assistance on the following duties of the BFP:

A. Strict observance of the requirement of fire safety measures for the issuance of Fire Safety Inspection Certificate (FSIC) as a prerequisite in the grant of and renewal of business, occupancy and other related permits/licenses. For this purpose, the LGU and/or other government agencies concerned shall refrain from issuing such licenses and/or permits without the applicant first securing an FSIC from the BFP;

B. Organization and training of fire brigades in all barangays in partnership with BFP to serve as first responders;

C. Summary abatement and closure of buildings/structures or portions thereof; and

D. Such other duties and functions of the BFP which would require their assistance.

SECTION 7.0.2.2 COORDINATION WITH OTHER AGENCIES

To institutionalize the areas of cooperation and coordination of the BFP with other departments, bureaus, agencies, offices and corporations of the government, as well as private institutions, the BFP may enter into Memoranda of Agreement with, but not limited to, the following:

A. National and Local Waterworks, for providing sufficient source of water, especially in times of fire or conflagration and for the establishment of fire hydrants in strategic areas;

B. Electric Companies and Cooperatives, on the immediate cut-off of electric main lines/ power lines during fires or conflagration and in case of hazardous electrical installation;

C. Department of Transportation (DOTr), on fire safety measures in all ports and land transportation vehicles;

D. Department of Education (DepEd), on the enforcement of fire safety regulations set forth by this RIRR for educational and other applicable facilities, institutionalization of school-based fire prevention activities and other initiatives;

E. Commission on Higher Education (CHED), on the enforcement of fire safety regulations set forth by this RIRR for educational and other applicable facilities, institutionalization of school-based fire prevention activities and the promotion of fire safety engineering courses, post graduate studies on fire science and technology and other research and development initiatives;

F. Department of Trade and Industry (DTI), on instituting continuing development, enhancement and setting of standards and rating on fire protection appliance, devices, extinguishing appurtenances and related fire and life safety facilities, equipage and systems;

G. Technical Education Skills Development Authority (TESDA), on providing and enhancing technical skills of BFP personnel and fire volunteer organizations as well as their subsequent accreditation/certification;

H. Department of Environment and Natural Resources (DENR), on providing pertinent information in the field of hazardous materials and hazardous waste management as well as collaboration on forest fire and life safety programs;

I. Department of Labor and Employment (DOLE), on the enforcement of the designation of a fire safety officer in every building facility;

J. Department of Information and Communications Technology (DICT), on the establishment of effective communication system for the BFP, and the development and integration of an electronic permit processing system responsive to the regulations of the BFP and recent advancement in information and communications technology; and

K. Such other government agencies, instrumentalities and subdivisions and non-government institutions, with respect to future concerns as may be deemed necessary by the BFP in furtherance of the enforcement of RA 9514 and its RIRR.

RULE 8. FIRE SAFETY ENFORCERS

CHAPTER 1. QUALIFICATIONS OF FIRE SAFETY ENFORCERS

DIVISION 1. MINIMUM REQUIREMENTS

BFP personnel duly designated as Fire Safety Enforcers shall possess minimum required qualification standard stated herein.

SECTION 8.1.1.1 FIRE SAFETY INSPECTORS

A. **Uniformed Personnel**

1. Shall be licensed Engineer (Civil, Electrical, Mechanical, Chemical, Sanitary and Electronics) with at least one (1) year in the BFP service; or
2. Shall be architect with at least one (1) year in the BFP service; or
3. Shall be graduate of any baccalaureate degree course with at least three (3) years in the BFP service.

B. **Non-Uniformed Personnel**

Appointed as Engineers with at least one (1) year in the BFP service.

C. Must have undergone and completed prescribed training on fire safety enforcement and other relevant fire safety training.

SECTION 8.1.1.2 PLAN EVALUATORS

A. Must be licensed Architect or Engineer; and

B. Shall have undergone and completed prescribed training on fire safety enforcement and other relevant fire safety training.

C. In cases where there is no licensed engineer or architect in a specific jurisdiction, a graduate of any baccalaureate degree with relevant fire safety and building plan evaluation training shall be designated as plan evaluator.

SECTION 8.1.1.3 CHIEF, FIRE SAFETY ENFORCEMENT SECTION/UNIT

A. The Chief of the Fire Safety Enforcement Section/Unit (FSES/U) to be designated shall possess the following minimum qualifications:

1. With the rank commensurate to the position prescribed by the organizational structure and qualification standard of the BFP;
2. Must be a licensed engineer or architect with at least three (3) years in the BFP service; and
3. Must have undergone and completed prescribed training on fire safety enforcement and other relevant fire safety training.

B. In cases the rank requirement cannot be complied, any personnel with lower rank who is a licensed engineer or architect, or a graduate of any baccalaureate degree with at least five (5) years of service in the BFP may be designated as Chief, FSES/U.

C. In case there is no ranking uniformed personnel or officer, a Non-Uniformed Personnel (NUP) can be designated as Chief, FSES/U, provided that he/she is occupying an Engineer IV plantilla position and has undergone relevant fire safety training.

CHAPTER 2. FUNCTIONS OF FIRE SAFETY ENFORCERS

DIVISION 1. RESPONSIBILITIES OF DESIGNATED FIRE SAFETY ENFORCERS

SECTION 8.2.1.1 FIRE SAFETY INSPECTORS

The following shall be the main duties and responsibilities of Fire Safety Inspectors:

A. Inspect any building, structure or facility and/or any part thereof, hazardous operations, storage facilities and transportation vehicles of hazardous materials to ensure compliance with RA 9514 and its RIRR and other related laws, regulations, standards and ordinances within the area of responsibility;

B. Assess compliance with the fire safety requirements, identify and recommend corrective actions for violations/defects and deficiencies and inform the owner/building administrator/ occupants of such actions to comply with the provisions of RA 9514 and its RIRR and other related laws, regulations, standards and ordinances;

C. Testify in any judicial and quasi-judicial bodies regarding matters relating to RA 9514 and its RIRR, and/or the performance of his/her duties related thereto, when needed;

D. Conduct fire safety lectures, seminars/workshop and drills; and

E. Prepare necessary documents and maintain files and/or records.

SECTION 8.2.1.2 PLAN EVALUATORS

The following shall be the main duties and responsibilities of Plan Evaluators:

A. Review and evaluate building plans and specifications including fire protection system to determine compliance with RA 9514 and its RIRR, National Building Code of the Philippines (NBCP) and other Life and Safety Standard; and

B. Conduct site verification and inspection on building under construction to determine compliance with the approved plans and specifications.

SECTION 8.2.1.3 CHIEF, FIRE SAFETY ENFORCEMENT SECTION/UNIT (FSES/U)

The following shall be the main duties and responsibilities of the Chief, FSES/U:

A. Review and evaluate reports submitted by the Fire Safety Enforcers and recommend approval to the concerned C/MFM having jurisdiction;

B. Assist the C/MFM having jurisdiction in implementing fire safety measures and education programs within his/her area of responsibility to reduce fire incidents;

C. Supervise/monitor the activities of the fire safety inspectors to ensure that inspection is conducted in accordance with the standards and existing rules and regulations;

D. Recommend to the C/MFM the filing of appropriate charges against the violator of RA 9514 and its RIRR;

E. Testify in any judicial and quasi-judicial bodies on matters relating to RA 9514 and its RIRR and/or in account of his/her duties and functions as Chief, FSES/U when needed; and

F. Perform such other functions mentioned under RA 9514 and its RIRR.

DIVISION 2. PROFESSIONALIZATION

In pursuit of competent fire safety enforcement and service excellence, the BFP must endeavor to professionalize its fire safety enforcers and establish the level of competency in accordance with the guidelines issued by the Chief, BFP.

RULE 9. ENFORCEMENT AND ADMINISTRATION OF FIRE SAFETY MEASURES

DIVISION 1. GENERAL

A. Inspection of all buildings, structures, facilities and premises, hazardous operations, storage facilities and transportation vehicles of hazardous materials and the determination of compliance with RA 9514 and its RIRR shall be done by C/MFM having jurisdiction.

B. Fire safety inspection shall be conducted as a prerequisite to grants of permits and/or licenses by local governments or other government agencies. No Certificate of Occupancy, Business Permit or Permit to Operate shall be issued without securing a Fire Safety Inspection Certificate (FSIC) from the C/MFM having jurisdiction.

C. The C/MFM having jurisdiction shall review, evaluate and assess plans, design calculations and specifications, and issue the necessary building Fire Safety Evaluation Clearance (FSEC) as a prerequisite for the issuance of Building Permit by the Office of the Building Official, upon determination that design and specification is in accordance with RA 9514 and its RIRR.

DIVISION 2. FIRE SAFETY EVALUATION AND INSPECTION

Building plan review, inspection during and after construction, and business routine inspection shall be in accordance with the Citizen's Charter.

SECTION 9.0.2.1 BUILDING PLAN REVIEW

A. The Plan Evaluator shall undertake the necessary evaluation and review of the plans in accordance with the guidelines issued by the Chief, BFP for this purpose, indicating whether or not such plans conform to the fire safety and life safety requirements of RA 9514 and its RIRR. For this purpose, a Fire Safety Checklist shall be used to facilitate the checking of building plan. The evaluated plans and the corresponding Fire Safety Checklist shall then be submitted to the Chief, FSES/U for review and recommendation to the C/MFM having jurisdiction.

B. The C/MFM having jurisdiction upon evaluation of the recommendation will either issue FSEC or Notice of Disapproval (NOD), as the case may be, and upon payment by the owner/authorized representative of Fire Code Construction Tax and other appropriate Fire Code Fees.

C. No building plan shall be evaluated without the submission of Fire Safety Compliance Report (FSCR) in accordance with Division 3 of this Rule and the pertinent documents required under the BFP Citizen's Charter.

D. The procedure for securing FSEC shall be in accordance with the BFP Citizen's Charter.

SECTION 9.0.2.2 INSPECTION DURING CONSTRUCTION

During construction, renovation, modification or alteration, the C/MFM having jurisdiction, on the basis of issued FSEC, shall inspect the premises to determine whether the plans, and specifications are being followed and fire safety precautions are being observed. He/ She shall cause the correction of any defects/deficiencies noted, when necessary.

SECTION 9.0.2.3 INSPECTION AFTER COMPLETION OF CONSTRUCTION

A. After construction/renovation/modification or alteration and prior to the issuance of the Certificate of Occupancy by the Building Official, the C/MFM having jurisdiction shall designate a Fire Safety Inspector (FSI) who shall inspect the building, structure or facility. The FSI shall recommend in his/her After Inspection Report (AIR) the issuance of necessary Fire Safety Inspection Certificate (FSIC) upon determination that the required fire safety construction is in place, and fire protective and/or warning systems are properly installed in accordance with the approved plans and specifications.

B. The C, FSES/U shall review the findings of the FSI and recommend to the C/MFM having jurisdiction the issuance of FSIC for Occupancy or NOD. The C/MFM having jurisdiction will either issue the FSIC or NOD, as the case may be, upon payment of appropriate Fire Code Fees. However, if it appears during inspection that the subject establishment is already occupied or operating, a Notice to Comply (NTC) shall be issued to the owner/administrator/ occupant and the procedure under Rule 13 of this Code shall be observed.

C. Testing and commissioning of fire protective and warning system of the building shall be conducted by the installer/contractor during inspection to be witnessed by the FSI. No FSIC for Occupancy shall be issued without submission of Fire Safety Compliance and Commissioning Report (FSCCR) in accordance with Division 3 of this Rule and other pertinent documents required under the BFP Citizen's Charter.

D. The procedure for securing FSIC for Occupancy shall be in accordance with the BFP Citizen's Charter.

SECTION 9.0.2.4 BUSINESS AND ROUTINE/ANNUAL INSPECTION

A. Inspection for the purpose of Business/Mayor's Permit and other Permits or Licenses Application

1. The C/MFM having jurisdiction shall cause the inspection of premises of any industrial, commercial or business operations, and issue the necessary FSIC, as a prerequisite for the grant of Business/Mayor's Permit or Certificate of Annual Inspection from Philippine Economic Zone Authority (PEZA), upon determination that fire safety measures for use, handling, or storage of explosives or combustible, flammable, toxic and other hazardous

materials, as well as hazardous operations or processes, have been complied, and upon payment of appropriate Fire Code Fees.

2. The designated FSI shall conduct final inspection in the establishment; prepare an After Inspection Report (AIR) using the prescribed format; and recommend the issuance of either FSIC or appropriate Notice in accordance with Rule 13. The Chief, FSES/U reviews the findings and recommends to the C/MFM having jurisdiction for approval or disapproval. The C/MFM having jurisdiction will either issue FSIC or NTC in accordance with Rule 13 of this Code.
3. No FSIC shall be issued without the submission of Fire Safety and Maintenance Report (FSMR), if applicable, in accordance with Division 3 of this Rule and payment of appropriate Fire Code Fees.
4. The procedure for securing FSIC shall be in accordance with the BFP Citizen's Charter.

B. Routine/Annual Fire Safety Inspection on Existing Buildings, Structures and Facilities other than for Business/Mayor's Permit and other Permits or Licenses Application

1. The C/MFM having jurisdiction, shall cause the conduct of routine or periodic fire safety inspection, re-inspection, or inspection arising from complaint, of any building, structure, facility or premises not falling under para "A" of this Section, for the purpose of determining compliance with RA 9514 and its RIRR. For this purpose, Inspection Order (IO) shall be issued by the C/MFM having jurisdiction. The building owner or administrator shall make available to the FSI, if necessary, copies of all plans, design calculations and specifications of the building as it was actually built/constructed, or in the absence of the same, copies of all plans, design calculations and specifications of the building as it is at the time of the inspection and FSMR, if applicable, in accordance with Division 3 of this Rule. The FSI shall prepare an AIR and recommend to the C/MFM having jurisdiction appropriate administrative courses of action provided under Rule 13 of this Code in case of any violation of RA 9514 and its RIRR.
2. Inspection procedure shall be in accordance with the BFP Citizen's Charter.

DIVISION 3. FIRE SAFETY COMPLIANCE REPORT (FSCR), FIRE SAFETY COMPLIANCE AND COMMISSIONING REPORT (FSCCR), AND FIRE SAFETY MAINTENANCE REPORT (FSMR)

SECTION 9.0.3.1 APPLICABILITY

A. All private and public buildings, facilities and structures to be constructed, altered or modified, which by reason of their use, size and height are required to install any or combination of the following: 1) wet standpipe system; 2) automatic fire suppression system; and 3) automatic fire detection and alarm system, pursuant to RA 9514 and its RIRR, shall be required to submit FSCR for application of FSEC for Building Permit and Fire Safety Compliance and Commissioning Report (FSCCR) for application of FSIC for Occupancy.

B. All existing private and public buildings, facilities or structures covered by para "A" hereof, shall be required to submit Fire Safety Maintenance Report (FSMR) annually to the C/MFM having jurisdiction when securing FSIC for business permit, Certificate of Annual Inspection for PEZA registered enterprises, DOH License to Operate and other permits and licenses where FSIC is a prerequisite.

SECTION 9.0.3.2 FIRE SAFETY COMPLIANCE REPORT (FSCR)

A. One (1) set of FSCR shall be submitted to the C/MFM having jurisdiction by the building owner duly signed by the Engineer/Architect-of-Record and his/her Fire Safety Practitioner duly accredited by the BFP. It shall contain a detailed design analysis of all fire safety features to be installed in the proposed building together with three (3) sets of plans and specifications. The FSCR is a prerequisite in granting FSEC.

B. The Engineer/Architect-of-Record and Fire Safety Practitioner shall ensure and certify that the design, criteria and specifications of all fire safety features are appropriate to the proposed project and compliant with the provisions of RA 9514 and its RIRR and other applicable laws.

C. The FSCR shall contain among others the following:

1. Short Project Description
2. Statement of the Codes and Standards used in the design

3. Discussion of Fire Protection and Life Safety Issues
    a. Building Classification and Construction Materials Used
    b. Hazards of contents and combustible loading including fire scenarios adopted if design is performance based
    c. Occupancy Classification
    d. Structural Requirements/Separation of Building Spaces
    e. Exit and Egress Description
        1) Basis of design
        2) Number of exits
        3) Travel distances
        4) Exit calculations (may be included in appendices)
        5) Time-exit analysis
    f. Fire Suppression Description
    g. Design Criteria Used for Sprinkler System/Standpipe
        1) Other suppression systems
        2) Water supplies, fire pumps, capacities
        3) Portable extinguishers
        4) Hydraulic and other calculations (may be placed in appendices)
        5) Riser diagrams (may be placed in appendices)
    h. Fire Detection, Alarm, Communication and Evacuation Systems
        1) Description of each system including features and controls
        2) Sound pressure calculations (for equivalencies and variances)
    i. Smoke Control Management (if applicable)
        1) Description of smoke control strategies
        2) Design criteria used
        3) Calculations (may be included in appendices)
        4) Equipment capacities and description
    j. Exit Light and Emergency Lighting Systems
        1) Description
        2) Typical location of exit lights and emergency lighting systems
        3) Design criteria
        4) Calculations (equivalencies and variances)
    k. Emergency Power Supply
        1) Description
        2) Capacities
        3) Calculations (may be included in appendices)
    l. Fire Department Access

        Description and location of street hydrant and BFP station
    m. Other issues not discussed above including elevator recall and use of elevators for evacuation

SECTION 9.0.3.3 FIRE SAFETY COMPLIANCE AND COMMISSIONING REPORT (FSCCR)

A. Prior to the beneficial occupancy of the newly constructed, altered, or modified buildings, one (1) set of FSCCR together with Certificate of Completion of Construction duly signed by the Contractor/Construction Manager and his/her Fire Safety Practitioner shall be submitted to the C/MFM having jurisdiction by the building owner. The FSCCR shall contain a certification that the plans and specifications prescribed in the FSCR for Building Permit was duly implemented. For modifications made, a detailed compilation of plans, specifications

and design analysis of the implemented changes shall be reflected in the "as-built" plans. The FSCCR is a prerequisite for granting of FSIC for Occupancy.

B. The contractor, construction manager or person in charge of the construction and his/her fire safety practitioner shall certify that all fire protection and life safety features indicated in FSCR for Building Permit, including amendments thereto which must be approved by concerned authorities, have been properly installed and implemented. They shall also certify that the building complies with the fire safety requirements of RA 9514 and its RIRR.

C. The FSCCR shall contain among others the following;

1. Short Description of the Project
2. Statement and Description of the Changes made in the design, plans and specifications (if applicable).
3. Standards Used for Authorized Changes
4. Certification that fire safety features included in FSCR for Building Permit have been implemented, including approved amendments thereto and that the completed building complies with RA 9514 and its RIRR.
5. Testing and Commissioning Certificates for all systems.
6. Close-out documents (shall be signed by Installing Contractor Professional Engineer or Architect)
   a. "As-built" Plan
   b. Calculations
   c. Specifications
   d. Test Report
   e. Product Data Sheet and Material Test Certificate

SECTION 9.0.3.4 FIRE SAFETY MAINTENANCE REPORT (FSMR)

A. The building owner shall submit to the C/MFM having jurisdiction, one (1) set of FSMR duly signed by the Building Administrator and his/her Fire Safety Practitioner during the regular annual fire safety inspection. FSMR is a prerequisite for the issuance of FSIC for Business or Mayor's Permit renewal, Certificate of Annual Inspection, Permit to Operate, PHILHEALTH Accreditation for Hospitals, DOH License to Operate and other permits or licenses being issued by other government agencies. The FSMR shall contain among others:

1. The detailed report on conducted annual maintenance of all installed fire safety and protection systems duly certified by the building fire safety practitioner/safety officer or a third party consultant specializing in said installation.
2. Fire safety lectures, drills and preparedness activities conducted within the year.

B. The building owner or his/her authorized representative, registered business owner (tenant) or his/her authorized representative, or their building administrator and his/her fire safety practitioner shall certify that all fire safety issues are addressed and that all required fire safety systems are installed and maintained as prescribed in RA 9514 and its RIRR and other applicable laws. They shall also keep an updated record of regular inspection, scheduled testing and/or regular preventive maintenance to ensure proper operational condition.

C. The FSMR shall contain among others the following:

1. Short Description of Building or Facilities
2. Statement of Testing and Maintenance Standards Used
3. Discussions of Fire Protection and Life Safety Issues
   a. Exit and Egress
      1) Number of active exits
      2) Maintenance records done on egress component such as doors and enclosed stairways
   b. Fire Suppression
      1) Maintenance and testing records done on fire pumps, sprinkler system, portable extinguishers, standpipes and other fire suppression systems
      2) Results of annual fire pump flow tests, annual main drain tests, and water flow tests for standpipe; submit other test results as appropriate

c. Fire Detection, Alarm Communication and Evaluation System

Testing and maintenance records done on the components of the detection and alarm system including the fire alarm control panel.

d. Smoke Control Management (if applicable)

Maintenance and testing records of the various component of the smoke management system. Include test records for pressurization fans for flows and fan controls.

e. Emergency Power Supply

Maintenance and testing records of the system components of the emergency power supply.

f. Other testing and maintenance records, including test results of the elevator recall system.

g. Other applicable systems

SECTION 9.0.3.5 FIRE SAFETY PRACTITIONERS

Only Fire Safety Practitioners issued with Certificate of Competency (COC) shall be allowed to prepare, sign and certify the FSCR, FSCCR and FSMR. The issuance of COC shall be pursuant to the duly issued guidelines.

DIVISION 4. FIRE SAFETY INSPECTION CERTIFICATE

SECTION 9.0.4.1 FSIC AS A PREREQUISITE FOR ISSUANCE OF PERMIT/LICENSE

Upon compliance of the fire safety requirements under Rule 10 of this RIRR, a Fire Safety Inspection Certificate (FSIC) shall be issued by the C/MFM having jurisdiction as a prerequisite for the issuance of Certificate of Occupancy, Business Permits or Permit to Operate, licenses and other permits issued by the following:

A. Local Government Units (LGUs);

B. Office of The Building Official (OBO);

C. PhilHealth Accreditation for Hospitals;

D. Department of Health (DOH);

E. Philippine Economic Zone Authority (PEZA) and other similar entities; and

F. Other government agencies

SECTION 9.0.4.2 DOCUMENTARY REQUIREMENTS

The documents required for the processing of FSEC, FSIC and other clearances being issued by the BFP shall be in accordance with its Citizen's Charter.

DIVISION 5. FIRE SAFETY CLEARANCE

Fire Safety Clearance (FSC) for stand-alone applications shall be required for the storage, handling and transportation of hazardous materials, and hazardous operations and processes, as may be prescribed in other provisions of this RIRR. Likewise, installation clearance shall be required for the installation of fire safety and warning systems and building services equipment.

All issued FSC, except installation clearance, to business establishments shall be renewed before the issuance of FSIC for Business Permit.

DIVISION 6. FIRE INSURANCE DATA REQUIRED

All persons having fire insurance coverage on their properties and/or business shall submit a certified true copy of all coverages currently in effect, including subsequent and/or additional policies to the C/MFM having jurisdiction not later than ten (10) days after receipt of the document from any insurance company. Exempted from this requirement are owners of detached single or two -family dwellings actually being used for residential occupancy.

RULE 10. FIRE SAFETY MEASURES

CHAPTER 1. COVERAGE

This Rule covers the fire safety measures for buildings, structures and facilities, hazardous materials and wastes, hazardous operations and processes, and miscellaneous hazardous premises and/or conditions that by its very nature or relation to life, property and environment pose threat or danger.

CHAPTER 2. FIRE SAFETY IN BUILDINGS, STRUCTURES AND FACILITIES

DIVISION 1. SCOPE

A. This Chapter deals with life safety from fire and like emergencies in buildings, structures and facilities. It covers construction, protection and occupancy features to minimize danger to life from fire, smoke, vapor and fumes before buildings are vacated. It also discusses procedures and guidelines in fire drills required for all types of occupancies to prevent panic in times of emergencies. It specifies the number, size, and arrangement of means of egress sufficient to permit prompt and safe escape of occupants from buildings, or structures or facilities in case of fire or other conditions dangerous to life and property.

B. Nothing in this Chapter shall be construed to prohibit a better type of design, building construction, more exits, or otherwise safer conditions than the requirements specified in this Chapter.

C. Nothing in this Rule is intended to prevent the use of new methods or devices, provided sufficient technical data are submitted to demonstrate that the new method or device is equivalent in quality, strength, fire resistance, effectiveness, durability, and safety to that prescribed by this Rule.

DIVISION 2. GENERAL REQUIREMENTS

A. Every building or structure, new or old, designed for human occupancy shall be provided with exits sufficient to permit the fast and safe escape of occupants in case of fire or other emergencies. The design of exits and other fire safety construction shall be such that reliance for safety of life in case of fire or other emergencies will not depend solely on any single fire safety construction. Additional safeguards shall be provided for life safety in case any single safeguard is ineffective due to some human or mechanical failure.

B. Every building or structure shall be designed, constructed, equipped, maintained and operated to avoid danger to lives and ensure safety of its occupants from fire, smoke, vapor and fumes, during the period of escape from the building or structure.

C. Every building or structure shall be provided with exits of kind, number, location and capacity appropriate to the individual building or structure, with due regard for the character of the occupancy, the number of persons exposed, the fire protection available and the height and type of construction of the building or structure, to afford all occupants convenient facilities for escape.

D. Every exit of buildings or structures shall be arranged and maintained to provide free and unobstructed egress from all parts thereof at all times. No lock or fastening device that would prevent escape from the inside of any building shall be installed except in mental, penal, or correctional institutions where personnel are continually on duty and effective provisions are made to evacuate occupants in case of fire or other emergencies.

E. Every exit shall be clearly visible. The route to the exit shall be conspicuously marked in such a manner that every occupant of a building or structure will readily know the direction of escape. Each route of escape, in its entirety, shall be so arranged or marked that the way to a place of safety outside is unmistakable. Any doorway not constituting an exit shall be marked to minimize its possible confusion as an exit. Likewise, passage constituting a way to reach an exit shall be marked to minimize confusion.

F. All means of egress shall be provided with adequate and reliable illumination.

G. Fire alarm systems or devices shall be provided in every building or structure of such size, arrangement, or occupancy, to provide adequate warning to occupants.

H. Every building or structure, section, or area thereof of such size, occupancy and arrangement such that the reasonable safety of a number of occupants may be endangered by the blocking of any single means of egress due to fire or smoke, shall have at least two means of egress remote from each other, so arranged as to minimize any possibility that both may be blocked by any one fire or other emergency conditions.

I. Every vertical way of exit and other vertical openings between floors of a building shall be suitably enclosed or protected to afford reasonable safety of occupants while using exits and to prevent spread of fire, smoke, or fumes through vertical openings from floor to floor before occupants have entered exits.

J. Required Fire Safety Programs/Measures

In addition to the requirements, lessees or occupants of buildings, structures or facilities shall observe all pertinent fire safety measures.

1. All occupants or lessees of buildings, structures or facilities shall organize themselves, and develop and implement fire safety programs to include among others, fire prevention in the premises, notification of the BFP on the existence of fire, evacuation of persons and initial firefighting. The building owner shall take the initiative of formulating the fire safety program for his/her building and of organizing the occupants to implement the programs.
2. In buildings, leased to and used by one (1) or several companies or persons, the management of each company or each person shall be responsible for fire safety measures within the leased or occupied areas. The building owner shall be responsible for the common areas in the building such as the means of egress, utilities and building services equipment or systems.
3. In building structures or facilities, such as condominium and the like, where some units of the building are not yet sold, the provisions of para 2 above shall apply. When all condominium units have been sold, responsibility for fire safety measures in the common areas such as the means of egress, utilities, building equipment/system and the building as a whole, shall devolve jointly upon all individual unit owners, occupants and building administrators.

K. Compliance with this Chapter shall not be construed as eliminating or reducing the necessity of complying with other provisions for safety of persons using a structure under normal occupancy conditions. Also, no provision of RA 9514 and its RIRR shall be construed as requiring or permitting any condition that might be hazardous under normal occupancy conditions.

L. Construction and Repair Operations

1. New Construction
   a. No building or structure under construction shall be occupied in whole or in part until all required means of egress required for the part to be occupied are completed, inspected and approved for occupancy.
   b. Adequate escape facilities shall be maintained at all times in buildings under construction for the use of construction workers. These facilities shall consist of doors, walkways, stairs, ramps, fire escapes, or other arrangements in accordance with the general guidelines of RA 9514 and its RIRR in so far as they can be reasonably applied to buildings under construction.
2. Repairs or Alterations
   a. Existing buildings may be occupied during repairs or alterations provided that all existing fire protection systems/devices are continuously maintained or, in lieu thereof, other measures are taken to provide equivalent safety.
   b. Flammable or explosive substances or equipment necessary for the repair or alteration of a building or structure may be introduced therein while it is occupied, only if the conditions of use and the safeguards provided will not create any additional danger or impair the use of the means of egress.

M. Cooking equipment shall be protected by automatic kitchen hood fire suppression in accordance with internationally recognized standards.

DIVISION 3. CLASSIFICATION OF OCCUPANCY

A. A building or structure, or portion of buildings or structure, shall be classified as follows:

1. **Assembly**

   a. Assembly occupancies include, but are not limited to, all buildings or portions of buildings 1) used for gathering fifty (50) or more persons for such purposes as deliberation, worship, entertainment, eating, drinking, amusement, awaiting transportation, or similar uses; and 2) used as special amusement buildings.

   b. Assembly occupancies include theaters; assembly halls; auditoriums; exhibition halls; museums; restaurants; drinking establishments; places of worship; classrooms of fifty (50)persons and over capacity; libraries; Internet shops of over fifty (50) persons capacity; dance halls; clubrooms; skating rinks; gymnasiums; cockpit arenas; bowling facilities; pool rooms; passenger stations and terminals of air, surface, underground, and marine public transportation facilities; recreational facilities; piers; courtrooms; conference rooms; mortuary chapels or funeral homes; and special amusement buildings.

   c. Restaurants and drinking establishments with an occupant load of less than fifty (50) persons shall be classified as mercantile occupancies.

   d. Occupancy of any room or space for assembly purposes by less than fifty (50) persons in a building of other occupancy and incidental to such other occupancy shall be classified as part of the other occupancy and subject to the provisions applicable thereto.

2. **Educational**

   a. Educational occupancies include all buildings or portions thereof used for gathering of six (6) or more persons for purposes of instruction.

   b. Educational occupancies include schools, universities, colleges, academies, and kindergartens.

   c. Other occupancies associated with educational institutions shall be in accordance with the appropriate parts of this Chapter.

   d. In case where instruction is incidental to some other occupancy, the Section of the Chapter governing such other occupancy shall apply.

3. **Day Care**

   a. Day care occupancies include buildings, or portions thereof, in which four (4) or more clients receive care, maintenance, and supervision, by other than their relatives or legal guardians, for less than twenty-four (24) hours per day.

   b. Day care occupancies include adult day care centers, except where part of health care occupancies; child day care centers; day care homes; kindergarten classes that are incidental to a child day care occupancy; and nursery schools.

4. **Health Care**

   a. Health care facilities are those used for purposes of medical or other treatment or care of persons, where such occupants are mostly incapable of self-preservation because of age, physical or mental disability, or because of security measures not under the occupants' control.

   b. Health care facilities include hospitals, nursing homes, and birth centers.

5. **Residential Board and Care**

   a. Residential board and care buildings are those used for lodging and boarding of four (4) or more residents, not related by blood or marriage to the owners or operators, for the purpose of providing personal care services.

   b. Residential Board and Care include:

      1) Group housing arrangement for physically or mentally handicapped persons who normally attend school in the community, attend worship in the community, or otherwise use community facilities.

      2) Group housing arrangement for physically or mentally handicapped persons who are undergoing training in preparation for independent living, for paid employment, or for other normal community activities.

3) Group housing arrangement for the elderly that provides personal care services but that does not provide nursing care.

4) Facilities for social rehabilitation, alcoholism, drug abuse, or mental health problems that contain a group housing arrangement and that provide personal care services but do not provide acute care.

5) Assisted living facilities.

6) Other group housing arrangements that provide personal care services but not nursing care.

6. **Detention and Correctional**

a. Detention and correctional buildings are those used to house one (1) or more persons under varied degrees of restraint or security where such occupants are mostly incapable of self-preservation because of security measures not under the occupants' control.

b. Detention and correctional occupancies shall include those used for purposes such as adult correctional institutions, adult or youth detention facilities, adult community residential centers, adult work camps, youth rehabilitation center, and adult and juvenile substance abuse centers, and other similar facilities where occupants are confined or housed under some degree of restraint or security.

7. **Residential**

a. Residential occupancies are those occupancies in which sleeping accommodations are provided for normal residential purposes and include all buildings designed to provide sleeping accommodation.

b. Residential buildings, structures or facilities are treated separately in this Rule in the following groups: hotels, motels, apartelles, pension houses, inns, apartments, condominiums, dormitories, lodging or rooming houses, and single and two -family dwellings, and the likes.

8. **Mercantile**

a. Mercantile occupancies include stores, markets, and other rooms, buildings, or structures for the display and/or sale of merchandise.

b. Mercantile occupancies include malls, supermarkets, department stores, shopping centers, flea markets, restaurants of less than fifty (50) persons capacity, public/private dry and wet markets, water refilling stations, drugstores, hardwares/construction supplies, showrooms, and auction rooms.

c. Minor merchandising operation in building predominantly of other occupancies, such as newsstand in an office building, shall be subject to the exit requirements of the predominant occupancy.

d. Office, storage, and service facilities incidental to the sale of merchandise and located in the same building should be considered part of the mercantile occupancy classification.

9. **Business**

a. Business buildings are those used for the transaction of business other than that covered under Mercantile, for the keeping of accounts and records, and similar purposes.

b. Included in this occupancy group are offices for lawyers, doctors, dentists and other professionals, general offices, city/municipal halls, business process outsourcing (BPO), call centers, Internet shops, massage parlors, beauty parlors, barbershops of less than fifty (50) occupants, and court houses.

c. Minor office occupancy incidental to operations in other occupancy shall be considered as a part of the dominant occupancy and shall be subject to the provisions of the Chapter applying to the dominant occupancy.

10**. Industrial**

Industrial occupancies include factories that make products of all kinds and properties which shall include but not be limited to product processing, assembling and disassembling, mixing, packaging, finishing or decorating, repairing, and material recovery, including factories of all kinds, laboratories, dry cleaning plants, power plants, pumping stations, smokehouses, gas plants, refineries, sawmills, laundries, and creameries.

11. **Storage**

a. Storage occupancy includes all buildings or structures utilized primarily for the storage or sheltering of goods, merchandise, products, vehicles, or animals. Included in this occupancy group are warehouses, cold storages, freight terminals, truck and marine terminals, bulk oil storage, LPG storage, parking garages, hangars, grain elevators, barns, and stables.

b. Minor storage incidental to other occupancy shall be treated as part of the other occupancy.

12. **Mixed Occupancies**

a. Refers to two (2) or more classes of occupancies occurring/located/situated/existing in the same building and/or structures so intermingled that separate safeguards are impracticable.

b. The means of egress shall be sufficient to meet exit requirements for the occupants of each individual room or section, and for the maximum occupant load of the entire building. Fire safety construction, protective and warning systems, and other safeguards shall meet the most stringent requirements of the occupancy involved.

13. **Special Structures**

This class of occupancy includes buildings or structures which cannot be properly classified in any of the preceding occupancy groups. Such special buildings and structures shall conform to the fundamental guidelines provided for in Division 2 and to any specific provisions applicable thereto in Division 19 both of this Chapter.

B. In case of conflict as to the type or classification of occupancy, the same shall be determined by the C/MFM having jurisdiction.

DIVISION 4. HAZARD OF BUILDINGS

SECTION 10.2.4.1 GENERAL

A. For purposes of this Chapter, the degree of hazard shall be the relative danger of the start and spread of fire, the generation of smoke or gases, and the danger of explosion or other occurrences potentially endangering the lives and safety of the occupants of the building or structure due to the nature of the contents or processes/operations therein.

B. The degree of fire hazard shall be determined by the C/MFM having jurisdiction on the basis of the nature, character of the contents, and the process or operations being conducted in the building or structure: Provided, however, that where the flame spread rating of the interior finish or other features of the building or structure are such as to involve a fire hazard greater than the hazard of contents, the greater degree of fire hazard shall govern, except if such hazardous areas are segregated or protected as specified in Section 10.2.6.10 of this RIRR and the applicable Sections of Divisions 8 through 20 of this Chapter.

SECTION 10.2.4.2 CLASSIFICATION OF HAZARD OF CONTENTS

The hazard of contents of any building or structure shall be classified as follows:

A. **Low Hazard**

Those of such low combustibility that no self-propagating fire therein can occur and that, consequently, the only probable danger requiring the use of emergency exits will be from panic, fumes or smoke or fire from some external source.

B. **Moderate Hazard**

Those which are liable to burn with moderate rapidity or to give off a considerable volume of smoke but from which neither poisonous fumes nor explosions are to be expected in the event of fire.

C. **High Hazard**

Those which are liable to burn with extreme rapidity or from which poisonous gases or explosions are to be expected in the event of fire.

DIVISION 5. MEANS OF EGRESS

SECTION 10.2.5.1 APPLICATION

A. Means of egress for both new and existing buildings shall comply with this Division except as may be modified for individual occupancies by Divisions 8 through 20 of this Chapter.

B. Any change, alteration or addition that would reduce the means of egress below the requirements for new buildings is prohibited.

SECTION 10.2.5.2 GENERAL PROVISIONS

A. **Permissible Exit Components**

An exit shall consist of the approved components that are described, regulated, and limited as to use by Sections 10.2.5.3 through 10.2.5.13 of this RIRR. Exit components shall be constructed as an integral part of the building or shall be permanently affixed thereto.

B. **Protective Enclosure of Exit**

1. When an exit is required to be protected by separation from other parts of the building by some requirements of this RIRR, the construction of the separation shall meet the following requirements:
   a. The separation shall have at least one (1) hour fire resistance rating when the exit connects three (3) storeys or less, regardless of whether the storeys connected are above or below the storey at which the exit discharge begins.
   b. The separation shall have at least two (2) hours fire resistance rating when the exit connects four (4) or more storeys, whether above or below the floor of discharge. It shall be constructed of noncombustible materials and shall be supported by construction having at least a two-hour (2-hr) fire resistance rating.
   c. Any opening in the separation wall/construction shall be protected by an approved self-closing fire resistive door.
   d. Openings in exit enclosure shall be confined to those necessary for access to the enclosure from normally occupied spaces and for egress from the enclosure.
2. No exit enclosure shall be used for any purpose other than for means of egress.

C. **Capacity of Means of Egress**

1. The egress capacity for approved components of means of egress shall be based on the capacity factors shown in Table 1, *Capacity Factors*.

TABLE 1: CAPACITY FACTORS

Area	STAIRWAYS (width per person)	LEVEL COMPONENTS and RAMPS (width per person)
Board and Care	10.0 mm	5.0 mm
Health Care, Sprinklered	7.6 mm	5.0 mm
Health Care, Non Sprinklered	15.0 mm	13.0 mm
High Hazards	18.0 mm	10.0 mm
All Others	7.6 mm	5.0 mm

2. The required capacity of a corridor shall be the occupant load that utilizes the corridor for exit access, divided by the required number of exits to which the corridor connects. But the corridor capacity shall be not less than the required capacity of the exit to which the corridor leads.
3. For stairways wider than one thousand one hundred twenty millimeters (1,120 mm) and subject to the seven and six tenths millimeters (7.6 mm) width per person capacity factor, the capacity shall be permitted to be increased using the following equation:

$$C = 146.7 + [\frac{(Wn - 1120)}{5.45}]$$

where:

C = capacity, in persons, rounded to the nearest integer

Wn = nominal width of the stair

D. **Occupant Load**

1. The total capacity of means of egress for any floor, balcony, tier, or other occupied space shall be sufficient for the occupant load thereof, and shall not be less than the number computed by dividing the floor area assigned to that use by the occupant load factor in accordance with the requirements of Divisions 8 through 20 of this Chapter for individual occupancies. The occupant load in any building or portion thereof shall be the maximum number of persons that may be in the space at any time, as determined by the C/MFM having jurisdiction.
2. Where exits serve more than one (1) floor, only the occupant load of each floor considered individually need be used in computing the capacity of the exits of that floor; provided, that exit capacity shall not be decreased in the direction of exit travel. When means of egress from the floor above and below converge at an intermediate floor, the capacity of the means of egress from the point of convergence shall not be less than the sum of the two (2).
3. When any required egress capacity of a balcony or mezzanine passes through the room below, that required capacity shall be added to the required egress capacity of the room below.

E. **Measurement of Means of Egress**

1. The width of means of egress shall be measured by clear width starting from the narrowest point of the egress component under consideration, unless otherwise provided in para 2 hereof.
2. Projections of not more than one hundred fourteen millimeters (114 mm) at a maximum height of nine hundred sixty-five millimeters (965 mm) within the means of egress on each side shall be permitted.

F. **Minimum Width**

The width of any means of egress shall not be less than nine hundred fifteen millimeters (915 mm) except when specifically provided under Division 8 through 20 of this Chapter.

G. **Number of Means of Egress**

1. The number of means of egress from any balcony, mezzanine, storey, or portion thereof shall not be less than two (2), except when specifically permitted in Division 8 through 20 of this Chapter.
2. When the occupant load for any storey or portion thereof is more than five hundred (500) but not more than one thousand (1,000), the means of egress shall not be less than three (3); in excess thereof, the means of egress shall not be less than four (4).
3. The occupant load of each storey considered individually shall be required to be used in computing the number of means of egress at each storey, provided that the required number of means of egress is not decreased in the direction of exit travel.
4. No doors other than hoistway door, the elevator car door, and doors that are readily openable from the car side without a key, tool, special knowledge, or special effort shall be allowed at the point of access to an elevator car.
5. Elevator lobbies shall have access to at least one exit. Such exit access shall not require the use of a key, a tool, special knowledge, or special effort.

H. **Arrangement of Exit**

1. Exits shall be located and exit access shall be arranged so that exits are readily accessible at all times.
2. When exits are not immediately accessible from an open floor area, continuous passageways, aisles, or corridors leading directly to every exit shall be maintained and shall be arranged to provide access for each occupant to not less than two (2) exits by separate ways of travel.
3. Corridors shall provide exit access without passing through any intervening rooms other than corridors, lobbies, and other spaces permitted to be open to the corridor.
4. Remoteness shall be determined in accordance with the following:
   a. When more than one (1) exit is required from a building or portion thereof, such exits shall be remotely located from each other and shall be arranged and constructed to minimize the possibility that more than one exit has the potential to be blocked by any fire or other emergency condition.
   b. When two (2) exits or exit access doors are required, they shall be located at a distance from one another not less than one half (1/2) of the length of the maximum

overall diagonal dimension of the building or area to be served, measured in a straight line between the nearest edge of the exit doors or exit access doors, unless otherwise provided in para "c" hereof.

c. In buildings protected throughout by an approved, supervised automatic sprinkler system, the minimum separation distance between two (2) exits or exit access doors measured in accordance with para "b" hereof shall not be less than one-third (1/3) the length of the maximum overall diagonal dimension of the building or area to be served.

d. Where exit enclosures are provided as the required exits specified in para "b" and para "c" hereof and are interconnected by not less than one-hour (1-hr) fire resistance-rated corridor, exit separation shall be measured along the line of travel within the corridor.

e. Where more than two (2) exits or exit access doors are required, at least two (2) of the required exits or exit access doors shall be arranged to comply with the minimum separation distance requirement.

5. Interlocking or scissor stairs shall be considered only as a single exit for new buildings.

I. **Dead-End Limits**

Means of egress shall be so arranged that there are no dead-end pockets, hallways, corridors, passage ways or courts, whose depth exceeds six meters (6 m) unless otherwise specified in individual occupancies by Divisions 8 through 20 of this Chapter.

J. **Measurement of Travel Distance to Exits**

1. The maximum travel distance in any occupied space to the nearest exit shall not exceed the limits specified for individual occupancies by Divisions 8 through 20 of this Chapter. Maximum travel distance shall be determined as follows:

   a. The travel distance to an exit shall be measured on the floor or other walking surface along the center line of the natural path of travel, starting from the most remote point subject for occupancy, curving around any corner or construction with a three hundred millimeters (300 mm) clearance therefrom, and ending at the center of the doorway or other point at which the exit begins. Where measurement includes stairs, it shall be taken in the place of the tread nosing.

   b. In the case of open areas, distance to exits shall be measured from the most remote point subject for occupancy. In case of individual rooms subject for occupancy by not more than six (6) persons, distance to exits shall be measured from the floors of such rooms, provided that the path of travel from any point in the room to the room door does not exceed fifteen meters (15 m).

2. Where open stairways or ramps are permitted, as a path of travel to required exit, such as between mezzanines or balconies and the floor below, the distance shall include the travel on the stairway or ramp, and the travel from the end of the stairway or ramp to reach an outside door or other exit, in addition to the distance to reach the stairway or ramp.

3. Where any part of an exterior way of exit access is within three meters (3 m) horizontal distance of any unprotected building opening, as permitted by Section 10.2.5.5 of this RIRR for outside stairs, the distance to the exit shall include the length of travel to ground level.

K. **Access to Exits**

1. A door from a room to an exit or to a way of exit access shall be of the side-hinged, swinging type. It shall swing with exit travel.

2. In no case shall access to exit be through a bathroom, bedroom, or other room subject to locking, except where the exit is required to serve only the bedroom or other room subject to locking, or adjoining rooms constituting part of the same dwelling or apartment used for single family occupancy.

3. Ways of exit access and the doors to exits to which they lead shall be designed and arranged to be clearly recognizable as such. Decorations or draperies shall not be placed on exit doors. Mirrors shall not be placed in or adjacent to any exit in such a manner as to confuse the direction of exit.

4. Exit access shall be arranged that it will not be necessary to travel toward any area of high hazard occupancy in order to reach the nearest exit, unless the path is protected by suitable partitions.

L. **Exterior Ways of Exit Access**

1. Access to an exit may be by means of any exterior balcony, porch, gallery, or roof that conforms to the requirements of this Section.
2. Exterior ways of access shall have smooth, solid floors, substantially level, and shall have guards on the unenclosed sides at least equivalent to those specified in para "H" of Section 10.2.5.4 of this RIRR.
3. A permanent, reasonably straight path of travel shall be maintained over the required exterior way of exit access. There shall be no obstruction by railings, barriers, or gates that divide the open space into sections appurtenant to individual rooms, apartments, or other uses. Where the C/MFM having jurisdiction finds that the required path of travel is obstructed by furniture or other movable objects, he/she shall require their removal. However, if the width of the exterior way of exit access is greater than the required path of travel, he/she may permit the relocation of such furniture to one side so that they are out of the pathway. Such furniture shall then be fastened so they can no longer be moved. Alternatively, he/she may require that railings or other permanent barriers be installed to protect the path of travel against encroachment.
4. An exterior way of exit access shall be arranged so that there are no dead-ends in excess of six meters (6 m) in length.
5. Any gallery, balcony, bridge, porch or other exterior exit access that projects beyond the outside wall of a building shall comply with the requirements of this Division as to width and arrangement.

M. **Discharge from Exits**

1. All exits shall terminate directly at a public way or at an exterior exit discharge. Yards, courts, open space, or other portions of the exit discharge shall be of required width and size to provide all occupants with a safe access to a public way, and be in accordance with NFPA 101, *Life Safety Code* with respect to changes in elevation, stairs, ramps, or keeping means of egress free from obstruction. Means of egress shall be permitted to terminate in an exterior area for detention and correctional occupancies as otherwise provided in NFPA 101.
2. Where permitted for individual occupancies by Divisions 8 through 20 of this Chapter, a maximum of fifty percent (50%) of the exits may discharge through areas on the floor of discharge provided all of the following requirements are met:
   a. Exits shall discharge to a free and unobstructed way to the exterior of the building and is readily visible and identifiable from the point of discharge from the exit.
   b. The floor of discharge into which the exit discharges and any other portion of the level of discharge with access to the discharge areas are protected with approved supervised sprinkler system or separated from it in accordance with the requirement for the enclosure of exits except if the discharge area is a vestibule or foyer complying with all of the following, and where allowed in Divisions 8 through 20 of this Chapter:
      1) The depth from the exterior of the building is not greater than three meters (3 m);
      2) The length is not greater than six meters (6 m);
      3) The foyer is separated from the remainder of the level of discharge by construction providing protection at least the equivalent of wired glass in steel frames; and the foyer serves only as means of egress, including exits direct to the outside.
   c. The entire area on the floor of discharge is separated from areas below by construction having a minimum of two-hour (2-hr) fire resistance rating.
3. Stairs and other exits shall be so arranged as to make clear the direction of egress to the street.
   a. An exit from the upper storeys in which the direction of egress travel is generally downward should not be arranged so that it is necessary to change to travel in an upward direction at any point before discharging to the outside. A similar prohibition of reversal of the vertical component of travel should be applied to exits from storeys below the floor of exit discharge. However, an exception is permitted in the case of stairs used in connection with overhead or under floor exit passageways that serve the street floor only.
   b. Exit stairs that continue beyond the floor of discharge shall be interrupted at the floor of discharge by partitions, doors, or other effective means. Stairs and ramps that continue more than a half (1/2) storey beyond the level of discharge shall be

provided with an approved means to prevent or dissuade occupants from traveling past the level of discharge during emergency building evacuation.

4. Stairs, ramps, bridges, balconies, escalators, moving walks and other components of an exit discharge shall comply with the detailed requirements of this Division for such components.
5. Subject to the approval of the C/MFM having jurisdiction, exits may be accepted to discharge to roofs or other sections of the building or adjoining buildings, where the roof has a fire resistance rating at least the equivalent of that required for the exit enclosure, and where there is a continuous and safe means of egress from the roof, and all other reasonable requirements for the safety are maintained.
6. The exit discharge shall be so arranged to meet the remoteness criteria in NFPA 101, and marked to make clear the direction of egress travel from the exit discharge to a public way.
   a. The entire area on the level of discharge shall be separated from areas below by construction having a fire resistance rating not less than that required for the exit enclosure.
   b. Levels below the level of discharge in an atrium shall be permitted to be open to the level of discharge where such level of discharge is protected.

N. **Headroom**

The minimum headroom shall not be less than two meters (2 m) nor any projection from the ceiling be less than two meters (2 m) from the floor.

O. **Changes in Elevation**

Where a means of egress is not level, such differences in elevation shall be negotiated by stairs or ramps conforming to the requirements of this Section for stairs and ramps.

P. **Interior Finish in Exits**

The flame spread of interior finish shall not exceed Class B in accordance with Section 10.2.6.4 of this RIRR in exit enclosures, except when allowed in Division 8 through 20 of this Section.

SECTION 10.2.5.3 DOORS

A. **Application**

1. A door assembly, including the doorway, frame, door, and necessary hardware, may be used as a component in a means of egress when it conforms to the general requirements of Section 10.2.5.2 of this RIRR and to the specific requirements of this Section.
2. Every door and every principal entrance which are required to serve as an exit shall be designed and constructed that the way of exit travel is obvious and direct. Windows, which because of their physical configuration or design and the materials used in their construction could be mistaken for doors, shall be made inaccessible to the occupants by barriers or railings conforming to the requirements of para "H" of Section 10.2.5.4 of this RIRR.
3. The door assembly required by this Section shall comply with the fire protection rating and, where rated, is self-closing or automatic-closing by means of smoke detection in accordance with para "G" of this Section, and is installed in accordance with NFPA 80, *Standard for Fire Doors and Fire Windows*.

B. **Swing and Force to Open**

1. Any door in a means of egress shall be of the side-hinged or pivoted-swinging type. The door shall be designed and installed so that it is capable of swinging from any position to the full required width of the opening in which it is installed. Doors required to be of the side-hinged or pivoted-swinging type shall swing in the direction of egress travel where serving a room or area with an occupant load of fifty (50) or more persons.
2. A door shall swing in the direction of egress travel when used in an exit enclosure or where serving a high hazard contents area, unless it is a door from an individual living unit that opens directly into an exit enclosure. During its swing, any door in a means of egress shall leave not less than a half (1/2) of the required width of an aisle, corridor, passageway, or landing unobstructed and shall not project more than one hundred seventy-eight millimeters (178 mm) into the required width of an aisle, corridor, passageway, or landing, when fully open. Doors shall not open directly onto a stair without a landing. The landing shall have a width not less than the width of the door.

3. Unless exempt by other provisions of this Rule, any door used in an exit shall be designed and installed that when a force is applied to the door on the side from which egress is to be made, it shall swing in the direction of exit travel from any position to the full instant use of the opening in which it is installed.

C. **Locks, Latches, Alarm Devices**

1. A door shall be arranged to be readily opened from the side from which egress is to be made at all times when the building served thereby is occupied. Locks, if provided, shall not require the use of a key, a tool, or special knowledge or effort, for operation from the inside of the building.
2. A latch or other fastening device on a door shall be provided with a knob, handle, panic bar, or other simple type releasing device, the method of operation of which is obvious, even in darkness.
3. A door designed to be kept normally closed in a means of egress, such as a door to a stair or horizontal exit, shall be provided with a reliable self-closing mechanism in accordance with para "G" of this Section, and shall not at any time be secured in the open position. A door designed to be kept normally closed shall bear a sign reading substantially as follows:

FIRE EXIT

KEEP DOOR CLOSED

4. Doors on buildings of four (4) or more storeys in height shall be provided with re-entry mechanism to provide access out of the stairway to another exit. There shall be re-entry mechanism every four (4) floors that provide a way out of the stairway.
5. Doors not allowing re-entry shall be provided with a sign indicating the location of the nearest door, in each direction of travel that allows re-entry or exit.

NO RE – ENTRY

PROCEED TO _____ FLOOR
AND _____ FLOOR

D. **Egress Capacity Width**

In determining the egress width for swinging doors, only the clear width of the doorway when the door is open ninety degrees (90°) shall be measured. In determining the egress width for other types of doors for purposes of calculating capacity, only the clear width of the doorway when the door is in the full open position shall be measured. Clear width of doorways shall be measured between the face of the door and the stop in accordance with Section 10.2.5.2 para "E" of this RIRR.

E. **Width and Floor Level**

1. Door openings in means of egress shall not be less than seven hundred ten millimeters (710 mm) in clear width. When a pair of doors is provided, not less than one of the doors shall provide at least seven hundred ten millimeters (710 mm) clear width opening.
2. No single door in a doorway shall exceed one and twenty-two hundredths meters (1.22 m) in width.
3. The elevation of the floor surfaces on both sides of a door shall not vary by more than thirteen millimeters (13 mm). The elevation shall be maintained on both sides of the doorway for a distance not less than the width of the widest leaf. Thresholds at doorways shall not exceed thirteen millimeters (13 mm) in height. Raised thresholds and floor level changes in excess of six millimeters (6 mm) doorways shall be beveled with a slope not steeper than one (1) in two (2).

F. **Panic Hardware**

1. When a door is required to be equipped with panic hardware by some other provisions of this Rule, the panic hardware shall cause the door latch to release when a force of not more than seven kilogram-force (7 kgf) is applied to the releasing device in the direction of exit travel.
2. Such releasing devices shall be bars or panel extending not less than two-thirds (2/3) of the width of the door and placed at heights suitable for the service required, and shall not be less than seven hundred sixty millimeters (760 mm) nor more than one thousand one hundred twenty millimeters (1,120 mm) above the floor.
3. Required panic hardware shall not be equipped with any locking or dogging device,

set screw, or other arrangement which can be used to prevent the release of the latch when pressure is applied to the bar.

G. **Self-Closing Devices**

A door normally required to be kept closed shall be installed or equipped with automatic door closer in accordance with the following criteria:

1. Upon release of the hold-open mechanism, the door becomes self-closing.
2. The release device is designed so that the door instantly releases manually and, upon release, becomes self-closing, or the door can be readily closed.

H. **Maintenance**

No lock, padlock, hasp, bar, chain, or other device, or combination thereof shall be installed or maintained at any time on or in connection with any door on which panic hardware is required by this Chapter, if such device prevents, or is intended to prevent, the free use of the door for purposes of egress.

I. **Power Operated Doors**

1. Where required doors are operated by power, such as those with photo-electric actuated mechanism which open upon the approach of a person or doors with power-assisted manual operation, the design shall be such that in event of power failure, the door may be opened manually to permit exit travel or closed where necessary to safeguard means of egress.
2. No power-operated door shall be counted as a required exit unless it also swings with the exit travel by manual means.

J. **Screen and Storm Doors**

No screen door or storm door in connection with any required exit shall swing against the direction of exit travel in any case where doors are required to swing with the exit travel.

K. **Revolving Doors**

1. A revolving door shall not be used in a means of egress for an exit from the floor of discharge directly to the outside except where specifically permitted in other Divisions of this Chapter. It shall not be used at the foot or top of stairs at the floor of discharge. Where permitted, the revolving door or doors shall be given a credit of only fifty percent (50%) of the required capacity of exit except as provided in para K.2 hereof. Such revolving doors shall be of approved type.
2. The number of revolving doors used as exit doors shall not exceed the number of swinging doors used as exit doors within six meters (6 m) except when revolving doors may serve as exits without adjacent swinging doors for street floor elevator lobbies, if no stairways or doors from other parts of the building discharge through the lobby, and the lobby has no occupancy other than as a means of travel between elevators and street.
3. Revolving doors shall be equipped with means to prevent their rotation at too rapid a rate to permit orderly egress.

L. **Turnstiles**

1. No turnstiles or similar device to restrict travel to one direction, or to collect fares or admission charges, shall be placed to obstruct any required means of egress, except that approved turnstiles not over nine hundred ten millimeters (910 mm), which turn freely in the direction of exit travel, may be used in any occupancy where revolving doors are permitted. Turnstiles over nine hundred ten millimeters (910 mm) shall be subject to the requirements for revolving doors.
2. No turnstiles shall be placed in any required exit, or barring the way of access thereto or travel therefrom, unless immediately adjacent or within six and one tenth meters (6.1 m) there is a swinging door or gate opening freely in the direction of exit travel, an open passage serving the same general path of travel as the turnstile.
3. Turnstile shall be rated the same as revolving doors as regards to units of exit width and rates of travel.

M. **Doors in Folding Partitions**

1. When permanently mounted folding movable partition are used to divide a room into smaller spaces, a swinging door or open doorway shall be provided as a way of exit access from each such space.

2. The swinging door may be omitted and the partition may be used to enclose the space completely under the following conditions:
   a. The subdivided space shall not be used by more than twenty (20) persons at any time;
   b. The use of the space shall be under adult supervision;
   c. The partitions shall be so arranged that they do not extend across any aisle or corridor used as a way of access to the required exits from the floor;
   d. The partitions shall conform to the interior finish and other applicable requirements of this Chapter; and
   e. The partitions shall be an approved type, shall have a simple method of release, and shall be capable of being opened quickly and easily by inexperienced persons in case of emergency.

N. **Horizontal Sliding Doors**

Horizontal sliding doors shall meet the following criteria:

1. The door is readily operable from either side without special knowledge or effort.
2. The force that, when applied to the operating device in the direction of egress, is required to operate the door is not more than seven kilogram-force (7 kgf).
3. The force required to operate the door in the direction of exit travel is not more than fifteen kilogram-force (15 kgf) to set the door in motion and is not more than seven kilogram-force (7 kgf) to close the door or open it to the minimum required width.
4. The door assembly complies with the fire protection rating and, where rated, is self-closing or automatic-closing by means of smoke detection in accordance with para "G" of this Section, and is installed in accordance with NFPA 80, *Standard for Fire Doors and Fire Windows*.

SECTION 10.2.5.4 STAIRS

A. **General**

1. Stairs used as a component in the means of egress shall conform to the general requirements of Section 10.2.5.2 of this RIRR and to the special requirements of this Section.
2. All stairways designated as a means of egress shall be continuous from the uppermost floor level down to the ground floor.

B. **Dimensional Criteria**

1. Standard stairs shall meet the following criteria:
   a. New stairs shall be in accordance with Table 2, *Dimensional Criteria for New Stairs* and Table 4, *New Stair Width*.
   b. Existing stairs shall be permitted to remain in use, provided that they meet the requirements for existing stairs shown in Table 3, *Dimensional Criteria for Existing Stairs*.
   c. Approved existing stairs shall be permitted to be rebuilt in accordance with the following:
      1) Dimensional criteria of Table 3, *Dimensional Criteria for Existing Stairs*.
      2) Other stair requirements of Section 10.2.5.4 of this RIRR.
      3) The requirements for new and existing stairs shall not apply to stairs located in industrial equipment access areas except as otherwise provided in Division 17 of this Chapter.

Table 2: DIMENSIONAL CRITERIA FOR NEW STAIRS

Feature	Dimensional Criteria
Minimum Width	See Table 4
Maximum height of risers	180 mm
Minimum height of risers	100 mm
Minimum tread depth	280 mm
Minimum headroom	2,000 mm
Maximum height between landings	3,660 mm

Table 3: DIMENSIONAL CRITERIA FOR EXISTING STAIRS

Feature	Dimensional Criteria
Minimum width clear of all obstructions, except projections not more than one hundred fourteen millimeters (114 mm) at or below handrail height on each side	915 mm
Maximum height of risers	205 mm
Minimum tread depth	230 mm
Minimum headroom	2,000 mm
Maximum height between landings	3,660 mm

2. Minimum New Stair Width

   a. Where the total occupant load of all storeys served by the stair is fewer than fifty (50), the minimum width clear of all obstructions, except projections not more than one hundred fourteen millimeters (114 mm) at or below handrail height on each side, shall be nine hundred fifteen millimeters (915 mm).

   b. Where stairs serve occupant loads exceeding that permitted by para B.2.a of this Section, the minimum width clear of all obstructions, except projections not more than one hundred fourteen millimeters (114 mm) at or below handrail height on each side, shall be in accordance with Table 4, *New Stair Width* and the requirements of paras B.2.c, 2.d, and 2.e of this Section.

Table 4: NEW STAIR WIDTH

Total Cumulative Occupant Load Assigned to the Stair	Width
< 2,000 persons	1,120 mm
≥ 2,000 persons	1,420 mm

   c. The total cumulative occupant load assigned to a particular stair shall be that stair's prorated share of the total occupant load, as stipulated in paras B.2.d and B.2.e of this Section, calculated in proportion to the stair width.

   d. For downward egress travel, stair width shall be based on the total number of occupants from storeys above the level where the width is measured.

   e. For upward egress travel, stair width shall be based on the total number of occupants from storeys below the level where the width is measured.

C. **Curved Stairs**

Curved stairs shall be permitted as a component in a means of egress, provided that the depth of tread is not less than two hundred eighty millimeters (280 mm) at a point three hundred five millimeters (305 mm) from the narrowest end of the tread, and the smallest radius is not less than twice the stair width.

D. **Spiral Stairs**

1. Where specifically permitted for individual occupancies by Divisions 8 to 20 of this Chapter, spiral stairs as a component of means of egress shall comply with the following:

   a. Riser heights shall not exceed one hundred eighty millimeters (180 mm).

   b. The stairway shall have a tread depth of not less than two hundred eighty millimeters (280 mm) for a portion of stairway width sufficient to provide egress capacity for the occupant load served in accordance with para "C" Section 10.2.5.2 of this RIRR.

   c. At the outer side of the stairway, an additional two hundred sixty-five millimeters (265 mm) of width shall be provided clear to the other handrail, and this width shall not be included as part of the required egress capacity.

   d. Handrails shall be provided on both sides of the spiral stairway.

   e. The inner handrail shall be located within six hundred ten millimeters (610 mm), measured horizontally, of the point where a tread depth of not less than two hundred eighty millimeters (280 mm) is provided.

   f. The turn of the stairway shall be such that the outer handrail is at the right side of descending users.

2. Where the occupant load served does not exceed three, spiral stairs shall be permitted, provided that the following criteria are met:
   a. The clear width of the stairs shall be not less than six hundred sixty millimeters (660 mm).
   b. The height of risers shall not exceed two hundred forty millimeters (240 mm).
   c. The headroom shall be not less than one and ninety-eight hundredths meters (1.98 m).
   d. Treads shall have a depth of not less than one hundred ninety millimeters (190 mm) at a point three hundred five millimeters (305 mm) from the narrower edge.
   e. All treads shall be identical.
   f. Handrails shall be provided on both sides of the stairway.
3. Where the occupant load served does not exceed five, existing spiral stairs shall be permitted, provided that the requirements of para D.2.a through 2.e above are met.

E. **Winders**

Where allowed in Division 8 through 20 of this Chapter, winders shall be permitted in stairs, provided that the same shall have a tread depth of not less than one hundred fifty millimeters (150 mm) and a tread depth of not less than two hundred eighty millimeters (280 mm) at a point three hundred five millimeters (305 mm) from the narrowest edge.

F. **Enclosure**

1. All interior stairways shall be enclosed in accordance with the provisions of Section 10.2.5.2 and Section 10.2.6.2 of this RIRR, except insofar as open stairways are permitted by para A.2 of Section 10.2.6.5 of this RIRR.
2. There shall be no enclosed, usable space within an exit enclosure, including under stairs, nor shall any open space within the enclosure be used for any purpose that has the potential to interfere with egress.

G. **Stair Details**

1. All stairs serving as required means of egress shall be of permanent fixed construction. Each new stair and platform, landing, balcony, and stair hallway floor used in buildings of four (4) storeys or more and in all new buildings, required by this Rule to be of fire-resistive construction, shall be non-combustible material throughout, except the handrails. Treads of stairs and landing floors shall be solid.
2. Each stair, platform, landing, balcony, and stair hallways floor shall be designed to carry a load of four hundred eighty-eight kilograms per square meter (488 kg/m^2) or a concentrated load of one hundred thirty-six kilograms (136 kg), so located as to produce maximum stress conditions.
3. There shall be no variation exceeding five millimeters (5 mm), in the width of treads or in height of risers in any flight, except as permitted by para "H" of this Section for monumental stairs.
4. Every tread less than two hundred fifty millimeters (250 mm) shall have a nosing or an effective projection of approximately twenty-five millimeters (25 mm) over the level immediately below.
5. Where material of stair treads and landings is such as to involve danger of slipping, non-slip material shall be provided on tread surface.
6. Stairways and intermediate landings shall continue with no decrease in width along the direction of exit travel.

H. **Guards and Handrails**

1. Means of egress such as stairs, stair landings, balconies, ramps and aisles located along the edge of open-sided floor and mezzanines, shall have guards to prevent falls over the open side. Each new stair, stair landing, and ramp shall have handrails on both sides.
2. Required guards and handrails shall continue for the full length of each flight of stairs.
3. The design of guards and handrails and the hardware for attaching handrails to guards, balusters, or masonry walls shall be such that there are no projecting logs on attachment devices or non-projecting corners or members of grilles or panels which may engage loose clothing. Opening in guards shall be designed to prevent loose clothing from being wedged in such openings.

4. Handrails Details:
   a. Handrails on stairs shall be not less than seven hundred sixty millimeters (760 mm) nor more than eight hundred sixty-five millimeters (865 mm) above the upper surface of the tread, measured vertically to the top of the rail from a point on the tread twenty-five millimeters (25 mm) back from the leading edge, except on stairways designed for use by children an additional handrail may be provided lower than the main handrail.
   b. Handrails shall provide a clearance of at least thirty-eight millimeters (38 mm) between handrail and wall to which it is fastened. Handrails shall be of such design and so supported as to withstand a load of not less than ninety-one kilograms (91 kg) applied to any point, downward or horizontally.
   c. Handrails shall be so designed as to permit continuous sliding of hands on them.
   d. Every stairway, required to be more than two and twenty-three hundredths meters (2.23 m) in width, shall have intermediate handrails dividing the stairway into portions not more than two and twenty-three hundredths meters (2.23 m) in width, except that in monumental outside stairs, two (2) handrails may be permitted.
5. Guard Details:
   a. The height of guards shall be measured vertically to the top of the guard from a point on the tread twenty-five millimeters (25 mm) back from the leading edge or from the floor of landings or balconies.
   b. No guards shall be required for inside stairs which reverse direction at intermediate landings, where the horizontal distance between successive flights is not more than three hundred five millimeters (305 mm).
   c. Guards shall not be less than one and six hundredths meters (1.06 m) high. Guards protecting changes in level, one storey or less on interior balconies and mezzanines, shall be not less than ninety-one hundredths meter (0.91 m).
   d. Guards shall be so constructed that the area in the plane of the guard from the top of the floor, riser, or curb to the minimum required height of guard shall be subdivided or filled in one of the following manners:
      1) A sufficient number of intermediate longitudinal rails so that the clear distance between rails measured at right angles to the run of rail do not exceed two hundred twenty-five millimeters (255 mm). The button rails shall not be more than two hundred twenty-five millimeters (255 mm) from the top of the floor, tread or curb measured vertically.
      2) Vertical balusters spaced not more than one hundred fifty-two and a half millimeters (152.5 mm) apart.
      3) Areas filled wholly or partially by panels of solid wire mesh or expanded metal construction or by ornamental grilles which provide protection against falling through the guard equivalent to that provided by the intermediate rails or vertical balusters specified in the two preceding paragraphs.
      4) The lower part of the area may consist of a continuous substantial curb, the top of which is parallel to the run of stairs of level areas and the height of which is not less than seventy-six millimeters (76 mm) on stairs (measured at right angles to the curb from its top to the nosing of the tread) and not less than one hundred fifty-two and and a half millimeters (152.5 mm) for level areas.
      5) Masonry walls may be used for any portion of the guard.
      6) Any combination of the foregoing that provides equivalent safety.
   e. Enclosure walls and guards consisting of masonry, railings, or other construction shall either be designed for loads transmitted by attached handrails or shall be designed to resist a horizontal force of seventy-five kilograms (75 kg) per lineal meter applied at the top of the guard, whichever condition produces maximum stress. For walls or guards higher than the minimum height, the specified force shall be applied at a height one and seven hundredths meters (1.07 m) above the floor or tread.
   f. Intermediate rails, balusters, and panel fillers shall be designed for a uniform load of not less than one hundred twenty-two kilograms per square meter (122 kg/m^2) over the gross area of the guard (including the area of any opening in the guard) of which they are a part. Reactions due to this loading need not be added to the loading specified by para H.5.c of this Section in designing the main supporting members of guards.

I. **Smoke-proof Enclosures**

1. General

Where smoke proof enclosures are required in other Sections of this Code, they shall comply with this Section, except for approved existing smoke proof enclosures.

2. Performance Design

An appropriate design method shall be used to provide a system that meets the definition of smoke proof enclosure. The smoke proof enclosure shall be permitted to be created by using natural ventilation, by using mechanical ventilation incorporating a vestibule, or by pressurizing the stair enclosure.

3. Enclosure

A smoke proof enclosure shall be enclosed from the highest point to the lowest point by barriers having two-hour (2-hr) fire resistance ratings. Where a vestibule is used, it shall be within the two-hour (2-hr) rated enclosure and shall be considered part of the smoke proof enclosure.

4. Vestibule

Where a vestibule is provided, the doorway into the vestibule shall be protected with an approved fire door assembly having a one and a half-hour (1.5-hr) fire resistance rating, and the fire door assembly from the vestibule to the smoke proof enclosure shall have not less than a twenty-minute (20-min) fire resistance rating. Doors shall be designed to minimize air leakage and shall be self-closing or shall be automatic-closing by actuation of a smoke detector within three meters (3 m) of the vestibule door. New doors shall be installed in accordance with NFPA 105*, Standard for Smoke Door Assemblies and Other Opening Protectives*.

5. Discharge

Every smoke proof enclosure shall discharge into a public way, into a yard or court having direct access to a public way, or into an exit passageway. Such exit passageways shall be without openings, other than the entrance to the smoke proof enclosure and the door to the outside yard, court or public way. The exit passageway shall be separated from the remainder of the building by a two-hour (2-hr) fire resistance rating.

6. Access

For smoke proof enclosures other than those consisting of a pressurized stair enclosure complying with para I.9 of this Section, access to the smoke proof stair enclosure shall be by way of a vestibule or an exterior balcony.

7. Natural Ventilation

Smoke proof enclosures using natural ventilation shall comply with para 3 hereof and the following:

a. Where access to the stair is by means of an open exterior balcony, the door assembly to the stair shall have a one and a half hour (1.5-hr) fire resistance rating and shall be self-closing or automatic-closing by actuation of a smoke detector. Openings adjacent to the exterior balcony specified in the preceding paragraph shall be protected

b. Every vestibule shall have a net area of not less than one and a half square meters (1.5 m^2) of opening in an exterior wall facing an exterior court, yard, or public space not less than six meters (6 m) in width.

c. Every vestibule shall have a minimum dimension of not less than the required width of the corridor leading to it and a dimension of not less than one and eighty-three hundredths meters (1.83 m) in the direction of travel.

8. Mechanical Ventilation

Smoke proof enclosures using mechanical ventilation shall comply with para 3 hereof and the following requirements:

a. Vestibules shall have a dimension of not less than one and twelve hundredths meters (1.12 m) in width and not less than one and eighty-three hundredths meters (1.83 m) in direction of travel.

b. The vestibule shall be provided with not less than one air change per minute, and the exhaust shall be one hundred fifty percent (150%) of the supply. Supply air shall enter and exhaust air shall discharge from the vestibule through separate tightly

constructed ducts used only for such purposes. Supply air shall enter the vestibule within one hundred fifty millimeters (150 mm) of the floor level. The top of the exhaust register shall be located not more than one thousand one hundred fifty millimeters (1,150 mm) below the top of the trap and shall be entirely within the smoke trap area. Doors, when in the open position, shall not obstruct duct openings. Controlling dampers shall be permitted in duct openings if needed to meet the design requirements.

c. To serve as a smoke and heat trap and to provide an upward-moving air column, the vestibule ceiling shall be not less than five and one tenth meters (5.1 m) higher than the door opening into the vestibule. The height shall be permitted to be decreased where justified by engineering design and field testing.

d. The stair shall be provided with a damper relief opening at the top and supplied mechanically with sufficient air to discharge at least seventy and eight tenths cubic meters per minute (70.8 m^3/min) through the relief opening while maintaining a positive pressure of not less than twenty-five Newton per square meter (25 N/m^2) in the stair, relative to the vestibule with all doors closed.

9. Stair Pressurization

a. Smoke proof enclosures using stair pressurization shall use an approved engineered system with a design pressure difference across the barrier of not less than twelve and a half Newton per square meters (12.5 N/m^2) in sprinklered buildings, or twenty-five (25 N/m^2) in non-sprinklered buildings, and shall be capable of maintaining these pressure differences under likely conditions of stack effect or wind. The pressure difference across doors shall not exceed that which allows the door to begin to be opened by a force of one hundred thirty-three Newtons (133 N) in accordance with Section 10.2.5.3 of this RIRR.

b. Equipment and ductwork for stair pressurization shall be located in accordance with one of the following specifications:

1) Exterior to the building and directly connected to the stairway by ductwork enclosed in noncombustible construction.

2) Within the stair enclosure with intake and exhaust air vented directly to the outside or through ductwork enclosed by a two-hour (2-hr) fire-resistive rating.

3) Within the building under the following conditions:

a) Where the equipment and ductwork are separated from the remainder of the building, including other mechanical equipment, by a two-hour (2-hr) fire-resistive rating.

b) Where the building, including the stairway enclosure, is protected throughout by an approved, supervised automatic sprinkler system and the equipment and ductwork are separated from the remainder of the building, including other mechanical equipment, by not less than one (1) hour fire-resistive rating.

c. In all cases specified by para I.9.a through 9.b of this Section, openings into the required fire resistance–rated construction shall be limited to those needed for maintenance and operation and shall be protected by self-closing fire protection–rated devices.

10. Activation of Mechanical Ventilation and Pressurized Stair Systems

a. For both mechanical ventilation and pressurized stair enclosure systems, the activation of the systems shall be initiated by a smoke detector installed in an approved location within three meters (3 m) of the entrance to the smoke proof enclosure.

b. The required mechanical system shall operate upon the activation of the smoke detectors specified in para "a" above and by manual controls accessible to the fire department. The required system also shall be initiated by the following, if provided:

1) Water flow signal from a complete automatic sprinkler system; or

2) General evacuation alarm signal.

11. Door Closers

The activation of an automatic-closing device on any door in the smoke proof enclosure shall activate all other automatic-closing devices on doors in the smoke proof enclosure.

12. Emergency Power Supply System (EPSS)

EPSS for new mechanical ventilation equipment shall be provided in accordance with NFPA 110, *Standard for Emergency and Standby Power Systems*.

J. **Monumental Stairs**

Monumental stairs, either inside or outside, may be accepted as required exits if all requirements for exit stairs are complied with, including required enclosures and minimum width of treads, except that curved stairs may be accepted with a radius of seven and a half meters (7.5 m) or more at the inner edges.

SECTION 10.2.5.5 OUTSIDE STAIRS

A. **General**

Any permanently installed stair outside of the building being served is acceptable as a means of egress under the same condition.

B. **Enclosures**

1. Under all conditions where enclosure of inside stairways is required, outside stairs shall be separated from the interior of the buildings with walls having the same fire-resistance rating as that required for the wall enclosing inside stairs. Any opening in such wall shall be protected by fire doors or fixed wired glass windows.
2. Wall construction required by para B.1 of this Section shall extend as follows:
   a. Either vertically from the ground to a point three thousand fifty millimeters (3,050 mm) above the topmost landing of the stairs or to the roofline, whichever is lower.
   b. Horizontally for not less than three thousand fifty millimeters (3,050 mm).

SECTION 10.2.5.6 HORIZONTAL EXITS

A. **Application**

1. A horizontal exit is a way of passage from one building to an area of refuge in another building on approximately the same level, or a way of passage through or around a wall or partition to an area of refuge on approximately the same level in the same building, which affords safety from fire or smoke from the area of escape and areas communicating therewith.
2. Horizontal exits may be substituted for other exits to an extent that the total exit capacity of the other exits (stairs, ramps, doors leading outside the building) will not be reduced below half that required for the entire area of the building or connected building if there were no horizontal exits, except for health care occupancies, where the total exit capacity of the other exits (stairs, ramps, doors leading outside the building) shall not be reduced below one-third (1/3) that required for the entire area of the building.

B. **Egress from Area of Refuge**

1. Every fire compartment allowed in connection with a horizontal exit shall have in addition to the horizontal exit or exits at least one (1) stairway or doorway leading outside, or other standard exit. Any fire section not having a stairway or doorway leading outside shall be considered as part of an adjoining section with stairway.
2. Every horizontal exit shall be so arranged that there are continuously available paths of travel leading from each side of the exit to stairways or other standard means of egress leading to outside the building.

   This requirement is complied with where the entire areas from each side of the horizontal exit to the stairways or other standard means of egress are occupied by the same tenant; or where there are public corridors or other continuously available passageways leading from each side of the exit to stairway or other standard means of egress leading to outside of the building.
3. Whenever either side of the horizontal exit is occupied, doors used in connection with the horizontal exit shall swing in opposite directions and shall not be locked from either side.
4. The floor area on either side of a horizontal exit shall be sufficient to hold the occupant of both floor areas, allowing not less than three tenths square meter (0.3 m^2) clear floor areas per person.
5. Every building shall be provided with separate means of egress. in cases where means of egress is by means of horizontal exit to another building or structure, the exits of said building shall be maintained, properly protected and readily accessible to the occupants of the other building

C. **Bridges and Balconies**

1. Each bridge or balcony utilized in conjunction with horizontal exits shall comply with the structural requirements for outside stairs and shall have guards and handrails in general conformity with the requirements of Section 10.2.5.4 of this RIRR for stairs and smoke proof enclosures.
2. Every bridge or balcony shall be at least as wide as the door leading to it and not less than one and twelve hundredths meters (1.12 m) for new construction.
3. Every door leading to a bridge or balcony serving as a horizontal exit from a fire area, shall swing with exit travel out of the fire area.
4. Where the bridge of balcony serves as a horizontal exit in one direction, only the door from the bridge or balcony into the area of refuge shall swing in.
5. Where the bridge or balcony serve as a horizontal exit in both direction, doors shall be provided in pairs swinging in opposite directions, only the door swinging with the exit travel to be counted in determination of exit width, unless the bridge or balcony has sufficient floor area to accommodate the occupant load of either connected or fire compartment on the basis of three tenths square meter (0.3 m^2) per person or in existing buildings by specific permission of the C/MFM having jurisdiction, in which case doors on both ends of the bridge or balcony may swing out from the buildings.
6. The bridge or balcony floor shall be on the level with the floor of the building.
7. Ramps shall be employed where there is a difference in level between connected buildings or floor areas. Steps may be used where the difference in elevation is greater than five hundred thirty-three and four tenths millimeters (533.4 mm). Ramps and stairs shall be in accordance with the Sections of this Rule pertaining to ramps, stairs and outside stairs.
8. All wall openings, in both of the connected buildings or fire areas any part of which is within three meters (3 m) of any bridge or balcony as measured horizontally or below, shall be protected with fire doors or fixed metal-frame wired-glass windows; except where bridges have solid sides not less than one and eight tenths meters (1.8 m) in height, such protection of wall openings may be omitted.

D. **Openings through Walls for Horizontal Exits**

1. Walls connected by a horizontal exit between buildings shall be of non-combustible material having a two-hour (2-hr) fire resistance rating. They shall provide a separation continuous to the ground.
2. Any opening in such walls, whether or not such opening serves as an exit, shall be adequately protected against the passage of fire or smoke therefrom.
3. Swinging fire exit doors on horizontal exits shall swing with the exit travel. Where a horizontal exit serves on both sides of a wall, there shall be adjacent openings with swinging doors at each wall, opening in opposite directions, with signs on each side of the wall or partitions indicating as the exit door which swings with the travel from that side, or other approved arrangements providing doors always swinging with any possible exit travel.
4. Sliding fire doors shall not be used on a horizontal exit except where the doorway is protected by a fire door on each side of the wall in which such sliding fire doors are located. In this case, one fire door shall be of the swinging type as provided in para C.3 of this Section and the other may be an automatic sliding fire door that shall be kept open whenever the building is occupied.

E. **Omission of Fire Partition on Certain Floors**

1. Where a fire partition is used to provide a horizontal exit in any storey of a building, such partition may be omitted in any lower storey under the following conditions:
   a. The open fire area storey from which the fire partition is omitted shall be separated from the storeys above by construction having at least two-hour (2-hr) resistance rating.
   b. Required exits from the storeys above the open fire area storey shall be separated therefrom by construction having two-hour (2-hr) fire resistance rating and shall discharge outside without travel through the open fire area storey.
   c. Vertical openings between the open fire area storey and the storeys above shall be enclosed with construction having two-hour (2-hr) fire resistance rating. Other details shall be in accordance with the applicable provisions of Section 10.2.5.2 of this RIRR.

2. Where a fire partition is used to provide a horizontal exit for any storey below the discharge level, such partition may be omitted at the level of the discharge under the following conditions:
   a. The open fire area storey shall be separated from the storeys below by construction having at least two-hour (2-hr) fire resistance rating.
   b. Required exits from storeys below the open fire area storey shall be separated from the open fire area storey by construction having two-hour (2-hr) fire resistance rating and all discharge directly outside without travel through the open fire area storey.
   c. Vertical openings between the open fire area storey and the floors below shall be enclosed with a construction having two-hour (2-hr) fire resistance rating. Other details shall be in accordance with the applicable provisions of Section 10.2.5.2 of this RIRR.

SECTION 10.2.5.7 RAMPS

A. **Application**

A ramp shall be permitted as component in a means of egress when it conforms to the general requirements of Section 10.2.5.2 of this RIRR and to the special requirements of this Section.

B. **Dimensional Criteria**

The following dimensional criteria shall apply to ramps:

Table 5: DIMENSIONAL CRITERIA FOR NEW RAMPS

Feature	Dimensional Criteria
Minimum width clear of all obstructions, except projections not more than one hundred fourteen millimeters (114 mm) at or below handrail height on each side	1,120 mm
Maximum slope	1:12
Maximum cross slope	1:48
Maximum rise for a single ramp run	760 mm

C. **Protective Enclosure**

1. When a ramp inside a building is used as an exit or exit component, it shall be protected by separation from other parts of the building as specified in para "B" Section 10.2.5.2 of this RIRR.
2. Fixed wired glass panels in steel sash may be installed in such a separation in a building fully provided with approved, supervised sprinkler system.
3. There shall be no enclosed usable space under ramps in an exit enclosure nor shall the open space under such ramps be used for any purpose.

D. **Other Details**

1. A ramp, as well as the platforms and landings associated therewith, shall be designed for not less than four hundred eighty-eight kilograms per square meter (488 kg/m^2) live load and shall have a nonslip surface.
2. The slope of a ramp shall not vary between landings. Landings shall be level and changes in direction of travel, if any, shall be made only at landings.
3. A ramp used as an exit component in a building more than three (3) storeys, or in a building of any height of noncombustible or fire-resistive construction, shall be of noncombustible material. The ramp floor and landings shall be solid and without perforations.
4. Guards and handrails complying with para "H" Section 10.2.5.4 of this RIRR shall be provided in comparable situations for ramps, except that handrails are not required in Class A ramps.

E. **Special Provisions for Outside Ramps**

1. Outside ramps shall be arranged to avoid any impediments to their use. For ramps more than three (3) storeys in height, any arrangement intended to meet this requirement shall be at least one and twenty-two hundredths meters (1.22 m) in height.
2. Outside ramps and landings shall be designed and maintained to minimize water accumulation on their surfaces.

SECTION 10.2.5.8 EXIT PASSAGEWAYS

A. **Application**

Any hallway, corridor, passage or tunnel, may be designated as an exit, passageway and used as an exit or component when conforming to all applicable requirement of Section 10.2.5.2 of this RIRR, as modified by the provisions of this Section.

B. **Protective Enclosure and Arrangement**

1. An exit passageway shall be protected by separation from other parts of the building as specified in para "B" of Section 10.2.5.2 of this RIRR.
2. Fixed wired glass panels in steel sash may be installed in such a separation in building provided with Automatic Sprinkler System.

C. **Width**

The width of an exit passageway shall be adequate to accommodate the aggregate capacity of all exits discharging through it.

D. **Floor**

The floor shall be solid and without perforations.

SECTION 10.2.5.9 ESCALATORS AND MOVING WALKS

Escalators and moving walks shall not constitute as part of the required means of egress, unless they are previously approved existing escalators and moving walks.

SECTION 10.2.5.10 FIRE ESCAPE STAIRS, LADDERS, AND SLIDE ESCAPES

A. **Fire Escape Stairs**

1. General
   a. Fire escape stairs (not those under Section 10.2.5.4 and 10.2.5.5 of this RIRR) may be used in required means of egress only in existing buildings, subject to the applicable provisions of Divisions 8 through 20 of this Chapter. Fire escape stairs shall not constitute more than fifty percent (50%) of the required exit capacity in any case. Fire escape stairs shall not be accepted as constituting any part of the required means of egress for new buildings.
   b. Fire escape shall provide a continuous unobstructed safe path of travel to the ground or other area of refuge to which they lead. All stairs leading to an adjoining roof, which shall be clearly indicated with appropriate signage, shall be provided with handrails. Where a single means of egress consists of a combination of inside stairs and fire escape stairs, each shall comply with the applicable provision of this Chapter, and the two shall be so arranged and connected as to provide a continuous safe path of travel.
2. Types
   a. The following types of fire escape stairs are recognized by this Chapter:
      1) Return platform types with superimposed runs; or
      2) Straight run type with platforms continuing in the same direction.
   b. Either of these may be parallel to or at right angle to the building. They may be attached to buildings or erected independently of them and connected bridges.
3. Stairs Details

Fire escape stairs, depending upon the requirement of Division 8 through 20 of this Chapter, shall be in accordance with the following table and subsequent paragraphs.

Table 6: DIMENSIONAL CRITERIA FOR FIRE ESCAPE STAIRS

PARTICULARS	DIMENSIONS
Minimum widths	600 mm clear between rails
Minimum horizontal dimension any landing of platform	600 mm
Maximum rise	230 mm
Minimum tread, exclusive of nosing	230 mm

Tread construction	Solid, 13.00 mm diameter perforation permitted
Winders (spiral)	None
Risers	None
Maximum height between landings	3.66 m
Headroom, minimum	2.00 m
Access to escape	Door or casement windows 610 mm by 1.98 m or double hung windows 762 mm by 914.40 mm clear
Level of access opening	Not over 305 mm above floor; steps if higher
Discharge to ground	Swinging stair section permitted
Capacity number of persons	45 per unit access by door; 20 if access by climbing over window rail

4. Arrangement and Protection of Openings

Fire escape stairs shall be so arranged that they will be exposed by the smallest possible or window and door openings. There shall be no transom over doors. Every opening, any portion of which is in the limits specified below, shall be completely protected by approved fire doors or metal-frame wired glass windows in the same manner as provided for outside stairs and outside ramps.

5. Access

a. Access to fire escape stairs shall be provided in accordance with Table 6 in para A.3 of this Section and the general provisions of para "K" of Section 10.2.5.2 of this RIRR.

b. Where access is by way of double windows, such windows shall be so counter balanced and maintained that they can be readily opened with a minimum of physical effort. Insert screens, if any, on any type of opening giving access to fire, an escape stair shall be of types that may be readily opened or pushed out. No storm sash shall be used on any window providing to fire escape stairs.

c. Fire escape stairs shall extend to the roof in all cases where the roof is subject to occupancy or is constructed and arranged to provide an area of refuge from fire. In all cases where stairs do not extend to the roof, access thereto shall be provided by a ladder in accordance with pertinent provisions of Section 10.2.5.10 of this RIRR, however such ladders are not required in the case of roofs with pitch or slope steeper than sixteen and sixty-seven hundredths percent (16.67%).

d. Balconies, to which access is secured through windows with sills above the inside floor level, shall be not more than four hundred sixty millimeters (460 mm) below the sill. In no case shall balcony level be above the sill.

6. Materials and Strength

a. Iron, steel, reinforced concrete, or other approved noncombustible materials shall be used for the construction of fire stairs, balconies, railings, and other features appurtenant thereto.

b. Balconies and stairs shall be designed to carry a load of four hundred eighty-eight kilograms per square meter (488 kg/m^2) or a concentrated load of one hundred thirty-six kilograms (136 kg) so located as to produce maximum stress conditions.

c. Except where embedded in masonry or concrete or where a suitable fire resistive and waterproof covering is provided, no structural metal member shall be employed, the entire surface of which is not capable of being inspected and painted.

d. All supporting members for balconies and stairs, which are in tension and are fastened directly to the building, shall pass through the wall and be securely fastened on the opposite side or they shall be securely fastened to the framework of the building. Where metal members pass through walls, they shall be protected effectively against corrosion. Holes in the wall through which metal members pass shall be effectively fire-stopped to preserve the fire resistive quality of the wall.

e. Balcony and stair enclosure and railings shall be designed to withstand a horizontal force of seventy-five kilograms per meter (75 kg/m) of railing or enclosure without serious deflection, and support at walls for such railings or enclosures shall be in the manner specified in para A.6.b of this Section for tension members, except as provided in para A.6.f of this Section.

f. Notwithstanding the provisions of para A.6.b and 6.c of this Section, the C/MFM having jurisdiction may approve any existing fire escape stair for a very small building when load test or other evidence shows satisfactory or adequate strength.

7. Guards and Handrails

a. All fire escapes shall have walls or guards on both sides, in accordance with para "H" of Section 10.2.5.4 of this RIRR, except for height, which shall be one thousand seventy millimeters (1,070 mm) and nine hundred ten millimeters (910 mm) for fire escape for every small building, the height being measured vertically from a point on the stair tread twenty-five millimeters (25 mm) back from the leading edge, or vertically above any landings or balcony floor level.

b. All fire escapes shall have handrails on both sides, not less than seven hundred sixty millimeters (760 mm) but not more than one thousand seventy millimeters (1,070mm) high, measured vertically from a point on the stair tread twenty-five millimeters (25 mm) back from the leading edge, all in general conformity to the requirements for stair handrails, para "H" of Section 10.2.5.4 of this RIRR.

c. Handrails and guards shall be so constructed as to withstand a force of ninety-one kilograms (91 kg) applied downward or horizontally at any point.

8. Swinging Section of Fire Escape Stairs

a. Swinging stair sections shall not be used for fire escape stairs, except where termination over sidewalks, alleys or driveways makes it impracticable to build stairs permanently to the ground. Where used, swinging stairs shall comply with all provisions of this Subsection.

b. Swinging section of stairs shall not be located over doors, over the path of travel from any other exit, or in any location where there are or would likely to have obstruction.

c. Width of swinging section of stairs shall be at least equal to that of the stairs above.

d. Pitch/slope shall not be steeper than that of the stairs above.

e. Railings shall be provided similar in height and construction with those required for the stairs above. Railings shall be designed to prevent any possibility of injury to persons when stairs swing downward. Minimum clearance between moving sections where hands might be caught shall be one hundred millimeters (100 mm).

f. If distance from lowest platform to ground exceed three and sixty-seven hundredths meters (3.67 m), an intermediate balcony not more than three and sixty-seven hundredths meters (3.67 m) from the ground or less than two meters (2 m) in the clear underneath shall be provided with width not less than that of the stairs and length not less than one and two tenths meters (1.2 m).

g. Counterweight shall be provided for swinging stairs and this shall be of type balancing about a pivot, no cables being used. Counterweight shall be securely bolted in place, but sliding ball weights or their equivalent may be used to hold stairs up and help lower them. Counterbalancing shall be such that a person weighing sixty-eight kilograms (68 kg), who makes one step from the pivot, will not start swinging the section downward, but when he/she is one quarter of the length of the swinging stairs from the pivot, the section will swing down.

h. Pivot for swinging stairs shall have either a bronze bushing or sufficient means to prevent sucking on account on corrosion.

i. No latch to lock swinging stairs section in up position shall be installed.

B. **Fire Escape Ladders**

1. Application

No form of ladder shall be used as a fire escape under the provisions of this Chapter, except those ladders conforming to paras B.2 and B.3 below may be used in single and two -family dwellings and residential apartments of not more than three (3) storey

provided that the height shall not exceed nine meters (9 m); in elevated platforms around machinery or similar spaces subject to occupancy by not more than three (3) able-bodied adults; and as a means of escape to unoccupied roof spaces from boiler rooms, grain elevators and towers as permitted by Division 18 and 20 of this Chapter. For purposes of this Subsection, mezzanine floors shall be counted as ordinary floor.

2. Installation

   a. All ladders shall be permanently installed in fixed position, supported by rigid connection to the building or structure at intervals not exceeding three meters (3 m).

   b. Where ladders provide access to roofs or elevated platforms, rails shall extend not less than one and fourteen hundredths meters (1.14 m) above roofline or platform floor or above coping or parapet. Extension of side rails to roof shall be carried over coping or parapet to afford hand hold.

   c. Ladders shall be arranged parallel to buildings or structures with travel either between ladder and buildings, in which case minimum clearance between center of rungs and buildings shall be six hundred eighty millimeters (680 mm), or outside of ladder, in which case minimum clearance between center of rungs and buildings shall be one hundred sixty millimeters (160 mm).

   d. Ladders shall be vertically or positively inclined. No negatively inclined ladders (i.e. ladder sloping out over the head of a person using it) shall be permitted.

3. Construction

   a. Ladders shall be constructed of iron, steel or other metal in the design that has equivalent strength and resistance to corrosion.

   b. Rails of iron or steel ladders shall not be less than one hundred twenty-five millimeters (125 mm) by fifty millimeters (50 mm) in section, not less than four hundred millimeters (400 mm) apart.

   c. Rungs shall not less than twenty-two millimeters (22 mm) diameter and shall be riveted or welded in position not less than two hundred fifty millimeters (250 mm) nor more than three hundred five millimeters (305 mm) on center.

   d. The lowest rung of any ladder shall be not more than three hundred five millimeters (305 mm) above the level of the ground or balcony floor beneath it.

C. **Slide Escape**

1. Use and Capacity Rating

   a. A slide escape may be used as component of means of egress where specifically authorized by Divisions 8 through 20 of this Chapter.

   b. Slide escapes, where permitted as required exits, shall be rated at one exit unit per slide, with rated travel capacity of sixty (60) persons per minute.

   c. Slide escapes, except as permitted for high hazard manufacturing buildings or structures, shall not constitute more than twenty-five percent (25%) of the required number of units of exit width from any building or structure or any individual storey or floor thereof.

   d. Slide escapes, used as exits shall comply with the applicable requirements of this Division for other types of exits.

SECTION 10.2.5.11 ILLUMINATION OF MEANS OF EGRESS

A. **General**

1. Illumination of means of egress shall be provided for every building and structure in accordance with this Section, as required by Divisions 8 through 20 of this Chapter.

2. Illumination of means of egress shall be continuous during the time that the conditions of occupancy require that the means of egress be available for use. Artificial lighting shall be employed at such places and for such periods of time as required to maintain the illumination to the minimum lumen values herein specified.

3. The floors of means of egress shall be illuminated at all points including angles and intersections of corridors and passageways, landings of stairs, and exit doors to values of not less than ten and seven tenths (10.7) lux.

4. Any required illumination shall be so arranged that the failure of any lighting unit, such as the burning out of an electric bulb, will not leave any area in darkness.

B. **Sources of Illumination**

1. Illumination of means of egress shall be from a source of reasonably assured reliability, such as public utility electric service.
2. Where electricity is used as a source of illumination of means of egress, the installation shall be properly made in accordance with the appropriate and internationally accepted standards.
3. No battery operated electric light nor any type of portable lamp or lantern shall be used for primary illumination of means of egress; but may be used as an emergency source to the extent permitted under Emergency Lighting, para "C" of this Section.
4. No luminescent, fluorescent, or reflective material shall be permitted as substitutes for any of the required illumination herein specified.

C. **Emergency Lighting**

1. In occupancies specified in Divisions 8 through 20 of this Chapter, emergency lighting facilities shall be provided for means of egress. Where maintenance of illumination depends upon charging from one energy source to another, there shall be no appreciable interruption of illumination during the changeover. Where emergency lighting is provided by a prime-mover-operated electric generator, a delay of not more than ten (10) seconds shall be permitted.
2. Emergency lighting facilities shall be arranged to maintain the specified degree of illumination in the event of failure of the normal lighting for a period of at least one and a half (1.5) hours.
3. An emergency lighting system shall be provided as specified in Divisions 8 through 20, subject to the approval of the C/MFM having jurisdiction as to the suitability of the equipment for its intended use and the conditions in the individual premises.
4. Electric battery-operated emergency lights shall use only reliable types of storage batteries, provided with suitable facilities for maintenance in properly charged conditions. Dry batteries shall not be used to satisfy these requirements. Electric storage batteries used in such lights or units shall be approved for their intended use and shall comply with the applicable Philippine National Standards (PNS) or other internationally accepted standards.
5. An emergency lighting system shall be so arranged as to provide the required illumination automatically in the event of any interruption of normal lighting, such as any failure of public utility or other outside electrical power supply, opening of a circuit breaker or fuse, or any manual act, including accidental opening of a switch controlling normal lighting facilities.
6. An emergency lighting system shall either be continuously in operation or shall be capable of repeated automatic operation without intervention.
7. All emergency lighting systems installed in accordance with this Section shall be properly maintained. Maintenance program shall be documented and incorporated in Fire Safety Maintenance Report (FSMR).

SECTION 10.2.5.12 EXIT MARKING

A. **Signs**

1. Where required by the provisions of Division 8 through 20 of this Chapter, exits shall be marked by a readily visible sign. Access to exit shall be marked by readily visible signs in all cases where the exit or way to reach it is not immediately visible to the occupants and in any case where required by the applicable provisions of Divisions 8 through 20 of this Chapter for individual occupancies.
2. Any door, passage, or stairway, which is neither an exit nor a way of exit access and which is so located or arranged as likely to be mistaken for an exit, shall be identified by a sign reading **"NOT AN EXIT"** and shall be identified by a sign indicating its actual character, such as **"TO BASEMENT**", **"STOREROOM"**, **"LINEN CLOSET"**, or the likes.

3. Every required sign designating an exit or way of exit access shall be so located and of such size, color, and design as to be readily visible. No decorations, furnishing, or equipment which impair visibility of an exit sign shall be permitted, nor shall there be any brightly illuminated sign (for other than exit purposes), display, or object in or near the line of vision to the required exit sign of such a character as to distract attention from the exit sign.

4. A sign reading **"EXIT"** with an arrow indicating the direction shall be placed in every location where the direction of travel to reach the nearest exit is not immediately apparent.

5. Every sign shall be distinctive in color and shall provide contrast with decorational interior finish, or other signs.

6. Directional Sign Requirements. The sign shall have a height of three hundred millimeters (300 mm) to six hundred millimeters (600 mm) from the floor to the line of vision and shall have a narrow width of seventy-six millimeters (76 mm) painted on the wall by a photo-luminescent paint or any equivalent material with photo-luminescent characteristic pointing to the direction of the exit.

B. **Illumination of Signs**

1. Every sign shall be suitably illuminated by a reliable light source giving a value of not less than five thousandths (0.005) lumens per square centimeters on the illuminated surface. Such illumination shall be continuous as required under this Section, and where emergency lighting facilities are required, exit signs shall be illuminated from the same source.

2. Internally illuminated signs shall be provided in all occupancies where reduction of normal illumination is permitted, such as in motion picture theaters.

3. Luminous directional signs shall comply with para "C" hereof.

C. **Size of Signs**

Every exit shall have the word **"EXIT"** in plainly legible letters not less than one hundred fifty millimeters (150 mm) in height, with the principal strokes of letters not less than nineteen millimeters (19 mm) in width; except that in existing buildings, externally illuminated exit signs having the word **"EXIT"** in plainly visible letters not less than one hundred fifteen millimeters (115 mm) in height, other than in places of assembly, may be continued in use. Other signages required by this Rule shall be of the same dimension, unless otherwise provided.

SECTION 10.2.5.13 EMERGENCY EVACUATION PLAN

A. An emergency evacuation plan shall be posted on strategic and conspicuous locations in the building containing the following basic information:

1. "You Are Here/ room number/ building" Marking
2. Fire Exits
3. Primary Route to Exit (Nearest to the viewer)
4. Secondary Route to Exit (Second nearest to the viewer)
5. Fire alarm pull stations and annunciators
6. Fire extinguishers/ hose cabinets
7. Emergency Light
8. First Aid Kits locations (if applicable)
9. Emergency Call stations (if applicable)
10. Areas of safe refuge (for high-rise building)
11. Assembly areas instructions
12. "In Case of Emergency" instructions

B. This shall be drawn with a photo-luminescent background to be readable in case of power failure.

C. It shall conform with the standard design format provided in this RIRR with the minimum dimension of:

1. Two hundred fifteen and nine tenths millimeters (215.9 mm) height by three hundred thirty and two tenths millimeters (330.2 mm) width if mounted on every rooms/spaces with fifty square meters (50 m^2) floor area and below;
2. Four hundred fifty-seven and two tenths millimeters (457.2 mm) height by six hundred nine and six tenths millimeters (609.6 mm) width if mounted on rooms/spaces fifty-one square meters (51 m^2) to one hundred fifty square meters (150 m^2) floor area including building lobbies upon entry, elevator lobbies at every floor, hallways and corridors on every bend/corner or at every fifteen meters (15 m) interval in the case of long hallways; or
3. Six hundred nine and six tenths millimeters (609.6 mm) height by nine hundred fourteen and four tenths millimeters (914.4 mm) width if mounted on rooms/spaces one hundred fifty-one square meters (151 m^2) floor area and above provided that it shall be mounted on multiple locations within the open space such as upon entry to the building, areas of assembly, or at every twenty-five meters (25 m) interval in the case of auditoriums and gymnasiums.

D. Symbols/icons/logos to be used for the marking shall be in accordance with NFPA 170, *Standard for Signs and Symbols*.

E. The wall mounted maps shall be oriented to correspond to the actual floor layout as perceived by the viewer.

DIVISION 6. FEATURES OF FIRE PROTECTION

SECTION 10.2.6.1 CONSTRUCTION AND COMPARTMENTATION

A. Where required by any individual occupancy of RA 9514 and its RIRR, construction and compartmentation shall apply to new, existing, permanent or temporary buildings.

B. Appropriate provisions of the latest edition of National Building Code of the Philippines (NBCP) shall be used to determine the requirements for the construction classification.

C. The design and construction of fire walls and fire barrier that are required to separate the buildings or subdivide the building to prevent the spread of fire shall comply with Section 602, *Fire Resistive Standards* of the latest edition of NBCP, and NFPA 5000, *Building Construction and Safety Code*.

D. In high rise buildings and healthcare occupancy building**,** a quality assurance program for devices and systems installed to protect penetration and joints shall be conducted by an approved inspection agency in accordance with American Society for Testing and Materials (ASTM) E2393, *Standard Practice for On-Site Inspection of Installed Fire Resistive Joint Systems and Perimeter Fire Barriers*.

E. Required fire resistive construction, including fire barriers, fire wall, exterior walls due to location on property, fire resistive requirements based on type of construction, draft-stop partition, and roof coverings shall be maintained and shall be immediately repaired, restored or replaced where damaged, altered, breached, penetrated, removed or improperly installed.

F. Fire-rated gypsum wallboard for walls or ceiling that are damaged to the extent that openings exist shall be replaced or returned to the required level of fire resistance using a listed repair system or using materials and methods equivalent to the original construction.

G. Where readily accessible, required fire resistance-rated assemblies in high rise buildings shall be inspected at least once every three (3) years.

H. The person responsible for the conduct of inspection shall demonstrate appropriate technical knowledge and experience in fire resistance rated design and construction acceptable to the Chief BFP or his/her duly authorized representative.

I. A written report prepared by the person responsible for conducting the inspection shall be submitted to the C/MFM having jurisdiction, documenting the result of visual inspection.

J. A certification of fire stopping in accordance with any of the following promulgated rules and regulations of PD 1096, *National Building Code of the Philippines*; NFPA 251, *Standard Method of Test of Fire Resistance of Building Construction and Materials*; American National

Standards Institute (ANSI)/ Underwriters Laboratories (UL) 263, *Standard for Fire Tests of Building Construction and Materials*; and ASTM E119, *Standard Test Methods for Fire Tests of Building Construction and Materials,* if available, from the third party shall be submitted to the C/MFM having jurisdiction.

SECTION 10.2.6.2 FIRE DOORS

A. Any fire door installed in accordance with the requirements of this Chapter shall be in accordance with NFPA 80*, Standard for Fire Doors and other Opening Protectives*. The fire resistance rating of any fire door shall be as measured in accordance with the appropriate internationally accepted standards. Each fire door shall be appropriate for the location in which it is installed.

B. Any swinging fire door and any door in stair enclosure walls designed to prevent the spread of fire shall be provided with approved positive latching means to hold it in closed position against the pressure of expanding fire gases.

C. The owner or his/her authorized representative shall be responsible for the annual inspection and testing of doors and its assembly and automatic closing doors. Hardware shall be examined and other defective parts of its assembly shall be replaced immediately with the same fire rating and mechanism. Reports shall be included in FSMR.

SECTION 10.2.6.3 SMOKE PARTITIONS

A. Any smoke partition when required shall be constructed of fire resistive materials and shall form an effective member, continuous from outside wall to outside wall and from floor to floor slab, thereby including continuity through all concealed, spaces, such as those found above a suspended ceiling, and including interstitial spaces.

B. Smoke partitions shall have openings only for ingress and egress and for building services equipment. Doorways shall be protected by doors meeting the provisions of para "C" hereof, and any openings where building services equipment pierces the partitions shall be closed. Transfer grills, whether equipped with fusible links and release dampers or not, shall not be used in these partitions.

C. Doors in Smoke Partitions

1. Doors in required smoke partitions shall be of swinging type and shall have a protection rating of at least twenty minutes (20 min).
2. Any glass panels in doors in smoke partitions shall be of transparent wired glass mounted in steel frames.
3. Doors in smoke partitions shall be automatically self-closing.
4. Doors in smoke partitions shall close the opening, with only the clearance for proper operation under self-closing.
5. Doors in smoke partitions shall be without undercuts, louvers, or grills.

D. Where door assemblies are required elsewhere in this RIRR to be smoke leakage-rated/ smoke proof, door assemblies shall comply with the following:

1. They shall be tested in accordance with acceptable and approved local and international standards.
2. Door assemblies shall be installed in accordance with NFPA 105, *Standard for the Installation of Smoke Door Assemblies and Other Opening Protectives*.

SECTION 10.2.6.4 INTERIOR FINISH

A. **General**

1. Interior finish means the exposed interior surfaces of buildings including, but not limited to, fixed or movable walls and partitions, columns, and ceilings. For requirements on decorations and furnishing, see para "B" of Section 10.2.21.1 of this RIRR.
2. A finish floor or covering shall be exempt from the requirements of this Section, provided however that in any case where the C/MFM having jurisdiction finds a floor surface of unusual hazard, the floor surface shall be considered part of the interior finish for purposes of this Chapter.

3. Interior finish materials shall be grouped in the following classes, in accordance with their flame spread rating:

   a. Class A Interior Finish

      Flame Spread 0-25. Includes any material classified at twenty-five (25) or less on the test scale described in para 4 hereof. Any element thereof when so tested shall not continue to propagate fire;

   b. Class B Interior Finish

      Flame Spread 26-75. Includes any material classified at more than twenty-five (25) but not more than seventy-five (75) on the test scale described in para 4 hereof;

   c. Class C Interior Finish

      Flame Spread 76-200. Includes any material classified at more than seventy-five (75) but not more than two hundred (200) on the test scale described in para 4 hereof;

   d. Class D Interior Finish

      Flame Spread 201-500. Includes any material classified at more than two hundred (200) but not more than five hundred (500) on the test scale described in para 4 hereof; and

   e. Class E Interior Finish

      Flame Spread over 500. Includes any material classified at over five hundred (500) on the test scale described in para 4 below.

4. Interior finish materials as specified in para 3 above shall be classified in accordance with NFPA 255, *Method of Test of Surface Burning Characteristics of Building Materials.*

B. **Fire Retardant Paints**

1. In all buildings, the required flame spread classification of interior surfaces may be secured by applying a proven fire retardant paint or solution to existing interior surfaces having a higher flame spread rating than permitted.
2. Fire retardant treatment and/or application shall be in accordance with NFPA 703, *Standard for Fire Retardant-treated wood and Fire Retardant Coatings for Building Materials.*
3. Surfaces of walls, partitions, columns, and ceilings shall be permitted to be finished with factory-applied fire-retardant-coated products that have been listed, labeled and approved.
4. Columns and beams of a building that are constructed by steel shall be protected by listed and approved fire retardant paints.
5. Fire-retardant coatings or factory-applied fire retardant assemblies shall possess the desired degree of permanency, and shall be maintained so as to retain the effectiveness of the treatment under the service conditions encountered in actual use.

C. **Automatic Sprinklers**

Where approved, supervised automatic sprinklers are installed, interior finish with flame spread rating not over Class C may be used in any location where Class B is normally specified, and with rating of Class B in any location where Class A is normally specified, unless specifically prohibited in this RIRR.

D. **Use of Interior Finishes**

1. Interior finish material shall be used in accordance with requirements for individual classes of occupancy specified elsewhere in the Rule. Wherever the use of any class of interior finish is specified, the use of a class of lower flame spread rating shall be permitted, ex. where Class B is specified, Class A may be used.
2. In all new buildings other than private residences, Class A or Class C interior shall be used in all basements or other underground spaces from which there is no direct exit to the outside of the building, if subject to occupancy for any purpose other than storage or service facilities.
3. Interior finish of Class E shall not be used in any room space subject to human occupancy, except to such extent as may be specifically permitted by the C/MFM having jurisdiction on the basis of finding that such use does not significantly increase the life hazard; provided however, that such use of Class E interior finish shall not in any case exceed ten

percent (10%) of the aggregate interior surface of the walls and ceiling of the room or space in which such Class E material is located.

SECTION 10.2.6.5 PROTECTION OF VERTICAL OPENING AND COMBUSTIBLE CONCEALED SPACES

A. **General**

1. Every stairway, elevator shaft, light and ventilation shaft, chute and other opening between storeys shall be enclosed or protected to prevent the spread of fire or smoke, except openings of building protected by automatic fire suppression system as permitted by other Section of this Rule.
2. In any building with low or ordinary hazard occupancy protected with approved, supervised sprinkler system, up to three (3) communicating floor levels are permitted without enclosure protection between floors, provided all the following conditions are met:
   a. The arrangement is permitted by the applicable occupancy Section of this Chapter;
   b. The lowest or next to the lowest level is a street floor;
   c. The entire area, including all communicating floor levels, is sufficiently open and unobstructed so that it may be assumed that a fire or other dangerous condition in any part will be immediately obvious to the occupants of all communicating levels and areas;
   d. Exit capacity is sufficient to provide simultaneously for all occupants of all communicating levels and areas, all communicating levels in the same fire area being considered as a single floor area for purposes of determination of required exit capacity;
   e. Each floor level, considered separately, has at least a half of its individual required exit capacity provided by an exit or exits leading directly out of that area without traversing another communicating floor level or being exposed to the spread of fire or smoke therefrom; and
   f. All requirements of this Chapter with respect to interior finish, protection of hazards, construction and other features are fully observed, without waivers, except openings in floors of educational, healthcare, and detention and correctional occupancies shall be enclosed as required in Divisions 9, 11 and 13 of this Chapter, respectively.
3. Each floor opening, as specified in para A.1 of this Section, shall be enclosed by substantial walls having fire resistance not less than that required for stairways in para A.4 hereof, with approved fire doors at windows provided in openings therein, all so designed and installed as to provide complete barrier to the spread of fire or smoke through such openings.
4. The enclosing walls of floor openings serving stairways or ramps shall be so arranged as to provide a continuous path of escape including landings and passageways, in accordance with Section 10.2.5.4 of this RIRR, providing protection for person using the stairway or ramp against fire or smoke therefrom in other parts of the building. Such walls shall have fire resistance rating, as follows:
   a. New buildings, four storeys or more in height – two-hour (2-hr) fire resistance rating.
   b. New buildings, below four storeys – one-hour (1-hr) fire resistance rating.

B. **Special Provisions for Escalator Openings**

Any escalator shall have its floor opening enclosed or protected as required for other vertical openings; except in buildings completely protected by approved supervised sprinkler system in accordance with Section 10.2.6.7 of this RIRR. Escalator opening may be protected by any one of the methods, as described in para "C" through "E" below.

C. **Sprinkler Vent Method**

1. Under the conditions specified in para "B" above, escalator openings may be protected by the "sprinkler-vent" method, consisting of a combination of an automatic smoke detection system, automatic exhaust system, and an automatic water curtain, meeting the design and other requirements as specified in the succeeding Sections.
2. The exhaust system shall be of such capacity as to create a downdraft through the escalator floor opening. The downdraft has an average velocity of not less than ninety-one and a half meters per minute (91.5 m/min) under normal conditions for a period of not less than thirty minutes (30 min).

3. Operation of the exhaust system for any floor opening shall be initiated by an approved device in the storey involved and shall be any one of the following means in addition to a manual means of opening and testing the system:
   a. Thermostats - fixed temperature, rate-of-rise, or a combination of both
   b. Water flow in the sprinkler system
   c. Approved supervised smoke detection. Smoke detection devices, if used, shall be so located that the presence of smoke is detected before it enters the stairway.
4. Electric power supply to all parts of the exhaust system and its control devices shall be designed and installed for maximum reliability.
5. Any fan or duct used in connection with an automatic exhaust system shall be installed and maintained in accordance with the latest editions of Philippine Mechanical Engineering Code (PMEC) and Philippine Electrical Code (PEC), or other approved engineering practice.
6. Periodic tests, not less frequently than quarterly, shall be made of the automatic exhaust system to maintain the system and the control devices in good working conditions.
7. The water curtain shall be formed by open sprinklers or spray nozzles so located and spaced as to form a complete and continuous barrier along all exposed sides of the floor opening and reaching from the ceiling to the floor. Water intensity for water curtain shall be not less than approximately thirty-seven and twenty-five hundredths liters per minute (37.25 L/min) per linear meter of water curtain, measured horizontally around the opening.
8. The water curtain shall operate automatically from thermal responsive elements of fixed temperature type so placed with respect to the ceiling (or floor) opening that the water curtain comes into action upon the advance of heat toward the escalator opening.
9. Every automatic exhaust system, including all motors, controls and automatic water curtain system, shall be supervised in an approved manner, similar to that specified for automatic sprinkler system supervision.

D. **Spray Nozzle Methods**

Under the conditions specified in para "B" above, escalator openings may be protected by the nozzle method, consisting of a combination of an automatic fire or smoke detection system and a system of high velocity water spray nozzle meeting the following requirements:

1. Spray nozzles shall be in the open type and shall have a solid conical spray pattern with discharged angles between forty-five degrees (45°) and ninety degrees (90°). The number of nozzles, their discharge angles, and their location shall be such that the escalator opening between the top of the well-way housing and the tread-way will be completely filled with the dense spray on operation of the system.
2. The number and size of nozzles and water supply shall be sufficient to deliver a discharge of one and four tenths liters of water per square meter per second (1.4 L/m^2/sec) through the well-way, with area to be figured perpendicular to tread-way.
3. Spray nozzles shall be so located as to effectively utilize the full advantage of the cooling and counter-draft effect. They shall be so positioned that the center line of spray discharge is as close as possible in line with the slope of the escalator, not more than an angle of thirty degrees (30°) with the top slope of the well-way housing. Nozzles shall be positioned also, so that the center line of discharge is an angle of not more than an angle of thirty degrees (30°) with the top slope of the well-way housing.
4. Spray nozzles shall discharge at a minimum pressure of one hundred seventy-two kilopascals (172 kPa). Water supply piping may be taken from the sprinkler system, provided that in so doing an adequate supply of water will be available for the spray nozzles and the water pressure at the sprinkler farthest from the supply riser is not reduced beyond the required minimum.
5. Control valves shall be readily accessible to minimize water damage.
6. A non-combustible draft curtain shall be provided extending at least five hundred ten millimeters (510 mm) below and around the opening and a solid non-combustible well-way housing at least one and a half meter (1.5 m) long, measured parallel to the handrail and extending from the top of the handrail enclosure to the soffit of the stairway or ceiling above, at each escalator floor opening. When necessary, spray nozzles shall be protected against mechanical injury or tampering that might interfere with proper discharge.

7. The spray nozzle system shall operate automatically from thermal response elements of the fixed temperature type, so placed with respect to the ceiling (or floor) opening that the spray nozzle system comes into action upon the advance of heat towards the escalator opening. Supervised smoke detector located in or near the escalator opening may be used to sound an alarm. The spray nozzle systems shall also be provided with manual means of operation.
8. Control valves for the spray nozzle system and approved smoke detection or thermostatic devices shall be supervised in accordance with applicable provisions of Section 10.2.6.6 of this RIRR.

E. **Partial Enclosure Method**

1. Under the conditions specified in para "B" of Section 10.2.6.5 of this RIRR, escalator opening may be protected by a partial enclosure, so designed as to provide an effective barrier to the spread of smoke from floor to floor.
2. Partial enclosure shall be of construction providing fire resistance equivalent to that specified for stairway enclosures in the same building, with openings therein protected by approved self-closing fire doors or may be of approved wired glass and metal frame construction with wired-glass panel doors. Such doors may be equipped with electric opening mechanism to open the door automatically upon the approach of a person. However, the mechanism shall be such as to return the door to its closed position upon any interruption of electric current supply, and the adjustment shall be such that the pressure of smoke will not cause opening of the door.

F. **Fire Stopping**

1. In new construction, any concealed space, in which materials having a flame spread rating greater than Class A as defined in Section 10.2.6.4 of this RIRR are exposed, shall be effectively fire-stopped as provided below, with approved materials, unless the space is sprinklered in accordance with this Section.
   a. Every exterior and interior wall and partition shall be fire-stopped at each level, at the top storey ceiling level, and at the level of support for roofs.
   b. Every unoccupied attic space shall be subdivided by fire stops into areas not to exceed two hundred eighty square meters (280 m^2).
   c. Any concealed space between the ceiling and the floor or roof above shall be fire-stopped for the full depth of the space along the line of support of the floor or roof structural members and, if necessary, at other locations to form areas not to exceed ninety-three square meters (93 m^2) for any space between the ceiling and floor, and two hundred eighty square meters (280 m^2) for any space between the ceiling and the roof.
2. In every existing building, fire stopping shall be provided as required by the provisions of Divisions 8 through 20 of this Chapter.
3. Penetrations for cables, cable trays, conduits, pipes, tubes, combustion vents and exhaust vents, wires, and similar items to accommodate electrical, mechanical, plumbing, and communications systems that pass through a wall, floor, or floor/ceiling assembly constructed as a fire barrier shall be protected by a fire stop system or device.

G. **Atriums**

Unless prohibited by Divisions 8 through 20 of this Chapter, an atrium shall be permitted, provided that all of the following conditions are met:

1. The atrium is separated from the adjacent spaces by fire barriers with not less than one (1) hour fire resistance rating, with protective openings for corridor walls, unless the following are met:
   a. The requirement of para 1 above shall not apply to existing buildings with atrium that are compliant with the provisions of the previous IRR of RA 9514, provided that no changes or renovation has been made thereat.
   b. Any number of levels of the building shall be permitted to open directly to the atrium without enclosure, based on the results of the engineering analysis required in para 5 below but health care occupancies prohibit the open floors addressed from involving patient sleeping and treatment rooms. Thus, there would need to be, at a minimum, a smoke-resisting membrane, such as a glass window, between the patient room and the atrium space.

c. Glass walls and inoperable windows shall be permitted in lieu of the fire barriers where all the following are met:

1) Automatic sprinklers are spaced along both sides of the glass wall and the inoperable windows at intervals not to exceed one and eighty-three hundredths meters (1.83 m).

2) The automatic sprinklers specified in para 1 above are located at a distance from the glass wall not to exceed three hundred five millimeters (305 mm) and arranged so that the entire surface of the glass is wet upon operation of the sprinklers.

3) The glass wall is of tempered, wired, or laminated glass held in place by a gasket system that allows the glass framing system to deflect without breaking (loading) the glass before the sprinklers operate.

4) The automatic sprinklers required by para 1 above are not required on the atrium side of the glass wall and the inoperable window where there is no walkway or other floor area on the atrium side above the main floor level.

5) Doors in the glass walls are of glass or other material that resists the passage of smoke.

6) Doors in the glass walls are self-closing or automatic-closing upon detection of smoke.

7) The glass is continuous vertically, without horizontal mullions, window treatments, or other obstructions that would interfere with the wetting of the entire glass surface.

2. Access to exits and exit discharge are permitted to be within the atrium.

3. The occupancy within the atrium meets the specifications for classification as low or ordinary hazard contents.

4. The entire building is protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 10.2.6.7 of this RIRR.

5. An engineering analysis is performed that demonstrates that the building is designed to keep the smoke layer interface above the highest unprotected opening to adjoining spaces, or one and eighty-three hundredths meters (1.83 m) above the highest floor level of exit access open to the atrium, for a period equal to one and a half (1.5) times the calculated egress time or twenty (20) minutes, whichever is greater.

6. For other than existing, previously approved smoke control systems, where an engineered smoke control system is installed to meet the requirements of para "G" of this Section, the system is independently activated by each of the following:

a. Upon actuation of the required automatic sprinkler system within the atrium or areas open to the atrium.

b. Manual controls that are readily accessible to the BFP.

7. Dangerous concentrations of smoke are promptly removed from the atrium, and the exhaust system designed in accordance with NFPA 92, *Standard for Smoke Control Systems*.

8. Sprinklers are closely spaced with a maximum spacing of one and eighty-three hundredths meters (1.83 m) on the center, provided that it can be shown that the glass can be wet by the sprinklers using a given discharge rate, and that the one and eighty-three hundredths meters (1.83 m) spacing is not exceeded.

9. The engineering analysis should include the following elements:

a. Fire dynamics, including the following:

1) Fire size and location

2) Materials likely to be burning

3) Fire plume geometry

4) Fire plume or smoke layer impact on means of egress

5) Tenability conditions during the period of occupant egress

b. Response and performance of building systems, including passive barriers, automatic detection and extinguishing, and smoke control

c. Response time required for building occupants to reach building exits, including any time required to exit through the atrium as permitted by para "G" of this Section.

10. Zoning of the activation functions of ventilation system by manual fire alarms, extinguishing systems, and detection systems is required such that ventilation system operates only when actually needed.

SECTION 10.2.6.6 FIRE DETECTION, ALARM, AND COMMUNICATION SYSTEMS

A. **General**

1. Fire detection, alarm, and communication systems if required by Division 8 through 20 of this Chapter shall be in accordance with the NFPA 72, *National Fire Alarm and Signaling Code*, or latest edition of Philippine Electronics Code and Philippine Electrical Code (PEC).
2. When a required fire alarm system is out of service for more than four (4) hours in a twenty-four hour (24-hr) period, the C/MFM having jurisdiction shall be notified within twenty-four (24) hours, and a fire watch shall be assigned until the fire alarm system has been returned to service.
3. To ensure operational integrity, the fire alarm system shall have an approved maintenance and testing program which shall be developed by the building management in accordance with internationally accepted standards. Records of conducted maintenance and testing should be maintained and submitted together with the FSMR when required by the C/MFM having jurisdiction.

B. **Signal Initiation**

1. As provided in Divisions 8 through 20 of this Chapter, activation of the complete fire alarm system shall be initiated by, but not be limited to, any or all of the following means:
   a. Manual initiation
   b. Automatic detection
   c. Extinguishing system operation
2. Manual fire alarm boxes shall be used only for fire protective signaling purposes.
3. A manual fire alarm box shall be provided in the natural path of escape from fire, near each exit from an area, and shall be readily accessible, unobstructed and at visible points.
4. Additional fire alarm boxes shall be so located that from any part of the building not more than thirty meters (30 m) horizontal distance on the same floor must be traversed in order to reach a fire alarm box.
5. For fire alarm systems using automatic fire detection or water flow detection devices, at least one manual fire alarm box shall be provided to initiate a fire alarm signal. This manual fire alarm box shall be located where required by the C/MFM having jurisdiction.
6. Where a sprinkler system provides automatic detection and alarm initiation, it shall be provided with an alarm initiation device which will operate when the flow of water is equal to or greater than that from a single automatic sprinkler.
7. Where a complete smoke detection system is required by another Section of this Code, automatic detection of smoke shall be provided in all occupiable areas, common areas, and work spaces in those environments suitable for proper smoke detector operation.

C. **Smoke Alarms**

Where required by Division 8 through 20 of this Chapter, single station smoke alarms and multiple station smoke alarms shall be in accordance with NFPA 72.

D. **Occupant Notification**

1. Occupant notification shall provide signal notification to alert occupants of fire or other emergency as required by other Sections of this RIRR.

2. A pre-signal system may be permitted where the initial fire alarm signal is automatically transmitted without delay either to the nearest fire station, a fire brigade, or to an on-site staff person trained to respond to fire emergency.
3. A positive alarm sequence may be permitted, provided that it is in accordance with NFPA 72.
4. Notification signals for occupants to evacuate shall be by audible and visible signals in accordance with NFPA 72, or other means of notification subject to the determination and approval of the C/MFM having jurisdiction.
5. The general evacuation alarm signal shall operate throughout the entire building.

E. **Emergency Forces Notification**

1. When required by Division 8 through 20 of this Chapter, emergency forces notification shall be provided to alert the nearest fire station and fire brigade in case of fire or other emergency.
2. Where fire department notification is required by another Section of this RIRR, the fire alarm system shall be arranged to transmit the alarm automatically via any of the following means which shall be in accordance with NFPA 72:
   a. auxiliary fire alarm system
   b. central station connection
   c. proprietary system
   d. remote station connection
3. Automatic fire department notification shall be mandatory in the following types of occupancy:
   a. All high rise buildings;
   b. All hospitals;
   c. All educational institutions, hotels, and apartment buildings (condominium) of at least four (4) storeys in height;
   d. All highly hazardous occupancies; and
   e. All mall buildings.

F. **Emergency Control**

1. A fire alarm and control system shall be arranged to activate automatically the control functions necessary to make the protected premises safer for building occupants.
2. Where required, the following functions shall be activated by the complete fire alarm system:
   a. release of hold-open devices for doors or other opening *protectives*;
   b. stairwell or elevator shaft pressurization;
   c. smoke management or smoke control systems; and
   d. unlocking of doors
3. The functions specified in para 2 above shall be permitted to be activated by any fire alarm and control system, where otherwise not required by RA 9514 and its RIRR. Additionally, such a fire alarm and control system shall be permitted to recall elevators, if the activation of the system for this purpose comes only from elevator lobby, hoist way, or associated machine room detectors.

G. **Location of Controls**

Operator controls, alarm indicators, and manual communications capability shall be installed in a control center at a convenient location acceptable to the C/MFM having jurisdiction.

H. **Annunciation**

1. Where alarm annunciation is required by another Section of this RIRR, it shall comply with the requirements of para 2 through para 7 below.
2. Alarm annunciation at the control center shall be by means of audible and visible indicators.

3. For purposes of alarm annunciation, each floor of the building, other than floors of existing buildings, shall be considered as not less than one zone, unless otherwise permitted by another Section of this Code.
4. Unless otherwise permitted by another Section of this Code, if a floor area exceeds one thousand eight hundred sixty square meters (1,860 m^2), additional zoning shall be provided, and the length of any single zone shall not exceed ninety-one meters (91 m) in any direction.

   Exception: Where the building is provided with automatic sprinklers throughout, installed in accordance with Section 10.2.6.7 of this RIRR, the area of the alarm zone shall be permitted to coincide with the allowable area of the sprinkler zone.
5. A system trouble signal shall be annunciated at the control center by means of audible and visible indicators.
6. A system supervisory signal shall be annunciated at the control center by means of audible and visible indicators.
7. Where the system serves more than one building, each building shall be considered separately.

SECTION 10.2.6.7 AUTOMATIC SPRINKLERS AND OTHER EXTINGUISHING EQUIPMENT

A. **General**

1. Automatic sprinklers if required by Division 8 through 20 of this Chapter shall be in accordance with NFPA 13, *Standard for the Installation of Sprinkler Systems* or NFPA 13R, *Standard for the Installation of Sprinkler Systems Low Rise Residential Occupancies*.
2. The plans and specifications to be submitted shall be signed and sealed by a Professional Mechanical Engineer (PME).
3. All automatic sprinkler and standpipe systems required by RA 9514 and its RIRR shall be inspected, tested, and maintained in accordance with NFPA 25, *Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems*. Records of conducted maintenance and testing should be maintained and submitted together with FSMR.
4. Where a required automatic sprinkler system is out of service for more than four (4) hours in a twenty-four (24) hour period, the owner shall notify the nearest fire station immediately upon discovery but not later than twenty-four (24) hours, and a fire watch shall be assigned until the sprinkler system has been returned to service.
5. Sprinkler impairment procedures shall comply with NFPA 25, *Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems*.

B. **Supervision**

1. Supervisory Signals

   Where supervised automatic sprinkler systems are required by another Section of this Code, supervisory attachments shall be installed and monitored for integrity in accordance with NFPA 72. A distinctive supervisory signal shall be provided to indicate a condition that would impair the satisfactory operation of the sprinkler system. Monitoring shall include, but shall not be limited to, monitoring of control valves, fire pump power supplies and running conditions, water tank levels and temperatures, tank pressure, and air pressure on dry-pipe valves. Supervisory signals shall sound and shall be displayed either at a location within the protected building that is constantly attended by qualified personnel, or at an approved remotely located receiving facility.
2. Alarm Signal Transmission

   Where supervision of automatic sprinkler systems is required, water flow alarms shall be transmitted to an approved proprietary alarm receiving facility, a remote station, a central station, or the fire station.

C. **Other Automatic Extinguishing System**

1. In any occupancy where the character of the potential fuel fire is such that extinguishment or control of fire will be more effectively accomplished by a type of automatic extinguishing systems other than automatic sprinkler system such as but not limited to carbon dioxide, dry chemical, foam, or water spray, a standard extinguishing system of appropriate type shall be installed subject to the approval of the C/MFM having jurisdiction.

2. If the extinguishing system is installed in lieu of a required, supervised automatic sprinkler system, the activation of the extinguishing system shall activate the building fire alarm system, where provided. The activation of an extinguishing system that is installed in lieu of a required supervised automatic sprinkler system shall be indicated at the building fire alarm system, where provided.

D. **Manual Extinguishing Equipment**

1. Any fire extinguisher provided shall be installed, inspected and maintained in accordance with Section 10.2.6.9 of this RIRR.

2. Each standpipe and hose system provided shall be in accordance with Section 10.2.6.8 of this RIRR

SECTION 10.2.6.8 STANDPIPES

A. The design, installation and maintenance of standpipe systems shall be in accordance with NFPA 14, *Standard for the Installation of Standpipe, Private Hydrant and Hose Systems*.

B. Wet Standpipes

Wet standpipe system extending from the cellar or basement into the topmost storey shall be required in the following:

1. Assembly occupancies with an occupant load exceeding one thousand (1,000);
2. Educational, healthcare and detention and correctional, business and mercantile, industrial, and hotels and apartments occupancies, four or more storeys in height, and
3. Hazardous storage and business and mercantile occupancies having a floor area exceeding one thousand eight hundred sixty square meters (1,860 m²) per floor.
4. When required in Divisions 8 to 20 of this Chapter.

SECTION 10.2.6.9 PORTABLE FIRE EXTINGUISHERS

A. The C/MFM having jurisdiction shall designate the type and number of fire extinguishers to be installed and maintained in all buildings, structures and facilities, in accordance with this Section.

B. All buildings, structures and facilities shall be installed with portable fire extinguishers that are designed, installed and maintained in accordance with this Section. Fire extinguishers shall be installed even if the property is equipped with automatic sprinklers, standpipe and hose, or other fixed fire protection equipment.

C. **Classification of Hazards**

The classification of Hazard for purposes of application of this Section shall be as follows:

1. **Low Hazard**

Light hazard occupancies are locations where the total amount of Class A combustible materials, including furnishings, decorations, and contents, is of minor quantity. This can include some buildings or rooms occupied as offices, classrooms, churches, assembly halls, guest room areas of hotels/motels, and so forth. This classification anticipates that majority of content items are either noncombustible or so arranged that a fire is not likely to spread rapidly. Small amounts of Class B flammables used for duplicating machines, art departments, and so forth are included, provided that they are kept in closed containers and safely stored.

2. **Moderate Hazard**

Ordinary hazard occupancies are locations where the total amount of Class A combustibles and Class B flammables are present in greater amounts than expected under light (or low) hazard occupancies. These occupancies could consist of dining areas, mercantile shops, and allied storage; light manufacturing, research operations, auto showrooms, parking garages, workshop or support service areas of light (or low) hazard occupancies; and warehouses containing Class I or Class II commodities as defined by NFPA 231, *Standard for General Storage*.

3. **High Hazard**

Extra hazard occupancies are locations where the total amount of Class A combustibles and Class B flammables present, in storage, production, use, finished product, or combination thereof, is over and above those expected in occupancies classed as ordinary (or moderate) hazard. These occupancies could consist of

woodworking, vehicle repair, aircraft and boat servicing, cooking areas, individual product display showrooms, product convention center displays, and storage and manufacturing processes such as painting, dipping, and coating, including flammable liquid handling. Also included is warehousing of or in-process storage of other than Class I and Class II commodities.

D. **Classification, Ratings, and Performance of Fire Extinguishers**

1. Portable fire extinguishers are classified for use on certain classes of fires and rated for relative extinguishing effectiveness as determined by the Bureau of Product Standard, Department of Trade and Industry (DTI).
2. The classification is as follows:
   a. Class A: fires involving ordinary combustible solid materials
   b. Class B: fires involving flammable and combustible liquid and gas
   c. Class C: fires involving energized electrical equipment
   d. Class D: fires involving combustible metal fires

E. **Fire Extinguisher General Requirements**

1. The classification of fire extinguishers shall consist of a letter that indicates the class of fire on which a fire extinguisher has been found to be effective, preceded by a rating number (applicable to Class A and Class B only) that indicates the relative extinguishing effectiveness. Fire extinguishers classified for use on Class C and Class D hazards shall not be required to have a number preceding the classification letter.
2. Portable fire extinguishers shall be maintained in a fully charged and operable condition, and kept in their designated places at all times when they are not being used.
3. Fire extinguishers shall be conspicuously located where they will be readily accessible and immediately available in the event of fire. Preferably, they shall be located along normal paths of travel, including exits from areas.
4. The following types of fire extinguishers are considered obsolete and shall be removed from service:
   a. soda acid
   b. chemical foam (excluding film-forming agents)
   c. vaporizing liquid (e.g., carbon tetrachloride)
   d. cartridge-operated water
   e. cartridge-operated loaded stream
   f. copper or brass shell (excluding pump tanks) joined by soft solder or rivets
5. Cabinets housing fire extinguishers shall not be locked, except where fire extinguishers are subject to malicious use, locked cabinets shall be permitted to be used, provided they include means of emergency access.
6. Fire extinguishers shall not be obstructed or obscured from view, except in large rooms, and in certain locations where visual obstruction cannot be completely avoided, arrows, lights, signs, or coding of the wall are the acceptable means of identifying its location.
7. Portable fire extinguishers other than wheeled types shall be securely installed on the hanger or in the bracket supplied or placed in cabinets or wall recesses. The hanger or bracket shall be securely and properly anchored to the mounting surface in accordance with the manufacturer's instructions. Wheeled-type fire extinguishers shall be located in a designated location.
8. Fire extinguishers installed under conditions where they are subject to physical damage, ex. from impact, vibration, the environment, shall be adequately protected.
9. Fire extinguishers having a gross weight not exceeding eighteen kilograms (18 kg) shall be installed so that the top of the fire extinguisher is not more than one and a half meter (1.5 m) above the floor. Fire extinguishers having a gross weight greater than eighteen kilograms (18 kg), except wheeled types, shall be so installed that the top of the fire extinguisher is not more than one meter (1 m) above the floor. In no case shall the clearance between the bottom of the fire extinguisher and the floor be less than one hundred millimeters (100 mm).

10. Extinguisher operating instructions, original manufacturer's labels, labels that specifically relate to the extinguisher's operation or fire classification, or inventory control labels specific to that extinguisher shall be located on the front face of the extinguisher and be clearly visible, except the Hazardous Materials Identification Systems (HMIS) labels, six-year maintenance labels, hydrotest labels, or other labels.
11. Fire extinguishers mounted in cabinets or wall recesses shall be placed so that the fire extinguisher operating instructions face outward. The location of such fire extinguishers shall be marked conspicuously.
12. Where fire extinguishers are installed in closed cabinets that are exposed to elevated temperatures, the cabinets shall be provided with screened openings and drains. Vented fire extinguisher cabinets should utilize tinted glass and should be constructed to prevent the entrance of insects and the accumulation of water. Vented fire extinguisher cabinets constructed in this manner will lower the maximum internal temperature five and six tenths degrees Celsius (5.6 °C) to eight and three tenths degrees Celsius (8.3 °C).
13. Water-type fire extinguishers, ex. water, Aqueous Film Forming Foam (AFFF), Film Forming Fluoro-Protein (FFFP), shall not be installed in areas where the temperatures are outside the range of four degrees Celsius to forty-nine degrees Celsius (4 °C - 49 °C). All other types shall not be installed in areas where temperatures are outside the range of negative four degrees Celsius to forty-nine degrees Celsius (-4 °C - 49 °C). Fire extinguishers shall not be exposed to temperatures outside the range shown on the fire extinguisher label; except where it is installed in locations subject to temperatures outside these ranges, it shall be of a type approved and listed for the temperature to which it is exposed, or it shall be placed in an enclosure capable of maintaining the stipulated temperature range.
14. The fire extinguisher owner or the owner's agent shall be provided with an instruction manual that details condensed instructions and cautions necessary to the installation, operation, inspection, and maintenance of the fire extinguishers. The manual shall refer to this standard as a source of detailed instruction.

F. **Selection of Fire Extinguishers**

1. General Requirements

   The selection of fire extinguishers for a given situation shall be determined by the character of the fires anticipated, the construction and occupancy of the individual property, the hazard to be protected, ambient-temperature conditions, and other factors. The number, size, placement, and limitations of use of fire extinguishers required shall meet the requirements of para 2 hereof.

2. Selection by Hazard

   Fire extinguishers shall be selected for the classes of hazards to be protected.

   a. Fire extinguishers for protecting Class A hazards shall be selected from the following:
      1) Water type
      2) Multipurpose dry chemical type
      3) Wet chemical type
   b. Fire extinguishers for protection of Class B hazard shall be selected from the following:
      1) AFFF
      2) FFFP foam
      3) Carbon dioxide
      4) Dry chemical type
   c. Fire extinguishers for protection of Class C hazard shall be selected from types that are specifically listed for use on Class C hazards.
   d. Fire extinguishers and extinguishing agents for the protection of Class D hazards shall be of types approved for use on the specific combustible-metal hazard.

3. Application for Specific Hazards

   a. Selection of fire extinguishers for pressurized flammable liquids and pressurized gas fires type of hazard shall be made on the basis of recommendations by manufacturers of this specialized equipment. The system used to rate the effectiveness of fire extinguishers on Class B fires (flammable liquids in depth) is not applicable to these

types of hazards. It has been determined that special nozzle design and rates of agent application are required to cope with such hazards.

b. Selection of fire extinguishers for fires involving Class B materials in motion (three - dimensional Class B fires) such as pouring, running, or dripping flammable liquids, which generally includes vertical as well as one (1) or more horizontal surfaces, shall be made on the basis of recommendations by manufacturers of this specialized equipment.

c. Fire extinguishers for the protection of delicate electronic equipment shall be selected from either a carbon dioxide type or a halogenated agent type.

G. **Distribution of Fire Extinguishers**

1. General Requirements

a. Fire extinguishers shall be provided for the protection of both the building structure and the occupancy hazards contained therein.

b. Required building protection shall be provided by fire extinguishers suitable for Class A fires.

c. Occupancy hazard protection shall be provided by fire extinguishers suitable for such Class A, B, C, and D fire potentials as might be present.

d. Fire extinguishers provided for building protection can be considered also for the protection of occupancies having Class A fire potential.

e. Buildings having an occupancy hazard subject to Class B or Class C fires, or both, shall have a standard complement of Class A fire extinguishers for building protection, plus additional Class B or Class A fire extinguishers, or both. Where fire extinguishers have more than one letter classification (such as 2-A: 20-B: C), they can be considered to satisfy the requirements of each letter class.

f. Rooms or areas shall be classified generally as light (or low) hazard, ordinary (or moderate) hazard, or extra (or high) hazard. Limited areas of greater or lesser hazard shall be protected as required.

g. On each floor level, the area protected and the travel distances shall be based on fire extinguishers installed in accordance with Tables 7, *Fire Extinguishers for Different Types of Class A Hazards*, and Table 8, *Fire Extinguishers for Different Types of Class B Hazards*.

2. Size and Placement

a. Class A Hazards

1) Fire extinguishers for the different types of hazards shall be provided on the basis of Table 7 below.

Table 7: FIRE EXTINGUISHERS FOR DIFFERENT TYPES OF CLASS A HAZARDS

TYPE OF HAZARD	MINIMUM EXTINGUISHING RATING	MAXIMUM TRAVEL DISTANCE TO EXTINGUISHER	MAXIMUM AREA (OPEN AREA) PER EXTINGUISHER
Low	2–A*	15 m	200 m^2
Moderate	3–A*	12 m	100 m^2
High	4–A*	10 m	75 m^2

* Two 2-A rated fire extinguisher, provided they are installed adjacent to each other, may be used to fulfill the requirements of one 3-A or 4-A rated extinguisher.

2) The protection requirements shall be permitted to be fulfilled with fire extinguishers of higher rating, provided the travel distance to such larger fire extinguishers does not exceed fifteen meters (15 m).

3) In cases where building spaces are compartmentalized or separated from each other by fire barriers, each compartment not exceeding the maximum protection area specified Table 7 shall be provided with at least one (1) fire extinguisher.

b. Class B Hazards (other than fires in flammable liquids of appreciable depth)

1) Fire extinguishers for the different types of Class B hazards shall be provided on the basis of Table 8 below.

Table 8: FIRE EXTINGUISHERS FOR DIFFERENT TYPES OF CLASS B HAZARDS

TYPE OF HAZARD	MINIMUM EXTINGUISHER RATING	MAXIMUM TRAVEL DISTANCE TO EXTINGUISHER	MAXIMUM AREA (OPEN AREA) PER EXTINGUISHER
Low	5-B	10 m	200 m^2
Moderate	10-B	10 m	100 m^2
High	40-B	10 m	75 m^2

2) The protection requirements shall be permitted to be fulfilled with fire extinguishers of higher rating, provided the travel distance to such larger fire extinguishers does not exceed fifteen meters (15 m).

3) In cases where building spaces are compartmentalized or separated from each other by fire barriers, each compartment not exceeding the maximum protection area specified in Table 10, *Hazardous Area Protection* shall be provided with at least one (1) fire extinguisher.

c. Class B Hazards in Flammable Liquids of Appreciable Depth [greater than six (6) mm]

1) Portable fire extinguishers shall not be installed as the sole protection for flammable liquid hazards of appreciable depth where the surface area exceeds one square meter (1 m^2).

2) For flammable liquid hazards of appreciable depth, a Class B fire extinguisher shall be provided on the basis of at least two (2) numerical units of Class B extinguishing potential per square meter of flammable liquid surface of the largest hazard area.

3) Travel distances for portable fire extinguishers shall not exceed ten meters (10 m).

d. Class C Hazards

Fire extinguishers with Class C ratings shall be required where energized electrical equipment can be encountered that would require a non-conducting extinguishing medium. This requirement includes situations where fire either directly involves or surrounds electrical equipment. Since the fire itself is a Class A or Class B hazard, the fire extinguishers shall be sized and located on the basis of the anticipated Class A or Class B hazard.

e. Class D Hazards

1) Fire extinguishers or extinguishing agents with Class D ratings shall be provided for fires involving combustible metals.

2) Fire extinguishers or extinguishing agents (or mediums) shall be located not more than fifteen meters (15 m) of travel distance from the Class D hazard.

3) Portable fire extinguishers or extinguishing agents (or mediums) for Class D hazards shall be provided in those work areas where combustible metal powders, flakes, shavings, chips, or similarly sized products are generated.

4) Size determination shall be on the basis of the specific combustible metal, its physical particle size, area to be covered, and recommendations by the fire extinguisher manufacturer on data from control tests conducted.

SECTION 10.2.6.10 SEGREGATION AND PROTECTION OF HAZARDS

A. Any process, operation or storage having a degree of hazard greater than that normal to the general occupancy of the building or structure under consideration shall be enclosed with construction having at least a four-hour (4-hr) fire resistance rating or shall be provided with automatic fire protection or both, as specified in Divisions 8 through 20 of this Chapter. Where a hazard is high, both the fire-rated construction and automatic fire protection shall be used.

B. All construction enclosing hazardous operation or storage shall have not less than two-hour (2-hr) fire resistance, and all openings between the balance of the building and rooms or enclosures for hazardous operations or processes shall be protected with self-closing or automatic fire doors.

C. Where hazardous processes or storage area of such a character as to involve an explosion hazard, explosion venting to outside the building shall be provided by thin glass or other approved vents.

D. Where automatic protection is required, such protection shall be by automatic sprinklers in accordance with Section 10.2.6.7 of this RIRR or other approved extinguishing system appropriate to extinguish fires in hazardous materials stored or handled.

DIVISION 7. BUILDING SERVICES EQUIPMENT

SECTION 10.2.7.1 UTILITIES

A. Equipment using gas and related gas piping shall be in accordance with NFPA 54, *National Fuel Gas Code*, or NFPA 58, *Liquefied Petroleum Gas Code*, as the case may be.

B. Electrical wiring and equipment shall be in accordance with the latest edition of PEC.

C. Cooking equipment shall be protected by automatic kitchen hood fire suppression system in accordance with NFPA 96, *Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations* and NFPA 17A, *Standard for Wet Chemicals Extinguishing System*, except in the following:

1. Restaurants and similar establishments with an occupant load of less than fifty (50) persons (classified under mercantile occupancy) which could include, but not be limited to, fast foods, carinderias, food stalls, food trucks, food counters that use the following cooking equipment:
   a. Outdoor equipment;
   b. Portable equipment; and/or
   c. Equipment used only for food warming.
2. Restaurants that use small cooking appliances and do not have kitchen hoods and exhaust ducting systems.

D. Electronics and telecommunications equipment and installation shall be in accordance with the Philippine Electronics Code or NFPA 76, *Standard for the Fire Protection of Telecommunications Facilities*.

SECTION 10.2.7.2 HEATING, VENTILATING AND AIR-CONDITIONING

A. The design and installation of air conditioning, ventilating, heating, cooking, incinerating, or other building services equipment shall be installed in accordance with the latest edition of PMEC.

B. Where ducting of air conditioning and ventilating system passes through from one room to another room or from one fire barrier to another fire barrier, it shall be provided with automatic fire dampers.

SECTION 10.2.7.3 SMOKE CONTROL SYSTEMS

A. Smoke control systems shall be provided in the following:

1. All high rise buildings through the pressurization of all stairwells, at least one (1) elevator shaft, zoned smoke control, and vestibule, as component of smoke proof enclosures;
2. Pressurization of smoke refuge area;
3. Every atrium of covered malls of over two (2) levels and every atrium of other occupancies by Divisions 8 through 20 of this Chapter of over three (3) levels by means of a smoke extraction/exhaust system, which is compliant with the stated conditions of atrium in para "G" of Section 10.2.6.5 of this RIRR in addition to the stated conditions for protection of vertical openings of communicating floor levels in para A.2 of Section 10.2.6.5 of this RIRR. In case there is another atrium or other succeeding multiple atriums in alternate vertical pattern in the building, it shall have a Smoke Extraction/Exhaust System on each atrium of over one (1) level and shall also comply with the stated conditions of atrium in para "G" of Section 10.2.6.5 of this RIRR. Otherwise, two (2) levels atrium of covered malls and two (2)/three (3) levels atrium of other building occupancies shall have at least a natural smoke vent suitable for covered area of atrium, in addition to the stated conditions for protection of vertical openings of communicating floor levels in para A.2 of Section 10.2.6.5 of this RIRR;

4. Underground structures and windowless facilities in accordance with the provisions in Section 10.2.19.10 of this RIRR. In addition, every windowless storey or basement shall have at least a Smoke Venting Facility in accordance with this Section. In cases where windowless storey or basement is in the high-rise or building with smoke refuge area or atrium, it shall also comply with the provisions of paras 1, 2 and 3 above;
5. All means of egress serving a smoke-protected assembly seating area shall have smoke-actuated ventilation facilities or natural ventilation designed to maintain the level of smoke of not less than one thousand eight hundred thirty millimeters (1,830 mm) above the floor of the means of egress. The ventilation system shall be in accordance with NFPA 92;
6. All movie houses pursuant to Section 10.2.8.2 of this RIRR; and
7. All other buildings or structures with at least one thousand one hundred fifteen square meters (1,115 m^2) single floor area.

B. The design, installation, operation and on-going periodic testing of smoke control systems to the above-mentioned areas of building/structure/facility shall be in accordance with the latest edition of the latest edition of PMEC and NFPA 92, NFPA 204, *Standard for Smoke and Heat Venting*.

C. Documentation Required.
1. Detailed design plans, report, and specifications signed and sealed by a PME shall be generated and approved by C/MFM having jurisdiction before issuance of FSEC or Installation Clearance; and
2. Operations and maintenance manual requirement before issuance of FSIC for Certificate of Occupancy/Business Permit, signed and sealed by the PME.

D. The detailed design, plans, report, specifications shall provide documents with the following elements, if applicable:
1. System purpose
2. System design objectives
3. Design approach
4. Design assumptions (building height, ambient conditions, reliance on other fire protection systems, leakage, etc.)
5. Location of smoke zone(s)
6. Design pressure differences
7. Building use limitations that arise out of the system design
8. Design calculations
9. Fan and duct specifications
10. Damper specifications
11. Detailed inlet or exhaust inlets site information
12. Detailed method of activation
13. Smoke control system operation logic
14. System commissioning procedures
15. Smoke control systems engineering analysis
16. Location of manual operating control of smoke control systems or Firefighters' Smoke-Control Station (FSCS)
17. Details and location of control of the Smoke Control Systems in a Fire Command Center.

E. Newly installed smoke-control systems shall be inspected by the C/MFM having jurisdiction and its acceptance testing shall be performed by a third party in accordance with the criteria established in the approved system design documents, and operations and maintenance manual.

F. The operations and maintenance manual shall provide the requirements to ensure the proper operation of the system over the life of the building. The building administrator/ owner shall be responsible for all system testing and shall maintain records of all periodic testing and maintenance in accordance with the operations and maintenance manual which shall include the following:

1. The procedure used in the initial commissioning of the system, as well as the measured performance of the system at the time of commissioning;
2. The testing and inspection requirements for the system and system components and the required frequency of testing;
3. The critical design assumptions used in the design and limitations on the building and its use that arise out of the design assumptions and limitations;
4. The purpose of the smoke control system;
5. Operational testing of the smoke-control systems shall be in accordance with NFPA 92, and shall include all equipment related to the system including, but not limited to, initiating devices, fans, dampers, controls, doors, and windows;
6. An approved written schedule for such operational tests shall be established with the periodic inspection of the C/MFM having jurisdiction;
7. Test records shall be maintained in the premises and must indicate the date of such testing, the qualified service personnel, and any corrective measures needed or taken;
8. All smoke-control systems and devices shall be maintained in a reliable operating condition and shall be replaced or repaired where defective;
9. The C/MFM having jurisdiction shall be notified when any smoke-control system is out of service for more than four (4) hours in a twenty-four hour (24-hr) period and again upon restoration of service of such systems; and
10. The C/MFM having jurisdiction shall require the building to be evacuated or an approved fire watch to be provided for all portions left unprotected by the fire protection/smoke control system shutdown until the fire protection system has been returned to service.

SECTION 10.2.7.4 RUBBISH CHUTES, LAUNDRY CHUTES, AND FLUE-FED INCINERATORS

A. Every chute and incinerator flue shall be enclosed and the openings therein shall be protected in accordance with paras A.1 and A.3 of Section 10.2.6.5 of this RIRR, respectively. In new construction, inlet openings serving chutes shall open only to a room that is designed and used exclusively for accessing the chute opening. Rubbish chutes and laundry chutes shall be permitted to open into rooms not exceeding thirty-seven square meters (37 m^2) that are used for storage, provided that the rooms are protected by automatic sprinklers.

B. Every incinerator flue, rubbish chute, and laundry chute shall be designed and maintained in accordance with the latest edition of PMEC.

C. In new constructions, any chute other than an incinerator flue shall be provided with approved, supervised sprinkler system.

D. The above requirements shall not apply to detached single or two -family dwellings.

SECTION 10.2.7.5 ELEVATORS AND ESCALATORS

A. Elevator installations shall be in accordance with the latest edition of PMEC.

B. All new elevators shall conform to the firefighters' emergency operations requirements of American Society of Mechanical Engineers (ASME) A17.1, *Safety Code for Elevators and Escalators*, except buildings of less than five (5) storeys in height.

C. Elevators shall be subject to periodic inspections and tests by building management, without prejudice to the power or authority of the BFP to conduct inspection. All elevators equipped with firefighters' emergency operation in accordance with para "B" hereof shall be subject to a monthly operation with a written record of the findings made and kept by the building management. Such record shall be included in the submission of FSMR**.**

SECTION 10.2.7.6 FIRE SAFETY CLEARANCES

A. All equipment/utilities/facilities mentioned in this Division, especially for stand-alone equipment, shall not be installed without first securing an installation clearance from the C/MFM having jurisdiction. This installation clearance shall be a prerequisite for the issuance of permits required by law for these installations.

B. Installation clearance, which is a prerequisite for issuance of permits shall be required in all fire protection and warning systems in this RIRR.

C. For installations covered by FSEC, installation clearance shall no longer be required.

SECTION 10.2.8.1 OCCUPANT LOAD

The occupant load permitted in any assembly building, structure, or portion thereof shall be determined by dividing the net floor area or space assigned to that use by the square meter per occupant as follows:

A. An assembly area of concentrated use without fixed seats such as an auditorium, place of worship, dance floor, and lodge room: sixty-five hundredths square meter (0.65 m^2) per person.

B. An assembly area of less concentrated use such as conference room, dining room, drinking establishment, exhibit room, gymnasium, or lounge: one and four tenths square meters (1.4 m^2) per person.

C. Standing room or waiting space: twenty-eight hundredths square meter (0.28 m^2) per person.

D. The occupant load of an area having fixed seats shall be determined by the number of fixed seats installed. Required aisle space serving the fixed seats shall not be used to increase the occupant load.

E. Every room constituting a place of assembly and not having fixed seats shall have the occupant load of the room posted in a conspicuous place near the main exit from the room. Approved signages shall be maintained in legible manner. Signs shall be durable and shall indicate the number of occupants permitted for each room.

F. In theaters and similar places of assembly where persons are admitted to the building at times when seats are not available for them and are allowed to wait in a lobby or similar space until seats are available, such use of lobby or similar spaces shall not encroach upon the required clear width of exits. Such waiting spaces shall be restricted to areas other than the required means of egress. Exits shall be provided for such waiting spaces on the basis of one person for each one-fourth square meter (0.25 m^2) of waiting space area. Such exits shall be in addition to the exits specified for the main auditorium area and shall conform in construction and arrangement to the general rules for exits given in this Division.

G. In areas not in excess of nine hundred thirty square meters (930 m^2), the occupant load shall not exceed one person in forty-six hundredths square meter (0.46 m^2); in areas in excess of nine hundred thirty square meters (930 m^2), the occupant load shall not exceed one person in sixty-five hundredths square meter (0.65 m^2).

SECTION 10.2.8.2 EXIT DETAILS

A. **Capacity of Exits**

1. The capacity of means of egress shall be in accordance with para "C" of Section 10.2.5.2 of this RIRR or shall be in accordance with the succeeding paragraph for means of egress serving theater-type seating or similar seating arranged in rows.
2. Minimum clear width of aisles and other means of egress serving theater-type seating or similar seating arranged in rows shall be in accordance with Table 9 below.

Table 9: CAPACITY FACTORS FOR THEATER TYPE SEATING

No. of seats	Clear width per seat served (in mm)	
	Stairs	Passageways, Ramps, and Doorways
Unlimited	7.6 AB	5.6 C

3. The minimum clear widths shown in Table 9 shall be modified in accordance with all of the following:

   a. If risers are equal to or less than one hundred seventy-eight millimeters (178 mm) in height, A=1. However, if risers exceed this height, multiply the stair width in Table 9 by factor A, where:

$$A = 1 + \left[\frac{RISER\ HEIGHT - 178}{125}\right]$$

   b. Stairs without a handrail located within a seven hundred sixty millimeters (760 mm) horizontal distance shall be twenty-five percent (25%) wider than otherwise

calculated, that is, multiply by factor B=1.25. If handrails are provided within seven hundred sixty millimeters (760 mm), B=1.

c. Ramps steeper than one (1) in ten (10) slope where used in ascent shall have their widths increased by ten percent (10%), that is, multiply by factor C = 1.10, otherwise C=1 if the ramp is within or less than one (1) in ten (10) slope.

B. **Minimum Number of Exit**

The number of exits shall be in accordance with para "G" of Section 10.2.5.2 of this RIRR.

C. **Location of Exits**

1. Main Exit

Every assembly occupancy shall be provided with a main exit. The main exit shall be of sufficient width to accommodate one half (1/2) of the total occupant load, but shall be not less than the total required width of all aisles, exit passageways and stairways leading thereto, and shall connect to a stairway or ramp leading to a street.

2. Other Exits

Each level of an assembly occupancy shall have access to the main exit and an addition shall be provided with exits of sufficient width to accommodate two-thirds (2/3) of the total occupant load served by that level. Such exits shall open directly to a street or into an exit court, enclosed stairway, outside stairway, or exit passageway leading to a street. Such exits shall be located as far apart and as far from the main exits as practicable. Such exits shall be accessible from a cross aisle or side aisle.

D. **Minimum Corridor Width**

The width of any exit access corridor serving fifty (50) or more persons shall not be less than one and twelve hundredths meters (1.12 m).

E. **Travel Distance to Exits**

Exits shall be so arranged that the total length of travel from any point to reach an exit will not exceed forty-six meters (46 m) in any place of assembly for spaces not protected by approved, supervised sprinkler system and sixty-one meters (61 m) in areas so protected.

F. **Types of Exits**

1. Exits of the specified number and width shall be of one (1) or more of the following types, in accordance with the provisions of Division 5 of this Chapter.

a. Doors of the swinging type leading directly outside or through a lobby or passageway leading to the outside of the building

b. Horizontal exits

c. Smoke proof enclosures

d. Stairs

e. Ramps

2. Turnstiles

No turnstiles or other devices to restrict the movement of persons shall be installed in any place of assembly in such a manner as to interfere in any way with required exit facilities in accordance with para "L" of Section 10.2.5.3 of this RIRR.

G. **Panic Hardware**

An exit door from in assembly occupancy shall not be provided with a latch or lock unless it is a panic hardware.

H. **Seating, Aisles and Railings**

1. Seating

a. The aisle access way between rows of seating shall have a clear width of not less than three hundred five millimeters (305 mm) and this minimum shall be increased by seven and six tenths millimeters (7.6 mm) for every seat over a total of fourteen (14) but shall not exceed five hundred sixty millimeters (560 mm);

b. Rows of seating served by the aisles of doorways at both ends shall not exceed one hundred (100) seats per row;

c. Rows of seating served by an aisle or doorway at one end only shall have a path of travel not exceeding nine meters (9 m) in length, measured from the farthest seat to an aisle.

2. Aisles

Every portion of any assembly building which contains seats, tables, displays, equipment, or other materials shall be provided with aisles leading to exit as follows:

a. When serving more than sixty (60) seats, every aisle shall be not less than nine hundred fifteen millimeters (915 mm) when serving seats on one side only, and not less than one thousand two hundred twenty millimeters (1,220 mm) when serving seats on both sides. Such minimum width shall be measured at the point farthest from an exit, cross aisles, or foyer and shall be increased in width by twenty-five millimeters (25 mm) for each meter in length toward the exit, cross aisles, or foyer.

b. When serving sixty (60) seats or less, aisles shall be not less than seven hundred sixty millimeters (760 mm) wide.

c. Aisles shall terminate in a cross aisle, foyer, or exit. The width of such cross aisle, foyer, or exit shall be not less than the sum of the required width of the widest aisle plus fifty (50%) percent of the total required width of the remaining aisles which it serves.

d. No dead-end aisle shall be greater than six and one tenth meters (6.1 m) in length. In arena or thrust stage theaters, dead-end aisles at the stage shall not exceed five rows beyond a cross aisle.

e. The length of travel to an exit door by any aisle shall be not greater than forty-six meters (46 m).

f. Steps shall not be placed in aisles to overcome differences in level unless the gradient exceeds twelve and a half percent (12.5%). Steps in aisles shall conform to the requirement for stairs as to riser and tread.

g. The gradient of sloping aisles shall not exceed twelve and a half percent (12.5%).

3. Railings

a. The fasciae of boxes, balconies and galleries shall have substantial railings not less than six hundred sixty millimeters (660 mm) high above the floor.

b. The railings at the ends of aisles extending to the fasciae shall be not less than seven hundred sixty millimeters (760 mm) high for the width of the aisle, or nine hundred ten millimeters (910 mm) high if at foot of steps.

c. Cross aisles shall be provided with railings not less than six hundred sixty millimeters (660 mm) high.

I. **Lighting and Signs**

1. All places of assembly shall have exit lighting in accordance with Section 10.2.5.11 and signs in accordance with Section 10.2.5.12 of this RIRR. All places of assembly shall be provided with emergency lighting.

2. In every auditorium or other places of assembly where pictures, motion pictures or other projections are made by means of directed light, the illumination projections are made by means of directed light, the illumination of the floors of exit access may be reduced during such period projection to values of not less than two ten-thousandths (0.0002) lumen per square centimeter.

J. **Exits Common to Other Occupancies**

1. Places of assembly in building of other occupancy may use exits common to the place of assembly and the other occupancy, provided that the assembly area and the other occupancy, considered separately, have exits sufficient to meet the requirements of this Chapter.

2. Exits shall be sufficient for simultaneous occupancy of both the place of assembly and other parts of the building.

SECTION 10.2.8.3 STAGE AND ENCLOSED PLATFORM

A. Every stage equipped with fly galleries, gridirons, and rigging for movable theater-type scenery, and every enclosed platform larger than forty-six and a half square meters (46.5 m^2) in area shall be protected with the automatic fire suppression system at the ceiling,

under the gridiron, in usable spaces under the stage or platform and in auxiliary spaces and dressing rooms, storerooms, and workshops.

When openings are provided on the stage floor for stage lifts, trap doors or stairs, automatic fire suppression system shall be provided around the opening at the ceiling below the stage; and baffles at least three hundred millimeters (300 mm) in depth shall be installed around the perimeter of the opening.

B. Every stage and every enclosed platform larger than forty-six and a half square meters (46.5 m^2) shall have ventilators in or above it, operable from the stage floor by hand, and also opening by fusible links or other approved automatic heat actuated device or heat and smoke actuated device, to give a free opening equal to at least five percent (5%) of the area floor of the stage or enclosed platform. Where mechanical ventilation is provided, it shall be so arranged that natural ventilation, at least equal to the above, will be available. Make up air for mechanical ventilation shall not be obtained from the audience (seating) areas.

C. The proscenium opening of every stage shall be provided with a fire resistant curtain constructed and mounted so as to intercept hot gases, flames, and smoke; and to prevent glow from a severe fire on the stage showing on the auditorium side within a five-minute (5-min) period. The curtain shall be automatic closing without the use of applied power.

D. Every stage shall be provided with a fire control station located on or adjoining the stage. The fire control station shall have the following:

1. Lights to indicate the operations of all emergency lights and power circuits.
2. Manual operating devices to actuate automatic spray heads at proscenium, proscenium curtain, and smoke vents.
3. Indicator light to show that the automatic fire suppression system is operating, or sprinkler system valves are open and system is charged with water under pressure.
4. A public address system energized from normal and emergency light and power sources.
5. An alarm system connected to the manager's office, dressing rooms, and auxiliary stage spaces. It shall not sound an alarm audible in the audience or seating portion of the theater.

E. Auxiliary stage spaces such as understage areas, dressing rooms, workshops and similar spaces associated with the functioning of a stage shall comply with the following:

1. No point within any auxiliary space shall be more than fifteen and twenty-five hundredths meters (15.25 m) from a door providing access to an exit.
2. There shall be at least two (2) exits available from every auxiliary stage space, one of which shall be available within a travel distance of twenty-three meters (23 m). A common path of travel of six meters (6 m) to the two (2) exits shall be permitted.
3. Auxiliary stage spaces shall be protected as provided under this Section.
4. No workshop involving the use of combustible or flammable paint, liquids, or gases, or their storage shall open directly upon a stage.

F. Where approved, supervised sprinkler system is not required, the proscenium wall of every theater using movable scenery or decorations shall not have more than two (2) openings entering the stage, exclusive of the proscenium opening. Such opening shall not exceed two square meters (2 m^2) each and shall be fitted with self-closing fire doors.

G. Each stage shall be equipped with thirty-eight and one tenth millimeters (38.1 mm) wet standpipes, equipped with at least thirty meters (30 m) hose on each side of the stage.

SECTION 10.2.8.4 PROJECTION BOOTH

A. Every place of assembly in which pictures are projected from cellulose acetate, or other safety film using electric arc, xenon, or other light sources, which generate hazardous gases, dust, or radiation shall have a projection room that complies with Section 10.2.8.17 of this RIRR and the following paragraph. This also applies to other latest types of projection, ex. LCD and i-MAX.

B. There shall be posted on the outside of each projection room door and within the projection room proper, a conspicuous sign in block letters twenty-five millimeters (25 mm) stroke stating: **"SAFETY FILM ONLY PERMITTED IN THIS ROOM."**

SECTION 10.2.8.5 DECORATIVE MATERIAL

A. No decorative material, which will ignite and allow flame to spread over the surface when exposed to a flame test, shall be allowed to be used in places of assembly.

B. The method of test shall be as follows: the piece shall be exposed to the flame from a common match and held in horizontal position twelve and seven tenths millimeters (12.7 mm) underneath the piece, and a constant location for a minimum of fifteen (15) seconds.

C. Treatments may be applied to decorative material to accomplish flame proofing. Such treatments shall be renewed as often as may be necessary to maintain the flame-proofed condition of the material.

SECTION 10.2.8.6 PYROXYLIN COATED FABRIC

Use of pyroxylin coated fabrics inside places of assembly shall be restricted as follows:

A. The nitrocellulose coating shall not exceed four hundred thirty grams (430 g) for every square meter of fabric.

B The total surface area of fabric-complying with para "A" above shall not exceed one (1) square meter for every four and a half cubic meter (4.5 m^3) of room volume.

C. Where the coating exceeds forty-seven grams per square meter (47 g/m^2), the total area of such fabric shall not exceed one square meter (1 m^2) for every two and twenty-five hundredths cubic meters (2.25 m^3) of room volume.

SECTION 10.2.8.7 MOTION PICTURE SCREENS, STAGE CURTAINS AND DRAPES

No motion picture screens or screen masking curtains, buntings, or other draperies shall be used unless the material is flame-proofed and will pass the match-flame test described in Section 10.2.8.5 of this RIRR.

SECTION 10.2.8.8 PROTECTION

A. **Protection of Vertical Opening**

Any vertical opening shall be enclosed or protected in accordance with Section 10.2.6.5 of this RIRR.

B. **Interior Finish**

1. The interior finish requirements of this Section shall be in accordance with Section 10.2.6.4 of this RIRR and subject to modifications specified therein.
2. Interior finish in all means of egress in all places of assembly shall be Class A.
3. Interior finish in general assembly areas shall be Class A.
4. Screen on which pictures are projected shall comply with requirements of Class A or Class B interior finish, as the case may be.

C. **Protection from Hazards**

Rooms or spaces used for hazardous equipment, operations and process, such as but not limited to rooms containing high-pressure vessels, refrigerating machineries, large transformers, or other service equipment; rooms or spaces used for the storage, processing or use of boilers or furnaces, combustible supplies, hazardous materials or flammable or combustible liquids; laundries; and maintenance shops including woodworking and painting areas shall not be directly located under or abutting required exits and shall be separated from other parts of the building by fire barriers by construction of not less than one (1) hour fire resistance rating.

D. **Fire Detection and Alarm System**

1. All assembly occupancies shall be provided with fire alarm system with manual initiation; provided however, that where occupants of the building exceed three hundred (300) persons, the initiation shall be through an automatic detection system.
2. The required fire alarm system shall activate an audible and visible alarm in a constantly attended receiving station within the building when occupied for purposes of initiating emergency action.

E. **Extinguishing Requirement**

1. The following assembly occupancies with occupant load of one hundred fifty (150) persons or more shall be protected throughout by an approved, supervised automatic sprinkler system:
   a. bars with live entertainment;
   b. dance halls;
   c. discotheques; and
   d. assembly occupancies with festival seating.
2. Buildings containing assembly occupancies with occupant load of more than three hundred (300) persons shall be protected by an approved, supervised automatic sprinkler system:
   a. throughout the storey containing the assembly occupancy;
   b. throughout all storeys below the storey containing the assembly occupancy;
   c. in case of an assembly occupancy located below the level of exit discharge, throughout all storeys intervening between that storey and the level of exit discharge, including the level of exit discharge.
3. The provisions of paras 1 and 2 above shall not apply to assembly occupancy with all sides open and places of worship at the level of exit discharge with sufficient means of egress.

F. **Smoke Management**

Public assembly buildings, structures or facilities with more than fourteen (14) seats shall be provided with smoke management system in such a way that the atmosphere shall not induce more than the acceptable limit by volume of the contaminated atmosphere emanating from the fire area.

SECTION 10.2.8.9 BUILDING SERVICES EQUIPMENT

A. **Elevators**

Elevators shall not constitute required means of exit. When places of assembly are more than three (3) storeys aboveground level and equipped with automatic elevators, at least one elevator shall be designed and equipped for fire emergency use of BFP personnel, or as may be determined by the C/MFM having jurisdiction. Key operation shall transfer automatic elevator operation to manual and bring elevator to ground or first floor use by said personnel. The elevator shall be situated so as to be readily accessible.

B. **Air Conditioning**

All air conditioning, heating, and ventilation installations shall comply with the provisions of Division 7 of this Chapter.

C. **Special Provisions for Food Service Establishments**

All devices in connection with the preparation of food shall be installed and operated to avoid hazard to the safety of occupants, and shall be installed and maintained in accordance with good engineering practice.

SECTION 10.2.8.10 EMERGENCY EVACUATION PLAN AND OCCUPANT LOAD CAPACITY

A. Emergency evacuation plan, in accordance with Section 10.2.5.13 of this RIRR, shall be submitted to the C/MFM having jurisdiction. Such plan shall also include the capacity and location of the exit ways and aisles, and shall be displayed prominently in the premises.

B. In all theaters, nightclubs, dance halls and similar occupancies, an audible announcement and other means of announcement shall be made prior to the performance describing the location of exits to be used in case of fire or other emergencies.

SECTION 10.2.8.11 OVERCROWDING

No person shall permit the overcrowding or admittance of any person beyond the approved capacity of any place of public assembly. The C/MFM having jurisdiction, upon finding any overcrowding condition or obstruction in aisles, passageways or other means of egress, or upon finding any condition which constitutes a serious menace to life, shall cause the performance, presentation, or entertainment to be stopped until the condition or obstruction is corrected.

SECTION 10.2.8.12 STANDBY BFP PERSONNEL

A. The C/MFM having jurisdiction, whenever in his/her judgment it is essential for public safety to deploy standby BFP personnel in any place of public assembly, or any other place where people congregate, due to the number of persons, or the nature of the performance, exhibition, display contest or activity, is authorized to detail standby BFP personnel at such place.

B. The said BFP personnel shall be in uniform and remain on duty during the time such places are open to the public, or when the activity is being conducted. Before each performance or the start of the activity, said BFP personnel shall inspect the required fire appliances provided, to see that they are in proper place and in good working order, and shall keep diligent watch for fires during the time such place is open to the public or such activity is being conducted, and take prompt measures for the extinguishment of fire that may occur.

SECTION 10.2.8.13 OUTDOOR ASSEMBLY

A. All grandstands, tents, and other places of outdoor assembly shall comply with the requirements of NFPA 102, *Standard for Grandstands, Folding and Telescopic Seating, Tents, and Membrane Structures*.

B. Grandstand and bleacher type seating may be used as indoor type seating only when it meets the requirements of this Division.

SECTION 10.2.8.14 UNDERGROUND STRUCTURE AND WINDOWLESS BUILDINGS

The requirements of underground structures and windowless buildings used as places of assembly shall be in accordance with Section 10.2.19.10 of this Chapter.

SECTION 10.2.8.15 SPECIAL PROVISIONS FOR EXHIBITION HALLS

A. No display or exhibit shall be so installed or operated as to interfere in any way with access to any required exit or with visibility of any required exit or of any required exit sign, nor shall any display block access to firefighting equipment.

B. All displays or exhibits of combustible material or construction and all booths and temporary construction in connection therewith shall be so limited in combustibility or shall be protected to avoid any undue hazard of fire which might endanger occupants before they have the opportunity to use available exits.

C. Any place of assembly used for exhibition or display purposes shall be equipped with complete automatic fire suppression system, when the exhibition or display area exceeds one thousand three hundred ninety-four square meters (1,394 m^2). For combustible materials not on display, storage room having an enclosure with fire resistance rating of at least two (2) hours and protected by an automatic fire extinguishing system shall be provided.

SECTION 10.2.8.16 EXISTING PLACES OF ASSEMBLY

A. **Capacity Limitations**

In existing places of assembly, the C/MFM having jurisdiction may permit occupancy by number of persons not to exceed that for which the existing exits are adequate, provided that measures established are satisfactory to the C/MFM having jurisdiction, to prevent occupancy by any greater number of persons based on the calculated occupant load of the building.

B. **Interior Finish**

Provisions of Section 10.2.6.4 of this RIRR shall apply in existing places of assembly where interior finish does not conform to the requirements for new assembly buildings.

SECTION 10.2.8.17 PROJECTION ROOMS FOR SAFETY FILM

A. Every projection room shall be of permanent construction consistent with the construction requirements for the type of building in which the projection room is located. The room shall have a floor area of not less than seven and four tenths square meters (7.4 m^2) for a single machine and at least three and seventy-five hundredths square meters (3.75 m^2) for each additional machine. Each motion picture projector, floodlight, spotlight, or similar piece of

equipment shall have a clear working space not less than two and twenty-five hundredths square meters (2.25 m^2).

B. Each projection room shall be at least one out-swinging, self-closing door not less than seven hundred sixty millimeters (760 mm) wide by two thousand millimeters (2,000 mm) high.

C. The aggregate of parts and openings for projection equipment shall not exceed twenty-five percent (25%) of the area of the wall between the projection room and the auditorium. All opening shall be provided with glass or other approved materials, so as to completely close the opening.

D. Projection booth room ventilation shall be not less than the following:

1. Supply Air

Each projection room shall be provided with two (2) or more separate fresh air inlet ducts with screened openings terminating within three hundred millimeters (300 mm) of the floor, and located at opposite ends of the room. Such air inlets shall be of sufficient size to permit an air change every three (3) minutes. Fresh air may be supplied from the general building air conditioning system, provided it is so arranged that the projection booth will continue to receive one change of air every three (3) minutes, when no other air is supplied by the general air conditioning system.

2. Exhaust Air

Each projection room shall be provided with one (1) or more exhaust air outlets which may be manifold into a single duct outside the booth. Such outlets shall be so located as to ensure circulation throughout the room. Projection room exhaust air system shall be independent of any other air systems in the building. Exhaust air ducts shall terminate at the exterior of the building in such a location that the exhaust system shall be mechanically operated and of such capacity to provide a minimum of one change of air every three minutes. The blower motor shall be outside the duct system. The projection room ventilation system may also be appurtenant rooms, such as the generator room and the rewind room.

E. Each projection machine shall be provided with an exhaust duct which will draw air from each lamp and exhaust it directly to the outside of the building in such a fashion that it will not be picked up by supply inlets. Such a duct shall be of rigid materials, except for a continuous flexible connector approved for the purpose. The lamp exhaust systems shall not be interconnected with any other system.

1. Electric Arc Projection Equipment

The exhaust capacity shall be five and sixty-six hundredths cubic meters per minute (5.66 m^3/min) for each lamp connected to the lamp exhaust system or as recommended by the equipment manufacturer, whichever is greater. Auxiliary air may be introduced into the system through a screened opening to stabilize the arc.

2. Xenon Projection Equipment

The lamp exhaust shall exhaust not less than eight and a half cubic meters per minute (8.5 m^3/min) per lamp, nor less than that exhaust volume required or recommended by the equipment manufacturer, whichever is greater. The external temperature of the lamp housing shall not exceed fifty-four and a half degrees Celsius (54.5˚C) when operating.

F. Each projection room shall be provided with rewind and film storage facilities.

G. A maximum of four (4) containers for flammable liquids not greater than five tenths liter (0.5 L) capacity and of a non-breakable type may be permitted in each projection booth.

H. Appurtenant electrical equipment such as rheostats, transformers, and generators may be located within the booth or in a separate room of equivalent fire resistance construction.

SECTION 10.2.8.18 OPEN FLAME

No person shall cause or permit any open flame to be used in any place of public assembly, or drinking or eating establishments, except when used in conjunction with approved heating or cooking appliances or under a written permit from the C/MFM having jurisdiction.

DIVISION 9. EDUCATIONAL OCCUPANCIES

SECTION 10.2.9.1 OCCUPANCY AND OCCUPANT LOAD

A. **Classification of Educational Occupancies**

1. Educational occupancies shall include all buildings used for the gathering of groups of six (6) or more persons for purposes of instruction, such as schools, universities, colleges, and academies.
2. Educational occupancy includes part-day, nursery schools, kindergartens, and other schools whose purpose is primarily educational even though the children are of pre-school age.
3. Other occupancies associated with educational institutions shall be in accordance with the appropriate parts of this Chapter.
4. In cases where instruction is incidental to some other occupancy, the Section of the Chapter governing such other occupancy shall apply.

B. **Occupant Load**

1. The occupant load of educational buildings or any individual storey or section thereof for the purpose of determining exits shall not be less than one (1) person for each one and nine tenths square meters (1.9 m^2) of net classroom area or four and six tenths square meters (4.6 m^2) of net area of shops, laboratories, and similar vocational rooms. In dry nurseries where sleeping facilities are provided, the occupant load shall be not less than one person for each three and three tenths square meters (3.3 m^2).
2. The occupant load of an area having fixed seats shall be determined by the number of fixed seats installed. Required aisle space serving the fixed seats shall not be used to increase the occupant load.
3. The occupant load of individual lecture rooms, gymnasiums, or cafeterias used for assembly purposes of more than fifty (50) persons shall be determined in accordance with Section 10.2.8.1 of this RIRR.

SECTION 10.2.9.2 EXIT DETAILS

A. **Capacity of Exits**

Capacity of means of egress shall be in accordance with Section 10.2.5.2 para "C" of this RIRR.

B. **Minimum Number of Exits**

1. Every room or space with a capacity of fifty (50) or more persons or over ninety-three square meters (93 m^2) in area shall have at least two (2) doorways as remote from each other as practicable. Such doorways shall provide access to separate exits; but where egress is through corridors, they shall open upon a common corridor leading to separate exits in opposite directions.
2. Not less than two (2) separate exits shall be provided on every storey and accessible from every part of every storey and mezzanine.

C. **Travel Distance to Exits**

Travel distance to an exit from any point in a building without an approved, supervised automatic sprinkler system shall not exceed forty-six meters (46 m), and shall not exceed sixty-one meters (61 m) in any building protected throughout by an approved, supervised automatic sprinkler system.

D. **Access to Exits**

1. Every aisle, corridor, balcony, other means of access to exits, and discharge from exit shall be in accordance with Section 10.2.5.2 of this RIRR.
2. Any corridor shall be not less than one and eighty-three hundredths meters (1.83 m) wide in the clear.
3. Doors which swing into an exit access corridor shall be recessed to prevent interference with corridor traffic; any doors not so recessed shall open the one hundred eighty degrees (180˚) to stop against the wall. Doors in any position shall not reduce the required corridor width by more than a half.

4. Drinking fountains or other equipment, fixed or movable, shall not be so placed as to obstruct the required minimum one and eighty-three hundredths meters (1.83 m) corridor width.

E. **Exterior Corridors or Balconies**

1. Where exterior corridors or balconies are provided as means of exit, they shall open to the outside air except for railings or balustrades with stairs or level exits to grade not over seventy-six and one fourth meters (76.25 m) apart, so located that an exit will be available in either direction from the door to any individual room or space, with dead ends not to exceed six meters (6 m). If balconies are enclosed by glass or in any other manner, they shall be treated as interior corridors.
2. The floors of balconies (exterior corridors) and stairs shall be solid, without openings, and shall comply with requirements for outside stairs as regards balustrades or railings, width and pitch of stairs, and other details, but are not required to be shielded from fire within the building by blank walls, wired glass windows or the like where the stairs are located on the side of balcony or corridor away from the building and are separated from the building by the full width of the balcony or corridor.

F. **Exit Arrangement**

1. Exits shall be so arranged that at least two (2) separate exits will be available from every floor area. Exits shall be as remote from each other as practicable, so arranged that there will be no pockets or dead ends in which occupants may be trapped, and in no case shall any dead-end corridor extend more than six meters (6 m) beyond the stairway or other means of exit therefrom.
2. Every classroom or room used for educational purposes or student occupancy below the floor of exit discharge shall have access to at least one (1) exit which leads directly to the exterior at level of discharge without entering the floor above.

G. **Types of Exits**

Exits of the specified number and width shall be of one (1) or more of the following types, in accordance with the provisions of Division 5 of this Chapter.

1. Doors of the swinging type leading directly outside or through a lobby or passageway leading to the outside of the building. Any exterior door and any room door subject to use by fifty (50) or more persons shall be operated by bars or other panic hardware device with re-entry mechanism, in accordance with Section 10.2.5.3 of this RIRR, except that a door leading directly to the outside from a classroom occupied by less than fifty (50) persons may be equipped with the same knob-operated schoolhouse type lock as is used in classroom doors leading to corridor, with no provision whatsoever for locking against egress from the classroom.
2. Horizontal exits
3. Smoke proof enclosures
4. Stairs
5. Ramps

H. **Additional Exit Details**

The provisions of this Section are based on occupancy by normal individuals. Educational buildings used by persons with physical or mental handicaps shall have additional features as may be required by the C/MFM having jurisdiction to ensure safe use of such exits in an emergency.

I. **Dead-End Corridors**

Dead end corridors shall not exceed six meters (6m).

SECTION 10.2.9.3 LIGHTING AND SIGNS

A. All educational buildings shall have adequate exit illumination in accordance with Section 10.2.5.11 of this RIRR. Flexible plan and open plan buildings and buildings designed for night occupancy and portions of buildings having interior and windowless rooms, areas, and corridors shall have emergency lighting.

B. All educational buildings shall have signs designating the location of exits or the path of travel to reach them, in accordance with Section 10.2.5.12 of this RIRR.

SECTION 10.2.9.4 WINDOWS FOR RESCUE AND VENTILATION

Except in buildings protected with approved, supervised sprinkler system in accordance with Section 10.2.6.7 of this RIRR, every room or space used for classroom or other educational purposes or normally subject to student occupancy, unless it has a door leading directly to the outside of building, shall have at least one outside window which can readily be used for emergency rescue or ventilation purposes, and which meets all of the following provisions:

A. It can readily be opened from the inside without the use of tools.

B. It provides a clear opening with a minimum dimension of five hundred sixty millimeters (560 mm) in width and eight hundred millimeters (800 mm) in height.

C. The bottom of window opening is not more than eight hundred twenty millimeters (820 mm) above the floor; and

D. Where storm windows, screens, or anti-burglar devices are used, these shall be provided with quick opening mechanism so that they may be readily opened from the inside for emergency egress, and shall be so arranged that when opened they will not drop to the ground.

SECTION 10.2.9.5 PROTECTION

A. **Vertical Opening**

Any interior stairways and other vertical openings in educational buildings shall be enclosed and protected in accordance with Section 10.2.6.5 of this RIRR, except when it serves only one adjacent floor other than a basement; it is not connected to other stairway serving other floors; and it is not connected with corridors or stairways serving other floors.

B. **Interior Corridors**

1. Every interior corridor shall be of construction having not less than a half-hour (1/2-hr) fire resistance rating, and all openings therein protected accordingly. Room doors may be forty-four millimeters (44 mm) solid bonded core wood doors or the equivalent. Such corridor protection shall not be required when all classrooms served by such corridors have at least one door directly to the outside or to an exterior balcony or corridor as in Section 10.2.9.2 of this RIRR.
2. Any interior corridor more than ninety-one meters (91 m) in length shall be divided into sections not to exceed ninety-one meters (91 m) in length by smoke partitions installed in accordance with Section 10.2.6.3 of this RIRR.

C. **Interior Finish**

Interior finish shall be Class A in corridors, stairways and other means of egress, and may be Class B or Class C elsewhere, in accordance with the provisions of Section 10.2.6.4 of this RIRR.

D. **Fire Alarm System**

1. Approved fire alarm facilities capable of being manually operated in accordance with Section 10.2.6.6 of this RIRR shall be provided in every educational building.
2. In building provided with automatic fire suppression system, the operation of the system shall automatically actuate electrical school fire alarm system.

E. **Automatic Fire Suppression System**

1. Every portion of educational buildings below the floor of exit discharge, being utilized as classroom or laboratory, shall be protected with approved, supervised sprinkler system in accordance with Section 10.2.6.7 of this RIRR**:**

   a. throughout the storey containing the classroom or laboratory; and

   b. at the level of exit discharge

2. When the building is classified as high rise it shall be completely protected by approved, supervised sprinkler system.

F. **Hazardous Areas**

An area used for general storage, boiler or furnace rooms, fuel storage, janitor closets, maintenance shops, including woodworking and painting areas, laundries and kitchen shall be separated from other parts of the building with construction having not less than one (1) hour fire resistance rating, and all openings shall be protected with self-closing fire doors, or such area shall be provided with automatic fire suppression system. Where

the hazard is high as determined by the C/MFM having jurisdiction, both the fire resistive separation and automatic fire suppression system shall be provided.

G. **Cooking equipment**

Cooking equipment shall be protected in accordance with Section 10.2.7.1 of this RIRR.

SECTION 10.2.9.6 BUILDING SERVICES EQUIPMENT

A. **Elevators**

1. An elevator shall not constitute as required means of exit.
2. When an educational occupancy is more than three (3) storeys and equipped with automatic elevators, one (1) or more elevators shall be designed and equipped for fire emergency use by firefighters, as specified in Section 10.2.7.5 of this RIRR. Key operation shall transfer automatic elevator operation to manual and bring elevator to ground or first floor for use of firefighters. The elevator shall be situated so as to be readily accessible. If the building is equipped with only one (1) elevator, the same shall be equipped with firefighter's switch to be capable of being manually operated.

B. **Air conditioning**

Every air-conditioning, heating, and ventilating installation shall comply with Division 7 of this Chapter.

C. **Electrical Wiring and Equipment**

Electrical wiring and equipment shall be in accordance with provisions of the latest edition of PEC, and all cooking, heating, incinerating and other building services equipment shall be installed in accordance with Division 7 of this Chapter.

SECTION 10.2.9.7 SPECIAL PROVISIONS FOR FLEXIBLE PLAN AND OPEN-PLAN BUILDINGS

A. **Definitions as Used in this Section**

1. Flexible plan and open-plan educational buildings or portion of a building not having corridors which comply with Section 10.2.9.1 of this RIRR and are designed for multiple teaching stations.
   a. ***Flexible plan buildings*** have movable corridor walls and movable partitions of full height construction with doors leading from rooms to corridors. Flexible plan buildings without exit access doors between rooms and corridors shall be classified as open plan buildings.
   b. ***Open-plan buildings*** have rooms and corridors delineated by use of tables, chairs, desks, bookcases, counters, low height partitions, or similar furnishings.
2. ***Common Atmosphere.*** A common atmosphere exists between rooms, spaces or areas within a building, which are not separated by an approved smoke partition.
3. ***Separate Atmosphere.*** A separate atmosphere exists between rooms, spaces, or areas, which are separated by an approved smoke partition.
4. ***Smoke Partition.*** For purposes of this Section, smoke partitions shall also include floors and openings therein, in accordance with Section 10.2.6.3 of this RIRR.
5. ***Room.*** For the purpose of this Section, a room is a space or area bounded by an obstruction to egress which at any time enclose more than eighty percent (80%) of the perimeter of the space or area. Openings of less than two meters (2 m) high shall not be considered in computing the unobstructed perimeter.
6. ***Interior Room.*** A room whose only means of egress is through an adjoining or intervening room, which is not an exit.
7. ***Separate Means of Egress.*** A means of egress separated in such a manner from other means of egress as to provide an atmosphere separation, which precludes contamination of both means of egress by the same fire, in accordance with Division 5 of this Chapter.

B. **Area Limitations and Separations**

1. Flexible plan and open-plan buildings shall not exceed two thousand seven hundred eighty-seven square meters (2,787 m^2) in undivided area. A solid wall or smoke partition shall be provided at maximum intervals of ninety-one meters (91 m) and openings in such walls or partition shall comply with Section 10.2.6.3 of this RIRR.

2. Vertical openings shall be enclosed as required by Section 10.2.6.5 of this RIRR.
3. Stages in places of assembly shall be separated from school areas by construction of non-combustible materials having at least a two-hour (2-hr) fire resistance rating and shall comply with Section 10.2.8.3 of this RIRR.
4. Shops, laboratories, and similar vocational rooms, as well as storage rooms, shall be separated from school areas by construction having at least one (1) hour fire resistance rating; they shall have exits independent from other areas.

C. **General Provisions**

1. The specific requirements of this Section are not intended to prevent the design or use of other systems, equipment or techniques, which will effectively prevent the products of combustion from breaching the atmospheric separation.
2. The provisions of this Subsection shall apply only to the requirements for providing separate atmosphere. The fire resistance requirements shall comply with other provisions of this Chapter.
   a. Walls, partitions and floors forming all of or part of an atmospheric separation shall be of materials consistent with the requirements for the type of construction, but of construction not less effective than a smoke partition. Openings in walls or partition used to allow the passage of light shall be wired glass set in metal frames.
   b. Every door opening therein shall be protected with a fire assembly as required in this Chapter, but not less than a self-closing or automatic closing, tight-fitting smoke assembly having a fire protection rating of not less than twenty (20) minutes.
   c. Ducts penetrating atmospheric separation walls, partitions, or floors shall be equipped with an approved automatic-closing smoke damper when having openings into more than one atmosphere or atmospheric separation shall be maintained by an approved method of smoke control.
   d. All automatic-closing fire assemblies installed in the atmospheric separation shall be activated by approved smoke detectors.
   e. Janitor closets and storage rooms shall be enclosed by materials having one (1) hour fire resistance. Stages and enclosed platform shall be constructed in accordance with Section 10.2.8.3 of this RIRR.

D. **Means of Egress**

1. Each room occupied by more than three hundred (300) persons shall have one (1) of its exit access doors through a separate means of egress. Where three (3) or more means of egress are required, not more than two (2) of them shall enter into the same means of egress.
2. Means of egress from interior rooms may pass through an adjoining or in intervening room, provided that the travel distance do not exceed those set forth in the succeeding paragraph. Foyers and lobbies constructed as required for corridors shall not be construed as intervening rooms. Where the only means of egress from a room is through an adjoining or intervening room, smoke detectors shall be installed in the area of common atmosphere through which the means of egress must pass. The detectors shall actuate alarms audible in the interior room and shall be connected to the school fire alarm system.

E. **Travel Distance to Exits**

No point in a building shall be more than forty-six meters (46 m) from an exit, measured in accordance with Section 10.2.5.2 of this RIRR.

F. **Interior Finish**

Interior finish in flexible plan and open-plan buildings shall be as follows:

1. Corridors in flexible plan buildings
   Class A on rigid material which will not deform at temperature below two hundred thirty-two degrees Celsius (232˚C).
2. Other than corridor walls
   Class A and Class B throughout, except that fixtures and low height partitions may be Class C. In one-storey buildings the exposed portions of structural members complying with the requirements for heavy timber construction may be permitted in accordance with Section 10.2.6.4 of this RIRR.

G. **Variable Plans**

1. Flexible plan schools may have walls and partitions rearranged periodically, only after revised plans or diagrams have been approved by the C/MFM having jurisdiction.
2. Open-plan schools shall have furniture, fixtures, or low height partitions so arranged that exits be clearly visible and unobstructed, and exit paths are direct, not circuitous. If paths or corridors are established, they shall be at least as wide as required by Section 10.2.9.2 of this RIRR.

H. **Sprinkler Systems**

1. Any flexible plan building or open plan building in which the travel distance to exits exceeds forty-six meters (46 m) shall have approved, supervised sprinkler systems in accordance with Section 10.2.6.7 of this RIRR. Such systems shall be electrically interconnected with the school fire alarm system.
2. Automatic fire suppression systems shall be modified to conform with partition changes. Modification plans shall have prior approval of the C/MFM having jurisdiction.

SECTION 10.2.9.8 SPECIAL PROVISIONS FOR PRE-SCHOOLS

Rooms used for preschoolers shall not be located above or below the floor of exit discharge.

SECTION 10.2.9.9 UNDERGROUND AND WINDOWLESS EDUCATIONAL BUILDINGS

The provisions of Section 10.2.19.10 of this RIRR shall apply to Underground and Windowless Educational Buildings and such buildings shall be provided completely with automatic fire suppression system.

SECTION 10.2.9.10 SPECIAL PROVISIONS FOR COMBINED OCCUPANCIES

A. **Assembly and Educational**

Any auditorium, assembly room, cafeteria, gymnasium used for assembly purposes such as athletic events with provisions for seating of spectators, or other spaces subject to assembly occupancy shall comply with Division 8 of this Chapter, which provides that where auditorium and gymnasium exits lead through corridors stairways also serving as exits for other parts of the building, the exit capacity shall be sufficient to permit simultaneous exit from auditorium and classroom sections.

B. **Dormitory and Classroom**

Any building used for both classroom and dormitory purposes shall comply with the applicable provisions of Division 14 of this Chapter in addition to complying with Division 9 of this Chapter. Where Classroom and dormitory sections are not subject to simultaneous occupancy, the same exit capacity may serve both sections.

C. **Other Combined Occupancies**

Any other combinations of occupancy not covered in this Section shall comply with all applicable Divisions of this Chapter, with exits adequate to serve all occupancies simultaneously.

SECTION 10.2.9.11 EXISTING EDUCATIONAL BUILDINGS

A. **General**

An existing building being used for educational occupancies established prior to the effective date of RA 9514 and its RIRR may have its use continued if it conforms or is made to conform to the provisions of this Rule to the extent that, in the opinion of the C/MFM having jurisdiction, reasonable life safety against the hazards of fire, explosion, and panic is provided and maintained subject to the provisions of para "B" through "E" below.

B. **Additional Protection**

The provision of additional means of egress, automatic fire suppression system, area separations, emergency lighting, and other alternate means of protection may be used to provide reasonable life safety from fire and panic.

C. **Exits**

1. Exit deficiency may be corrected by adding additional exits, preferably those which will provide direct exit to the outside from classroom or student-occupied areas.

2. In lieu of direct exit to the outside from classrooms, additional life safety may be afforded by the provisions of communicating doors between classrooms or student-occupied areas to provide access to at least one (1) exit stair without passing through interior corridors.

D. **Interior Finish**

In existing educational buildings which have interior finish that do not comply with the requirements for new buildings, the provisions of Section 10.2.6.4 of this RIRR shall be acceptable as alternate requirements.

E. **Fire Alarm Systems**

Requirements for Fire Alarm System for existing educational buildings shall conform to those required for new educational buildings, in accordance with para "D" of Section 10.2.9.5 of this RIRR.

DIVISION 10. DAY CARE OCCUPANCIES

SECTION 10.2.10.1 GENERAL REQUIREMENTS

A. The requirements of this Section shall apply to day care occupancies in which more than twelve (12) clients receive care, maintenance, and supervision by other than their relative(s) or legal guardian(s) for less than twenty-four (24) hours per day.

B. The requirements of Sections 10.2.10.1, 10.2.10.4, 10.2.10.7 and 10.2.10.8 of this RIRR shall apply to day care homes.

C. Where a facility houses more than one age group, the strictest requirements applicable to any group present shall apply throughout the day care occupancy or building, as appropriate to a given area, unless the area housing such a group is maintained as a separate fire area.

D. Places of religious worship shall not be required to meet the provisions of this Section where operating a day care home while services are being held in the building.

E. No day care center shall be located below the level of exit discharge.

SECTION 10.2.10.2 OCCUPANT LOAD

The occupant load, in number of persons for whom means of egress and other provisions are required, either shall be one (1) person for every three and three tenths square meters (3.3 m^2) or shall be determined as the maximum probable population of the space under consideration, whichever is greater.

SECTION 10.2.10.3 EXIT DETAILS

A. **General Requirements**

The means of egress of day care occupancies shall comply with Section 10.2.5.2 of this RIRR and this Section.

B. **Permissible Exit Components**

Components of means of egress for day care occupancies shall be limited to the following types:

1. Doors
2. Stairs and Smoke-proof Enclosures
3. Horizontal Exits
4. Ramps
5. Exit Passageways

C. **Capacity of Means of Egress**

Capacity of means of egress shall be in accordance with para "C" of Section 10.2.5.2 of this RIRR.

D. **Number of Means of Egress**

The number of means of egress for day care occupancies shall be in accordance with para "G" of Section 10.2.5.2 of this RIRR and this Section.

E. **Arrangement of Means of Egress**

1. Means of egress shall be arranged in accordance with para "H" of Section 10.2.5.2 of this RIRR.
2. No dead-end corridor shall exceed six meters (6 m), other than in buildings protected throughout by an approved, supervised automatic sprinklers, in which case dead-end corridors shall not exceed ten meters (10 m).
3. Common path of travel shall not exceed twenty meters (20 m) in a building protected throughout by an approved, supervised automatic sprinkler system and ten meters (10 m) in a building not protected throughout by an approved, supervised automatic sprinkler system.

F. **Travel Distance to Exits**

1. Travel distance shall be measured in accordance with para "J" of Section 10.2.5.2 of this RIRR.
2. Travel distance shall meet all of the following criteria, unless otherwise permitted by para 3 hereof:
   a. The travel distance between any room door intended as an exit access and an exit shall not exceed fifteen meters (15 m).
   b. The travel distance between any point in a room and an exit shall not exceed twenty-three meters (23 m).
   c. The travel distance between any point in a sleeping room and an exit access door in that room shall not exceed fifteen meters (15 m).
3. The travel distance required by paras 2.a and 2.b above shall be permitted to be increased by fifteen meters (15 m) in buildings protected throughout by an approved, supervised automatic sprinkler system.

G. **Discharge from Exits**

Discharge from exits shall be arranged in accordance with Section 10.2.5.2 of this RIRR.

H. **Illumination of Means of Egress**

1. Means of egress shall be illuminated in accordance with Section 10.2.5.11 of this RIRR.
2. Emergency lighting shall be provided in the following areas:
   a. Interior stairs and corridors
   b. Assembly use spaces
   c. Flexible and open-plan buildings
   d. Interior or limited access portions of buildings
   e. Shops and laboratories

I. **Marking of Means of Egress**

Means of egress shall have signs in accordance with Section 10.2.5.12 of this RIRR.

SECTION 10.2.10.4 WINDOWS FOR RESCUE

Every room or space normally subject to client occupancy, other than bathrooms, shall have not less than one (1) outside window for emergency rescue that complies with all of the following:

A. Such windows shall be *openable* from the inside without the use of tools and shall provide a clear opening of not less than five hundred sixty millimeters (560 mm) in width and eight hundred millimeters (800 mm) in height.

B. The bottom of the opening shall be not more than eight hundred twenty millimeters (820 mm) above the floor.

C. The clear opening shall allow a rectangular solid, with a width and height that provide not less than the required five tenths square meter (0.5 m^2) opening and a depth of not less than five hundred ten millimeters (510 mm), to pass fully through the opening.

SECTION 10.2.10.5 MANDATORY RAMP REQUIREMENT

For day care centers with non-ambulatory residents of at least twelve (12), a ramp complying with Section 10.2.5.7 of this RIRR shall be provided.

SECTION 10.2.10.6 PROTECTION

A. **Vertical Openings**

1. Any vertical opening, other than unprotected vertical openings in accordance with para 2 hereof, shall be enclosed or protected in accordance with Section 10.2.6.5 of this RIRR.
2. Unenclosed vertical openings not concealed within the building construction shall be permitted as follows:
   a. Such openings shall connect not more than two (2) adjacent storeys (one (1) floor pierced only).
   b. Such openings shall be separated from unprotected vertical openings serving other floors by a barrier.
   c. Such openings shall be separated from corridors.

B. **Detection, Alarm and Communication Systems**

1. Day care occupancies shall be provided with an automatic fire detection and alarm system in accordance with Section 10.2.6.6 of this RIRR, except day care occupancies housed in one room having at least one (1) door opening directly to the outside at grade plane or to an exterior exit access balcony.
2. A smoke detection system shall be installed in day care occupancies, other than those housed in one (1) room having at least one (1) door opening directly to the outside at grade plane or to an exterior exit access, and such system shall comply with both of the following:
   a. Detectors shall be installed on each storey in front of the doors to the stairways and in the corridors of all floors occupied by the day care occupancy.
   b. Detectors shall be installed in lounges, recreation areas, and sleeping rooms in the day care occupancy.

C. **Extinguishing Requirements**

1. Buildings with unprotected openings, up to five (5) communicating floor levels not considered as a high rise building, shall be protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 10.2.6.7 of this RIRR.
2. Portable fire extinguishers shall also be provided pursuant to Section 10.2.6.9 of this RIRR.

D. **Hazardous Areas**

Rooms or spaces for the storage, processing, or use of materials specified in paras 1 through 3 below shall be protected in accordance with the following:

1. Separation from the remainder of the building by fire barriers having a minimum one (1) hour fire resistance rating or protection of such rooms by automatic extinguishing systems in the following areas:
   a. Boiler and furnace rooms, unless such rooms enclose only air-handling equipment;
   b. Rooms or spaces used for the storage of combustible supplies in quantities deemed hazardous by the C/MFM having jurisdiction;
   c. Rooms or spaces used for the storage of hazardous materials or flammable or combustible liquids in quantities deemed hazardous by recognized standards; and
   d. Janitor closets.
2. Separation from the remainder of the building by fire barriers having a minimum of one (1) hour fire resistance rating and protection of such rooms by automatic extinguishing systems in the following areas:
   a. Laundry rooms;
   b. Maintenance shops, including woodworking and painting areas;
   c. Rooms or spaces used for processing or use of combustible supplies deemed hazardous by the C/MFM having jurisdiction; and
   d. Rooms or spaces used for processing or use of hazardous materials or flammable or combustible liquids in quantities deemed hazardous by recognized standards.
3. Where automatic extinguishing is used to meet the protection requirements of paras 1 and 2, as permitted.

SECTION 10.2.10.7 CORRIDORS

Every interior corridor shall be constructed of walls having not less than one (1) hour fire resistance rating, unless otherwise permitted by any of the following:

A. Corridor protection shall not be required where all spaces normally subject to client occupancy have not less than one door opening directly outside or to an exterior exit access balcony or corridor.

B. In buildings protected throughout by an approved, supervised automatic sprinkler system; corridor walls shall not be required to be rated, provided that such walls form smoke partitions.

C. Where the corridor ceiling is an assembly having one (1) hour fire resistance rating; where tested as a wall, the corridor walls shall be permitted to terminate at the corridor ceiling.

D. Lavatories shall not be required to be separated from corridors, provided that they are separated from all other spaces by walls having not less than one (1) hour fire resistance.

E. Lavatories shall not be required to be separated from corridors, provided that both of the following criteria are met:

1. The building is protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 10.2.6.7 of this RIRR.
2. The walls separating the lavatory from other rooms form smoke partitions.

SECTION 10.2.10.8 BUILDING SERVICES EQUIPMENT

A. **Utilities**

1. Utilities shall comply with the provisions of Section 10.2.7.1 of this RIRR.
2. Special protective covers for all electrical receptacles shall be installed in all areas occupied by clients.

B. **Heating, Ventilating and Air-Conditioning Equipment**

1. Heating, ventilating, and air-conditioning equipment shall be in accordance with Section 10.2.7.2 of this RIRR.
2. Unvented fuel-fired heating equipment, other than gas space heaters in compliance with NFPA 54/ANSI Z223.1: National Fuel Gas Code, shall be prohibited.
3. Any heating equipment in spaces occupied by clients shall be provided with partitions, screens, or other means to protect clients from hot surfaces and open flames; if solid partitions are used to provide such protection, provisions shall be made to ensure adequate air for combustion and ventilation for the heating equipment.

C. **Elevators, Escalators and Conveyors**

Elevators, escalators and conveyors, other than those in day care homes, shall comply with the provisions of Section 10.2.7.5 of this RIRR.

D. **Waste Chutes, Incinerators, and Laundry Chutes**

Waste chutes, incinerators, and laundry chutes, other than those in day care homes, shall comply with the provisions of Section 10.2.7.4 of this RIRR.

SECTION 10.2.10.9 DAY CARE HOMES

A. **General Requirements**

1. The requirements of Section 10.2.9.8 shall apply to day care homes in which more than three (3), but not more than twelve (12), clients receive care, maintenance, and supervision by other than their relative(s) or legal guardian(s) for less than twenty-four (24) hours per day, generally within a dwelling unit.
2. Where a facility houses more than one age group, the strictest requirements applicable to any group present shall apply throughout the day care home or building, as appropriate to a given area, unless the area housing such a group is maintained as a separate fire area.
3. Facilities that supervise clients on a temporary basis with a parent or guardian in close proximity shall not be required to meet the provisions of this Section.
4. Places of religious worship shall not be required to meet the provisions of this Section where operating a day care home while services are being held in the building.

B. **Classification of Occupancy**

1. ***Family Day Care Home.*** A family day care home shall be a day care home in which more than three (3), but fewer than seven (7), clients receive care, maintenance, and supervision by other than their relative(s) or legal guardian(s) for less than twenty-four (24) hours per day, generally within a dwelling unit.
2. ***Group Day Care Home.*** A group day care home shall be a day care home in which not less than seven (7), but not more than twelve (12), clients receive care, maintenance, and supervision by other than their relative(s) or legal guardian(s) for less than twenty-four (24) hours per day, generally within a dwelling unit.

C. **Location**

No day care home shall be located below the level of exit discharge.

D. **Occupant Load**

1. In family day care homes, both of the following shall apply:
   a. The minimum staff-to-client ratio shall be not less than one (1) staff for up to six (6) clients, including the caretaker's own children under age six (6).
   b. There shall be not more than two (2) clients incapable of self-preservation.
2. In group day care homes, all of the following shall apply:
   a. The minimum staff-to-client ratio shall be not less than two (2) staffs for up to twelve (12) clients.
   b. There shall be not more than three (3) clients incapable of self-preservation.

E. **Means of Escape Requirements**

1. Means of escape shall comply with those of Single and Two -Family Dwellings.
2. Every room used for sleeping, living, recreation, education, or dining purposes shall have the number and type of means of escape.
3. No room or space that is accessible only by a ladder or folding stairs or through a trap door shall be occupied by clients.
4. In group day care homes where spaces on the storey above the level of exit discharge are used by clients, that storey shall have not less than one (1) means of escape complying with one of the following:
   a. Door leading directly to the outside with access to finished ground level
   b. Door leading directly to an outside stair to finished ground level
   c. Interior stair leading directly to the outside with access to finished ground level, separated from other storeys by one half (1/2) hour fire barrier.
5. Where clients occupy a storey below the level of exit discharge, that storey shall have not less than one (1) means of escape complying with any of the following:
   a. Door leading directly to the outside with access to finished ground level
   b. Door leading directly to an outside stair going to finished ground level
   c. Bulkhead enclosure
   d. Interior stair leading directly to the outside with access to finished ground level, separated from other storeys by one half (1/2) hour fire barrier

F. **Arrangement of Means of Escape**

1. No dead-end corridors shall exceed six meters (6 m).
2. Doors in means of escape shall be protected from obstructions.

G. **Travel Distance**

1. Travel distance shall be measured in accordance with Section 10.2.5.2 of this RIRR.
2. The travel distance between any point in a room and a door leading directly to the outside with access to finished ground level shall not exceed forty-six meters (46m).
3. The travel distance between any point in a sleeping room and access to a means of escape from that room shall not exceed fifteen meters (15 m).
4. The travel distance shall be permitted to be increased by fifteen meters (15 m) in buildings protected throughout by an approved, supervised automatic sprinkler.

H. **Illumination of Means of Egress**

Means of egress shall be illuminated in accordance with Section 10.2.5.11 of this RIRR.

I. **Protection**

1. For group day care homes, the doorway between the level of exit discharge and any storey below shall be equipped with a fire door assembly having twenty-minute (20-min) fire protection rating.
2. For group day care homes where the storey above the level of exit discharge is used for sleeping purposes, there shall be a fire door assembly having twenty-minute (20-min) fire protection rating at the top or bottom of each stairway.

DIVISION 11. HEALTH CARE OCCUPANCIES

SECTION 10.2.11.1 GENERAL REQUIREMENTS

A. **Fundamental Requirements**

1. All health care buildings shall be so designed, constructed, maintained, and operated as to minimize the possibility of a fire emergency requiring the evacuation of occupants. Because the safety of occupants of health care buildings cannot be assured adequately by dependence on evacuation of the building, their protection from the fire shall be provided by appropriate arrangement of facilities, adequate staffing, and careful development of operating and maintenance procedure composed of the following:
   a. proper design, construction, and compartmentation;
   b. provisions for detection, alarm, and extinguishment; and
   c. fire prevention and the planning, training, and drilling in programs for the isolation of fire and transfer of occupants to areas of refuge or evacuation of the building.
2. It is recognized that in buildings housing various types of psychiatric patients, it may be necessary to lock doors and bar windows to confine and protect building inhabitants. Sections of this Rule requiring the keeping of exits unlocked may be waived by the C/MFM having jurisdiction. It is also recognized that some psychiatric patients are not capable of seeking safety without guidance. In buildings in which doors are locked or windows are barred, provisions shall be made for the removal of occupants by such reliable means as the remote control of locks or by keying all locks to keys carried by attendants.

B. **Emergency Rooms, Operating Rooms, Intensive Care Units, Delivery Rooms and Other Similar Facilities**

Emergency rooms, operating rooms, intensive care units, delivery rooms and other similar facilities shall be located on the level of exit discharge. When the above requirement is not met, one of the following conditions shall be complied:

1. Where the said facilities are located above the floor of exit discharge but in no case shall exceed five (5) floors, or where the said facilities are located below the floor of exit discharge but in no case shall exceed one (1) floor, it shall be equipped with ramp complying with Section 10.2.5.7 of this RIRR leading directly to exit discharge. The ramp, constructed in a fire resistive and smoke proof enclosure, shall be so designed to accommodate the movement of hospital beds with non-ambulatory patients to the level of exit discharge. The enclosure shall have the minimum fire rating of two (2) hours.
2. Where the construction of ramp is not practicable, a horizontal exit compliant with Section 10.2.5.6 of this RIRR shall be provided leading to another separate building.

C. **New Construction, Additions, Conversion**

1. Any addition shall be separated from any existing non-conforming structure by a non-combustible fire partition having at least a two-hour (2-hr) fire resistance rating. Communicating openings in such dividing fire partition shall occur only in corridors and shall be protected by an approved self-closing fire door. Such doors shall normally be kept closed.
2. Any building converted to these occupancies shall comply with all requirements for new facilities.

D. **Occupancy and Occupant Load**

1. Health care occupancies in buildings housing other occupancies shall be completely separated from them by noncombustible construction having at least two-hour (2-hr) fire-resistance rating. All means of egress from health care occupancies that traverse non-health care spaces shall conform to requirements of this standard for health care

occupancies. Any occupancy with a hazard of contents classified higher than that of the health care and located in the same building as health care occupancies shall be protected. Industrial, office, mercantile and storage occupancies categorized as high hazard shall not be permitted in buildings housing health care occupancies.

2. Sections of health care buildings may be classified as other occupancies if they meet at the following conditions:
   a. They are not intended to serve health care occupants for purposes of housing, treatment, customary access, or means of egress.
   b. They are adequately separated from areas of health care occupancies by construction having two-hour (2-hr) fire resistance rating.
3. Auditoriums, chapels, staff residential areas, garages or similar occupancies provided in connection with health care occupancy shall have exits provided in accordance with other applicable Sections of this Chapter.
4. The occupant load for which means of egress shall be provided for any floor shall be the maximum number of persons intended to occupy that floor but not less than one (1) person for each eleven and one tenth square meters (11.1 m^2) gross floor area in health care sleeping departments and not less than one (1) person for every twenty-two and three tenths square meters (22.3 m^2) of gross floor area of inpatient health care treatment departments. Gross floor areas shall be measured within the exterior building walls with no deductions.

SECTION 10.2.11.2 EXIT DETAILS

A. **Number and Types**

1. Exits shall be restricted to the following permissible types:
   a. Doors leading directly outside the building
   b. Stairs and smoke-proof enclosures
   c. Ramps
   d. Horizontal exits
   e. Exit passageways
2. At least two (2) exits of the above types, remote from each other, shall be provided for each floor or fire section of the building.
3. Elevators constitute a supplementary facility, but shall not be counted as required exits.

B. **Capacity of Exits**

The capacity of means of egress shall be in accordance with Section 10.2.5.2 para "C" of this RIRR.

C. **Access to Exit**

1. Every aisle, passageway, corridor, exit discharge, exit location and access shall be in accordance with Section 10.2.5.2 of this RIRR, except as modified in the succeeding paragraphs of this Subsection.
2. Travel distance shall comply with the following:
   a. Between any room door intended as exit access and an exit shall not exceed thirty meters (30 m);
   b. Between any point in a room and an exit shall not exceed forty-six meters (46 m);
   c. Between any point in a health care sleeping room or suite and an exit access door of that room or suite shall not exceed fifteen meters (15 m);
   d. Travel distance shall be measured in accordance with Section 10.2.5.2 of this RIRR; and
   e. The travel distances in paras 2.a and 2.b above may be increased by fifteen meters (15 m) in buildings completely equipped with an automatic fire suppression system.
3. Every health care sleeping room, unless it has a door opening at ground level, shall have an exit access door leading directly to a corridor which leads to an exit. One (1) adjacent room, such as a sitting or anteroom, may intervene if all doors along the path of exit travel are equipped with non-lockable hardware, and this intervening room is not intended to serve more than eight (8) health care sleeping beds. However, special

nursing suites or nurseries permitted in this Division shall not be limited to eight (8) cribs or bassinets.

4. Aisles, corridors and ramps required for exit access of exit in hospitals or nursing homes shall be at least two and forty-four hundredths meters (2.44 m) in clear and unobstructed width. Corridors and ramps in adjunct areas not intended for the housing, treatment, or use of inpatients shall be at least one and eighty-three hundredths meters (1.83 m) in clear and unobstructed width.
5. Any rooms and any suite or rooms of more than ninety-three square meters (93 m^2) shall have at least two (2) exit access doors remote from each other.
6. Every exit or exit access shall be so arranged that no corridor or aisle has a pocket or dead-end exceeding six meters (6 m) and/or a common path of travel exceeding ten meters (10 m).
7. Any health care sleeping room which complies with the requirements previously set forth in this Section may be subdivided with non-fire-rated, non-combustible barriers, provided that the arrangement allows for direct and constant visual supervision by nursing personnel. Rooms which are so subdivided shall not exceed four hundred sixty-five square meters (465 m^2).

D. **Doors**

1. Doors shall be in accordance with Section 10.2.5.3, except as modified in this Subsection. Door requirements in horizontal exits and smoke partitions shall be in accordance with Sections 10.2.5.6 and 10.2.6.3 and, this Section.
2. Locks shall not be permitted on patient sleeping room doors.

   Exception No. 1: Key-locking devices that restrict access to the room from the corridor and that are operable only by staff from the corridor side shall be permitted. Such devices shall not restrict egress from the room.

   Exception No. 2: Door-locking arrangements shall be permitted in health care occupancies, or portions of health care occupancies, where the clinical needs of the patients require specialized security measures for their safety, provided that keys are carried by staff at all times.
3. Exit access doors from hospital and nursing home sleeping rooms, diagnostic and treatment rooms or areas, such as X-ray, surgery and physical therapy, all doors between these spaces and the required exits, and all exit doors serving these spaces shall be at least one and twelve hundredths meters (1.12 m).
4. Any door in a fire separation, horizontal exit or a smoke partition may be held open only by an electrical device which complies with Section 10.2.5.3 of this RIRR. Each of the following systems shall be so arranged as to initiate the self-closing action throughout the entire health care facility:

   a. the required alarm system

   b. the required automatic fire detection system

   c. an approved automatic fire suppression system
5. Doors in stair enclosures and in walls surrounding hazardous areas shall not be equipped with hold-open devices.

E. **Stairs and Smoke-proof Enclosures**

Every stair and smoke proof enclosure shall be in accordance with Section 10.2.5.4 of this RIRR.

F. **Horizontal Exits**

A horizontal exit shall be in accordance with Section 10.2.5.6 and/or as modified in this paragraph.

1. At least two and eight tenths square meters (2.8 m^2) per occupant in a hospital or nursing home shall be provided on each side of the horizontal exit for the total number of occupants in adjoining compartments.
2. A single door may be used as a horizontal exit if it serves one (1) direction only and is at least one and twelve hundredths meters (1.12 m) wide for a hospital or nursing home. The swing shall be in the direction of exit travel.
3. A horizontal exit involving a corridor two and four tenths meters (2.4 m) or more in width serving as means of egress from both sides of the doorway shall have the opening

protected by a pair of swinging doors, each door having a clear width of one and fifty-five thousandths meters (1.055 m) and swinging in the opposite direction from the other.

4. An approved vision panel is required in each horizontal exit door. Center mullions are prohibited.

G. **Ramps**

Ramps in accordance with Section 10.2.5.7 of this RIRR shall be permitted.

H. **Emergency Lighting, Exit Markings, Alarms and Communication Systems**

1. Each hospital shall be provided with emergency lighting as described in Section 10.2.5.11 and exit markings as described in Section 10.2.5.12 of this RIRR. Such emergency lighting and the illumination of required exits and directional signs shall be supplied by the Life Safety Branch of the hospital electrical system as described in NFPA 99, *Standard for Health Care Facilities*. The Life Safety Branch shall also serve alarms, emergency communication systems and the illumination of generator set locations as described in paragraphs (c), (d) and (e), Section 312 of the same reference.
2. Each nursing home shall have emergency lighting in accordance with Section 10.2.5.11 of this RIRR. Emergency lighting with at least one and a half (1.5) hour duration shall be provided.
3. Exit signs shall be provided in each hospital and nursing home in accordance with Section 10.2.5.12 of this RIRR.

I. **Emergency Evacuation Plan**

Emergency Evacuation Plan shall be provided in accordance with Section 10.2.5.13 of this RIRR.

SECTION 10.2.11.3 PROTECTION

A. **Subdivision of Building Spaces**

1. Smoke partitions shall be provided, regardless of building construction type, as follows:
   a. To divide into at least two (2) compartments every storey used by inpatients for sleeping or treatment and any storey having an occupant load of fifty (50) or more persons.
   b. To limit on any storey the maximum area of each smoke compartment to no more than two thousand one hundred square meters (2,100 m^2), of which both length and width shall be no more than forty-six meters (46 m).

   Note: Protection may be accomplished in conjunction with the provisions of horizontal exits.
2. Smoke partitions shall be provided on storeys which are usable but unoccupied.
3. Any smoke partition shall be constructed in accordance with Section 10.2.6.3 of this RIRR and shall have a fire resistance rating of at least one (1) hour.
4. At least two and eight tenths square meters (2.8 m^2) per occupant for the total of bed or litter patients shall be provided on each side of the smoke partition. On other storeys not housing bed or litter patients at least five tenths square meter (0.5 m^2) per occupant shall be provided on each side of the smoke partition for the total number of occupants in adjoining compartments.
5. Corridor openings in smoke partitions shall be protected by a pair of swinging doors, door to swing in a direction opposite from the other. The minimum width of each door for hospitals and nursing homes shall be one and twelve hundredths meters (1.12 m).
6. Doors in smoke partitions shall comply with Section 10.2.6.3 of this RIRR and shall be self-closing and held open only if they meet the requirements of this Section.
7. Vision panels of approved transparent wired glass not exceeding forty-six hundredths square meter (0.46 m^2) in steel frames shall be provided in all doors in smoke partitions.
8. Stops are required on the head and sides of door frames in smoke partitions, and center mullions are prohibited.

B. **Minimum Construction Standards**

1. Health care buildings of one (1) storey only may be constructed of protected non-combustible construction, fire-resistive construction, protected ordinary construction, protected wood frame construction, heavy timber construction or unprotected noncombustible construction. For the purpose of this Subsection, storeys

shall be counted starting at the lowest floor of exit discharge. All levels below the floor of exit discharge shall be separated from the floor of exit discharge by at least protected non-combustible construction.

2. Health care buildings two (2) storeys or more shall be at least of fire-resistive construction.
3. Health care occupancies of two (2) or more storeys shall have enclosure walls of non-combustible materials having a fire resistance rating of at least two (2) hours around stairways, elevators, chutes, and other vertical openings between floors.
4. All interior walls and partitions in buildings of fire-resistive and non-combustible construction shall be composed of non-combustible materials.
5. Every health care sleeping room shall have an outside window or outside door arranged and located so that it can be opened from the inside without the use of tools or keys, to permit the products of combustion and to permit any occupant to have direct access to fresh air in case of emergency. The maximum allowable sill height shall not exceed nine hundred ten millimeters (910 mm) above the floor, except that in special nursing care areas the window sill may be one thousand five hundred millimeters (1,500 mm) above the floor.

C. **Construction of Corridor Walls**

1. Corridors shall be separated from use areas by partitions having fire-resistance rating of at least one (1) hour.
2. These walls shall be continuous from the floor slab to the underside of the floor or roof slab above, through any concealed spaces such as those above the suspended ceilings and through interstitial structural and mechanical spaces.
3. Doors with a twenty-minute (20-min) fire protection rating shall be used on openings other than those serving exits or hazardous areas. Doors shall be provided with latches of a type suitable for keeping the door tightly closed.
4. Transfer grills, whether protected by fusible-link-operated dampers or not, shall not be used in these walls or doors.
5. Fixed wired glass vision panels may be placed in corridor walls, provided they do not exceed eighty-four hundredths square meter (0.84 m^2) in size and are installed in approved steel frames. Fixed wired glass vision panels may be installed in wooden doors, provided they do not exceed forty-six hundredths square meter (0.46 m^2) size and are installed in approved steel frames.
6. Waiting areas of twenty-three square meters (23 m^2) or less on an institutional sleeping floor of fifty-six square meters (56 m^2) or less on other floors may be open to the corridor, provided that they are located to permit direct supervision by the institutional staff, so arranged to not obstruct any access to required exits. Such areas shall be equipped with an electrically supervised automatic smoke detection system installed in accordance with this Section. Not more than one (1) such waiting area is permitted in each smoke compartment.

D. **Protection of Vertical Openings and Fire-stopping**

1. Any stairway, ramp, elevator shaft, light and ventilation shaft, chute and other openings between storeys shall be enclosed with fire resistive materials in accordance with Section 10.2.5.2 of this RIRR.
2. A door in a stairway enclosure shall be self-closing; shall normally be kept in closed position; and shall be marked in accordance with Section 10.2.5.3 of this RIRR.
3. Fire-stopping shall be provided in accordance with Section 10.2.6.5 of this RIRR.

E. **Interior Finish**

Interior finish of walls and ceilings in means of egress and of any room shall be Class A in accordance with Section 10.2.6.4 of this RIRR, while floor finish material shall be Class A or B throughout all hospitals and nursing homes.

F. **Alarm, Detection and Extinguishment Systems**

1. Every building shall have an electrically supervised automatic fire alarm system capable of being manually operated in accordance with Section 10.2.6.6 of this RIRR. The fire alarm system shall be installed with provisions for future connection to the nearest BFP station in the locality. Internal audible alarm devices shall be provided in accordance with Section 10.2.6.6 of this RIRR. Pre-signal systems shall not be permitted in healthcare occupancies.

2. An approved automatic heat and/or smoke detection system shall be installed in all corridors of hospitals and nursing homes; such systems shall be installed in accordance with the applicable standards of the NFPA 72, but in no case shall smoke detectors be spaced farther apart than nine meters (9 m) on centers or more than four and six tenths meters (4.6 m) from any wall. All automatic heat and/or smoke detection systems required by this Section shall be electrically interconnected to the fire alarm system.
3. Approved, supervised sprinkler system shall be provided throughout all hospitals and nursing homes, except for one (1) storey building with a bed capacity of not exceeding five (5). Replenishment of water supplies shall be strictly considered in the design. Quick-response sprinklers shall be required in smoke compartments containing patient sleeping rooms.
4. Approved, supervised sprinkler system shall be in accordance with the requirements of Section 10.2.6.7 of this RIRR.
5. In light hazard occupancies, required automatic fire suppression systems shall be in accordance with Section 10.2.6.7 of this RIRR for systems and shall be electrically interconnected with the fire alarm system. The main automatic fire suppression control valve shall be electrically monitored so that at least a local alarm will sound when the valve is closed.
6. If the fire suppression system is an automatic sprinkler, its piping serving no more than six (6) sprinklers for any isolated hazardous area, may be connected directly to a domestic water supply system having a capacity sufficient to provide six liters per minute per square meter (6 L/min/m^2) of floor area throughout the entire enclosed area. As outside-screw-and-yoke shutoff valve shall be installed in an accessible location between the sprinklers and the connection to the domestic water supply.
7. Portable fire extinguishers shall be provided in all health care occupancies in accordance with Section 10.2.6.9 of this RIRR.

G. **Hazardous Areas**

Any hazardous area shall be segregated and protected in accordance with Section 10.2.6.10 of this RIRR. Hazardous areas include, but are not limited to, boiler and heater rooms, laundries, kitchens, gift shops, repair shops, handicraft shops, employee locker rooms, trash collection rooms, soiled linen rooms, paint shops, and rooms or spaces, including shops, used for the storage of combustible supplies and equipment in quantities deemed hazardous by C/MFM having jurisdiction.

SECTION 10.2.11.4 BUILDING SERVICES EQUIPMENT

A. **Air Conditioning, Ventilating, Heating, Cooking and Other Service Equipment**

1. Air-conditioning, ventilating, heating, cooking and other service equipment shall be in accordance with Division 7 of this Chapter.
2. Any heating device other than a central heating plant shall be so designed and installed that combustible material will not be ignited by it or its appurtenances. If fuel fired, such heating devices shall be chimney or vent connected; shall take air for combustion directly from outside; and shall be so designed and installed to provide for complete separation of the combustion system from the atmosphere of the occupied area. The heating system shall have safety devices to immediately stop the flow of fuel and shut down the equipment in case of either excessive temperatures or ignition failure. Fire-places may be installed and used only in areas other than patient sleeping areas, provided that these areas are separated from patient sleeping spaces by construction having one-hour (1-hr) fire resistance rating. In addition thereto, the fireplace shall be equipped with a hearth that shall be raised at least one hundred millimeters (100 mm), and a heat tempered glass fireplace enclosure guaranteed against breakage up to a temperature of three hundred forty-three degrees Celsius (343 ˚C). If special hazards are present, a lock on the enclosure and other safety precautions may be required.
3. Combustion and ventilation air for boiler, incinerator or heater rooms shall be taken directly from and discharged directly to the outside air.
4. Any rubbish chute and linen chute, including pneumatic systems, shall be safeguarded in accordance with Sections 10.2.6.5 and 10.2.7.4 of this RIRR. An incinerator shall not be directly flue-fed nor shall any floor charging chute directly connect with the combustion chamber. Any rubbish chute shall discharge into a rubbish collecting room used for no other purpose and protected in accordance with Section 10.2.6.10 of this RIRR.

DIVISION 12. RESIDENTIAL BOARD AND CARE

SECTION 10.2.12.1 GENERAL REQUIREMENTS

A. No board and care occupancy shall have its sole means of egress or means of escape pass through any nonresidential or non-health care occupancy in the same building.

B. No board and care occupancy shall be located above a nonresidential or non-health care occupancy, unless the board and care occupancy and exits therefrom are separated from the nonresidential or non-health care occupancy by construction having a minimum two-hour (2-hr) fire resistance rating.

SECTION 10.2.12.2 SMALL FACILITIES

A. **Scope**

1. This Section shall apply to residential board and care occupancies providing sleeping accommodations for not more than sixteen (16) residents.
2. Where sleeping accommodations for more than sixteen (16) residents are provided, the occupancy shall be classified as a large facility.

B. **Means of Escape**

1. Designated means of escape shall be continuously maintained free of all obstructions or impediments to full instant use in case of fire or other emergency.
2. Every sleeping room and living area shall have access to a primary means of escape located to provide a safe path of travel to the outside at street level or the finished ground level.
3. Where sleeping rooms or living areas are above, the primary means of escape shall be an interior stair, an exterior stair, a horizontal exit, or a fire escape stair.
4. Sleeping rooms and living areas in facilities without a sprinkler system shall have a second means of escape consisting of any of the following:
   a. Door, stairway, passage, or hall providing a way of unobstructed travel to the outside of the dwelling at street or the finished ground level that is independent of, and remotely located from, the primary means of escape.
   b. Passage through an adjacent non-lockable space independent of, and remotely located from, the primary means of escape to any approved means of escape.
   c. Outside window or door operable from the inside, without the use of tools, keys, or special effort, that provides a clear width of not less than five hundred ten millimeters (510 mm) and a height not less than eight hundred millimeters (800 mm), and the bottom of the opening not more than eight hundred twenty millimeters (820 mm) above the floor.
   d. Sleeping rooms that have a door leading directly to the outside of the building with access to the finished ground level or to an exterior stairway shall be considered as meeting all the requirements for a second means of escape.
   e. Sleeping rooms shall not be required to have a secondary means of escape where the clinical needs of the residents require special security measures, provided all of the following are met:
      1) The building is protected throughout by an approved, automatic sprinkler system
      2) A fire alarm system is provided.
5. Aisles, corridors and ramps required for exit access or exit shall be at least one and eighty-three hundredths meters (1.83 m) in clear and unobstructed width.

C. **Interior Stairs Used for Primary Means of Escape**

1. Interior stairs shall be enclosed with fire barriers having a minimum of half-hour (1/2-hr) fire resistance rating.
2. Stairs shall comply with Section 10.2.5.4 of this RIRR.
3. The entire primary means of escape shall be arranged so that occupants are not required to pass through a portion of a storey above, unless that route is separated from all spaces on that storey by construction having a minimum of half-hour (1/2-hr) fire resistance rating.

4. Stairs that connect a storey at street level to only one other storey shall be permitted to be open to the storey that is not at street level.
5. In buildings three (3) or fewer storeys in height and protected by an approved, automatic sprinkler system, stair enclosures shall not be required, provided that there still remains a primary means of escape from each sleeping area that does not require occupants to pass through a portion of a lower floor, unless that route is separated from all spaces on that floor by construction having a minimum of half-hour (1/2-hr) fire resistance rating.
6. Stairs serving a maximum of two (2) storeys in buildings protected with an approved, automatic sprinkler system shall be permitted to be unenclosed.

D. **Doors**

1. Doors, other than the bathroom doors and paths of travel to a means of escape shall be not less than eight hundred millimeters (800 mm) wide.
2. Bathroom doors shall be not less than six hundred ten millimeters (610 mm) wide.
3. Doors shall be swinging or sliding.
4. Every closet door latch shall be readily opened from inside.
5. Every bathroom door shall be designed to allow opening from the outside during an emergency, when locked.
6. No door in any means of escape, other than those meeting the requirements below, shall be locked against egress when the building is occupied.
   a. Delayed-egress locks shall be permitted on exterior doors only.
   b. Access-controlled egress door assemblies shall be permitted.
   c. Door-locking arrangements shall be permitted where the clinical needs of residents require specialized security measures or where residents pose a security threat, provided all of the following conditions are met:
      1) Staff can readily unlock doors at all times.
      2) The building is protected by an approved, automatic sprinkler system.

E. **Protection**

1. Protection of Vertical Opening

   Vertical openings, other than those meeting the requirement of para C.5 of this Section, shall be separated by smoke partitions having a minimum of half-hour (1/2-hr) fire resistance rating.

2. Hazardous Areas

   Areas for cartoned storage, food or household maintenance items in wholesale or institutional-type quantities and concentrations, or mass storage of residents' belongings, or other hazardous areas that are located on a floor where primary means of egress or sleeping rooms are located shall be protected by a construction having a minimum fire resistance rating of one (1) hour and an automatic detection and alarm system or automatic sprinkler system.

3. Detection, Alarm and Communication System
   a. A manual fire alarm system shall be provided on all small residential custodian care facilities.
   b. Single station smoke detectors shall be provided in all levels including basements, living areas and sleeping rooms.
4. Extinguishing Requirements
   a. All buildings of four (4) or more storeys in height shall be protected with approved, supervised sprinkler system, using quick-response or residential sprinklers in accordance with Section 10.2.6.7 of this RIRR.
   b. Portable fire extinguishers shall be installed in accordance with Section 10.2.6.9 of this RIRR.
5. Construction of Corridor Walls
   a. Walls separating sleeping rooms shall have a minimum of half-hour (1/2-hr) fire resistance rating. The minimum of half-hour (1/2-hr) fire resistance rating shall be considered to be achieved if the partitioning is finished on both sides with lath and plaster or materials providing a fifteen-minute (15-min) thermal barrier.

b. Sleeping room doors shall be substantial doors, such as those of forty-four millimeters (44 mm) thick, solid-bonded wood-core construction, or of other construction of equal or greater stability and fire integrity.

c. Any vision panels shall be fixed fire window assemblies or shall be wired glass not exceeding eighty-four hundredths square meter (0.84 m^2) each in area and installed in approved frames.

F. **Building Services Equipment**

1. Utilities shall be installed in accordance with Section 10.2.7.1 of this RIRR.
2. Heating, ventilating and air-conditioning equipment shall comply with Section 10.2.7.2 of this RIRR.
3. Elevators, escalators and conveyors shall comply with Section 10.2.7.5 of this RIRR.

SECTION 10.2.12.3 LARGE FACILITIES

A. **Scope**

1. This Section shall apply to residential board and care occupancies providing sleeping accommodations for more than sixteen (16) residents.
2. Facilities having sleeping accommodations for not more than sixteen (16) residents shall comply with Section 10.2.14.2 of this RIRR.

B. **Occupant Load**

The occupant load in number of persons for whom means of egress and other provisions are required shall be determined on the basis of one (1) person for every eighteen and six tenths square meters (18.6 m^2), or shall be determined as the maximum probable population of the space under consideration, whichever is greater.

C. **Means of Egress**

1. General
   a. Means of egress from resident rooms and resident dwelling units to the outside of the building shall be in accordance with Section 10.2.12.2 and this Section.
   b. Means of escape within the resident room or resident dwelling unit shall comply with Section 10.2.14.6 of this RIRR for single and two-family dwellings.
2. Permissible Exit Components

   Components of means of egress shall be limited to the following types:

   a) Doors
   b) Stairs and Smoke-proof Enclosures
   c) Horizontal Exit
   d) Ramps
   e) Exit Passageways
3. Capacity of Means of Egress
   a. The capacity of means of egress shall be in accordance with Section 10.2.5.2.
   b. Street floor exits shall be sufficient for the occupant load of the street floor, plus the required capacity of stairs and ramps discharging onto the street floor.
   c. The width of corridors shall be sufficient for the occupant load served but shall be not less than one thousand five hundred twenty-five millimeters (1,525 mm).
4. Number of Means of Egress
   a. Not less than two (2) separate exits shall be provided on every storey.
   b. Not less than two (2) separate exits shall be accessible from every part of every storey.
   c. Exit access, as required in para "b" above, shall be permitted to include a single exit access path of not more than sixty-one meters (61 m) if protected with sprinkler system, and forty-six meters (46 m) if not protected with sprinkler system.
5. Arrangement of Means of Egress
   a. Access to all required exits shall be in accordance with Section 10.2.5.2 of this RIRR.
   b. Common path of travel shall not exceed twenty meters (20 m).

c. Dead-end corridors shall not exceed six meters (6 m).

d. Any room or any suite of rooms, exceeding ninety-one square meters (91 m^2), shall be provided with not less than two (2) exit access doors located remotely from each other, said doors shall be swinging in the direction of exit travel.

e. Aisles, corridors and ramps required for exit access or exit shall be at least one and eighty-three hundredths meters (1.83 m) in clear and unobstructed width.

6. Travel Distance to Exits

Travel distance from any point in a room to the nearest exit, measured in accordance with Section 10.2.5.2 of this RIRR, shall not exceed sixty-one meters (61 m) if protected with sprinkler system, and forty-six meters (46 m) if not protected with sprinkler system.

7. Discharge from Exits

Exit discharge shall comply with Section 10.2.5.2. of this RIRR

8. Illumination of Means of Egress

Means of egress shall be illuminated in accordance with Section 10.2.5.11 of this RIRR.

9. Emergency Lighting

Emergency lighting in accordance with Section 10.2.5.11 shall be provided, unless each sleeping room has a direct exit to the outside at the ground level.

10. Marking of Means of Egress

Means of egress shall be marked in accordance with Section 10.2.5.12.

D. **Protection**

1. Protection of Vertical Openings

a. Protection of vertical openings shall be in accordance with Section 10.2.6.5.

b. No floor below the level of exit discharge used only for storage, heating equipment, or purposes other than residential occupancy shall have unprotected openings to floors used for residential occupancy.

2. Hazardous Areas

Hazardous areas shall be protected in accordance with Section 10.2.6.10 and in accordance with Table 10 below.

Table 10: HAZARDOUS AREA PROTECTION

Hazardous Area Description	**Separation/Protection** (Minimum fire resistance rating)
Boiler and fuel-fired heater rooms	1 hour
Central/back laundries larger than 9.3 m^2	1 hour
Paint shops employing hazardous substances in quantities less than those that would be classified as severe hazard	1 hour
Physical plant maintenance shops	1 hour
Soiled linen rooms	1 hour
Storage rooms larger than 4.6 m^2, but not exceeding 9.3 m^2, storing combustible material	Smoke partition
Storage rooms larger than 9.3 m^2, storing combustible material	1 hour
Trash collection room	1 hour

3. Detection, Alarm and Communication Systems

a. An automatic detection and alarm system shall be required in all large residential custodial care facilities in accordance with Section 10.2.6.6 of this RIRR.

b. An annunciator panel, connected to the fire alarm system, shall be provided at a location readily accessible from the primary point of entry for emergency response personnel.

c. High-rise buildings shall be provided with an approved emergency voice communication system.

d. Smoke alarms shall be installed inside every sleeping room, outside every sleeping area in the immediate vicinity of the bedrooms, and all levels within a resident unit.

e. Corridors and spaces open to the corridors shall be provided with smoke detectors arranged to initiate an alarm that is audible in all sleeping areas.

4. Extinguishing Requirements

a. All buildings shall be protected throughout by an approved, automatic sprinkler system, and quick-response or residential sprinklers, except for one (1) storey building with a bed capacity of not exceeding five (5). Replenishment of water supply shall be strictly considered in the design. Quick-response sprinklers shall be required in smoke compartments containing patient sleeping rooms.

b. Portable fire extinguishers shall be installed in accordance with Section 10.2.6.9 of this RIRR.

5. Corridors and Separation of Sleeping Rooms

a. Access shall be provided from every resident use area to at least one (1) means of egress that is separated from all sleeping rooms by walls complying with para "c" through "f" hereof.

b. Sleeping rooms shall be separated from corridors, living areas, and kitchens by walls complying with para "c" through "f" hereof.

c. Walls required by para "a" or para "b" hereof shall be smoke partitions having a minimum of half-hour (1/2-hr) fire resistance rating.

d. Doors protecting corridor openings shall not be required to have a fire protection rating, but shall be constructed to resist the passage of smoke.

e. Door-closing devices shall not be required on doors in corridor wall openings, other than those serving exit enclosures, smoke barriers, enclosures of vertical openings, and hazardous areas.

f. No louvers, transfer grilles, operable transoms, or other air passages, other than properly installed heating and utility installations, shall penetrate the walls or doors.

6. Subdivisions of Building Spaces

a. Every storey shall be divided into not less than two (2) smoke compartments with an area of not exceeding two thousand one hundred square meters (2,100 m^2), except:

1) Storeys that do not contain a board and care occupancy located above the board and care occupancy;

2) Smoke barriers shall not be required in areas that do not contain a board and care occupancy and that are separated from the board and care occupancy by a fire barrier;

3) Smoke barriers shall not be required on storeys that do not contain a board and care occupancy and that are more than one (1) storey below the board and care occupancy; and

4) Smoke barriers shall not be required in open parking structures protected throughout by an approved, supervised automatic sprinkler system.

b. The travel distance from any point to reach a door in the required smoke barrier shall be limited to a distance of sixty-one meters (61 m).

E. **Building Services Equipment**

1. Utilities shall be installed in accordance with Section 10.2.7.1.

2. Heating, ventilating and air-conditioning equipment shall comply with Section 10.2.7.2.

3. Elevators, escalators and conveyors shall comply with Section 10.2.7.5.

DIVISION 13. DETENTION AND CORRECTIONAL OCCUPANCIES

SECTION 10.2.13.1 GENERAL REQUIREMENTS

Detention and correctional occupancies shall include those used for purposes such as correctional institutions, detention facilities, community residential centers, substance abuse or rehabilitation centers, and other similar facilities where occupants are confined or housed under some degree of restraint or security.

A. **Occupancy**

1. For the application of the life safety requirements of this Division, the resident user category shall be divided into the following groups:
   a. Use Condition I – Free Egress. Free movement is allowed from sleeping areas and other spaces where access or occupancy is permitted to the exterior via means of egress that meet the requirements of this RIRR.
   b. Use Condition II – Zoned Egress. Free movement is allowed from sleeping areas and any other occupied smoke compartment to one (1) or more other smoke compartments.
   c. Use Condition III – Zoned Impeded Egress. Free movement is allowed within individual smoke compartments, such as within a residential unit comprised of individual sleeping rooms and a group activity space, with egress impeded by remote-controlled release of means of egress from such a smoke compartment to another smoke compartment.
   d. Use Condition IV – Impeded Egress. Free movement is restricted from an occupied space. Remote-controlled release is provided to allow movement from all sleeping rooms, activity spaces, and other occupied areas within the smoke compartment to another smoke compartment.
   e. Use Condition V – Contained. Free movement is restricted from an occupied space. Staff-controlled manual release at each door is provided to allow movement from all sleeping rooms, activity spaces, and other occupied areas within the smoke compartment to another smoke compartment.
2. To be classified as Use Condition III or Use Condition IV, the arrangement, accessibility, and security of the release mechanism(s) used for emergency egress shall be such that the minimum available staff, at any time, can promptly release the locks.
3. Areas housing occupancies corresponding to Use Condition I shall conform to the requirements of residential occupancies under this Chapter.

   Exception: Use Condition I facilities shall be permitted to conform to the requirements of this Division for Use Condition II facilities, provided that said facilities are provided with a twenty-four hour (24-hr) on-duty staff.

B. **Occupant Load**

The occupant load for which means of egress shall be provided for any floor shall be the maximum number of persons intended to occupy that floor but not less than one (1) person for every eleven and one tenth square meters (11.1 m^2) gross floor area.

SECTION 10.2.13.2 EXIT DETAILS

A. **Types**

Exits shall be restricted to the following permissible types;

1. Doors
2. Stairs and smoke-proof enclosures
3. Horizontal exits
4. Exit passageways

B. **Capacity of Exits**

The capacity of means of egress shall be calculated in accordance with para "C" of Section 10.2.5.2 of this RIRR.

C. **Number of Exits**

1. At least two (2) exits of the above types, remote from each other, shall be provided for each floor or fire section of the building.

2. Exit access travel shall be permitted to be common path not exceeding thirty meters (30 m).

D. **Access to Exit**

Every aisle, passageway, corridor, exit discharge, exit location and access shall be in accordance with Section 10.2.5.2 of this RIRR.

E. **Arrangement of Means of Egress**

1. Every sleeping room shall have a door leading directly to an exit access corridor, unless otherwise permitted by the following:
   a. If there is an exit door opening directly to the outside from the room at the ground level.
   b. One (1) adjacent room, such as a day room, group activity space, or other common space shall be permitted to intervene. Where sleeping rooms directly adjoin a day room or group activity space that is used for access to an exit, such sleeping rooms shall be permitted to open directly to the day room or space, and shall be permitted to be separated in elevation by a half or full storey height.
2. No exit or exit access shall contain a corridor, hallway, or aisle having a pocket or dead end exceeding six meters (6 m).
3. A sally port shall be permitted in a means of egress where there are provisions for continuous and unobstructed travel through the sally port during an emergency egress condition.

F. **Travel Distance to Exits**

1. Between any room door intended as exit access and an exit shall not exceed thirty meters (30 m);
2. Between any point in a room and an exit shall not exceed forty-six meters (46 m); and
3. Any point in a sleeping room to the door in that room shall have a maximum travel distance of ten meters (10 m).

G. **Discharge from Exits**

1. Exits shall be permitted to discharge into a fenced or walled courtyard, provided that not more than two (2) walls of the courtyard are the building walls from which egress is being made. Enclosed yards or courts shall be of sufficient size to accommodate all occupants at a distance of not less than fifteen meters (15 m) from the building while providing a net area of one and four tenths square meters (1.4 m^2) per person.
2. All exits shall be permitted to discharge through the level of exit discharge. This requirement shall be waived, provided that not more than fifty percent (50%) of the exits discharge into a single fire compartment separated from other compartments by construction having not less than a one-hour (1-hr) fire resistance rating.

H. **Emergency Lighting and Exit Markings**

1. Means of egress shall be illuminated in accordance with Section 10.2.5.11 of this RIRR.
2. Emergency lighting shall be provided in accordance with Section 10.2.5.11 of this RIRR.
3. Exit signs shall be provided in areas accessible to the public.

SECTION 10.2.13.3 PROTECTION

A. **Protection of Vertical Opening**

Any vertical opening shall be enclosed or protected.

Exception No. 1: Unprotected vertical openings in accordance with Section 10.2.6.5 of this RIRR shall be permitted.

Exception No. 2: In sleeping quarters smoke compartments, unprotected vertical openings shall be permitted in accordance with the conditions of Section 10.2.6.5 of this RIRR, provided that the height between the lowest and highest finished floor levels does not exceed seven meters (7 m). The number of levels shall not be restricted. Sleeping quarters subdivided in accordance with this Section shall be permitted to be considered as part of the communicating space. The separation shall not be required to have a fire resistance rating.

B. **Interior Finish**

Interior finish shall be Class A or Class B.

C. **Detection, Alarm and Communication Systems**

1. Detention and correctional occupancies shall be provided with a fire alarm system in accordance with Section 10.2.6.6 of this RIRR, except as modified by the succeeding paragraphs.
2. Initiation of the required fire alarm system shall be by manual means in accordance with Section 10.2.6.6 of this RIRR, by means of any required detection devices or detection systems, and by means of water flow alarm in the sprinkler system.

   Exception No. 1: Manual fire alarm boxes shall be permitted to be locked, provided that staff is present within the area when it is occupied and staff has keys readily available to unlock the boxes.

   Exception No. 2: Manual fire alarm boxes shall be permitted to be located in a staff location, provided that the staff location is attended when the building is occupied and that the staff attendant has direct supervision of the sleeping area.
3. Occupant notification shall be accomplished automatically in accordance with Section 10.2.6.6 of this RIRR; a positive alarm sequence shall be permitted.

   Exception: Any smoke detectors required by this Chapter shall be permitted to be arranged to alarm at a constantly attended location only and shall not be required to accomplish general occupant notification.
4. Fire department notification shall be accomplished in accordance with Section 10.2.6.6 of this RIRR; a positive alarm sequence shall be permitted.

   Exception No. 1: Any smoke detectors required by this Chapter shall not be required to transmit an alarm to the fire department.

   Exception No. 2: This requirement shall not apply where staff is provided at a constantly attended location that has the capability to promptly notify the fire department or has direct communication with a control room having direct access to the fire department.
5. An approved automatic smoke detection system shall be in accordance with Section 10.2.6.6 of this RIRR, as modified by paras 6 through 8 hereof, throughout all resident sleeping areas and adjacent day rooms, activity rooms, or contiguous common spaces.
6. Smoke detectors shall not be required in sleeping rooms with four (4) or fewer occupants.
7. Other arrangements and positioning of smoke detectors shall be permitted to prevent damage or tampering, or for other purposes. Such arrangements shall be capable of detecting any fire, and the placement of detectors shall be such that the speed of detection is equivalent to that provided by the spacing and arrangements required by the installation standards referenced in Section 10.2.6.6 of this RIRR. Detectors shall be permitted to be located in exhaust ducts from cells, behind grilles, or in other locations.
8. Smoke detectors shall not be required in Use Condition II open dormitories where staff is present within the dormitory whenever the dormitory is occupied.

D. **Extinguishment Requirements**

1. All buildings classified as Use Condition II, Use Condition III, Use Condition IV, or Use Condition V shall be protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 10.2.6.7 of this RIRR.
2. The automatic sprinkler system required by the preceding paragraph shall be fully supervised and electrically connected to the fire alarm system.
3. Portable fire extinguishers shall be provided in accordance with para "C" of Section 10.2.6.9 of this RIRR.

   Exception No. 1: Access to portable fire extinguishers shall be permitted to be locked, provided that personnel are on duty on a twenty-four hour (24-hr) basis and keys are readily available to unlock access to the extinguishers.

   Exception No. 2: Portable fire extinguishers shall be permitted to be located at staff locations only.
4. Standpipe and hose systems shall be provided in accordance with Section 10.2.6.8 of this RIRR.

E. **Subdivision of Building Spaces**

1. Every storey used for sleeping by residents, or any other storey with an occupant load of fifty (50) or more persons, shall be subdivided into compartments by means of smoke barrier.
2. The requirement for subdivision of building space shall be permitted as follows:
   a. By smoke compartments having exit to the public way, provided that such exit serves only one area and has no opening to other areas;
   b. A building separated from the resident housing area by two-hour (2-hr) fire resistance rating or fourteen meters (14 m) open area; and
   c. Secured open area holding a space located fifteen meters (15 m) from the housing area that provides one and four tenths square meter (1.4 m^2) or more of refuge area for each person.

F. **Hazardous Areas**

1. Any hazardous area shall be protected in accordance with Section 10.2.6.10 of this RIRR. The areas described in Table 11 below shall be protected as indicated.

Table 11: HAZARDOUS AREA OPERATION

Hazardous Area Description	Separation/Protection
Areas not incidental to resident housing	2 hours
Boiler and fuel-fired heater rooms	1 hour
Central or bulk laundries > 9.3 m^2	1 hour
Commercial cooking equipment	In accordance with Section 10.2.7.1 of this RIRR and NFPA 96
Commissaries	Smoke resistant
Employee locker rooms	Smoke resistant
Hobby/handicraft shops	Smoke resistant
Maintenance shops	Smoke resistant
Padded cells	1 hour
Soiled linen rooms	1 hour
Storage rooms > 4.6 m^2 in area but 9.3 m^2 in area storing combustible material	Smoke resistant
Storage rooms > 9.3 m^2 storing combustible materials	1 hour
Trash collection rooms	1 hour

Doors used to access the areas specified above shall meet the requirements for doors at smoke barriers for the applicable use condition.

2. Where smoke barriers are required, they shall limit the occupant load to not more than two hundred (200) residents in any smoke compartment and limit the travel distance to a door in a smoke barrier as follows:
   a. The distance from any room door required as exit access shall not exceed forty-five meters (45 m).
   b. The distance from any point in a room shall not exceed sixty meters (60 m).
3. Any required smoke barrier shall be constructed in accordance with Section 10.2.6.3 of this RIRR. Barriers shall be of substantial construction and shall have structural fire resistance.
4. Openings in smoke barriers shall be protected in accordance with Section 10.2.6.3 of this RIRR, provided that there shall be no restriction on the total number of vision panels in any barrier. Provided further that, sliding doors in smoke barriers that are designed to normally be kept closed and are remotely operated from a continuously attended location shall not be required to be self-closing.
5. Not less than fifty-six hundredths square meter (0.56 m^2) of net area per occupant shall be provided on each side of the smoke barrier for the total number of occupants in adjoining compartments. This space shall be readily available wherever occupants are moved across the smoke barrier in a fire emergency.

6. Doors shall provide resistance to the passage of smoke. Swinging doors shall be self-latching, or the opening resistance of the door shall be not less than twenty-two Newton (22 N).
7. Doors in smoke barriers shall conform to the requirements for doors in means of egress and shall have locking and release arrangements according to the applicable use condition.
8. Vision panels shall be provided in smoke barriers at points where the barrier crosses an exit access corridor.
9. Smoke dampers shall be provided.

G. **Building Services Equipment**

Air-conditioning, ventilating, heating, cooking and other service equipment shall be in accordance with Division 7 of this Chapter, and shall be installed in accordance with the manufacturer's specifications, except as modified in the following paragraphs:

1. Combustion and ventilation air for boiler or incinerator shall be taken directly from and discharged directly to the outside air.
2. Any rubbish chute and linen chute including pneumatic systems shall be safeguarded in accordance with Sections 10.2.6.5 and 10.2.7.4 of this RIRR. An incinerator shall not be directly flue-fed nor shall any floor charging chute directly connect with the combustion chamber. Any trash chute shall discharge into a trash collecting room used for no other purpose and protected in accordance with Section 10.2.6.10 of this RIRR.

DIVISION 14. RESIDENTIAL OCCUPANCIES

SECTION 10.2.14.1 CLASSIFICATION

Residential occupancies shall include all occupancies so classified in Division 3 of this Chapter. They shall be classified in the following groups, subject to determination by the C/MFM having jurisdiction.

A. ***Hotels***. Buildings or groups of building under the same management in which there are more than fifteen (15) sleeping accommodations for hire, primarily used by transients who are lodged with or without meals, whether designated as a hotel, inn, motel, or by any other name. So-called apartelle, condotel or pension houses shall be classified as hotels, because they are potentially subject to transient occupancy like that of hotels.

B. ***Dormitories***. Buildings where group sleeping accommodation are provided for persons, not members of the same family group in one room or in series of closely associated room under joint occupancy and single management, as in college dormitories, convents, fraternity houses, military barracks, and the like.

C. ***Apartment Buildings***. Buildings containing three (3) or more living units with independent cooking and bathroom facilities, whether designated as condominium, row house, apartment house, tenement, garden apartment, or by any other name.

D. ***Lodging or Rooming Houses***. Building in which separate sleeping rooms are rented providing sleeping accommodations for a total of fifteen (15) or less persons, on either a transient or permanent basis; with or without meals, but without separate cooking facilities for individual occupants.

E. ***Single and Two -Family Dwellings.*** Detached dwellings in which each living unit is occupied by members of a single family.

SECTION 10.2.14.2 REQUIREMENTS

A. **Occupant Load**

The occupant load of residential occupancies in number of persons for whom exits are to be provided except in detached single and two -family dwellings shall be determined on the basis of one (1) person per eighteen and six tenths square meters (18.6 m^2) gross floor area, or the maximum probable population of any room or section under consideration, whichever is greater. The occupant load of any open mezzanine or balcony shall be added to the occupant load of the floor below for the purpose of determining exit capacity.

B. **Capacity of Exits**

Capacity of means of egress shall be in accordance with para "C" of Section 10.2.5.2 of this RIRR.

C. **Maintenance of Exits**

1. No door in any means of egress shall be locked against egress when the building is occupied.
2. No residential occupancy shall have its means of egress pass through any nonresidential occupancy in the same building, except in buildings provided with approved, supervised sprinkler system, provided that the means of egress shall not pass through a high hazard content area as determined by the C/MFM having jurisdiction and the means of egress shall be separated by a construction of not less than one (1) hour.
3. No guest room or guest suite shall be permitted to be located above a nonresidential occupancy, except when the guest room or guest suite and its exits are separated from the nonresidential occupancy by construction having a fire resistance rating of not less than one (1) hour or when the nonresidential occupancy is protected throughout by approved, supervised sprinkler system.

SECTION 10.2.14.3 HOTELS AND DORMITORIES

A. **Requirements**

1. Any ballroom assembly or exhibition hall, and other space used for purposes of public assembly shall be in accordance, with Division 8 of this Chapter. Restaurant having a capacity of fifty (50) or more persons shall be treated as places of assembly.
2. Any dormitory divided into suites of rooms, with one (1) or more bedrooms opening into living room or study that has a door opening into a common corridor serving number of suites, shall be classified as an apartment building.

B. **Exit Details**

1. Requirements

   a. Any room having a capacity of less than fifty (50) persons with an outside door at street or ground level may have such outside door as a single exit provided that no part of the room or area is more than fifteen and twenty-five hundredths meters (15.25 m) from the door measured along the natural path of travel.

   b. Any floor below the floor of exit discharge occupied for public purposes shall have exits arranged in accordance with the subsequent paragraph of this Section, with access thereto in accordance with Section 10.2.5.2 of this RIRR.

   c. Any floor below the floor of exit discharge not open to the public and used only for mechanical equipment, storage, and service operations (other than kitchens which are considered part of the hotel occupancy) shall have exits appropriate to its actual occupancy in accordance with applicable Sections of this Chapter.

      The same stairway or other exit required to serve any one (1) upper floor may also serve other upper floor, except that no inside open stairway, escalator, or ramp may serve as a required egress from more than one (1) floor.

2. Types of Exits

   Exits, arranged in accordance with Division 5 of this Chapter, shall be one (1) or more of the following types:

   a. Doors, provided that doors in any means of egress shall not be locked against egress when the building is occupied. Delayed egress locks may be permitted, provided that not more than one (1) such is located in any one egress path;

   b. Stairs and smoke proof enclosures;

   c. Ramps; or

   d. Horizontal exits.

3. Minimum Corridor Width

   Corridors, other than those within individual guest rooms or individual guest suites, shall be of sufficient width to accommodate the required occupant load and shall not be less than one and twelve hundredths meters (1.12 m).

4. Number of Exits

   Not less than two (2) exits shall be accessible from every floor, including floors below the floor of exit discharge and occupied for public purposes.

5. Travel Distance to Exits

   a. Any exit shall be such that it will not be necessary to travel more than thirty meters (30 m) from the door of any room to reach the nearest exit.

   b. Travel distance within a guest room or guest suite to a corridor door shall not exceed twenty-three meters (23 m) in buildings not protected by an approved, supervised automatic sprinkler system.

   c. Travel distance within a guest room or guest suite to a corridor door shall not exceed thirty-eight meters (38 m) in buildings protected by an approved, supervised sprinkler system.

6. Access to and Arrangement of Exits

   a. Access to all required exits shall be in accordance with Section 10.2.5.2 of this RIRR, shall be unobstructed, and shall not be veiled from open view by ornamentation, curtain, or other appurtenance.

   b. Means of egress shall be so arranged that, from every point in any open area or from any room door, exits will be accessible in at least two (2) different directions.

   c. Doors between guest rooms and corridors shall be self-closing.

   d. Common path of travel shall not exceed ten meters (10 m).

   e. Dead end corridors shall not exceed six meters (6 m).

7. Discharge from Exits

   a. All of the required exits shall terminate directly to the street or through a yard, court, or passageway with protected openings and separated from all parts of the interior of the building.

   b. The exits may also discharge on the areas of the floor exit discharge provided the following are met:

      1) Such exits discharge to a free and unobstructed way to the exterior of the building by not more than six-meter (6-m) distance, which way is readily visible and identifiable from the point of discharge from the exit.

      2) The floor of discharge into which the exit discharge is provided with automatic fire suppression system and any other portion of the level of discharge with access to the discharge area is provided with automatic fire suppression system or separated from it in accordance with the requirements for the enclosure of exit, and with Section 10.2.5.2 of this RIRR.

      3) The entire area on the floor of discharge is separated from areas below by construction having a minimum fire-resistance rating of two (2) hours.

8. Lighting and Signs

   a. Each public space, hallway, stairway, or other means of egress shall have illumination in accordance with Section 10.2.5.11 of this RIRR. Access to exit shall be continuously illuminated at all times. Any hotel and dormitory shall have emergency lighting installed in individual guest rooms or guest suites, hallways, landings of stairways and other appropriate areas as determined by the C/MFM having jurisdiction.

   b. Every exit access door from public hallways or from corridors on floors with sleeping accommodations shall have an illuminated sign in accordance with Section 10.2.5.12 of this RIRR. Where exits are not visible in a hallway or corridor, illuminated directional signs shall be provided to indicate the direction of exit.

9. Emergency Evacuation Plan

   Emergency Evacuation Plan shall be provided in accordance with Section 10.2.5.13 of this RIRR.

C. **Protection**

1. Protection of Vertical Openings

   a. Every stairway, elevator shaft and other vertical openings shall be enclosed or protected in accordance with Section 10.2.6.5 of this RIRR.

   b. Any required exit stair which is so located that it is necessary to pass through the lobby or other open space to reach the outside of the building shall be continuously enclosed down to the lobby level.

   c. No floor below the floor of exit discharge, used only for storage, heating requirements,

or other than hotel occupancy open to guest or the public, shall have unprotected openings to floors used for hotel purposes.

2. Protection of Guest Rooms
   a. In any new hotel building every corridor shall be separated from guest rooms by partitions having at least a one (1) hour fire resistance rating.
   b. Each guest room shall be provided with a door having a fire protection rating at least twenty (20) minutes.
   c. Openings in corridor partitions other than door openings shall be prohibited.
   d. Doors that open directly onto exit access corridors shall be self-closing and self-latching.
3. Interior Finish

   Interior finish, in accordance with Section 10.2.6.4 of this RIRR and subject to the limitations and modifications therein specified, shall be as follows:

   a. For new construction or new Interior Finish
      1) Exits – Class A or B;
      2) Lobbies, corridors – Class A or B;
      3) Places of assembly – In accordance with Division 8 of this Chapter; and
      4) Individual guest rooms – Class B or C.
   b. Existing Interior Finish
      1) Exits – Class A or B;
      2) Lobbies and Corridors;
         a) Used as exit access – Class A or B
         b) Not used as required exit access – Class A, B or C
   c. Places of Assembly – In accordance with Division 8 of this Chapter;
   d. Individual guest rooms – Class A, B or C; and
   e. Other rooms – Class A, B or C.
4. Fire Detection and Alarm System
   a. An automatic fire detection and alarm system, in accordance with Section 10.2.6.6 of this RIRR, shall be provided for any hotel or dormitory having accommodations for fifteen (15) or more guests. For less than fifteen (15) guests, a manual fire alarm system shall be installed.
   b. Every sounding device shall be of such character and so located as to arouse all occupants of the building or section thereof endangered by fire.
   c. An alarm-sending station and manual fire alarm box shall be provided at the hotel desk or other convenient central control point under continuous supervision of responsible employees.
   d. Suitable facilities shall be provided for immediate notification of the BFP.
   e. Positive fire alarm sequence may be permitted.
   f. Hotels and dormitories including its guest rooms and guest suites shall be required to be equipped with both audible and visible notification appliance.
   g. In hotels and dormitories not equipped with automatic fire detection and alarm system, guest rooms, living area and sleeping rooms within a guest suite shall be installed with single-station smoke detectors.
5. Extinguishing Requirements
   a. All hotels and dormitories with four (4) storeys or more in height shall be protected throughout by approved, supervised sprinkler system.
      1) Hotels and dormitories with four (4) storeys and below shall be installed with sprinkler system in accordance with NFPA 13R.
      2) Hotels and dormitories with five (5) storeys and above shall be installed with sprinkler system in accordance with NFPA 13.
   b. Portable fire extinguishers shall be installed in accordance with Section 10.2.6.9 of this RIRR.

6. Subdivision of Building Spaces

   a. In buildings not protected by an approved, supervised automatic sprinkler system, each hotel guest room, including guest suites, and dormitory rooms shall be separated from other guest rooms or dormitory rooms by walls and floors having fire resistance ratings of not less than one (1) hour.

   b. In buildings protected throughout by an approved, supervised automatic sprinkler system, each hotel guest room, including guest suites and dormitory room, shall be separated from other guest rooms or dormitory rooms by walls, floors and fire barriers having fire resistance ratings of not less than a half (1/2) hour.

7. Hazardous Areas

   a. Any room containing high pressure boilers, refrigerating machinery, transformers, or other service equipment subject to possible explosion shall not be located directly under or directly adjacent to exits. All such rooms shall be effectively cut off from other parts of the building as specified in Section 10.2.6.10 of this RIRR.

   b. Every hazardous area shall be separated from other parts of the building by construction having a fire-resistance rating of at least one (1) hour and communicating openings shall be protected by approved automatic or self-closing fire doors, or such area shall be equipped with automatic fire suppression system. Where a hazard is high as determined by the C/MFM having jurisdiction, both fire-resistive construction and automatic fire suppression system shall be used. Hazardous areas include, but are not limited to, boiler and heater rooms, laundries, repair shops, rooms or spaces used storage of combustible supplies and equipment in quantified deemed hazardous by the C/MFM having jurisdiction.

D. **Building Services Equipment**

1. Air-Conditioning and Ventilation

   a. Every air conditioning installation shall comply with Section 10.2.7.2 of this RIRR.

   b. No transom/windowpane shall be installed in partition of sleeping rooms in new buildings. In existing buildings transoms shall be fixed in the closed position and shall be covered or otherwise protected to provide a fire-resistance rating at least equivalent to that of the wall in which they are installed.

2. All other building services equipment installed or used in hotels and dormitories shall comply with Division 7 of this Chapter.

SECTION 10.2.14.4 APARTMENT BUILDINGS

A. **General Requirements**

1. Any apartment building which complied with all of the preceding requirements of this Section for hotels may be considered as a hotel and, as such, the following requirements for apartment buildings will not be applicable.

2. Every individual unit covered by this Section shall at least comply with the minimum provisions of Section 10.2.14.6 of this RIRR.

B. **Exit Details**

1. General Types and Capacities of Exits

   a. Exits of the same arrangement, types and capacities, as required by Section 10.2.14.3 of this RIRR shall be provided.

   b. Street floor exits shall be sufficient for the occupant load of the street floor plus the required capacity of stairs and ramps discharging onto the street floor.

2. Number of Exits

   Every living unit shall have access to at least two (2) separate exits.

   Exception No. 1: Any living unit, which has an exit directly to the street or yard at ground level or by way of an outside stairway that serves a maximum of two (2) units or an enclosed stairway with fire-resistance rating of one (1) hour or more serving that apartment only and not communicating with any floor below the floor of exit discharge or other area not a part of the apartment served, may have a single exit.

   Exception No. 2: Apartment buildings of not more than three (3) storeys in height with not more than six (6) living units per floor, with a smoke-proof

enclosure or an outside stairway as the exit, immediately accessible to all apartments served thereby, may have a single exit.

Exception No. 3: Any building not more than three (3) storeys in height with no floor below the floor of exit discharge or, in case there is such a floor, with the street floor construction of at least one-hour (1-hr) fire resistance, may have a single exit, under the following conditions:

- The stairway is completely enclosed with a partition having a fire resistance rating of at least one (1) hour with self-closing fire doors protecting all openings between the stairway enclosed and the building.
- The stairway does not serve any floor below the floor of exit discharge,
- All corridors serving as access to exits at least one-hour (1-hr) fire resistance rating.
- There is not more than six and one tenth meters (6.1 m) of travel distance to reach an exit from entrance door of any living unit.

3. Minimum Corridor Width

   a. Corridors with a required capacity of more than fifty (50) persons shall be of sufficient width to accommodate the required occupant load but have a width of not less than one and twelve hundredths meters (1.12 m).

   b. Corridors with a required capacity of not more than fifty (50) persons shall not be less than nine hundred ten millimeters (910 mm).

4. Access to Exits

   a. Exits shall be remote from each other, as required by Section 10.2.5.2 of this RIRR.

   b. Exits shall be so arranged that there are no dead-end pockets, hallways, corridors, passageways or courts.

   c. Exits and exit access shall be so located that:

      1) It will not be necessary to travel more than fifteen and a half meters (15.5 m) within any individual living unit to reach the nearest exit, or to reach an entrance door of the apartment which provides access through a public corridor to an exit on the same floor level.

      2) Within any individual living unit, it will not be necessary to traverse stairs more than one (1) storey above or below the floor level of the apartment to the nearest exit or entrance door.

      3) The entrance door to any apartment is within thirty-one meters (31 m) of an exit of within forty-six and a half meters (46.5 m) in a building protected by approved, supervised sprinkler system in accordance with Section 10.2.6.7 of this RIRR.

   d. Doors between apartments and corridors shall be self-closing.

5. Discharge from Exits

   Discharge from exits shall be the same as required for hotels in accordance with Section 10.2.12.3 of this RIRR.

6. Lighting and Signs

   a. Every public space, hallway, stairway, and other means of egress shall have illumination in accordance with Section 10.2.5.11 of this RIRR. All apartment buildings shall have emergency lighting.

   b. Signs in accordance with Section 10.2.5.12 of this RIRR shall be provided in all apartment buildings.

C. **Protection**

1. Segregation of Dwelling Units

   Dwelling units in row apartments shall be separated from each other by partition walls having a fire resistance rating of four (4) hours. Such walls shall be constructed solidly and continuously from the ground to level one meter (1 m) above the ridge line of the roof.

2. Protection of Vertical Openings

   Protection of vertical openings shall be the same as required for hotels in accordance with para "C" of Section 10.2.14.3 of this RIRR. There shall be no unprotected vertical opening in any building or fire section with only one exit.

3. Interior Finish

   a. For new construction and new interior finish

      1) Exits - Class A or B;

      2) Lobbies, corridors and public spaces - Class A or B; and

      3) Individual living units - Class A, B or C.

   b. Existing Interior Finish

      1) Exits - Class A or B; and

      2) Other spaces - Class A, B or C.

4. Alarm Systems

   a. Every apartment building of four (4) storeys or more in height, or more than twelve (12) apartment units, except row houses shall have automatic fire detection and alarm system in accordance with Section 10.2.6.6 of this RIRR.

   b. Apartment buildings of not more than three (3) storeys in height shall be provided with manual fire alarm system, provided that dwelling units shall be installed with single-station or multi-station smoke detectors.

5. Extinguishing Requirements

   a. All apartments, except row houses with four (4) storeys in height, shall be protected throughout by approved, supervised sprinkler system.

   b. For four (4) storeys and below it shall be installed with sprinkler system in accordance with NFPA 13R.

   c. For five (5) storeys and above, it shall be installed with sprinkler system in accordance with NFPA 13.

   d. Portable fire extinguishers shall be installed in accordance with Section 10.2.6.9 of this RIRR.

6. Hazardous Areas

   a. Every hazardous area shall be separated from other parts of the building construction having a fire-resistance rating of at least one (1) hour. Communicating openings shall be protected by approved automatic or self-closing fire doors. Hazardous areas include, but shall not be limited to, boiler and heaters rooms, laundry rooms, repair shops and rooms or spaces used for storage of combustible supplies and equipment in quantities deemed hazardous by the C/MFM having jurisdiction.

   b. Both fire-resistant construction and automatic fire suppression system shall be provided where the hazard is high as determined by the C/MFM having jurisdiction.

D. **Building Services Equipment**

1. Air conditioning and ventilation, when provided, shall be in accordance with Section 10.2.7.2 of this RIRR.

2. All other building services equipment installed or used in hotels and dormitories shall comply with Division 7 of this Chapter.

SECTION 10.2.14.5 LODGING OR ROOMING HOUSES

A. **General**

1. This Section applies only to lodging or rooming houses providing sleeping accommodations for less than fifteen (15) persons, as specified in Section 10.2.14.1 of this RIRR.

2. In addition to the following provisions, every lodging or rooming house shall comply with the minimum requirements for detached single and two -family dwellings.

B. **Means of Escape Requirement**

1. Every sleeping room and living area shall have access to two (2) means of escape complying with that of single or two -family dwelling.

2. Every sleeping room above or below the street floor shall have access to two (2) separate means of exit, at least one (1) of which shall consist of an enclosed interior stairway, an exterior stairway, a fire escape or a horizontal exit.
3. All exits shall be arranged to provide a safe path of travel to the outside of the building without traversing any corridor or space exposed to an unprotected vertical opening.
4. Any sleeping room below the street floor shall have direct access to the outside or the building.

C. **Alarm System**

A manual fire alarm system shall be provided in accordance with Section 10.2.6.6 of this RIRR**.** Likewise, each sleeping room shall be installed with single station-smoke or heat detector.

SECTION 10.2.14.6 SINGLE AND TWO -FAMILY DWELLINGS

A. **General**

This Section covers detached single and two -family dwellings as specified in Section 10.2.14.1 of this RIRR. Where the occupancy is so limited, the only requirements applicable are those in this Section.

B. **Means of Escape Requirements**

1. Number, Type and Access to Means of Escape
   a. In any dwelling of more than two (2) rooms, every room used for sleeping, living or dining purposes shall have at least two (2) means of escape, at least one (1) of which shall be a door or stairway providing a means of unobstructed travel to the outside of the building at street or ground level. No room or space shall be occupied for living or sleeping purposes which is accessible only by a ladder, folding stairs or through a trap door.
   b. Every sleeping room shall have at least one (1) outside window. Such window could be opened from the inside, without the use of tools, keys or special effort or knowledge to provide a clear opening of not less than five hundred sixty millimeters (560 mm) in width and eight hundred millimeters (800 mm) in height. The bottom of the opening shall be not more than one thousand two hundred twenty millimeters (1,220 mm) above the floor, except if the room has two (2) doors providing separate ways of escape or has a door leading directly outside of the building.
   c. No required path of travel to the outside from any room shall be through another room or apartment not under the immediate control of the occupant of the first room or his/her family, not through a bathroom or other space subject to locking.
   d. No exit access from sleeping rooms to outside shall be less than nine hundred millimeters (900 mm) wide.
2. Doors
   a. No doors in the path of travel providing means of escape shall be less than seven hundred millimeters (700 mm) of clear width.
   b. Every closet door latch shall be such that children can open the door from inside the closet.
   c. Every bathroom door lock shall be designed to permit the opening of the locked door from the outside in an emergency.
3. Stairs

   The width, risers, and treads of every stair shall comply at least with the minimum requirements for stairs, as described in Section 10.2.5.4 of this RIRR.

C. **Interior Finish**

Interior finish of occupied spaces of new buildings shall be Class A, B or C as defined in Section 10.2.6.4 of this RIRR and in existing buildings the interior finish shall be Class A, B, C or D.

D. **Building Services Equipment**

No heating equipment such as stove or combustion heater shall be so located as to block escape in case of fire arising from malfunctioning of the stove or heater.

E. **Fire Alarm and Detection System**

Each living unit or sleeping room shall be installed with single-station smoke or heat detectors.

F. **Extinguishing Requirement**

Each single and two -family dwelling shall be provided with portable fire extinguishers in accordance with Section 10.2.6.9 of this RIRR.

DIVISION 15. MERCANTILE OCCUPANCIES

SECTION 10.2.15.1 GENERAL REQUIREMENTS

A. **Classification of Mercantile**

1. Mercantile occupancies shall include all buildings and structures or parts thereof with occupancy as described in Division 3 of this Chapter.

   a. Mercantile occupancies shall be classified as follows:

      1) ***Class A.*** All stores having aggregate gross area of two thousand seven hundred eighty-eight square meters (2,788 m^2) or more, or utilizing more than three (3) floor levels for sales purposes.

      2) ***Class B.*** All stores of less than two thousand seven hundred eighty-seven square meters (2,787 m^2) aggregate area, but over two hundred seventy-nine square meters (279 m^2), or utilizing any balcony, mezzanine or floor above or below the street floor level for sales purposes, except that if more than three (3) floors are utilized, the store shall be considered Class A, regardless of area.

      3) ***Class C.*** All stores of two hundred seventy-eight square meters (278 m^2) or less gross area used for sales purposes on the street floor only.

   b. For the purpose of Class A, B, and C, the aggregate gross area shall be the total area of all floors used for mercantile purposes and, where a store is divided into sections by fire walls, shall include the area of all sections used for sales purposes. Areas of floors not used for sales purposes, such as a floor below the street floor used only for storage and not open to the public, shall not be counted for the purpose of the above classifications, but exits shall be provided for such non-sales area in accordance with their occupancy, as specified by other Divisions of this Chapter.

   c. A balcony or mezzanine floor having an area less than one half (1/2) of the floor below shall not be counted as a floor level for the purpose of applying the classification, but if there are two (2) balconies or mezzanine floors, one (1) shall be counted.

   d. Storeys not used for sales above or below sales floor are not counted in the height classification.

   e. A mezzanine less than or equal to one third (1/3) the area (new) or less than or equal to one half (1/2) the area (existing) of the floor below is permitted.

   f. Where a number of stores under different management are located in the same building or in adjoining buildings with no fire wall or other standard fire separations in between, the aggregate gross of all such stores shall be used in determining classification.

B. **Classification of Hazard**

The contents of mercantile occupancies shall be classified in accordance with Division 4 of this Chapter.

Exception: Mercantile occupancies classified as high hazard in accordance with Division 4 of this Chapter shall meet the following additional requirements:

- Exits shall be located not more than twenty-three meters (23 m) of travel from any point is needed to reach the nearest exit.
- From every point there shall be at least two (2) exits accessible by travel in different directions (no common path of travel).
- All vertical openings shall be enclosed.

C. **Occupant Load**

1. For purposes of determining required exits, the occupant load of mercantile buildings or parts of building used for mercantile purposes shall not be less than the following:

a. Street floor, one (1) person for each two and eight tenths square meters (2.8 m^2) gross floor area. In stores with no street floor as defined in Rule 3 hereof, but with access directly from the street by stairs or escalators, the principal floor at the point of entrance to the store shall be considered the street floor. In stores where, due to difference in grade of streets on different sides, there are two (2) or more floors directly accessible from the street (not including alleys or similar back streets), each such floor shall be considered a street floor for the purpose of determining occupant load.

b. Due to differences in grade of streets on different sides, two (2) or more floors directly accessible from streets (not including alleys or similar back streets) exist; each such floor is permitted to be considered a street floor. The occupant load factor is one (1) person for each three and seven tenths square meters (3.7 m^2) of gross floor area of sales space.

c. Sales floors below the street floor: same as street floor.

d. Upper floors, used for sale: one (1) person for each five and six tenths square meters (5.6 m^2) gross floor area.

e. Floor or sections used only for offices, storage, shipping and not open to the general public: one (1) person for each nine and three tenths square meters (9.3 m^2) gross floor area.

f. Floors or sections used for assembly purposes: occupant load determined in accordance with Division 8 of this Chapter.

g. Covered Walls: one (1) person for each two and eight tenths square meters (2.8 m^2) gross floor area.

2. Where any required egress capacity from a balcony or mezzanine passes through the room below, that required capacity shall be added to the required egress capacity of the room below.

SECTION 10.2.15.2 EXIT DETAILS

A. **General**

1. All exit facilities shall be in accordance with Division 5 of this Chapter and this Division. Only types of exits specified in this Section shall be used as required exit facilities in any mercantile occupancy.

2. Where a stairway, escalator, outside stair, or ramp serves two (2) or more upper floors, the same stairway or other exit required to serve any one (1) upper floor may also serve other upper floors.

   Exception: No inside open stairway, escalator, or ramp may serve as required egress facility from more than one (1) floor.

3. Where there are two (2) or more floors below the street floor, the same stairway or other exit may serve all floors, but all required exits from such areas shall be independent of any open stairways between street and the floor below it.

4. Where a level outside exit from upper floors is possible owing to hills, such outside exits may serve instead of horizontal exits. If, however, such outside exits from the upper floor also serve as an entrance from a principal street, the upper floor shall be classified as a street, and is subject to the requirements of this Section for street floors.

B. **Types of Exits**

1. Exits shall be restricted to the following permissible types: doors; stairs and smoke-proof enclosures; horizontal exits; and ramps.

2. In existing interior stair or fire escape not complying with Section 10.2.5.4 or Section 10.2.5.10 of this RIRR may be continued in use, subject to the approval of the C/MFM having jurisdiction.

C. **Capacity of Means of Egress**

1. The capacity of means of egress shall be in accordance with Section 10.2.5.2 of this RIRR.

2. In Class A and Class B mercantile occupancies, street floor exits shall be sufficient for the occupant load of the street floor plus the required capacity of stairs and ramps discharging through the street floor.

D. **Number of Exits**

1. Exits shall comply with the following, except as otherwise permitted by paras 2 through 5 below:
   a. The number of means of egress shall be in accordance with Section 10.2.5.2 of this RIRR.
   b. Not less than two (2) separate exits shall be provided on every storey.
   c. Not less than two (2) separate exits shall be accessible from every part of every storey.
2. Exit access as required by para 1.c above shall be permitted to include a single exit access path for the distances permitted as common path of travel.
3. A single means of egress shall be permitted in a Class C mercantile occupancy, provided that the travel distance to the exit or to a mall does not exceed twenty-three meters (23 m).
4. A single means of egress shall be permitted in a Class C mercantile occupancy, provided that the travel distance to the exit or to a mall does not exceed thirty meters (30 m), and the storey on which the occupancy is located, and all communicating levels that are traversed to reach the exit or mall, are protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 10.2.6.7 of this RIRR.
5. A single means of egress to an exit or to a mall shall be permitted from a mezzanine within any Class A, Class B, or Class C mercantile occupancy, provided that the common path of travel does not exceed thirty meters (30 m) if protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 10.2.6.7 of this RIRR.

E. **Arrangement and Access of Exits**

1. Exits shall be remote from each other and shall be arranged to minimize the possibility that both may be blocked by an emergency.

   Exception: A common path may be permitted for the first fifteen meters (15 m) from any point in accordance with Section 10.2.15.1 of this RIRR, if there are high hazard contents.
2. The aggregate width of all aisles leading to each exit shall be equal to at least the required width of the exit.
3. In no case shall aisles be less than eight hundred millimeters (800 mm) in clear width.
4. In Class A stores, at least one (1) aisle of one and a half meters (1.5 m) minimum width shall lead directly to an exit.
5. If the only means of entrance of customer is through one (1) exterior wall of the building, two-thirds (2/3) of the required exit width shall be located in this wall,
6. At least one and a half (1.5) of the required exits shall be so located as to be reached without going through check-out stands. In no case shall checkout stands or associated railings or barriers obstruct exits or required aisles or approached thereto.

F. **Measurement of Travel Distance to Exits**

Travel distance to exits shall be measured in accordance with Section 10.2.5.2 of this RIRR.

Exception: An increase in the above travel distance to forty-six meters (46 m) shall be permitted in a building completely protected by an approved, supervised sprinkler system in accordance with Section 10.2.6.7 of this RIRR.

G. **Discharge from Exits**

In buildings with automatic fire suppression system in accordance with Section 10.2.6.7 of this RIRR, one half (1/2) of rated number of exit units of stairways, escalators or ramps serving as required exits from floors above or below the street floor, may discharge through the main street floor area, instead of directly to the street, provided that:

1. Not more than one half (1/2) of the required exit units from any single floor considered separately discharge through the street floor area.
2. The exits are enclosed, in accordance with Section 10.2.6.5 of this RIRR, to the street floor.
3. The distance of travel from the termination of the enclosure to an outside street door is not more than fifteen and a half meters (15.5 m).

4. The street floor doors provide sufficient units of exit width to serve exits discharging through the street floor in addition to the street floor itself, in accordance with Section 10.2.15.1 of this RIRR.

H. **Doors**

1. Every street floor door shall be in accordance with Section 10.2.5.3 of this RIRR, and a horizontal exit door, if used, in accordance with Section 10.2.5.6 of this RIRR.
2. All doors at the foot of stairs from upper floors or at the end of stairs leading to floors below the street floor shall swing with the exit travel.

I. **Exit Signs and Lighting**

1. Every mercantile occupancy shall have exit illumination and signs in accordance with Sections 10.2.5.11 and 10.2.5.12 of this RIRR.
2. Every Class A and Class B store shall have emergency lighting facilities conforming to Section 10.2.5.11 of this RIRR.

SECTION 10.2.15.3 PROTECTION

A. **Protection of Vertical Openings**

1. Any stairway, elevator shaft, escalator opening or other critical opening shall be enclosed or protected in accordance with Section 10.2.6.5 of this RIRR, except as permitted in this Section.
2. Exceptions for Class A and Class B stores
   a. In any Class A or Class B store, openings may be unprotected between any two (2) floors, such as open stairs or escalators between street floor and the floor below, or open stairs to second floor or balconies or mezzanines above the street floor level (not both to the floor below the street floor and above unless protected throughout by an approved, supervised sprinkler system).
   b. In any Class A or Class B store protected throughout by an approved, supervised sprinkler system in accordance with Section 10.2.6.7, openings may be unprotected under the conditions permitted by Section 10.2.6.5 of this RIRR; or between the street floor and the floor below the street and between street floor and second floor; or if no openings to the floor below the street floor, between street floor, street floor balcony, or mezzanine, and second floor, but not between more than three (3) floor levels.
   c. In existing Class A or Class B stores, only one (1) floor above those otherwise permitted may open if such floor is not used for sales purposes and the entire building is protected by an approved, supervised automatic fire suppression system.
3. Exceptions for Class C stores

   In any Class C store, openings may be unprotected between street floor and balcony or mezzanine.

B. **Interior Finish**

1. Interior finish of exits of all stores shall be Class A and Class B in accordance with Section 10.2.6.4 of this RIRR.
2. In any Class A or Class B store, interior finish of the ceiling shall be Class A or Class B in accordance with Section 10.2.6.4 of this RIRR, unless completely protected by an approved, supervised automatic fire suppression system in accordance with Section 10.2.6.7 of this RIRR, in which case Class C interior finish may be used in any Class A or Class B store. Interior finish of the walls shall be Class A, Class B or Class C in accordance with Section 10.2.6.4 of this RIRR.
3. In any mercantile occupancy, exposed portions of structural members complying with the requirements for heavy timber construction may be permitted. Laminated wood shall be delaminated under the influence of heat.
4. In a Class C store, interior finish shall be Class A, B or C in accordance with Section 10.2.6.4 of this RIRR.

C. **Alarm Systems**

Class A and Class B stores shall be provided with an automatic fire alarm system in accordance with Section 10.2.6.6 of this RIRR.

D. **Automatic Sprinkler Protection**

Approved, supervised automatic sprinkler system protection shall be installed in accordance with Section 10.2.6.7 of this RIRR in all mercantile occupancies as follows:

1. Throughout all mercantile occupancies three (3) or more storeys in height provided that at least one (1) of the floors is at least two hundred thirty-two square meters (232 m^2).
2. Throughout all mercantile occupancies exceeding one thousand one hundred fifteen square meters (1,115 m^2) in gross area.
3. Throughout floor below the street floor having an area exceeding two hundred thirty-two square meters (232 m^2) when used for the sale, storage or handling of combustible goods and merchandise.

E. **Hazardous Areas**

1. An area used for general storage, boiler or furnace rooms, fuel storage, janitor closet, maintenance shops including woodworking and painting areas, and kitchens shall be separated from other parts of the building by construction having a fire-resistance rating of not less than one (1) hour, and all openings shall be protected with self-closing fire doors.
2. Areas with high hazard contents as defined in Division 4 of this Chapter shall be provided with both fire-resistive construction and automatic fire suppression system.
3. Cooking equipment shall be protected in accordance with Section 10.2.7.1 of this RIRR.

SECTION 10.2.15.4 BUILDING SERVICES EQUIPMENT

A. Air conditioning, ventilating, heating, cooking, and other service equipment shall be in accordance with Division 7 of this Chapter.

B. An elevator shall not constitute required means of exit. When mercantile occupancies are more than three (3) storeys or more than three (3) storeys above the street floor and equipped with automatic elevator, one (1) or more elevators and escalators shall be designed and equipped for fire emergency use by fire fighters as specified in Division 7 of this Chapter. Key operation shall transfer automatic elevator operation to manual and bring elevator to the street floor for use of Fire Service. The elevator shall be situated so as to be readily accessible by firefighters.

SECTION 10.2.15.5 SPECIAL PROVISIONS

A. **Self-Service Stores**

1. In any self-service store, no check-out stand or associated railings or barriers shall obstruct exits or required aisles or approaches thereto.
2. In every self-service store, where wheeled carts or buggies are used by customers, adequate provision shall be made for the transit and parking of such carts to minimize the possibility that they may obstruct exits.

B. **Open-Air Mercantile Operations**

1. Open-air mercantile, operations, such as open-air markets, gasoline filling stations, auto LPG refilling stations, roadside stands for the sale of farm produce and other outdoor mercantile operations shall be so arranged and conducted as to maintain free and unobstructed ways of travel at all times to permit prompt escape from any point of danger in case of fire or other emergency, with no dead ends in which persons might be trapped due to display stands, adjoining buildings, fences, vehicles, or other obstructions.
2. If mercantile operations are conducted in roof-over areas, they shall be treated as mercantile buildings, provided that canopies over individual small stands to protect merchandise from the weather shall not be construed to constitute buildings for the purpose of this Chapter.

C. **Combined Mercantile and Residential Occupancies**

No dwelling unit shall have its sole means of exit through any mercantile occupancy in the same building.

Exception No. 1: Where the dwelling occupancy and exits therefrom are separated from the mercantile occupancy by construction having a fire resistance rating of at least one (1) hour.

Exception No. 2: Where the mercantile occupancy is protected by automatic fire suppression system in accordance with Section 10.2.6.7 of this RIRR.

Exception No. 3: Where an existing building with not more than two (2) dwelling units above the mercantile occupancy is protected by an automatic fire detection system in accordance with Section 10.2.6.6 of this RIRR.

D. **Covered Malls and Walkway**

1. ***Covered Mall and Walkways***. A covered or roofed interior area used as a pedestrian public way and connecting buildings housing individual or multiple tenants. Use of the term covered mall shall include covered walkways.
2. A covered mall and all buildings connected to it shall be treated as a single mercantile building and shall be subject to the requirements for mercantile occupancies, except as provided herein.
3. Exit Details
   a. Every covered mall shall have no less than two (2) exits located remote from each other.
   b. No less than one half (1/2) the required exit widths for each Class A or Class B store connected to a covered mall shall lead directly outside without passing through the mall.
   c. Every mall shall be provided with unobstructed exit access, parallel to and adjacent to the connected buildings. This exit access shall extend to each mall exit.
   d. In no case shall an exit access through a covered mall be less than three thousand millimeters (3,000 mm), and six hundred sixty millimeters (660 mm) in clear width.

DIVISION 16. BUSINESS OCCUPANCIES

SECTION 10.2.16.1 GENERAL REQUIREMENTS

A. **Classification of Occupancy**

Business Occupancies shall include all buildings and structures or parts thereof with occupancy described in Division 3 of this Chapter.

B. **Classification of Hazard of Contents**

The contents of business occupancies shall be classified as ordinary hazard in accordance with Division 4 of this Chapter. For purposes of the design of an automatic fire suppression system, an office occupancy shall be classified as "light hazard occupancy".

C. **Occupant Load**

1. For purposes of determining required exits, the occupant load of business purposes shall be no less than one (1) person per nine and three tenths square meters (9.3 m^2) of gross floor area. The occupant load for concentrated use as in the case of Call Centers, IT Centers, BPO's, and other similar occupancies, shall not be less than one (1) person per four and six tenths square meters (4.6 m^2) of gross floor area devoted for that use, provided that the means of egress and other fire safety requirements of RA 9514 and its RIRR are followed or incorporated in the building.
2. In the case of mezzanine or balcony open to the floor below of other unprotected vertical openings between floors, the occupant load of the mezzanine or other subsidiary floor level shall be added to that of the street floor for the purpose of determining required exits.

SECTION 10.2.16.2 EXIT DETAILS

A. **General**

1. All exit facilities shall be in accordance with Section 10.2.5.10 of this RIRR and this Division. However, only types of exits specified in para "B" of this Section (Types of Exits) may be used as required exit facilities in any business occupancy with access thereto and ways of travel therefrom in accordance with Section 10.2.5.2 of this RIRR.
2. If, owing to differences in grade level, any street floor exits are at points above or below the street or ground level, such exits shall comply with the provisions for exits from upper floors or floors below the street floor.

3. Stairs and ramps serving two (2) or more floors below a street floor occupied for business use shall be permitted in accordance with paras 4 and 5 below.
4. Where two (2) or more floors below the street floor are occupied for business use, the same stairs or ramps shall be permitted to serve each.
5. An inside open stairway or inside open ramp shall be permitted to serve as a required egress facility provided that only one (1) floor level below the street floor.
6. Floor levels below the street floor used only for storage, heating, and other service equipment, and are not subject to business occupancy shall have a separate means of egress in accordance with Division 18 of this Chapter.

B. **Types of Exits**

1. Exits shall be restricted to the following permissible types:
   a. Doors
   b. Stairs and smoke proof enclosures
   c. Horizontal exits
   d. Ramps
   e. Exit Passageways

C. **Capacity of Means of Egress**

1. The capacity of means of egress shall be in accordance with Section 10.2.5.2 of this RIRR.
2. The clear width of any corridor or passageway serving an occupant load of fifty (50) or more shall be not less than one and twelve hundredths meters (1.12 m). It is not the intent that this provision applies to non-corridor or non-passageway areas of exit access, such as the spaces between rows of desks created by office layout or low-height partitions.
3. Street floor exits shall be sufficient for the occupant load of the street floor plus the required capacity of stairs and ramps discharging through the street floor.

D. **Number of Exits**

1. Exits shall comply with the following, except as otherwise permitted by para 2 through 6 below:
   a. The number of means of egress shall be in accordance with Section 10.2.5.2 of this RIRR.
   b. Not less than two (2) separate exits shall be provided on every storey.
   c. Not less than two (2) separate exits shall be accessible from every part of every storey.
2. Exit access, as required by para 1.a through 1.c above, shall be permitted to include a single exit access path for the distances permitted as common paths of travel.
3. A single exit shall be permitted for a room or area with a total occupant load of fewer than one hundred (100) persons, provided that the following criteria are met:
   a. The exit shall discharge directly to the outside at the level of exit discharge for the building.
   b. The total distance of travel from any point, including travel within the exit, shall not exceed thirty meters (30 m).
   c. The total distance of travel specified in para "b" above shall be on the same floor level or, if traversing of stairs is necessary, such stairs shall not exceed four thousand five hundred seventy millimeters (4,570 mm) in height and the stairs shall be provided with complete enclosures to separate them from any other part of the building.
4. Any business occupancy not exceeding three (3) storeys, and not exceeding an occupant load of thirty (30) people per floor, shall be permitted a single separate exit to each floor, provided that either of the following criteria is met:
   a. This arrangement shall be permitted only where the total travel distance to the outside of the building does not exceed thirty meters (30 m) and where the exit is enclosed in accordance with Section 10.2.6.5 of this RIRR, serves no other levels, and discharges directly to the outside.
   b. A single outside stair in accordance with Section 10.2.5.5 of this RIRR shall be permitted to serve all floors.

5. A single means of egress shall be permitted from a mezzanine within a business occupancy, provided that the common path of travel does not exceed twenty-three meters (23 m), or thirty meters (30 m) if protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 10.2.6.7 of this RIRR.
6. A single exit shall be permitted for a maximum two-storey, single-tenant space/building that is protected throughout by an approved, supervised sprinkler system in accordance with Section 10.2.6.7 of this RIRR and where the total travel to the outside does not exceed thirty meters (30 m).

E. **Arrangement of Means of Egress**

1. Means of egress shall be arranged in accordance with Section 10.2.5.2 of this RIRR.
2. Dead-end corridors shall be permitted in accordance with the following:
   a. In buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 10.2.6.7 of this RIRR, dead-end corridors shall not exceed fifteen meters (15 m).
   b. In buildings other than those complying with para "c" below, dead-end corridors shall not exceed six meters (6 m).
   c. It is recognized that dead ends exceeding the permitted limits exist and, in some cases, are impractical to eliminate. The C/MFM having jurisdiction might permit such dead ends to continue to exist, taking into consideration any or all of the following:
      1) Tenant arrangement
      2) Automatic sprinkler protection
      3) Smoke detection
      4) Exit remoteness
3. Limitations on common path of travel shall be in accordance with the following:
   a. Common path of travel shall not exceed thirty meters (30 m) in a building protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 10.2.6.7 of this RIRR.
   b. Common path of travel shall not exceed thirty meters (30 m) within a single tenant space having an occupant load not exceeding thirty (30) persons.
   c. In buildings other than those complying with para "a" or "b" above, the common path of travel shall not exceed twenty-three meters (23 m).
   d. It is recognized that common paths of travel exceeding the permitted limits exist and, in some cases, are impractical to eliminate. The C/MFM having jurisdiction might permit such common paths of travel to continue to exist, taking into consideration any or all of the following:
      1) Tenant arrangement
      2) Automatic sprinkler protection
      3) Smoke detection
      4) Exit remoteness

F. **Travel Distance to Exits**

1. In buildings protected throughout by an approved, supervised sprinkler system in accordance with Section 10.2.6.7 of this RIRR, the travel distance shall not exceed sixty-one meters (61 m).
2. In buildings other than those complying with para 1 above, the travel distance, measured in accordance with Section 10.2.5.2 of this RIRR, shall not exceed forty-six meters (46 m).

G. **Discharge from Exits**

All of the required exits shall terminate directly to the street or through a yard, court, or passageway with protected openings and separated from all parts of the interior of the building.

The exits may also discharge on the areas of the floor exit discharge provided the following are met:

1. Such exits discharge to a free and unobstructed way to the exterior of the building by not more than six meters (6 m) distance, which way is readily visible and identifiable from the point of discharge from the exit.

2. The floor of discharge into which the exit discharge is provided with automatic fire suppression system and any other portion of the level of discharge with access to the discharge area is provided with automatic fire suppression system or separated from it in accordance with the requirements for the enclosure of exit in Section 10.2.5.2 of this RIRR.
3. The entire area on the floor of discharge is separated from areas below by construction having a minimum fire-resistance rating of two (2) hours.

H. **Exit Signs and Lighting**

1. Exit illumination shall be provided in accordance with Section 10.2.5.11 of this RIRR.
2. Emergency lighting shall be provided in accordance with Section 10.2.5.11 of this RIRR in any building where any one of the following conditions exists:
   a. The building is two (2) or more storeys in height above the level of exit discharge.
   b. The occupancy is subject to fifty (50) or more occupants above or below the level of exit discharge.
3. Emergency lighting in accordance with Section 10.2.5.11 of this RIRR shall be provided for all underground and limited access structures.
4. Means of egress shall have signs in accordance with Section 10.2.5.12 of this RIRR.

I. **Emergency Evacuation Plan**

Emergency Evacuation Plan shall be in accordance with Section 10.2.5.13 of this RIRR.

SECTION 10.2.16.3 PROTECTION

A. **Protection of Vertical Openings**

1. Vertical openings shall be enclosed or protected in accordance with Section 10.2.6.5 of this RIRR, unless otherwise permitted by the following:
   a. Unenclosed vertical openings in accordance with Section 10.2.6.5 of this RIRR shall be permitted.
   b. Exit stairs shall be permitted to be unenclosed in two-storey, single tenant spaces that are provided with a single exit in accordance with para D.6 of Section 10.2.16.2 of this RIRR.
   c. Unprotected vertical openings shall be permitted in existing buildings complying with all of the following:
      1) Where protected throughout by an approved automatic sprinkler system in accordance with NFPA 13, *Standard for the Installation of Sprinkler Systems*.
      2) Where no unprotected vertical opening serves as any part of any required means of egress.
      3) Where required exits consist of exit doors that discharge directly to grade in accordance with Section 10.2.5.3, outside stairs in accordance with Section 10.2.5.4, smoke-proof enclosures in accordance with Section 10.2.5.4, or horizontal exits in accordance with Section 10.2.5.6 of this RIRR.
   d. Floors that are below the street floor and are used for storage or other than a business occupancy.

B. **Interior Finish**

1. Interior finish shall be in accordance with Section 10.2.6.4 of this RIRR.
2. Interior wall and ceiling finish
   a. Interior wall and ceiling finish material complying with Section 10.2.6.4 of this RIRR shall be Class A or Class B in exits and in exit access corridors.
   b. Interior wall and ceiling finishes shall be Class A, Class B, or Class C in areas other than those specified in para "a" above.
3. Interior floor finish
   a. Interior floor finish shall comply with Section 10.2.6.4 of this RIRR.
   b. Interior floor finish in exit enclosures shall be Class I or Class II.

C. **Extinguishing Equipment**

All business occupancy buildings fifteen meters (15 m) or more in height shall be provided throughout with approved, supervised sprinkler system, fully electrically supervised designed in accordance with NFPA 13.

D. **Detection, Alarm, and Communications Systems**

1. A fire alarm system in accordance with Section 10.2.6.4 of this RIRR shall be provided in all business, where any one of the following conditions exists:
   a. The building is two (2) or more storeys in height above the level of exit discharge;
   b. The occupancy is subject to fifty (50) or more occupants above or below the level of exit discharge. For existing building, the occupancy is subject to one hundred (100) or more occupants above or below the level of exit discharge; or
   c. The occupancy is subject to three hundred (300) or more total occupants. For existing building, the occupancy is subject to one thousand (1,000) or more total occupants.
2. Initiation of the required fire alarm system shall be by one of the following means:
   a. Manual means in accordance with Section 10.2.6.6 of this RIRR;
   b. Means of an approved automatic fire detection system that complies with Section 10.2.6.6 of this RIRR, and provides protection throughout the building; or
   c. Means of an approved automatic sprinkler system that complies with Section 10.2.6.7 of this RIRR, and provides protection throughout the building.
3. Occupant notification. During all times that the building is occupied, the required fire alarm system, once initiated, shall perform one of the following functions:
   a. For new and existing building, it shall activate a general alarm throughout the building in accordance with Section 10.2.6.6 of this RIRR. A positive alarm sequence in accordance with Section 10.2.6.6 of this RIRR shall be permitted.
   b. For existing building, a pre-signal system in accordance with Section 10.2.6.6 of this RIRR shall be permitted.
   c. For new and existing building, it shall activate an alarm signal in a continuously attended location for the purpose of initiating emergency action by personnel trained to respond to emergencies as follows:
      1) Emergency action shall be initiated by means of live voice public address system announcements originating from the attended location where the alarm signal is received, unless otherwise permitted by para 3 below.
      2) The live voice public address system shall be permitted to be used for other announcements, provided that the emergency action use takes precedence over any other use.
      3) In lieu of live voice public address system announcements, any other occupant notification means in accordance with Section 10.2.6.6 of this RIRR shall be permitted.
4. Where business occupancies do not fall within the condition of para D.1 above, it shall be provided with manual fire alarm system.

E. **Protection from Hazard**

1. Hazardous areas including, but not limited to, areas used for general storage, boiler or furnace rooms, and maintenance shops that include woodworking and painting areas shall be protected in accordance with Section 10.2.6.10 of this RIRR.
2. It is not the intent of this provision that rooms inside individual tenant spaces that are used to store routine office supplies for that tenant be required to be either separated or sprinklered.
3. High hazard contents areas, as classified in Division 4 of this Chapter, shall meet the following criteria:
   a. The area shall be separated from other parts of the building by fire barriers having a fire resistance rating of not less than one (1) hour, with all openings therein protected by the three-quarters (3/4) of an hour, fire protection-rated, self-closing fire door assemblies.
   b. The area shall be protected by an automatic extinguishing system in accordance with Section 10.2.6.7 of this RIRR.

4. The requirement for separating high hazard contents areas from other parts of the building shall comply with Section 10.2.6.10 of this RIRR.

SECTION 10.2.16.4 BUILDING SERVICES EQUIPMENT

Utilities shall comply with the provisions of Division 7 of this Chapter.

SECTION 10.2.16.5 COMBINED BUSINESS AND MERCANTILE OCCUPANCY

In any building occupied for both business and mercantile purposes, the entire building shall have exits in accordance with Division 16 of this Chapter.

Exception: If mercantile occupancy sections are effectively segregated from business section, exit facilities may be treated separately.

DIVISION 17. INDUSTRIAL OCCUPANCIES

SECTION 10.2.17.1 REQUIREMENTS

A. **Sub-classifications of Occupancy**

1. General Industrial Occupancy

   These are industrial occupancies that conduct ordinary and low hazard industrial operations in buildings of conventional design suitable for various types of industrial process. These include multi-storey buildings, where floors are occupied by different tenants or buildings suitable for such occupancy and are therefore subject to possible use for types of industrial process with high density of employee population.

2. Special Purpose Industrial Occupancy

   These are industrial occupancies that conduct ordinary and low hazard industrial operations in all buildings, except high hazard occupancy, designed and suitable only for particular types of operations, characterized by a relatively low density of employee population, with much of the area occupied by machinery or equipment.

3. High Hazard Industrial Occupancy

   These are industrial occupancies that use high hazard materials or processes, or that house high hazard contents.

4. Open Industrial Structures

   These are industrial occupancies that include operations conducted in open-air as distinguished from enclosure with buildings, such as those often found in oil refining and chemical processing plants where equipment is in the open platforms used for necessary access, sometimes with roofs or canopies to provide some shelter, but without walls.

B **Occupant Load**

1. The occupant load of industrial occupancies for which exits are to be provided shall be one (1) person per nine and three tenths square meters (9.3 m^2) gross floor area; provided that in Special Purpose Industrial Occupancy and for Open Industrial Structures, the occupant load shall be the maximum number of persons to occupy the area under any probable conditions; and further provided that in existing industrial occupancies, the C/MFM having jurisdiction may waive requirements for additional exits if the existing exits are adequate for the maximum number of persons actually employed.
2. Every auditorium, restaurant, office, garage and medical facility in connection with industrial occupancies shall have exits in accordance with the applicable Sections of this RIRR.
3. Exit requirements for specific occupancies shall comply with this Division.

SECTION 10.2.17.2 EXIT DETAILS

A. **General**

Each required exit shall be in accordance with the applicable Sections of Division 4 of this Chapter, with access thereto and ways of travel therefrom in accordance with Section 10.2.5.2 of this RIRR.

B. **Types of Exits**

Exits shall be restricted to the following permissible types: Doors; Stairs or smoke proof enclosures; Horizontal exits; Ramps; Slide Escapes.

C. **Minimum Corridor Width**

The minimum width of any corridor or passageway serving as a required exit or means of travel to or from required exit shall be one and twelve hundredths meters (1.12 m) in the clear.

D. **Capacity of Exits**

Capacity of means of egress shall be determined in accordance with Section 10.2.5.2 of this RIRR.

E. **Number of Exits**

At least two (2) exits shall be provided for every floor or section, including floors below the floor of exit discharge used for industrial purposes or uses incidental thereto. At least one (1) of which shall be reached without traversing another storey.

Exception: For rooms or areas with a total capacity of less than twenty-five (25) persons having direct exit to the street or to an open area outside the building at ground level, with a total travel distance from any point of not over fifteen and a half meters (15.5 m), a single exit may be permitted. Such travel shall be on the same floor level. If the traversing of stairs is required, there shall not be a vertical travel or more than four and six tenths meters (4.6 m) and such stairs shall be provided with complete enclosures to separate them from any other part of the building with no door openings therein.

F. **Travel Distance to Exits**

1. Exits shall be as remote from other as practicable, so arranged that it will not be necessary to travel more than sixty-one meters (61 m) from any point to reach the nearest exit for buildings not protected by a complete automatic fire suppression system, or seventy-six meters (76 m) in a building protected by an approved supervised sprinkler system in accordance with Section 10.2.6.7 of this RIRR.
2. From every point, there shall be at least two (2) separate exits accessible, so arranged as to be reached by different paths of travel in different directions.

   Exception: A common path of travel may be permitted for the first thirty meters (30 m) from any point, i.e. no dead-end may be more than fifteen meters (15 m) deep.

G. **Discharge from Exits**

A maximum of fifty percent (50%) of the exits may discharge through areas on the floor of exit discharge provided:

1. Such exits that discharges to a free and unobstructed way to the exterior of the building, which way is readily visible and identifiable from the point of discharge from the exit.
2. The floor of discharge into which the exit discharges is provided with automatic fire suppression system and any other portion of the level of discharge with access to the discharge area is provided with automatic fire suppression system protection or separated from it in accordance with the requirements for the enclosure of exits in Section 10.2.6.7 of this RIRR.

   Exception: If the discharge area is a vestibule or foyer with no dimension exceeding three meters (3 m) and separated from the remainder of the floor or discharge by construction providing protection at least the equivalent of wired glass in steel frames, and serving only for means of egress including exits directly to the outside, the requirements of Section 10.2.5.2 of this RIRR may be waived.
3. The entire area on the floor of discharge is separated from areas below by construction having a minimum of two-hour (2-hr) fire-resistance rating.

H. **Signs, Lighting, and Exit Signage**

1. Signs designating exits or ways of travel there to shall be provided in accordance with Section 10.2.5.12 of this RIRR.
2. Exit lighting shall be provided in accordance with Section 10.2.5.11 of this RIRR.
3. Emergency lighting shall be provided in accordance with Section 10.2.5.11 of this RIRR.

SECTION 10.2.17.3 PROTECTION

A. **Protection of Vertical Openings**

Every stairway, elevator shaft, escalator opening and other vertical opening shall be enclosed or protected in accordance with Section 10.2.6.5 of this RIRR.

Exception No. 1: Unprotected vertical openings connecting not more than three (3) storeys used for industrial occupancy only may be permitted in accordance with the provisions of Section 10.2.6.7 of this RIRR, with approved, supervised sprinkler system.

Exception No. 2: In any existing building only, where provided with approved, supervised sprinkler system in accordance with Section 10.2.6.7 of this RIRR, vertical openings not constituting as required means of egress may be unprotected, provided that all required exits shall consist of smoke-proof enclosure in accordance with Section 10.2.5.4, outside stairway in accordance with Section 10.2.5.5 or horizontal exits in accordance with Section 10.2.5.6 of this RIRR.

B. **Interior Finish**

Interior finish shall be Class A, Class B or Class C.

C. **Detection, Alarm and Communications Systems**

1. An approved automatic fire detection and alarm system shall be required in all industrial occupancies, except for buildings with less than twenty-five (25) occupants where such building shall be equipped with manual fire alarm system.
2. Not less than one (1) fire alarm box shall be installed for buildings equipped with automatic fire detection and alarm system.
3. If buildings are equipped with approved, supervised automatic sprinkler system, the flow of water shall initiate the fire alarm system.

D. **Extinguishing Requirement**

1. Every high-hazard occupancy shall be provided with automatic fire suppression system appropriate to the particular hazard in accordance with NFPA or other internationally accepted standards.
2. Portable fire extinguishers shall be installed in accordance with Section 10.2.6.9 of this RIRR.
3. Standpipe systems shall be installed in accordance with Section 10.2.6.8 of this RIRR.

E. **Explosion Prevention**

Explosion prevention in industrial occupancies shall be in accordance with NFPA 654, *Standard for the Prevention of Fires for Dust Explosions from the Manufacturing, processing, and Handling of Combustible Particular Solids,* and NFPA 69, *Standard on Explosion Prevention Systems*.

DIVISION 18. STORAGE OCCUPANCIES

SECTION 10.2.18.1 GENERAL REQUIREMENTS

A. **Occupancy Load**

The occupant load, in number of persons for whom means of egress and other provisions are required, shall be determined on the basis of the maximum probable population of the space under consideration.

B. **Exit Details**

1. Types of Exits

Means of egress for storage occupancies shall be restricted to the following types: Doors; Stairs and Smoke-proof Enclosures; Horizontal Exits; Ramps; Slide Escapes.

2. Capacity of means of egress

The capacity of means of egress shall be determined in accordance with para "C" of Section 10.2.5.2 of this RIRR.

3. Number of Exits

   a. Every building or structure used for storage and every section thereof considered separately shall have at least two (2) separate means of egress, as remote from each other as practicable.

      Exception: In rooms or spaces of less than one thousand three hundred ninety-four square meters (1,394 m^2) gross area where less than ten (10) persons may normally be present, at least one (1) means of egress shall be provided for any person employed therein.

   b. Every storage area shall have access to at least one (1) means of exit which can be readily opened, not subject to locking at any time that any persons are therein, and not dependent on any power-operated doors except where the design of the power-operated doors may be opened manually in case of power failure to permit exit travel.

4. Travel Distance to Exits

   Every area used for the storage of high hazard commodities shall have an exit within twenty-three meters (23 m) of any point in the area where persons may be present, except where automatic fire suppression system protection is provided, distances may be increased to thirty meters (30 m).

5. Signs, Lighting and Exit Signages

   a. Means of egress shall be installed with signs that comply with Section 10.2.5.12 of this RIRR.

   b. Means of egress shall be properly illuminated in accordance with Section 10.2.5.11 of this RIRR.

   c. Emergency lighting shall be provided on normally occupied areas and on all components of means of egress in accordance with Section 10.2.5.11 of this RIRR.

SECTION 10.2.18.2 PROTECTION

A. **Protection of Vertical Opening**

1. Any vertical opening shall be protected in accordance with Section 10.2.6.5 of this RIRR except for existing open stairs and open ramps shall permitted where connecting only two (2) floor levels.

2. Existing unprotected vertical opening in buildings protected throughout by approved supervised sprinkler system in accordance with Section 10.2.6.7 of this RIRR, vertical openings not constituting as required means of egress may be unprotected provided that all required exits shall consist of smoke-proof enclosure in accordance with Section 10.2.5.4, outside stairway in accordance with Section 10.2.5.5 or horizontal exits in accordance with Section 10.2.5.6 of this RIRR.

B. **Detection, Alarm and Communications Systems**

1. An approved automatic fire detection and alarm system shall be required on all storage occupancies except for buildings with ordinary or low hazard not exceeding two thousand square meters (2,000 m^2) where such building shall be equipped with manual fire alarm system.

2. Not less than one (1) fire alarm box shall be installed for buildings equipped with automatic fire detection and alarm system.

3. If buildings are equipped with approved, supervised automatic sprinkler system, the flow of water shall initiate the fire alarm system.

C. **Extinguishing Requirement**

1. Every high hazard occupancy shall have automatic fire suppression system protection such as Sprinkler Systems/Water Spray Fixed Systems/Water Mist Fire Protection Systems, Hybrid (Water and Inert Gas) Fire Extinguishing Systems, Carbon Dioxide Extinguishing Systems, Foam-Water Sprinkler and Foam-Water Spray Systems, Dry Chemical Extinguishing Systems, Wet Chemical Extinguishing Systems, Clean Agent Fire Extinguishing Systems, Fixed Aerosol Fire Extinguishing Systems and other equivalent protection as may be appropriate to the particular hazard, including Explosion Prevention Systems/Explosion Protection by Deflagration Venting for any area subject to an explosion hazard, designed to minimize danger to occupants in case of fire or other emergency before they have time to utilize exits to escape.

2. Portable fire extinguishers shall be installed in accordance with Section 10.2.6.9 of this RIRR.
3. Standpipe systems shall be installed in accordance with Section 10.2.6.8 of this RIRR.

SECTION 10.2.18.3 SPECIAL PROVISION FOR PARKING STRUCTURES

A. **General Requirements**

The following provisions apply to parking structures of closed or open type, above or below ground, but not to mechanical or exclusively attendant parking facilities, which are not occupied by customers and thus require a minimum of exits. Where repair operations are conducted, the exits shall comply with the provisions on Division 17 (Industrial Occupancies) of this Chapter, except if the parking and repair sections are effectively separated by not less than one (1) hour fire resistive construction, the parking and repair sections shall be treated separately.

B. **Exit Details**

1. Number and Types of Exits

Every floor of every parking structure shall have access to at least two (2) separate exits. Such exits shall be provided with doors, interior stairs of smoke proof towers, outside stairs or a horizontal exit in accordance with this RIRR.

Exception No. 1: In an open-type parking structure with open ramps not subject to closure, the ramp may serve in lieu of the second exit, provided the ramp discharges directly outside at the street level.

Exception No. 2. For parking structure extending only (1) floor level below the floor of exit discharge, a ramp leading directly to the outside may serve in lieu of the second exit.

2. Arrangement of and Travel Distance to Exit

a. Exits in parking structures shall be so arranged that no point in the area will be more than forty-five meters (45 m) from the nearest exit other than a ramp on the same floor level.

Exception No. 1: Travel distance may be increased to ninety-one meters (91 m) for open floors of open parking structures.

Exception No. 2: Travel distance may be increased to sixty meters (60 m) for enclosed parking structures completely protected by an approved, supervised sprinkler system in accordance with Section10.2.6.7 of this RIRR.

b. Exits shall be so arranged that from any point in the parking structures, the paths of travel to the two (2) exits will be in different directions, except that a common path of travel may be permitted for the first fifteen meters (15 m) from any point.

c. If fuel pumps are located within any closed parking garage, exits shall be so located that travel away from the fuel pump in any direction which leads to an exit, with no dead end in which occupants might be trapped by fire or explosion at any fuel pump. Such exit shall lead to the outside of the building on the same level or down stairs: no upward travel permitted unless direct outside exits are available from that floor.

Any storey below the storey at which is being dispensed shall have exits direct to the outside via outside stairs or doors at ground level.

C. **Illumination of Means of Egress**

Every public space, hallway, stairway and other means of egress shall have illumination and emergency lighting facilities in accordance with Section 10.2.5.11 of this RIRR.

D. **Exit Marking**

Signs in accordance with Section 10.2.5.12 of this RIRR shall be provided for all required exits and exit access.

E. **Detection, Alarm, and Communication Systems**

1. Parking structures with the aggregate floor area of nine thousand three hundred square meters (9,300 m^2) shall be required to have a fire alarm system, where the parking structure is combined with other occupancy, fire alarm and detection requirement for the occupancy shall likewise be applied to parking structure.

2. Open parking structures not combined with other occupancy or not more than fifteen meters (15 m) in height shall not be required with fire alarm system. Otherwise, it shall be required with fire alarm system.
3. Parking structures protected throughout by an approved automatic sprinkler system shall not be required to have a fire alarm system.

F. **Open Parking Structures**

1. Open parking structures shall not be required to install automatic sprinkler systems or automatic fire suppression system regardless of height except if it is combined with structures that require sprinkler, however, its means of egress shall comply with Section 10.2.5.2 of this RIRR which shall be fully enclosed and protected.
2. Parking structures shall be considered open if it complies with the following:
   a. Each parking level shall have wall openings open to the atmosphere for an area not less than four tenths square meter (0.4 m^2) for each linear meter of its exterior perimeter. The opening shall be distributed over forty percent (40%) of the building perimeter or uniformly over two opposite sides.
   b. Interior wall lines and column lines shall be at least twenty percent (20%) open, with openings distributed to provide ventilation.

SECTION 10.2.18.4 SPECIAL PROVISIONS FOR AIRCRAFT HANGARS

A. **Design and Fire Protection**

Design and fire protection of all aircraft hangars shall be in accordance with NFPA 409, *Standards for Aircraft Hangars*.

B. **Exit Details**

1. Exits from aircraft storage of servicing areas shall be provided at intervals of not more than forty meters (40 m) on all exterior walls or aircraft hangars. There will be a minimum of two (2) exits serving each aircraft storage or servicing area. Horizontal exits through interior fire walls shall be provided at intervals of not more than thirty meters (30 m). Dwarf or "smash" doors accommodating aircraft may be used to comply with these requirements. All doors designated as exits shall be kept unlocked in the direction of exit travel while the area is occupied.
2. Exits from mezzanine floors in aircraft storage or servicing areas shall be so arranged that the maximum travel to reach the nearest exit from any point on mezzanine shall not exceed twenty-three meters (23 m). Such exits shall lead directly to a properly enclosed stairwell discharging directly to the exterior or to a suitably cut-off area or to outside stairs.

C. **Signs**

Exits signs shall be provided above all doors and exit ways in accordance with Section 10.2.5.12 of this RIRR.

SECTION 10.2.18.5 SPECIAL PROVISIONS FOR GRAIN HANDLING, PROCESSING, MILLING, OR OTHER BULK STORAGE FACILITIES

A. There shall be not less than two (2) means of egress from all working levels of the head house.

B. One (1) of the two (2) means of egress shall be a stair to the level of exit discharge, and, if this means of egress is interior to the structure, it shall be enclosed by a dust-resistant, one (1) hour fire resistance-rated enclosure in accordance with Section 10.2.5.4 of this RIRR. Exterior stair means of egress shall be protected from the structure by a one (1) hour fire resistance-rated wall that extends at least three and five hundredths meters (3.05 m) beyond the stair.

C. The second means of egress shall be one of the following:

1. Exterior stair or basket ladder – type fire escape that is accessible from all working levels of the structure and provides a passage to the finished ground level; or
2. Exterior stair or basket ladder – type fire escape that is accessible from all working levels of the structure, provides access to adjoining structures, and provides a continuous path to the means of egress, described in para "E" hereof.

D. Stair enclosures in existing structures shall be permitted to have non-fire-rated dust-resistant enclosures.

E. An exterior stair or basket ladder-type fire escape shall provide passage to the finished ground level from the top of the end of an adjoining structure, such as a silo, conveyor, gallery, or gantry.

F. Underground spaces shall have not less than two (2) means of egress, one of which shall be permitted to be a means of escape, except as permitted in para "G" hereof.

G. Where the horizontal travel distance to the means of egress in underground spaces is less than fifteen meters (15 m) in normally unoccupied spaces, a single means of egress shall be permitted.

H. The travel distance to exits in underground spaces shall be in accordance with Section 10.2.5.2 of this RIRR.

I. Exits shall be as remote as practicable, so arranged that it will not be necessary to travel not more than sixty-one meters (61 m) from any point to reach the nearest exit for underground spaces not protected throughout by an approved, supervised automatic sprinkler system or one hundred twenty-two meters (122 m) for underground spaces protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 10.2.6.7 of this RIRR.

DIVISION 19. SPECIAL STRUCTURES

Any building or structure occupied for purposes not covered by Division 8 through 18 of this RIRR shall have exits and related safeguards in accordance with the fundamental principles of this Chapter, and shall comply with the following provisions where applicable.

SECTION 10.2.19.1 AERODROME FACILITIES

A. **General Fire Safety Requirements**

1. The BFP shall conduct regular and periodic fire safety inspection on all aerodrome facilities.
2. For large airport terminal buildings, the occupant load factor per area are as follows:
   a. Concourse - Nine and three tenths square meters (9.3 m^2)
   b. Waiting Areas - One and four tenths square meters (1.4 m^2)
   c. Baggage Claim - One and nine tenths square meters (1.9 m^2)
   d. Baggage Handling - twenty-seven and nine tenths square meters (27.9 m^2)
3. No dispensing, transfer or storage of flammable or combustible liquids shall be permitted within aerodrome facilities, except as provided in Section 10.3.7.5 of this RIRR.
4. Flammable and combustible liquid and fuel shall not be dispensed into or removed from the fuel system of an aircraft within any aircraft hangar, a container, tank, vehicle or aircraft except in locations approved by the C/MFM having jurisdiction.
5. The application of flammable and combustible liquid finishes shall be done only in locations approved by the C/MFM having jurisdiction.
6. No person shall clean any aircraft engines or its parts in an aircraft hangar nor within fifteen meters (15 m) of another aircraft, building or hangar with any flammable liquid having a flash point under thirty-seven and eight tenths degrees Celsius (37.8 °C).
7. In case of spills on Aerodrome Facilities, the following shall be observed:
   a. All activities in the affected area not related to the mitigation of the spill shall cease until the spilled material has been removed or the hazard has been mitigated.
   b. No aircraft or other vehicles shall be moved through the spill area until the spilled material has been removed or the hazard has been mitigated.
   c. Spills shall be reported immediately to the C/MFM having jurisdiction, documented and mitigated.
8. Every aircraft hangar shall be equipped and maintained with metal drip pans under the engines of all aircraft stored or parked thereon.

9. No open flame, flame-producing device, or other source of ignition shall be permitted in any hangar, except in locations approved by the C/MFM having jurisdiction.
10. **"NO SMOKING"** signs with white letters at least one hundred millimeters (100 mm), high upon a red background shall be posted conspicuously throughout every aircraft hangar and each fuel transfer point, except in approved designated and posted locations where smoking is permitted.
11. Smoking equipment such as cigarette lighters and ash trays shall be prohibited in aircraft-fueling vehicles.
12. No person shall run the engine of any aircraft in any aircraft hangar except in approved engine test area.
13. All repairing of aircraft requiring the use of open flames, fire-producing devices or the heating parts above two hundred and sixty degrees Celsius (260 °C) shall be done in the open or in a room separated from any hangar or other building by a fire resistive construction having fire resistance rating of not less than two (2) hours.
14. Storage of flammable and combustible or other hazardous materials in an aircraft hangar shall be prohibited, except in locations and containers approved by the C/MFM having jurisdiction.
15. Portable fire extinguishers shall be installed as follows:
    a. Every vehicle used for towing aircraft and every welding apparatus shall be equipped with at least one (1) fire extinguisher having a minimum 4-B-C classification.
    b. Every aircraft refueller shall be equipped with a minimum of two (2) B-C fire extinguishers. The fire extinguisher shall be readily accessible from either side of the vehicle.
    c. At every aircraft service station, including heliports, there shall be at least one (1) fire extinguisher having a minimum 6-B-C classification, and shall be so located that no pump or dispenser shall be more than twenty-three meters (23 m) from such extinguisher.
16. All pumps of a positive displacement type shall be provided with a by-pass relief valve set at a pressure of not more than thirty-five percent (35%) in excess of the normal working pressure of the unit. Such unit shall be equipped and maintained with a pressure gauge on the discharged side of the pumps.
17. Dispensing Hose and Nozzle shall conform to the following:
    a. Only hose designed for the transferring of hydrocarbon liquids shall be permitted.
    b. The length of the hose shall be limited to the actual needs of the individual transfer apparatus. Such hose shall be equipped with an approved shut-off nozzle. Fuel transfer nozzles shall be of self-closing type, designed to be actuated by hand pressure only. No notches or other devices shall be used for holding the nozzle valve handle in an open position. Such nozzle shall be equipped with a grounding cable complete with proper attachment for the aircraft to be serviced.
18. Electrical wiring, switches, lights and any other source of ignition, when located in compartment housing piping, pumps, air eliminators, water separators, hose reels and the like shall be enclosed in a vapor-tight housing. Any electric motor located in such a compartment shall be of a type approved for use in hazardous locations as specified in the latest edition of Philippine Electrical Code (PEC).

    "As-built" Electrical System design in compliance with the latest edition of PEC, NFPA 70, *National Electrical Code* and NFPA 780, *Standard for the Installation of Lightning Protection Systems*, signed and sealed by a Professional Electrical Engineer shall be provided.
19. Compartments housing piping and the like, pumps, air eliminators, water separators, hose reels, shall be adequately ventilated at floor level or within the floor itself.

    "As-built" Detailed Mechanical Design in compliance with latest edition of Mechanical Code of the Philippines/NFPA Standards, signed and sealed by a Professional Mechanical Engineer shall be provided.

20. Accessory Equipment shall conform to the following:

    a. Ladders constructed from non-combustible material may be used with, or attached to any aircraft refueller unit; provided that the manner of attachment or use of such ladder is approved and shall not in any occasion constitute any additional fire or accident hazard in the operation of such refueller unit.

    b. Hose reels used in connecting with any such refueller unit shall be constructed of noncombustible materials and shall be provided with a pacing gland or other device which will preclude fuel leakage between such reel and fuel manifold in connection therewith.

    c. Similar accessory equipment shall be of approved type.

21. Bonding and Grounding shall be as follows:

    a. Every transfer apparatus shall be metallically interconnected with the tank, chassis, axles and springs of every aircraft refueller unit.

    b. Every aircraft refueller unit shall be provided and maintained with a substantially heavy ground cable of sufficient length to be bonded to the aircraft to be serviced. Such cable shall be metallically connected to the transfer apparatus of chassis of the aircraft refueller unit on one and shall be provided with a suitable metal clamp on the other end, to be fixed to the aircraft.

    c. The ground cable shall be bare or have a transparent protective sleeve and be carried on a reel or in a compartment for no other purpose in such a manner that it will not be subjected to sharp kinks or accidental breakage under conditions of general use.

    d. Electrical System design in compliance with the latest edition of PEC, NFPA 70, *National Electrical Code* and NFPA 780, *Standard for Installation Lightning Protection Systems* signed and sealed by a Professional Electrical Engineer shall be provided.

B. **Refueller Units**

1. Design and Construction of Aircraft Refuellers shall conform to the following:

    a. Tanks and vehicles shall be designed and constructed in accordance with NFPA 385, *Tank Vehicles for Flammable Liquids*, and NFPA 407, *Aircraft Fuel Servicing Tank Vehicles.*

    b. Annual testing and certification of every system by a registered or licensed professional or government accredited testing company shall be required.

        1) If such transfer apparatus is operated by an individual unit of internal combustion motor type, such power unit shall be located as remotely as practicable from any pumps, piping, meters, air eliminators, water separators, hose reels, etc., and shall be housed in separate compartment from any aforementioned items; the fuel tank in connection therewith shall be suitably designed and installed and the maximum capacity shall not exceed nineteen liters (19 L) when such tank is installed on any such engine or in any compartment housing any such engine. The exhaust pipe, muffler and tail pipes shall be shielded.

        2) If operated with gears or chains, the gears, chains, shafts, bearings, housing and all parts thereof shall be of an approved design and shall be installed in a workman-like manner and so maintained.

        3) Flexible connections for the purpose of eliminating vibration may be permitted if the material used therein is designed, installed and maintained in an approved manner and provided such connections do not exceed six hundred ten millimeters (610 mm) in length.

2. Operations, Maintenance and Use of Aircraft Refueller Units shall conform to the following:

    In addition to all other applicable provisions of RA 9514 and its RIRR, the following regulations shall apply to the operations, maintenance, and use of aircraft refueller units.

    a. Aircraft-fueling vehicles and all related equipment shall be properly maintained and kept in good working condition. Accumulations of oil, grease, fuel and other

flammable or combustible materials are prohibited. Maintenance and servicing of such equipment shall be accomplished in approved areas. Minor adjustment and repairs may be made when necessary to move such units to the storage locations when failure occurs elsewhere on the airport or heliport.

b. Tanks, pipes, hoses, valves and other fuel delivery equipment shall be maintained leak free at all times.

c. Aircraft-fueling vehicles and related equipment which are in violation of this Rule shall be immediately defueled and removed from service and shall not be returned to service until proper repairs have been made.

d. Aircraft-fueling vehicles that are operated by a person, firm or corporation other than the permitee's authorized employee shall be provided with a legible sign visible from outside the vehicle showing the name of a person, firm or corporation operating such unit and signage conforming with.

3. Electrical System Design Plan in compliance with the PEC, NFPA 70, NEC on grounding protection systems shall be signed and sealed by a Professional Electrical Engineer.

a. Aircraft refueller units shall not be located, parked, or permitted to stand under any portions of an aircraft nor in any position where such unit could obstruct egress from aircraft should fire occur during fuel transfer operations.

b. Every aircraft refueller unit shall be electrically bonded to the aircraft being fueled or defueled and either the aircraft refueller unit or the aircraft shall be adequately grounded in approved manner. A drag chain and flexible ground conductor shall not be deemed to fulfill the requirements of this Section for grounding during fuel transfer.

c. Transfer nozzle shall be equipped with approved bonding conductors which shall be clipped or otherwise positively engaged with the bonding attachment provided on the aircraft adjacent to the fuel tank cap.

d. All bonding and ground connections required by this Section shall be made prior to any fuel transfer and shall not be disconnected until fuel transfer operations are completed.

e. During fuel transfer operations, qualified persons shall be in immediate control of each transfer nozzle and fuel pumping equipment to shut off or otherwise control the flow of fuel from the time fueling operations have begun until they are completed except for under wing refueling

f. Fuel transfer nozzle shall not be held in the open position by any device other than by direct hand pressure by the operator.

4. Aircraft refueller unit shall be attended and operated only by qualified personnel. Each qualified operator shall be required to carry his/her identification card and to submit documents issued by the employer certifying his/her qualifications to the BFP.

5. The fuel transfer hoses shall be properly placed on the approved reels, or in the compartment provided, or may be stored on top decking of refuellers; provided that rails of proper height are installed for security and protection of such equipment before any aircraft refueller unit is moved. Such transfer hose shall not be looped or dropped over any part of the refueller unit nor shall fuel transfer hose be dragged when such refueller unit is moved from fueling unit to another.

6. System Design Plan in compliance in latest edition of Philippine Mechanical Engineering Code (PMEC) shall be signed and sealed by a Professional Mechanical Engineer.

a. Every aircraft refueller unit and all equipment shall be maintained in a safe operating condition and in good repair at all times.

b. On finding any aircraft servicing equipment which is in use for fuelling operations to be defective or in a state of disrepair, and by reason of such defect or disrepair, the use of such aircraft servicing equipment constitutes an undue fire hazard, the C/MFM having jurisdiction shall order the use of such equipment discontinued until such repairs, replacements or such changes are made as necessary to render the same safe for continued use. No person shall use any such defective equipment until the same is rendered safe by the C/MFM having jurisdiction.

c. Each system shall be periodically inspected, checked and certified at least twice a year by a registered or licensed professional or an accredited testing company.

7. Loading and Unloading shall conform to the following:

   a. Aircraft refueller units shall be loaded only at an approved loading rack, except that when refueling aircraft, such unit may be loaded from the fuel tanks or the aircraft.

   b. The fuel cargo of any such unit shall be unloaded only by approved transfer apparatus into the fuel tanks of aircrafts, underground storage tanks or approved gravity storage tanks.

8. Standard Operating Procedures in accordance with NFPA Standards shall be provided.

   a. No person shall smoke or produce any open flame in the cabin of the aircraft or in the outside thereof within fifteen meters (15 m).

   b. A qualified employee of the air vehicle owner shall be responsible for ensuring that the passengers are not allowed to smoke when aboard the aircraft, nor while going across the ramp from the gate to such aircraft or vice-versa.

   c. Passengers shall not be permitted to linger about the plane but shall proceed directly from the loading gate and the aircraft, and vice-versa.

   d. Passenger loading stands shall be left in loading position until all fuel transfer operations are completed.

   e. Fuel transfer operations shall not be performed on the main exit side of any aircraft containing passengers.

9. No smoking or open flames shall be allowed within fifteen meters (15 m) from the point where fuel is being transferred nor shall any electrical or motor driven devices be connected from any aircraft at any time while refueling operations are in progress on such aircraft.

C. **Helistops**

1. Approval must first be obtained from the Civil Aviation Authority of the Philippines (CAAP) and C/MFM having jurisdiction before any helistops can be operated.

2. The touchdown area shall be surrounded on all sides by a clear area having a minimum average width of the roof level of four and six tenths meters (4.6 m) with no width less than one and a half meters (1.5 m).

3. Landing areas on the structures shall be so maintained as to confine any flammable liquid spillage to the landing area itself and shall be made to drain such spillage away from any exit or stairway.

4. Exit and stairways from helistops shall be maintained in accordance with Section 10.2.5.2 of this RIRR, except that all landing areas located on building or structures shall have two (2) or more exits. For landing platforms or roof areas less than eighteen and three tenths meters (18.3 m) in length, or less than one hundred eighty-six square meters (186 m^2) in area, the second exit may be a fire escape stair in accordance to Section 10.2.5.10 of this RIRR.

SECTION 10.2.19.2 FIXED GUIDEWAY TRANSIT AND PASSENGER RAIL SYSTEMS

A. **General**

1. Life safety from fire and fire protection requirements for fixed guideway transit and passenger rail systems, including, but not limited to, stations, trainways, emergency ventilation systems, vehicles, emergency procedures, communications, and control systems shall be in accordance with NFPA 130, *Standard for Fixed Guideway Transit and Passenger Rail Systems*.

2. The provisions under this Section shall not be applied to existing fixed guideway transit and passenger rail system, provided that no modification or renovation shall be undertaken that will increase hazardous condition where it is evident that a reasonable degree of safety is provided on existing structures in accordance with NFPA and other internationally accepted standards.

B. **Means of Egress**

1. General

The provisions for means of egress for a station shall comply with Division 5 of this Chapter and the paragraphs below.

2. Occupant Load

a. The occupant load for a station shall be based on the train load of trains simultaneously entering the station on all tracks in normal traffic direction plus the simultaneous entraining load awaiting trains.

1) The train load shall consider only one (1) train at any one track.

2) The basis for calculating train and entraining loads shall be the peak period ridership figures as projected for design of a new system or as updated for an operating system.

b. At multilevel, multiline, or multiplatform stations, occupant loads shall be determined as follows:

1) The maximum occupant load for each platform shall be considered separately for the purpose of sizing the means of egress from that platform.

2) Simultaneous loads shall be considered for all egress routes passing through each level of that station.

c. An area within a station intended for use by other than passengers or employees, shall apply the following parameters:

1) The occupant load for that area shall be determined in accordance with the occupancy as appropriate for the use.

2) The additional occupant load shall be included in determining the required egress from that area.

3) The additional occupant load shall be permitted to be omitted from the station occupant load where the area has independent means of egress of sufficient number and capacity.

3. Calculation of Platform Occupant Load

The platform occupant load for each platform in a station shall be the maximum peak period occupant load calculated according to the following:

a. The peak period occupant load for each platform shall be based on the simultaneous evacuation of the entraining load and the train load for that platform in the peak period.

b. The entraining load for each platform shall be the sum of the entraining loads for each track serving that platform.

c. The entraining load for each track shall be based on the entraining load per train headway factored to account for service disruptions and system reaction time.

d. Where a platform serves more than one (1) line on one track, the calculation of entraining load shall consider the combined effect of accumulation for each of the lines served.

e. The train load for each platform shall be the sum of the train loads for each track serving that platform.

f. The train load for each track shall be based on the train load per train headway factored to account for service disruptions and system reaction time.

g. The maximum train load at each track shall be the maximum passenger capacity for the largest capacity train operating on that track during the peak period.

C. **Capacity and Location of Means of Egress**

1. Platform Evacuation Time.

There shall be sufficient egress capacity to evacuate the platform occupant load from the station platform in four minutes (4 min) or less.

2. Evacuation Time to a Point of Safety.

The station shall be designed to permit evacuation from the most remote point on the platform to a point of safety in six minutes (6 min) or less. A point of safety is one of the following:

a. an enclosed exit that leads to a public way or safe location outside the station, trainway, or vehicle;

b. an at grade point beyond the vehicle, enclosing station, or trainway; or

c. any other approved location.

3. Point of Safety

a. For open stations where the concourse is below or protected from the platform by distance or materials as determined by an appropriate engineering analysis, that concourse shall be permitted to be defined as a point of safety.

b. For enclosed stations equipped with an emergency ventilation system and where the emergency ventilation system provides protection for the concourse from exposure to the effects of a train fire at the platform as confirmed by engineering analysis, that concourse is permitted to be defined as a point of safety.

4. Travel Distance

The maximum travel distance on the platform to a point at which a means of egress route leaves the platform shall not exceed one hundred meters (100 m).

5. Common Path of Travel

A common path of travel from the ends of the platform shall not exceed twenty-five meters (25 m) or one (1) car length, whichever is greater.

6. Alternate Egress

At least two (2) means of egress remote from each other shall be provided from each station platform as follows:

a. A means of egress used as a public circulation route shall be permitted to provide more than fifty percent (50%) of the required egress capacity from a station platform or other location.

b. Means of egress from separate platforms shall be permitted to converge.

c. Where means of egress routes from separate platforms converge, the subsequent capacity of the egress route shall be sufficient to maintain the required evacuation time from the incident platform.

D. **Platforms, Corridors, and Ramps**

1. A minimum clear width of one and twelve hundredths meters (1.12 m) shall be provided along all platforms, corridors, and ramps serving as means of egress.

2. In computing the means of egress capacity available on platforms, corridors, and ramps, three hundred millimeters (300 mm) shall be deducted at each sidewall, and four hundred fifty millimeters (450 mm) shall be deducted at platform edges that are open to the trainway.

3. The maximum means of egress capacity of platforms, corridors, and ramps shall be computed at eight hundred nineteen ten-thousandths (0.0819) person/mm-min.

4. The maximum means of egress travel speed along platforms, corridors, and ramps shall be computed at thirty-seven and seven tenths meters per minute (37.7 m/min).

5. The means of egress travel speed for concourses and other areas where a lesser pedestrian density is anticipated shall be computed at sixty-one meters per minute (61.0 m/min).

6. Stairs and escalators shall be permitted to be counted as contributing to the means of egress capacity in stations.

7. Stairs in the means of egress shall be a minimum of one and twelve hundredths meters (1.12 m) wide.

8. Capacity and travel speed for stairs and escalators shall be computed as follows:

a. Capacity – 0.0555 p/mm-min

b. Travel speed – 14.6 m/min (indicates vertical component of travel speed)

9. Escalators shall not account for more than a half (1/2) of the means of egress capacity at any one level except where the following criteria are met:

a. The escalators are capable of being remotely brought to a stop.

b. A portion of the means of egress capacity from each station level is stairs.

c. For enclosed stations, at least one (1) enclosed exit stair or exit passageway provides continuous access from the platforms to the public way.

10. In calculating the egress capacity of escalators, the following criteria shall be met:
    a. One escalator at each level shall be considered as being out of service.
    b. The escalator chosen shall be the one having the most adverse effect upon egress capacity.
11. Elevators meeting the requirements of NFPA 130 shall be permitted to account for part of the means of egress capacity in stations. Where elevators are counted as contributing to the means of egress capacity, the following shall apply:
    a. They shall account for no more than fifty percent (50%) of the required egress capacity.
    b. At least one elevator shall be considered out of service, and one elevator shall be reserved for Fire Service.
    c. The capacity of each elevator shall be the carrying capacity of the elevator within thirty minutes (30 min).

E. **Doors, Gates, and Exit Hatches, Fare Barriers, Turnstile-type Fire Barriers** shall be permitted as means of egress and computed in accordance with the requirements of NFPA 130.

F. **Means of Egress Lighting**

Illumination of the means of egress in stations, including escalators that are considered a means of egress, shall be in accordance with Section 10.2.5.11 of this RIRR.

G. **Fire Protection**

1. Enclosed stations shall be provided with a fire command center in accordance with Section 10.2.20.2 of this RIRR.
2. Stations equipped with fire alarm devices shall be protected by a proprietary supervising station alarm system as defined in accordance with Section 10.2.6.6 of this RIRR.
3. Each station having fire alarm initiating devices shall be provided with a fire alarm annunciator panel at a location that is accessible to emergency response personnel in accordance with Section 10.2.6.6 of this RIRR.
4. Automatic fire detection shall be provided in all ancillary spaces by the installation of combination fixed temperature and rate-of-rise heat detectors or smoke detectors except where protected by automatic sprinklers.
5. A public address system and emergency voice alarm reporting devices, such as emergency telephone boxes or manual fire alarm boxes conforming to Section 10.2.6.6 of this RIRR, shall be required in stations.
6. Emergency alarm reporting devices shall be located on passenger platforms and throughout the stations such that the travel distance from any point in the public area shall not exceed one hundred meters (100 m) unless otherwise approved.
7. An automatic sprinkler protection system shall be provided in areas of stations used for concessions, in high hazard storage areas, in trash rooms, and other similar areas with combustible loadings, except trainways.
8. Other fire suppression systems may be permitted upon approval of the C/MFM having jurisdiction.
9. Standpipe and Hose Systems. Class I standpipes shall be installed in enclosed stations in accordance with Section 10.2.6.8 of this RIRR, except as modified by NFPA 130.
10. Portable fire extinguishers shall be in accordance with Section 10.2.6.9 of this RIRR.

H. Emergency ventilation shall be provided in enclosed stations in accordance with NFPA 130. A mechanical emergency ventilation system shall be provided in an enclosed system station or in a system underground or enclosed trainway that is greater in length than three hundred five meters (305 m).

I. Emergency power shall be provided in accordance with latest edition of PEC, NFPA 70 and NFPA 110, for enclosed stations. Systems connected to the emergency power system shall include the following:

1. Emergency lighting
2. Protective signaling systems

3. Emergency communication system
4. Fire command center
5. Elevators providing required egress capacity

J. **Trainways' Emergency Egress**

1. The system shall incorporate a walk surface or other approved means for passengers to evacuate a train at any point along the trainway so that they can proceed to the nearest station or other point of safety.
2. The maximum distance between exits shall not exceed seven hundred sixty-two meters (762 m) within enclosed trainways.
3. Cross-passageways shall be permitted to be used in lieu of emergency exit stairways to the surface where trainways in tunnels are divided by a minimum of two-hour (2-hr) rated fire separations or where trainways are in twin bores. Where cross-passageways are utilized in lieu of emergency exit stairways, the following requirements shall apply:
   a. Cross-passageways shall not be farther than two hundred forty-four meters (244 m) apart.
   b. Cross-passageways shall not be farther than two hundred forty-four meters (244 m) from the station or portal of the enclosed trainway.
   c. Cross-passageways shall be separated from the trainway with self-closing fire door assemblies having a fire protection rating of one and a half (1.5) hours.
   d. A tenable environment shall be maintained in the portion of the trainway that is not involved in an emergency and that is being used for evacuation.
   e. A ventilation system for the incident trainway shall be designed to control smoke in the vicinity of the passengers.
   f. Provisions shall be made for evacuating passengers via the non-incident trainway to a nearby station or other emergency exit.
   g. The provisions shall include measures to protect passengers from oncoming traffic and from other hazards.
4. The means of egress within the trainway shall be provided with an unobstructed clear width graduating from six hundred ten millimeters (610 mm) at the walking surface to seven hundred sixty millimeters (760 mm) at one thousand five hundred seventy-five millimeters (1,575 mm) above the walking surface to four hundred thirty millimeters (430 mm) at two thousand twenty-five millimeters (2,025 mm) above the walking surface.
5. Cross-passageways shall be a minimum of one thousand one hundred twenty millimeters (1,120 mm) in clear width and two thousand one hundred millimeters (2,100 mm) in height.
6. The width of exit stairs shall not be required to exceed one thousand one hundred twenty millimeters (1,120 mm) for enclosed trainways.
7. Doors in egress routes serving trainways shall have a minimum clear width of eight hundred ten millimeters (810 mm).
8. Walkways that are more than seven hundred sixty millimeters (760 mm) above the floor or grade below shall be provided with a continuous guard to prevent falls over the open side and continuous handrail along the side opposite the trainway.
9. Raised walkways that are greater than one thousand one hundred twenty millimeters (1,120 mm) wide and located between two (2) trainways shall not be required to have a handrail.

K. **Signage, Illumination, and Emergency Lighting** in trainway shall be in accordance with Division 5 of this Chapter.

L. **Emergency Access** shall be in accordance with NFPA 70.

M. A **non-mechanical emergency ventilation system** shall be permitted to be provided in lieu of a mechanical emergency ventilation system in the following locations:

1. The length of the underground or enclosed trainway is less than or equal to three hundred five meters (305 m) and greater than sixty-one meters (61 m).
2. In an enclosed station where engineering analysis indicates that a non-mechanical emergency ventilation system supports the tenability criteria of the project.

N. **Emergency Ventilation Fans**. The ventilation system fans that are designated for use in fire and similar emergencies shall be capable of satisfying the emergency ventilation requirements to move trainway air in either direction as required to provide the needed ventilation response in accordance with NFPA 130.

SECTION 10.2.19.3 HISTORICAL BUILDINGS AND STRUCTURES ,AND HISTORIC CENTERS/HERITAGE ZONES

A. Conservation and maintenance of historical buildings and structures, and historic centers/ heritage zones shall be made in accordance with existing regulations and shall be afforded with applicable fire safety protection system in accordance with this Division.

B. No person, firm or entity, including any agency or instrumentality of government shall erect, construct, alter, repair, move, convert, or demolish any building or structure or cause the same to be done without first obtaining a clearance from the Local Government Unit (LGU), FSEC from BFP and Building Permit from the Local Building Official.

C. **Alteration and Restoration**

1. All buildings/structures classified under this category shall conform with the fire safety requirements applicable to its incumbent occupancy.
2. Should the conservation to be made will result to change of occupancy, the fire safety requirements to be applied shall be in accordance with its new occupancy type.

D. **Applicability of Fire Safety Measures**

1. Design and installation of fire protection system for historical buildings, structures and historic sites/heritage zones under conservation shall be in accordance with NFPA 914, *Code for Fire Protection of Historic Structures*, subject to its applicability to the approved conservation plan of the National Historical Commission of the Philippines (NHCP).
2. Buildings/structural components and finishings to be installed, restored, or replaced shall be so designed and/or treated with fire resistive materials.

SECTION 10.2.19.4 WIND TURBINE ENERGY GENERATING FACILITIES

A. **General**

1. The design, installation and maintenance of wind turbine energy generating facilities shall be in accordance with this Section, NFPA 850, *Recommended Practice for Fire Protection for Electric Generating Plants and High Voltage Direct Current Converter Stations* and internationally accepted standards
2. The recommendations of Chapters 4, 5, 6, 7, 15 and 16 of NFPA 850, shall apply to wind generating facilities.
3. The Fire Protection Design for wind turbine generating facilities shall be based on the specific hazards that exist in the facility and the level of acceptable risks for the facility.

B. **General Design and Equipment Arrangement**

1. Separation shall be provided between the following:
   a. Adjacent wind turbine units consistent with land and wind topography constraints
   b. Adjacent structures or exposures, including transformers
   c. Adjacent properties (e.g., aboveground pipelines, tank farms, or natural gas facilities that could present a severe exposure)
2. Consideration shall be given to equipment layout that is adjacent to wind turbines and in line with the planes of the rotating blades and hub in typical wind conditions that have a higher potential for damage from flying debris (such as blade sections on overspeed).

C. **Unattended Facilities**

1. Wind farms, located in remote areas that are unattended in a long period of time and timely access to towers and nacelles are not usually acceptable, shall be provided with special fire protection.
3. To address delayed response, lack of communication and access, additional fire protection measures shall be provided.
3. Remote annunciation of fire-signaling systems shall be provided to one (1) or more constantly attended locations for emergency response use.

D. **Wind Generating Facilities**

1. General

   a. The installation and operation of wind turbine generating facilities shall be in accordance with standard practices of the industry, except as modified by hereunder provisions.

   b. Site-specific considerations or a manufacturer's typical layout shall govern wind turbine generating facility design, including wind turbine design, tower design and heights, tower foundations, power output, and load control circuitry.

   c. In the event of a problem with a wind turbine generator, automatic shutdowns shall be provided. Different methods of equipment shutdown and isolation that are operating independently shall be provided.

2. Prevention of Fires in Wind Turbine Generating Facilities

   a. Gearboxes and lubricating oil sumps, pumps, coolers, filters, and associated piping shall be in accordance with Section 10.3.7.5 of this RIRR and NFPA 30, *Flammable and Combustible Liquids Code*. Piping systems supplying flammable and combustible liquids shall be designed to minimize hydraulic and lubricating oil piping failures as follows:

      1) If rigid metal piping is used, it shall be designed with freedom to deflect with the gearbox, in any direction, at the interface with the gearbox. This provision shall also apply to hydraulic lines that are connected to accessory gearboxes or actuators mounted directly in the nacelle. In high vibration areas, properly designed metallic hose for hydraulic and lube oil lines shall be used.

      2) Rigid piping connected directly to the gearbox shall be supported such that failures will not occur due to the natural frequency of the piping coinciding with the rotational speed of the gearbox, drive shaft and hub, and generator. Pipe supports shall be designed to avoid vibrations induced by other equipment that can excite its natural frequency.

      3) Pipe joints shall be welded. Threaded couplings and flange bolts in oil piping shall be assembled using a torque wrench and torqued to the manufacturer's requirements. Threaded fittings shall have a positive locking device to prevent unscrewing.

      4) Instrumentation tubing, piping, and gauges shall be protected from accidental mechanical damage. Sight glasses shall be listed.

      5) Lubricating oil lines shall use guarded pipe construction with the pressure feed line located inside the return line. Where guarded pipe construction is not used, piping sleeves shall be used to reduce the possibility of oil atomization. All mechanical connections shall be guarded.

      6) Containment and drainage shall be provided to minimize the spread of oil within the nacelle or externally, which poses a risk to equipment or personnel below.

      7) Fluid piping shall be routed below all electrical equipment to preclude leaked fluid dripping on the equipment.

   b. For wind turbine generators, the following monitors and/or trip functions shall be provided to safely monitor the operation of wind turbine generators and initiate a safe shutdown of abnormal operating conditions or parameters:

      1) Grid disturbance

      2) Yaw errors or limits

      3) Braking issues

      4) Abnormal vibration

      5) Overspeed (including wind conditions)

      6) Temperature faults

      7) Oil condition (gearbox/lubrication and hydraulic)

      8) Motor protection

      9) Loss of communication between modules or with control center

      10) Blade angles and battery status

c. For gearbox lubrication, a listed fire-resistant fluid shall be used. System designs shall reflect a design objective to minimize the amount of oil needed and the amount of piping and associated components outside of the gearbox.

d. Hydraulic control systems shall use a listed fire-resistive hydraulic fluid. System designs shall reflect a design objective to minimize the amount of hydraulic fluid needed and the amount of piping and associated components required.

e. Electrical power delivery and control systems, as well as communications systems, including cabling, wiring, insulation, fans/motors, and cabinetry, shall meet the applicable industry design standards for the use intended and duty cycle specified. Such standards shall be applied to systems within the nacelle and tower as well as those associated with moving power from the wind turbine units to the grid. Electrical equipment shall consist of listed arc resistant switchgear.

f. The plant design shall include features that address the exposures posed by dry type transformers or transformers filled with a listed less-flammable fluid insulating oil. If the transformers are not dry type, the design shall consider the transformer location, containment of oil, spacing from other objects, including the tower, and the use of barriers and fixed protection. Step-up transformer installations shall reflect a proper evaluation of the exposure created with respect to other transformers as well as wind farm support structures. Barrier walls shall be constructed, to control exposures created with respect to other transformers and wind farm support structures. Batteries, as a back-up power in the nacelle and hub of a wind turbine proper, and other support structures (e.g., control rooms), shall be provided with adequate ventilation and shall be kept clean.

g. Lightning protection for blades, nacelles, towers, power lines, transformers, and support structures shall be provided in accordance with International Electrotechnical Commission (IEC) TR 61400-24, *Wind Turbine Generator Systems—Part 24, Lightning Protection*.

h. Materials of construction shall be noncombustible or less-flammable materials. Nacelles, towers, operations and maintenance/control buildings, and other support structures such as relay houses, switch yard control buildings, and power conditioning buildings, shall be constructed with noncombustible or less-flammable materials.

i. Shield(s) shall be provided to isolate large quantity of sparks from high speed brakes from combustible equipment components and locations where leaked combustible fluids can accumulate.

3. Fire Protection for Wind Generating Facilities

a. General

1) Fire detection and alarm systems shall be provided in the wind turbine and tower, power delivery and control circuits, nacelles, electrical equipment enclosures, and buildings. The systems shall be arranged to activate alarms at a constantly attended location or via the provision of remote operator circuits.

2) Automatic Fire Suppression Systems (AFSS) shall be provided in the wind turbine and tower, power delivery and control circuits, nacelles, electrical equipment enclosures, and buildings.

3) Wind turbine safe shutdown sequence/procedures for wind generating facilities shall be submitted to the C/MFM having jurisdiction.

4) If the design of a particular facility use water-based fire protection systems, these systems shall be in accordance with Chapter 7 of NFPA 850 and other internationally accepted standards.

b. Total Flooding Gaseous Systems

1) Where total flooding gaseous systems are used, electrical enclosures, cabinets, or buildings shall be arranged for minimum leakage by automatic closing of ventilation dampers and doors, as applicable, and automatic shutdown of fans.

2) Records of maintenance and inspection of total flooding gaseous agent systems and interlocked equipment shall be reflected in the FSMR.

3) For electrical enclosures or cabinetry located in buildings or other such structures, provisions shall be addressed for safely removing the gas and potential toxic combustion by-products from these structures following system actuation.

c. Total Flooding Water Mist Systems

1) Where total flooding water mist systems are used, the system shall be installed in accordance with NFPA 750, *Standard on Water Mist Fire Protection Systems*, and shall be listed for the application. The system shall be installed in accordance with the manufacturer's installation procedures.

2) Electrical enclosures, cabinets, and buildings shall be arranged for reduced leakage by automatic closing of doors, ventilation dampers, and automatic shutdown of fans.

3) The water (and agent) supply shall be sized to be capable of providing protection for as long as the hazards above the auto-ignition temperature exist. The system shall be listed and sized for the application.

d. Compressed Air Foam Systems

1) Where compressed air foam systems are used, the system shall be installed in accordance with NFPA 11, *Standard for Low-, Medium-, and High-Expansion Foam*, and shall be listed for the application. The system shall be installed in accordance with the manufacturer's installation procedures.

2) The water (and agent) supply shall be sized to be capable of providing protection for as long as the hazards above the auto-ignition temperature exist. The system shall be listed and sized for the application.

e. Nacelle Fire Protection

1) Automatic fixed fire protection shall be provided within the nacelle of a wind turbine generator.

2) For sealed electrical enclosures and cabinets, discharge rates and duration shall be such that cooling and shutdown occur to prevent re-ignition of the fire. System operation shall be arranged to coincide with automatic shutdown of the wind turbine and the positioning of local application nozzles shall be such that maintenance access to the wind turbine components within the nacelle is maintained.

3) For unsealed electrical enclosures and cabinets within the nacelle and tower, a local application system shall be installed. Likewise, for the gearbox lubrication system or hydraulic control system, a local application extinguishing system shall be installed. Fire extinguishing systems for hydraulic control equipment shall include protection of reservoirs, pumps, accumulators, piping, and actuating systems. Listed systems shall be used.

E. **Electrical Equipment Enclosures and Buildings**

1. Control enclosures, which contain control panels, switchgear, batteries, relays, rectifiers, and electronic switching circuits, shall be provided depending on the size and complexity of the wind generating facility site.

2. Auxiliary electrical equipment enclosures, which may contain excitation equipment, switchgear, current transformers, potential transformers, grounding transformers, and other electrical equipment, shall be provided.

3. A smoke detection system shall be installed to provide early warning and alarm functions in the event of an electrical fire within the enclosure.

4. An automatic suppression system shall provided for the enclosures.

SECTION 10.2.19.5 IMMOBILIZED VEHICLE AND VESSELS

A. Any house trailer or similar vehicle, railroad car, street car, truck or bus from which the wheels have been removed, provided with a permanent-type foundation, or otherwise fixed so that it is not mobile shall be considered as a building and shall be subject to the requirements of this Rule which are applicable to buildings of similar occupancy.

B. Any ship, barge, or other vessel, which is permanently moored or aground and is occupied for purposes other than navigation, shall be subject to the requirements of this Rule applicable to buildings or similar occupancy.

SECTION 10.2.19.6 MOTION PICTURE AND TELEVISION PRODUCTION, STUDIO SOUNDSTAGES AND APPROVED PRODUCTION FACILITIES

A. **General**

1. Applicability
   a. This Section address fire protection, property protection, and life safety in motion picture and television industry soundstages, approved production facilities, and production locations.
   b. Practices, processes, materials, and facilities that are addressed by other Section of RA 9514 and its RIRR shall be governed by those standards unless modified herein.
   c. This Section shall apply to the following:
      1) New buildings, or portions thereof, used as soundstages or approved production facilities in motion picture and television industry productions.
      2) Existing buildings, or portions thereof, used as soundstages or approved production facilities in motion picture and television industry productions to the extent specifically required by other portions of this document
      3) Additions to buildings used as soundstages or approved production facilities in motion picture and television industry productions
      4) Alterations, modernizations, or renovations of existing buildings used as soundstages or approved production facilities in motion picture and television industry productions
      5) Existing buildings, or portions thereof, upon change of occupancy for use as soundstages or approved production facilities in motion picture and television industry productions
      6) Production locations used in motion picture and television industry productions.
   d. Existing soundstages, approved production facilities, and production locations that are in accordance with requirements of the previous IRR at the time of the adoption of this Section shall be permitted to remain in use under the following conditions:
      1) The occupancy classification and use remain the same.
      2) No serious hazards to life safety exist that would constitute an imminent threat.
2. An FSC shall be secured from C/MFM having jurisdiction.
3. Standby BFP personnel shall be provided for soundstages, approved production facilities and production locations where pyrotechnic special effects are used and for hazardous operations, other than pyrotechnic special effects. In any case, members of the production company fire brigade shall also be deployed on standby.
4. Fire department access shall be maintained as required by the C/MFM having jurisdiction.
5. Smoking shall be prohibited on soundstages, approved production facilities and production locations. However, smoking shall be allowed when it is a necessary part of a performance, and only when the smoker is a member of the cast.
6. Housekeeping shall be maintained in soundstages, approved production facilities and production locations, in accordance with Chapter 10, *General Safety Requirements* and Chapter 19, *Combustible Waste and Refuse* of NFPA 1, *Fire Code*, where applicable.
7. Pyrotechnic Special Effects and Open Flames
   a. The use of pyrotechnic special effects and open flames shall be subject to the approval of the C/MFM having jurisdiction.
   b. Where audience is present on set, the use of pyrotechnic special effects and open flames shall be regulated in accordance with NFPA 1126, *Standard for the Use of Pyrotechnics Before a Proximate Audience* and NFPA 160, *Standard for the Use of Flame Effects Before an Audience*.

B. **Soundstages and Approved Production Facilities**

1. An FSC shall be obtained for any of these activities:
   a. Use of pyrotechnic special effects;
   b. Use of open flames;
   c. Welding;

d. Use of flammable or combustible liquids or gases;

e. Use of aircrafts;

f. Presence of motor vehicles within a building;

2. Decorative Materials

a. Foamed plastic materials used for decorative purposes, scenery, sets, or props shall have a heat release rate not exceeding one hundred kilowatts (100 kW) where tested in accordance with UL 1975, *Standard for Fire Tests for Foamed Plastics Used for Decorative Purposes*, or where tested in accordance with NFPA 289, *Standard Method of Fire Test for Individual Fuel Packages* using the twenty kilowatts (20 kW) ignition source.

b. Combustible drapes, drops, and any other similar combustible hangings or vertically placed materials shall comply with one of the following options:

1) The materials meet the requirements of NFPA 701, *Standard Methods of Fire Tests for Flame Propagation of Textiles and Films*.

2) The materials exhibit a heat release rate not exceeding one hundred kilowatts (100 kW) when tested in accordance with NFPA 289 using the twenty kilowatts (20 kW) ignition source.

3) The materials are present in such limited quantity that a hazard of fire development or spread is minimal.

4) The materials are approved by the C/MFM having jurisdiction to exhibit acceptable fire performance.

5) Approved interim measures are provided for the period during which the combustible materials are present.

c. Cut greens shall be treated with an approved fire retardant, and the process shall be repeated as often as necessary to maintain its effectiveness.

3. Electrical Requirements

a. Electrical equipment, wiring method to electrical distribution equipment shall be in accordance with the latest edition of PEC.

b. Soundstages and approved production facilities shall be provided with a minimum of three hundred seventy-seven watts per square meter (377 W/m^2) dedicated for production lighting and power.

c. The electrical distribution equipment used shall comply with UL 1640, *Standard for Portable Power-Distribution Equipment* and with the latest edition of PEC.

d. The location of portable, mobile, or stationary power-generating equipment shall be subject to the approval of the C/MFM having jurisdiction.

e. Exterior penetrations shall be located near the pre-designated location for portable and mobile power-generating equipment.

f. Auxiliary power cables supplied from mobile generators or adjacent buildings shall not be routed through fire-rated windows and doors.

g. Portable feeder cables shall be allowed to temporarily penetrate fire-rated walls, floors, or ceilings, provided that all of the following apply:

1) The opening is of noncombustible material.

2) When in use, the penetration is sealed with a temporary seal of an approved firestop material.

3) When not in use, the opening shall be capped with a material of equivalent fire rating.

h. Where the penetration utilizes a conduit, metal-threaded caps shall be attached to the pipe by means of chain or cable and shall effectively cap the conduit when not in use.

i. The lighting equipment used shall comply with UL 1573, *Standard for Stage and Studio Luminaires and Connector Strips* and the provisions of the latest edition of PEC.

4. Means of Egress

a. Means of egress and exit detail capacities shall be in accordance with Section 10.2.8.2 of this RIRR.

b. The maximum travel distance to an exit within the soundstage shall be forty-five meters (45 m).

c. Soundstage and approved production facilities shall have an aisle along the perimeter of the soundstage or facilities and shall maintain an unobstructed height of two and one tenth meters (2.1 m).

d. A soundstage or approved production facility with a gross area not exceeding one hundred thirty-nine square meters (139 m^2) shall be exempt from the perimeter aisle requirement provided that there is a minimum of two (2) exits.

e. Emergency lighting shall be provided for the means of egress in accordance with Section 10.2.5.11 of this RIRR

f. Any door in a required means of egress from an area having an occupant load of one hundred (100) persons or more shall be allowed to be provided with a latch or lock only if it is panic hardware or fire exit hardware.

g. Means of egress shall be kept clear of obstructions and tripping hazards.

h. When an audience is present, an announcement shall be made notifying the audience of the following:

1) The location of exits to be used in case of fire or other emergency

2) The means that will be used to notify the audience of fire or other emergency.

5. Fire Protection

a. Extinguishment Requirements

1) Existing soundstages and existing approved production facilities equipped with automatic sprinkler systems shall be in accordance with Section 10.2.6.7 and Section 10.2.8.8 of this RIRR and NFPA 13,

2) A new soundstage or new approved production facility shall be equipped with an approved, supervised automatic sprinkler system in accordance with Section 10.2.6.7 and Section 10.2.8.8 of this RIRR and NFPA 13.

a) The requirements of NFPA 13, prohibiting obstructions to sprinkler discharge shall not be applicable if approved mitigation is employed.

b) The requirements of NFPA 13, prohibiting obstructions to sprinkler discharge shall not be applicable if the building sprinkler system meets the design criteria for Extra Hazard, Group 2 Occupancies of NFPA 13.

3) Portable fire extinguishers shall be installed and maintained in accordance with Section 10.2.6.9 of this RIRR.

b. Fire alarm system notification appliances within soundstages and approved production facilities shall be allowed to be deactivated with the approval of the C/MFM having jurisdiction during videotaping, filming, or broadcasting of programs provided the following conditions exist:

1) In the event of alarm system activation, notification appliances shall activate at a location that is constantly attended during the videotaping, filming, or broadcasting of programs.

2) The attendants of the location shall be provided with a means of communicating with the fire command center for the building, where one is provided, and with the occupants of the soundstage to initiate emergency action.

3) Deactivation of notification appliances shall cause activation of a visual signal at an approved location, which shall remain illuminated while notification appliances on the soundstage are deactivated.

4) The visual signal shall be identified by a sign that shall read, **"WHEN ILLUMINATED, SOUNDSTAGE FIRE ALARM SYSTEM NOTIFICATION APPLIANCES ARE DEACTIVATED."**

c. Heating, Ventilating and Air-conditioning ductwork and related equipment shall be in good working order and shall be in accordance with Section 10.2.7.2 of this RIRR.

C. **Production Locations**

1. An FSC shall be obtained from the C/MFM having jurisdiction, for any of the following activities:

a. Use of the site as a production location;

b. Use of pyrotechnic special effects;

c. Use of open flames;

d. Welding;

e. Use of flammable or combustible liquids or gases;

f. Use of aircraft; or

g. Presence of motor vehicles within a building.

2. Foamed plastic materials used for decorative purposes, scenery, sets, or props shall have a heat release rate not exceeding one hundred kilowatts (100 kW) when tested in accordance with UL 1975, or where tested in accordance with NFPA 289, using the twenty kilowatts (20 kW) ignition source.

3. Electrical Requirements

a. Electrical power connections made on the site shall be installed by an electrical practitioner.

b. Portable cables shall be positioned to allow for emergency egress as approved by the C/MFM having jurisdiction.

c. Auxiliary power cables supplied from mobile generators or adjacent buildings shall be allowed to be routed through fire-rated windows and doors with the approval of the C/MFM having jurisdiction.

d. Where power from both mobile generators and site electrical services are used to energize equipment in the same proximate location at production locations, grounds for the two systems shall be bonded in accordance with the latest edition of PEC.

4. The production location shall be provided with means of egress appropriate for the intended use.

5. Fire Protection

a. Building areas used as production locations shall be designed, constructed, and maintained to protect the occupants not intimate with the initial fire development for the time needed to evacuate, relocate, or defend in place.

b. Any production location building protected by an existing automatic sprinkler system, where solid or hard-ceiling sets or platforms are introduced to create an obstruction to sprinkler discharge, shall be in accordance Section 10.2.6.7 of this RIRR.

c. Prohibiting obstructions to sprinkler discharge shall not be applicable if approved mitigation is employed in accordance Section 10.2.6.7 of this RIRR.

d. Prohibiting obstructions to sprinkler discharge shall not be applicable if the building sprinkler system meets the design criteria for Extra Hazard, Group 2, as defined in NFPA 13.

e. Automatic sprinkler systems, where provided, shall be maintained in accordance with Section 10.2.6.7 of this RIRR.

f. Portable fire extinguishers shall be provided as required in accordance with Section 10.2.6.9.

g. Hydrants, standpipes, and fire department connections shall not be obstructed, blocked, or rendered inoperable.

SECTION 10.2.19.7 OFF-SHORE ENERGY FACILITIES

A. **Specific Facility Protection**

All off-shore energy facilities shall be provided with appropriate fire safety measures under this Section or equivalent protection in accordance with internationally accepted standards and good design and engineering practices.

1. Wellhead Areas

a. The wellhead area, including wellheads, flow-lines, manifolds (when located on the wellhead side of the blast division), etc., shall be regarded as a single fire area to be covered by a deluge system, unless physical separation is provided to sub-divide it into separate areas.

b. Dedicated Equipment Protection shall be required for wellheads that are likely to convey hydrocarbons.

c. The deluge system shall cover all wellheads.

d. The deluge valve and water supply shall be sized for the maximum number of wellheads anticipated to convey hydrocarbons.

e. The system nozzle connections shall initially be plugged for new projects where the number and location of hydrocarbon wellheads are not known.

f. As wellheads are identified to likely convey hydrocarbons, the plugs shall be replaced with nozzles intended for use as identified in the design.

g. The types and location of nozzles shall be selected to avoid any interference with the drilling sequence, work-overs, maintenance, etc.

h. A minimum of two (2) nozzles per wellhead shall be installed and positioned to spray upwards from low level to protect the lower region of the wellhead, thereby increasing protection to the upper portions of the wellhead and surrounding equipment.

i. Flow-lines and manifolds not protected shall be provided with area protection.

j. Fixed and/or fixed automatic oscillating monitors may be used to apply water to specific targets, protect firefighters and escape routes, and cool areas at the boundary of the fire affected area. Monitors may be used simultaneously with any deluge system to prevent escalation by means of discretionary boundary cooling or to protect personnel.

2. Flare Knockout Drum.

   Passive Fire Protection shall be the primary protection technique.

3. Riser Isolation Valving and Pipe Work

   a. Protection of risers, riser isolation valving and cross-platform interconnecting pipe work shall be defined during the Fire Hazard Assessment.

   b. Passive Fire Protection shall be selected for riser elements essential to the integrity of the riser outboard of the Emergency Shutdown (ESD) valve (including the ESD valve itself.)

   c. Deluge or automatic monitor protection of cross-over piping inboard of the riser ESD valve shall be provided on all manned facilities, except those where a temporary refuge is located on an adjacent bridge-linked facility.

   d. Deluge or automatic fixed firewater protection of cross-over pipeline inter-connections on multi-platform facilities shall be installed where fire or explosion will not threaten the main areas used to muster personnel and where manual systems can be applied to contain an incident.

4. Process Areas

   a. A process area shall, wherever practicable, be regarded as a single fire area unless physical separation is provided to sub-divide it into different deluge zones.

   b. For modules/areas (e.g., integrated naturally ventilated decks) where a fire is likely to trigger deluge in the adjacent fire areas, and hence place additional demand on the firewater system, consideration shall be given to sub-dividing the system on each level to allow partial isolation, thus permitting efficient deployment of firewater.

   c. Equipment Protection shall be provided to low-pressure vessels if there is the likelihood of a Boiling Liquid Expanding Vapour Explosion (BLEVE) type failure of the vessel.

   d. Vessels containing a small quantity of flammable liquid or gas may not require Equipment Protection deluge, provided there is Area Protection and it is demonstrated that ignited releases of hydrocarbon from the vessel do not jeopardize the integrity of critical safety equipment.

   e. For vessels containing a small quantity of flammable liquid or gas, monitors shall be provided to supplement the area deluge system.

   f. If pipe work or vessels containing hydrocarbons are located in, or pass through, the beam space, then additional spray heads shall be located above such pipes or vessels.

   g. Deluge systems shall not be specified to prevent escalation of jet fires.

5. Drilling Module and Substructure

   a. The fire protection design philosophy for drilling module and substructure shall consider the requirements for personnel, structural and equipment protection.

b. A deluge system and/or fixed monitors shall be provided in the drill floor area to protect personnel from radiated heat; equipment that may be used to control the well (e.g., blowout preventer control panel, choke/kill manifold, doghouse); and the "Poor Boy" degasser.

c. Automatic deluge systems protecting the drilling module and drilling substructure may be taken out of automatic mode to allow manual operation at the drilling supervisor's discretion, either at the local deluge valve or by the actuation of a suitably located electrical or pneumatic shielded push-button.

6. Structural Protection

a. All the primary load-bearing structural steelwork (with the exception of that essential to the support of a Temporary Refuge) in process and wellhead areas, or in any area that contains a significant fire hazard, may be protected either by deluge or Passive Fire Protection (PFP). If deluge is used, it shall be installed to avoid local damage.

b. Structures essential to the integrity of the Temporary Refuge (TR) and Evacuation Escape and Rescue (EER) facilities (e.g., lifeboat launching, helideck and muster platform) shall be protected by PFP.

c. For structural protection, deluge systems shall use either medium/high-velocity sprayers or specialized nozzles (e.g., incorporating a narrow spray pattern to reduce wastage).

d. The water application rate for plant and primary load-bearing structural steelwork shall be at least ten and two tenths liters per minute per square meter (10.2 L/min/m^2) over the surface area of the structural member.

e. Spray heads shall be located on the side of the steelwork facing the area protected by the deluge system supplying the spray heads.

f. In the case of a structural member located entirely within the protected area, spray heads shall alternate on either side of the member to achieve the discharge density over the wetted area.

7. Helideck

a. Fire protection system

1) If the Fire Explosion Strategy identifies that a fire protection system is required for a helideck, then the fire protection and firefighting system shall be designed as per the requirement of Civil Aviation Authority of the Philippines (CAAP) or other Internationally Accepted Standards.

2) Positions shall be allocated on or near the helideck to be called the **"HELICOPTER LANDING OFFICER'S (HLO) POSITIONS"**:

a) HLO positions shall be the focal point for firefighting and control actions during an emergency;

b) HLO positions shall be identified on the Installation Safety Plan;

c) There shall be two (2) HLO positions, each located adjacent to foam monitor and may form part of a helideck access platform;

d) HLO position is not required to be adjacent to each monitor if three (3) or more monitors are installed;

e) A firewater pump start switch shall be located at each HLO position; and

f) A control valve shall also be located at each HLO position to allow the HLO to start and stop all helideck firefighting monitors from this location.

b. Foam system

1) Foam system for fire protection and firefighting at the helideck may be the Fixed Monitor System (FMS) or Deck Integrated Foam Firefighting System (DIFFS).

2) Compressed Air Foam (CAF) System shall be the preferred means of protecting the helideck of Normally Unmanned Installation (NUI).

3) The foam system shall be able to be initiated from nominated HLO positions.

4) The firewater pump shall be able to be started from at least two (2) separate positions, including any nominated HLO positions.

5) Each helideck foam monitor shall be supplied with firewater/foam solution via a dedicated foam storage tank.

6) Each dedicated foam tank shall be:
   a) capable of supplying at least ten minutes (10 min) foam concentrate to the associated helideck monitor;
   b) sized to provide foam solution quantity to extinguish or control all likely helideck incident scenarios;
   c) located adjacent to the monitors;
   d) provided with a manually operated control valve located immediately upstream of the foam tank at the HLO's position;
   e) suitably sized to permit the operation of all the helideck monitors at the same time.
7) Control valves shall be clearly marked and accessible.
8) If the foam tanks are remote from the monitors, the control valve shall be a manually remote-operated pneumatic control valve.
9) Pneumatic control valves shall be located within a cabinet, manufactured from materials that take into account the operating environment
10) Each cabinet shall incorporate a non-lockable front access door and shall be clearly marked, **"FOAM MONITOR CONTROL CABINET"**. The duty firewater pump start switch may also be located within the cabinet.
11) Back air supply for the pneumatic control valve shall be provided via a stainless steel air reservoir in the event of loss of offshore facility's air pressure.
12) The air reservoir shall be sized to open and close the valve three (3) times and have a minimum volume of ten liters (10 L).
13) The air reservoir shall be connected to the offshore facility's instrument air supply
14) On offshore facilities without an instrument air supply or on unmanned offshore facilities, the helideck foam monitors (if installed) shall be locally controlled by the manual operation of a valve located upstream of the foam tank.
15) Water for the foam system and monitors shall be supplied via a firewater sub-main located under the helideck, incorporating isolation valves to ensure firewater supply from two (2) directions.
16) Block valves that isolate the helideck firewater sub-main from the helideck foam storage facilities shall be fire-safe.

c. Monitors
   1) Monitors for foam systems shall be water-powered, automatically oscillating, and have a low-profile design.
   2) Monitors shall be spaced around the perimeter of the helideck taking into account the orientation of the offshore facility and worst-case wind conditions. If three (3) monitors are installed, each shall be capable of projecting a minimum of fifty percent (50%) of the total foam solution demand, with the discharged foam reaching to the far side of the helicopter landing area under the worst anticipated wind conditions.
   3) Monitors shall be positioned so that when in operation, the water jets do not impede the escape of passengers from the helicopter.
   4) Monitors shall use a constant-flow nozzle to prevent the foam concentrate pick-up rate varying with firewater flow rate. The nozzle "K" factor shall match the Pelton Wheel characteristics.

8. Pipe work and fittings
   a. The inlet and discharge flanges of the foam system shall terminate at a common skid edge, suitable for connection to horizontal pipe work.
   b. The discharge flange shall be positioned such that the drainage of the tank through the pump and check valve is prevented.
   c. The Pelton Wheel driven pump discharge line shall incorporate a relief valve arrangement that is sized to discharge foam concentrate back to the bottom of the tank when pumping against a closed valve.
   d. The pump discharge pipe work shall incorporate a pressure gauge and check valve.

e. The firewater inlet line to the Pelton Wheel shall incorporate a pressure gauge, filter and isolation valve.

f. All pressure gauges shall be liquid filled, have a one hundred millimeters (100 mm) face with Monel trim, incorporate an isolation valve and be mounted so that the effects of vibration are eliminated.

g. The pipe work between the tank and the pump shall incorporate an isolation valve and a flushing connection.

h. The Manufacturer/Supplier shall incorporate a throttling valve on the pump line to permit minor adjustments. The throttling valve shall have a removable handle and shall be capable of being locked into position.

9. Pump and gearbox

a. The pump shall be of the gear-type positive displacement design.

b. The pump shall be of proprietary design and manufacture and shall be suitable for use in an exposed marine environment when permanently filled with AFFF concentrate.

c. The pump shall be designed to run with the foam tank empty and the Manufacturer/Supplier shall state the operating life of the pump when running under this condition.

d. The foam concentrate pump shall meet the requirement of NFPA 20, *Standard for the Installation of Stationary Pumps for Fire Protection*.

10. Foam storage tanks

a. Foam storage tanks shall be constructed of Glass Reinforced Plastic (GRP), e.g., isophthalic polyester fiberglass.

b. Orthophthalic polyester fiberglass composites and/or room-temperature-cured epoxy systems shall not be used.

c. Foam tanks shall have the following fittings:

1) inspection opening [min. clear inside diameter is one hundred fifty millimeters (150 mm), incorporating lockable hinged cover and vent arrangement. Material of cover to be stainless steel 316 or same as tank body;

2) clear isophthalic polyester strip moulded into tank to act as level gauge;

3) one hundred millimeters (100 mm) diameter filling connection with anti-froth tube and quick-release cap in stainless steel;

4) drain connection;

5) relief valve return line (anti-froth).

11. Skid

a. Complete foam tank assemblies shall be mounted on a skid of compact design to suit the footprint space available.

b. Overall skid height shall not exceed one meter (1 m) to allow installation on the access platform adjacent to the helideck.

c. The Manufacturer/Supplier shall ensure that skids and all ancillary equipment are designed in accordance with the specified lifting and transportation requirements.

d. Lifting and fixing eyes shall also be provided.

e. A nameplate/instruction plate of corrosion-resistant material (e.g., austenitic stainless steel or cast bronze) shall be provided and secured in a prominent position on each skid.

f. The following information shall be displayed on the nameplate:

1) manufacturer's name and/or identification mark;

2) tank capacity;

3) type of concentrate; and

4) any start-up instructions.

12. Accommodation Areas

a. The Fire and Explosion Strategy shall identify the Active Fire Protection requirement for accommodation areas.

b. The following shall be the typical methodology for protection of accommodation areas:

1) Corridors and stairwells shall be provided with automatic sprinklers, water hose reels and water extinguishers.

2) Fire doors in corridors shall have magnetic latches released upon a change in platform status;

3) Cabins - automatic sprinklers;

4) Offices/Public Rooms/Sick Bay - automatic sprinklers;

5) Public rooms are provided with water extinguishers;

6) Galley - automatic sprinklers and CO2 extinguishers are provided. The deep fat fryer is provided with a drop-down lid held open by a fusible link;

7) Galley hood/extract duct - Local carbon dioxide extinguishing system; and

8) Radio/Switchgear/Telecom Equipment/HVAC Plant Rooms – CO2 extinguisher.

B. **Firefighting Equipment**

1. Hydrants

a. The following points shall be considered when locating hydrants:

1) the provision of safe access to and deployment of equipment from hydrants under all fire conditions;

2) hydrants shall be located so that not more than two hose lengths need to be deployed from any hydrant in order to allow ease of hose handling and speed of response;

3) hydrants shall be located outside, or on the periphery of, areas in which the discharge equipment they serve needs to be used;

b. If hydrants and ancillary equipment are designed to back up fixed systems, they shall not be supplied from the same section of the fire main as the fixed system (e.g., deluge/sprinklers).

c. Each hydrant risers shall be provided with an isolation valve to allow maintenance of an individual hydrant valve.

d. The discharge flow/pressure shall not exceed approximately seven (7) barg with one thousand (1,000) L/min flow.

e. Proprietary items developed to limit discharge pressures shall be used and the speed of response of the device shall be fast enough to cope with the surges caused when a main firewater pump starts up.

f. The pressure regulating devices shall be cased elastomeric ring type with no moving parts.

g. If equipment with different operating pressures is used at a hydrant outlet, pressure regulation shall be provided by removable rather than in-line units.

h. Normally ancillary equipment (e.g., hoses, nozzles, valve keys.) shall be located in a cabinet immediately adjacent to a hydrant outlet.

2. Hose reels, hose lines

a. Typical flow rates achievable are:

1) Hose reels with twenty-five millimeters (25 mm) diameter hose = one fifty (150) L/min

2) Hose line nozzles on forty-five millimeters (45 mm) diameter hose = four fifty (450) L/min

3) Hose line nozzles on sixty-five millimeters (65 mm) diameter hose = one thousand (1,000) L/min

b. Foam solution can be discharged through hose lines. If aspirated foam is required, special foam nozzles are necessary. For unaspirated foam, normal water application equipment can be used provided a film-forming foam concentrate is used.

c. Typical application rates for hand-held equipment applying foam solution to spill fires are in the range of four (4) L/min m^2 to eight (8) L/min m^2 as required by NFPA 11. The concentrate-proportioning devices suitable for hand-held equipment are usually line proportioners and pressure drops shall be allowed.

d. Self-inducing nozzles are not normally appropriate because they require a source of foam concentrate at the nozzle itself and consequently reduce maneuverability.

e. Consideration shall be taken of hose weight and maneuverability:

1) reeled hose lengths shall be limited to thirty meters (30 m);

2) individual hose lengths used from hydrants shall be limited to twenty (20 m);

3) if the specified application rates and pressures are achievable using hoses, forty-five millimeters (45 mm) hose shall be used in preference to sixty-five millimeters (65 mm) hose for ease of handling.

3. Monitors

a. Monitors shall be either fixed in position and served directly from the firewater main or portable and served via hose lines from hydrants.

b. Deployment and adjustment of portable monitors is labor-intensive and time consuming and they shall not be considered as a means of primary active fire protection but may be deployed to supplement fixed systems/equipment.

c. Monitors can be used to provide protection in open deck areas where deluge systems are impractical or are not considered an appropriate protection method.

d. The use of fixed and/or fixed automatic oscillating monitors shall be considered for applying water to specific targets, protecting firefighters and escape routes and cooling areas at the boundary of the fire-affected area.

e. Monitors shall have a dedicated supply from the firewater main with a manual isolation valve external to the area.

f. Monitors shall be accessible in the event of a fire and protected from blast and/or damage from falling objects.

4. Sprinkler Systems

a. Selection of the sprinkler system type shall take into account environmental conditions and the water damage that it may cause. The selected sprinkler system type shall be designed in accordance with a recognized standard, such as NFPA 13.

b. Sprinkler systems used on offshore facilities shall be one of the following types:

1) wet-pipe;

2) dry-pipe; and

3) pre-action.

c. Sprinkler heads with a nominal orifice of less than ten millimeters (10 mm) and a metric 'K' function of less than forty-seven (47) shall not be used.

d. In areas with high ventilation air currents, additional sprinkler locations may be required to cover the heat plume/heat travel from the design fire scenarios.

e. Sprinklers in cooking areas shall not impinge directly onto the equipment used for heating cooking oil or fat.

f. Frangible-bulb-actuated automatic spray sprinkler heads shall be used in sprinkler systems on offshore facilities.

g. Fusible-link or fusible-strut type sprinkler heads shall not be used

h. Sprinkler heads shall be upright and located above the branch pipes except in areas having suspended ceilings, where decorative type pendant heads may be used with connections being taken from the top of the branch pipe and the heads being located in the center of ceiling tiles where practicable.

i. In areas having suspended ceilings where decorative type pendant heads may be used then the sprinkler head shall be sited below the tiles with ceiling rosettes around the base of each sprinkler head.

j. All sprinkler heads shall be suitable for use with raw sea water, even though systems may be charged with fresh water.

k. Actuation of one (1) or more sprinkler heads shall be detected by either a flow switch in the pipe work or a differential pressure flow transmitter connected to the firewater shutdown system.

l. A manual isolation valve shall be provided immediately upstream of the sprinkler control valve.

1) The manual isolation valve shall have an indicator to show open and closed positions.

2) The manual isolation shall be locked with leather straps or nylon chains and padlocks under normal operating conditions.

3) A key for the padlocks shall be provided in a break-glass type container adjacent to the valve

5. Deluge Systems

a. The deluge system for water spray system shall be designed as per the requirement of NFPA 15, *Standard for Water Spray Fixed Systems for Fire Protection.*

b. The foam-water spray system using deluge shall be designed as per NFPA 16, *Standard for the Installation of Foam-Water Sprinkler and Foam-Water Spray Systems*. Deluge systems shall provide a uniform application of water to equipment and pipe work within a designated fire risk area in order to cool the area, prevent failure of the equipment and pipe work therein and prevent escalation of the incident to other areas. For extinguishing the hydrocarbon pool fires, foam-water spray using Deluge system shall be considered.

c. A feature shall be provided to enable the deluge valves to be tested without discharging firewater through the pipe work or nozzles.

d. The deluge system shall have a deluge valve that is separated from the area that the system is protecting by locating it at a distance, by means of a rated fire wall or by locating it within an enclosure.

e. In order to maintain a firewater supply to a deluge system, a secondary supply that is connected to the system shall be considered.

f. The deluge system shall have manually operated isolating valves that are of fire safe design.

g. If the water quality can cause blockage of the pipe work or spray nozzles, a strainer shall be located immediately upstream of the deluge valve.

1) The strainer shall be sized for the full design flow and pressure conditions of the deluge system.

2) A manual bypass around the strainer shall be fitted to allow maintenance of the strainer.

h. All piping downstream of deluge valve shall be self-draining.

i. The deluge system shall be designed to protect personnel by means of radiation water screens and/or a water spray system.

1) Water screens/drenchers shall be located near natural fire-breaks, e.g., main walkways and/or escape and evacuation routes to create a water curtain as an exposure/radiated heat protection barrier for personnel.

2) The use of monitors may also be considered although their effectiveness is likely to be limited, unless they are used to back up other fixed systems.

j. General area protection shall be provided by means of open sprinklers positioned to achieve a typical minimum discharge density of ten and two tenths liters per minute per square meter (10.2 L/min/m^2) of floor area for uncongested areas.

k. For congested areas and in the vicinity of hydrocarbon pumps and compressors the discharge density may have to be increased up to twenty and four tenths (20.4) L/min per m^2 based on test data or knowledge based on similar condition to those that will apply on the offshore facility in question.

l. Water application rate, for water curtains providing personal protection on escape and evacuation routes for personal protection against pool fires, shall be between fifteen to forty-five (15-45) L/min per m.

m. High-pressure jet fires are very intense, transfer heat at high rates to any object in the high-momentum region of the flame and are difficult to extinguish using water spray or foam deluge systems.

n. The primary extinguishment technique for high pressure jet fires shall be to remove the pressure and isolate the fuel source.

o. Specific equipment protection shall be provided where there is a threat of escalation that cannot be controlled by blowdown or contained by Area Protection using

open sprinklers. Specific equipment protection shall be provided for equipment in shadowed areas where area protection is deemed ineffective.

p. Deluge systems shall have dedicated nozzles for protection of primary load-bearing structural steelwork to avoid local damage from credible fire risks.

q. Structural protection may be considered for all primary load-bearing structural steelwork not essential to the support of the Temporary Refuge (TR) and Evacuation Escape and Rescue (EER) facilities in areas where there is a significant fire risk.

r. Structures essential to the support of the TR and EER facilities shall be protected by Passive Fire Protection to ensure that they survive long enough under all foreseeable fire conditions to allow evacuation of the offshore facility.

s. Spray heads for structural protection shall be located on the side of the steelwork facing the area protected by the deluge system. If a structural member is located entirely within the protected area, spray heads shall alternate on either side of the member.

t. The deluge valve shall automatically open if the air pressure falls below that required to keep the valve closed. The air shall be supplied to the deluge valve assembly from the air supply through a pressure regulator.

u. Pneumatic systems shall be capable of preventing spurious deluge release for two (2) hours after loss of instrument air supply.

v. An air reservoir [typically five liters (5 L) capacity] may be provided to maintain the deluge valve in a closed position. The size of the air reservoir shall consider maximum leakage rate per joint (excluding threaded connections) of less than two thousand eight hundred thirty-two liters (2,832 L) per year.

w. A correctly sized restriction orifice [typically one millimeter (1 mm) diameter hole size)] shall be installed in the pneumatic supply immediately downstream of the regulator and air reservoir where fitted.

6. Foam Systems

a. The foam system shall be selected and designed in accordance with the requirements of NFPA 11, *Standard for Low, Medium, and High -Expansion Foam Systems* or NFPA 16, *Standard for the Installation of Foam-Water Sprinkler and Foam-Water Spray Systems*.

b. Design quantity of the foam concentrate shall be capable to meet the minimum system running times with one hundred percent (100%) backup.

c. Central foam systems shall not be utilized as a primary source of foam solution to hand held equipment. This is to avoid compromising the quantity of foam available to protect the equipment for which the foam system is primarily designed.

d. Foam "low-level" indication shall be provided for foam concentrate storage tanks where automatic foam discharge shut-down is required. Foam concentrate flow indication shall be provided for all systems.

7. **Gaseous Extinguishing System**

a. The Fire Hazard Assessment shall determine the type of extinguishing agent, the spaces that needs to be protected by each system, and the method of activating the system.

b. Only extinguishing agents that do not have a negative impact on the environment and are not electrically conductive shall be applied in gaseous extinguishing systems.

c. The use of carbon dioxide shall not be used unless approved by the Principal due to the asphyxiation risk.

d. Extinguishing agents e.g., water mist system, as per NFPA 750, *Standard on Water Mist Fire Protection Systems* or other clean agents as per NFPA 2001, *Standard on Clean Agent Fire Extinguishing Systems*, shall be used.

SECTION 10.2.19.8 PIERS AND WATER-SURROUNDED STRUCTURE

A. This Section applies to water-surrounded structures or piers occupied as a place of amusement, passenger terminal or used for any purpose other than for the mooring of vessels and handling of cargo. Such piers shall be provided with means of exit from any structures thereon and to the shore appropriate to the character or occupancy of the pier in accordance with the applicable Sections of Division 8 through 20 of this RIRR.

B. Any pier so occupied, extending more than forty-six meters (46 m) from the shore, shall be so arranged as to minimize the possibility that fire in or under the pier, may block escape of occupants to shore by one (1) or more of the following measures:

1. It must be provided with two (2) separate ways of travel to shore, by two (2) well-separated walkways or independent structures.
2. The pier deck must be open, fire-resistant, and supported with non-combustible materials.
3. The pier deck must be provided with automatic fire suppression system protection for combustible structure and for superstructure, if any.
4. It should be completely open and unobstructed, and is fifteen meters (15 m) in width if less than one hundred fifty-two meters (152 m) long; or its width is not less than ten percent (10%) of its length if over one hundred fifty-two meters (152 m) long.

C. Any building or structure surrounded by water such as a lighthouse shall have sufficient outside area of ground as on an island, or fire-resistant platform, to provide an adequate area of refuge from any fire in the structure. Means shall be available for transportation of occupants away from such structures to the shore or other places of safety such as by boat or helicopter, in case of fire or other emergency, within a reasonable period of time.

SECTION 10.2.19.9 SOLAR PHOTOVOLTAIC (PV) SYSTEM

A. **General**

1. All Solar PV electrical energy systems, including the array circuit(s), inverter(s), and controller(s) for such systems shall comply with the installation requirements of the latest edition of PEC and NFPA 70. All materials used (panels, inverters, battery, and the like) must be compliant with UL fire safety standards or equivalent international standards like International Electrotechnical Commission (IEC).
2. All Electrical Energy Storage for Solar PV Systems such as batteries must be installed in accordance with the latest edition of PEC and NFPA 70. The interconnected battery cells shall be considered grounded where the PV power source is installed. Battery room must be adequately ventilated, with not less than two-hour (2-hr) fire rating, and with system protection.
3. All Solar PV must have adequate system protection like Direct Current (DC) and Alternating Current (AC) breakers or fuse, surge protection and safety disconnect or isolation in case of fire and system maintenance.
4. The plans, design, and specification of the Solar PV System shall be signed and sealed by a Professional Electrical Engineer (PEE) for the issuance of Electrical Installation Clearance.
5. Installation of equipment and all associated wiring and interconnections shall be performed only by qualified Electrical Practitioners or Registered Electrical Engineer (REE).

B. Solar PV systems with a maximum system voltage over one thousand volts (1,000 V) DC shall comply with NFPA 70 and other requirements applicable to installations rated over one thousand volts (1,000 V).

C. Solar PV systems used directly to charge electric vehicles shall comply with latest edition of PEC and NFPA 70.

D. All Solar PV roof insulation shall comply with the latest civil and structural requirements of the latest edition of the National Building Code of the Philippines (NBCP) to ensure structural integrity and consumer safety. All host Structures of Solar PV systems shall comply with the installation requirements of the latest edition of PEC and NFPA 70.

E. All Solar PV system shall be inspected and properly maintained in accordance with the manufacturer's instruction or with the latest edition of PEC. Reports shall be attached to FSMR and be submitted to the C/MFM having jurisdiction.

SECTION 10.2.19.10 TOWERS

A. Any tower utilized for such purposes as observation, signaling, either as an independent structure or on top of a building, shall be permitted to have a single stairway or ramp exit if all of the following conditions are met:

1. The tower is of such size as not to be subject to occupancy by more than twenty-five (25) persons at any floor level.

2. The tower shall not be used for living or sleeping purposes.
3. The construction shall be fire-resistant, noncombustible or constructed of heavy timber. The interior finish, if any, is Class A or Class B, and there shall be no combustible materials in, under, or in the immediate vicinity of the tower except necessary furniture such as bare wooden or metal chairs or benches.

B. In each tower where there is no occupancy below the top floor level and the conditions required by para "A" above are met, stairs may be open with no enclosure required or, where the structure is entirely open, fire-escape type stairs may be used.

C. Stairs shall be Class B for new construction. For existing towers, outside stairs or fire-escape type stairs may be allowed

D. A tower such as a forest observation tower and a railroad signal tower, designed for occupancy only of not more than three (3) persons therein, may be of any type of construction, and may be served by ladders instead of stairs. However, if used for living or sleeping purposes, it shall at least comply with exit requirements in accordance with Section 10.2.14.6 of this RIRR for family dwellings.

E. Utility/transmitter building shall be provided with appropriate type of automatic fire extinguishing system and, if subject to occupancy by technician/authorized personnel, automatic fire alarm system and portable fire extinguishers shall also be provided.

F. Advertisement structures shall be made of fire-resistant materials including its signage components.

SECTION 10.2.19.11 UNDERGROUND STRUCTURES AND WINDOWLESS BUILDINGS

A. **General**

1. Any area subject to occupancy by fifty (50) or more persons, from which there is no direct access to outdoors or to another area and no outside light or ventilation through windows, shall be equipped with approved, supervised automatic fire suppression system protection in accordance with Section 10.2.6.7 of this RIRR.
2. Any underground structure, building, or floor area lacking direct outside access or windows and having combustible contents, interior finish, or construction, if subject to occupancy by more than one hundred (100) persons shall have automatic smoke venting facilities in accordance with Section 10.2.7.3 of this RIRR and in addition to automatic fire suppression system protection in accordance with Section 10.2.6.7 of this RIRR.
3. Any underground structure or windowless building, for which no natural lighting is provided, shall be provided with emergency lighting in accordance with Section 10.2.5.11 of this RIRR.

B. **Underground Structures**

Where required from underground structure involving upward travel such as ascending stairs or ramps, such upward exits shall be cut off from main floor areas and shall be provided with outside smoke venting facilities or other means to prevent the exits serving as flues for smoke from any fire in the area served by the exits, thereby making the exits impassable.

C. **Windowless Buildings**

Every windowless building shall be provided with outside access panels on each floor level. Such panels shall be designed for use of firefighters in accordance with all of the following requirements:

1. The opening shall have dimensions of not less than five hundred sixty millimeters (560 mm) in width and eight hundred millimeters (800 mm) in height and shall be unobstructed to allow for ventilation and rescue operations from the exterior;
2. The bottom of the opening shall be not more than eight hundred millimeters (800 mm) above the floor;
3. The opening shall be readily identifiable from both the exterior and interior; and
4. The opening shall be readily openable from both the exterior and interior.

D. **Road Tunnel**

Fire protection and fire life safety requirements for road tunnels shall be provided in accordance with NFPA 502, *Standard for Road Tunnels, Bridges, and Other Limited Access Highways* or other internationally accepted standards. The provisions cited below shall not

apply to a roadway or portion of a roadway not fully enclosed on both sides, or not fully enclosed on top, or any combination thereof.

1. Road tunnel shall be categorized as follows:
   a. ***Category X*** – Where tunnel length is less than ninety meters (90 m).
   b. ***Category A*** – Where tunnel length is ninety meters (90 m) but not greater than two hundred thirty-nine meters (239 m) .
   c. ***Category B*** – Where tunnel length is two hundred forty meters (240 m) but not greater than two hundred ninety-nine meters (299 m), and where the maximum distance from any point within the tunnel to a point of safety exceeds one hundred twenty meters (120 m).
   d. ***Category C*** – Where the tunnel length is three hundred meters (300 m) but not greater than nine hundred ninety-nine meters (999 m).
   e. ***Category D*** – Where the tunnel length equals or exceeds one thousand meters (1,000 m).
2. Tunnels described in categories B, C, and D shall have at least one (1) manual fire alarm and detection means of identifying and locating a fire.
3. Tunnels described in categories B, C, and D without twenty-four hour (24-hr) supervision shall have an automatic fire detection system in accordance with para 9 below.
4. Closed-circuit television (CCTV) systems with traffic flow indication devices or surveillance cameras shall be permitted for use to identify and locate fires in tunnels with twenty-four hour (24-hr) supervision.
5. When water-based firefighting systems are installed in road tunnels, an automatic fire detection system shall be provided.
6. Ancillary spaces within tunnels defined in categories B, C, and D (such as pump stations and utility rooms) and other areas shall be supervised by automatic fire alarm systems.
7. Manual fire alarm boxes mounted in National Electrical Manufacturers Association (NEMA) Enclosure Type 4 (IP 65) or equivalent boxes shall be installed at intervals of not more than ninety meters (90 m) and at all cross passages and means of egress from the tunnel. The system shall be installed, inspected, and maintained in accordance with Section 10.2.6.6 of this RIRR.
8. The manual fire alarm boxes shall be accessible to the public and the tunnel personnel. The alarm shall indicate the location of the manual fire alarm boxes at the monitoring station.
9. Automatic fire detection systems shall be installed in accordance with Section 10.2.6.6 of this RIRR and approved by the C/MFM having jurisdiction.
10. Portable fire extinguishers, with a rating of 2-A:20-B:C, shall be located along the roadway in approved wall cabinets at intervals of not more than ninety meters (90 m). To facilitate safe use by motorists, the maximum weight of each extinguisher shall be nine kilograms (9 kg).
11. The means of egress requirements for all road tunnels shall be in accordance with Division 5 of this Chapter, except as modified herein. Reflective or lighted directional signs indicating the distance to the two (2) nearest emergency exits shall be provided on the side walls at distances of no more than twenty-five meters (25 m).
12. The walking surfaces of the emergency exits, cross passageways, and walkways shall be slip resistant.
13. Emergency exit doors shall provide protection against fire and ensure pressurization of escape routes. Doors to the emergency exits shall open in the direction of exit travel. Horizontal sliding doors shall have a sign identifying them as horizontal sliding doors and indicating the direction to open.
14. Emergency exit doors shall be one and a half-hour (1.5-hr) rated doors and shall be installed in accordance with the requirements of NFPA 80, *Standard for Fire Doors and Fire Windows*. Emergency exit doors shall be self-closing door systems.
15. Emergency exits shall be provided throughout the tunnel. Spacing between exits for protection of tunnel occupants shall not exceed three hundred meters (300 m).
16. The tunnel roadway surface, when supported by a traffic management system, shall be considered as a part of the egress pathway. Where walkways are provided for egress

purposes, the walkway egress path shall have a minimum clear width of one and twelve hundredths meters (1.12 m), lead directly to an emergency exit, and be protected from traffic.

17. The emergency exits shall be separated from the tunnel by a minimum of a two-hour (2-hr) fire-rated construction.
18. Emergency exits shall be pressurized in accordance with NFPA 80.
19. Where portals of the tunnel are below surface grade, surface grade shall be made accessible by a stair, vehicle ramp, or pedestrian ramp. Where cross-passageways are used as an emergency exit, provisions shall be included that stop all traffic operation in the adjacent tunnel.
20. Wet standpipe systems (automatic or semi-automatic) shall be connected to an approved water supply that is capable of supplying the system demand for a minimum of one (1) hour. Dry standpipe systems shall have an approved water supply that is capable of supplying the system demand for a minimum of one (1) hour. Acceptable water supplies shall include the following:
    a. Public or Privately owned waterworks systems that have adequate pressure and flow rate and a level of integrity acceptable to the C/MFM having jurisdiction;
    b. Automatic or manually controlled fire pumps that are connected to an approved water source;
    c. Pressure-type or gravity-type storage tanks that are installed, inspected, and maintained in accordance with NFPA 22, *Standard for Water Tanks for Private Fire Protection*.
21. Fire department connections shall be of the threaded two-way or three-way type or shall consist with a minimum of one hundred millimeters (100 mm) quick-connect coupling that is accessible. Each independent standpipe system shall have a minimum of two (2) fire department connections that are remotely located from each other.
22. Hose connections shall be spaced so that no location on the protected roadway is more than forty-five meters (45 m) from the hose connection. Hose connection spacing shall not exceed eighty-five meters (85 m). Hose connections shall have sixty-five millimeters (65 mm) external treads in accordance with NFPA 1963, *Standard for Fire Hose Connections*.
23. Emergency ventilation systems and tunnel operating procedures shall be developed to maximize the use of the road tunnel ventilation system for the removal and control of smoke and heated gases that result from fire emergencies within the tunnel. Emergency ventilation shall be required in tunnels exceeding one thousand meters (1,000 m).

DIVISION 20. HIGH RISE BUILDINGS

SECTION 10.2.20.1 SCOPE

This Section deals with life safety from fires and similar emergencies in high rise buildings. It covers fire safety features in construction and protection of exits and passageways, and provisions for fire protection.

SECTION 10.2.20.2 FIRE COMMAND CENTER

For building ten (10) or more floors, a Fire Command Center shall be provided in a location approved by the C/MFM having jurisdiction. The Fire Command Center shall be accessible directly from the exterior of the building at the floor of exit discharge with a sign on the door stating **"Fire Command Center"**.

A. The Fire Command Center shall be separated by not less than two (2) hours fire resistive construction.
B. The Fire Command Center shall be not less than ten square meters (10 m^2) with no dimensions less than one and a half meters (1.5 m) with minimum ceiling height of not less than two and four tenths meters (2.4 m).
C. The Fire Command Center shall contain the following:
    1. Emergency voice/alarm communication system unit which shall provide a predetermined message (applicable information and directions to occupants) to the fire area where the alarm originated, actuated by a smoke detector, sprinkler head,

water flow device, or manual fire alarm; and operate between the fire command center and every elevator, elevator lobby, exit stairway, and exit access corridor.

2. Fire department communication unit.
3. Fire detection and alarm system annunciator unit
4. Elevator floor location and operation annunciator.
5. Sprinkler valve and water flow display panels.
6. Controls for unlocking stairway doors simultaneously.
7. Telephone for fire department use with controlled access to the public telephone system. A telephone station or jack shall also be provided in each fire pump room.
8. Fire pump status indicators.
9. Status indicators and controls for air handling systems.
10. The firefighters control panel for smoke control systems.
11. Emergency power and standby power status indicators.
12. Schematic building plans indicating the typical floor plan and detailing the building core, means of egress, fire protection systems, firefighting equipment and fire department access.
13. Public address system, where specifically required by other rules of RA 9514 and its RIRR.

D. Shut off valves and water flow devices at the riser connection must be provided on each floor. Combined sprinkler/standpipe systems must have an individual control valve and check valve at each sprinkler connection.

SECTION 10.2.20.3 SMOKE CONTROL

High rise buildings shall be designed in such a manner that the levels of smoke concentration in protected spaces can be maintained within values tolerable by occupants. The protected spaces shall include stairwells, at least one (1) elevator shaft, and floor spaces readily accessible to all occupants and large enough to accommodate them. Smoke control systems in accordance with Section 10.2.7.3 of this RIRR shall be provided in the cited protected spaces for safe evacuation of all occupants and safety of the responding fire fighters and rescuers during the conduct of their operations.

SECTION 10.2.20.4 SPRINKLER SYSTEMS PROTECTION

High rise buildings shall be protected with approved, supervised sprinkler systems designed and installed in accordance with NFPA 13. The approved, supervised sprinkler systems must protect all floor spaces including every closet and concealed spaces/plenums of certain configuration and construction – particularly where combustible materials are located such as exposed electrical wiring, combustible duct work, and combustible sound/thermal insulation. The system shall be interconnected to the Fire Command Center of the building.

SECTION 10.2.20.5 STAIRWELLS

A. All stairwells shall be enclosed and protected in accordance with Division 5 of this Chapter. All doors on stairwells shall be kept closed. Electronically locked fire exit doors shall be integrated in the Fire Detection Alarm System to automatically unlock during an emergency.

B. All interior stairwells used as a means of egress shall be pressurized. In no case shall stairwells in high rise buildings be allowed to be unprotected.

SECTION 10.2.20.6 FIRST-AID FIRE PROTECTION

A. In addition to the other requirements of this RIRR, each floor shall be provided with a thirty-eight millimeter (38-mm) lightweight flexible hose equipped with a spray nozzle and connected to the wet standpipe system capable of providing water supply for at least a period of thirty (30) minutes.

B. Portable fire extinguisher shall be provided in accordance with Section 10.2.6.9 of this RIRR.

SECTION 10.2.20.7 APPLICABILITY OF ALL OTHER PROVISIONS OF THIS CODE

This Section shall supplement all other applicable provisions of RA 9514 and its RIRR.

DIVISION 21. OPERATING FEATURES

SECTION 10.2.21.1 GENERAL

A. **Fire Exit Drills**

1. Fire exit drills shall be conducted in coordination with the Office of the C/MFM having jurisdiction.
2. Fire exit drills conforming to the provisions of this Division shall be regularly conducted in schools and in other occupancies where specified by the provisions of Divisions 8 through 20 of this Chapter, or by appropriate action of the C/MFM having jurisdiction over the area. The C/MFM having jurisdiction shall exercise discretion for the necessary modifications in detail of procedures to make the drills more effective for their intended purposes.
3. Fire exit drills, where required, shall be held with sufficient frequency to familiarize all occupants with the drill procedure and to have the conduct of the drill a matter of established routine.
4. Drills shall be held at unexpected times and under varying conditions to simulate the unusual conditions obtaining in case of fire.
5. Planning and conduct of drills shall be the responsibility of the management and/or owners of business establishments. Such planning and drill shall be made in consultation and coordination with the C/MFM having jurisdiction.
6. In the conduct of drills, emphasis shall be placed upon orderly evacuation under proper discipline rather than upon speed.
7. Drills shall include suitable procedures to make sure that all persons in the building, or all persons subject to the drill, actually participate.
8. Fire alarm facilities, where available, shall be used in the conduct of fire exit drills.
9. The management of every establishment shall submit to the C/MFM having jurisdiction an after activity report of all drills conducted during the prescribed period throughout the year.

B. **Furnishing and Decorations**

1. No furnishing, decorations, or other objects shall be so placed as to obstruct exits, access thereto, egress therefrom, or visibility thereof.
2. Furnishing or decorations shall be treated with flame retardant where required by the applicable provisions of RA 9514 and its RIRR.
3. No furnishing or decorations of an explosive or highly flammable character shall be used in any place of assembly or other occupancy.

C. **Automatic Fire Suppression System**

All automatic fire suppression systems required by this Chapter shall be continuously maintained in reliable operational condition at all times and such periodic inspections and tests shall be made to assure proper maintenance.

D. **Alarm and Fire Detection Systems**

1. Systems shall be under the supervision of qualified and competent persons, who shall cause proper tests to be made at specified intervals and have general charge of all alternations and additions.
2. Systems shall be tested at intervals as recommended by the C/MFM having jurisdiction.
3. Fire alarm signaling equipment shall be restored to service as promptly as possible after each test or alarm and shall be kept in normal conditions ready for operation. Equipment requiring rewinding or replenishing shall be rewound or replenished as promptly as possible after test or alarm.

E. **Fire Retardant Paints**

Fire retardant paints or solutions shall be reapplied at such intervals as necessary to maintain the necessary flame retardant properties.

F. **Recognition of Means of Egress**

Hangings or draperies shall not be placed over exit doors or otherwise located as to conceal or obscure any exit. Mirrors shall not be placed on exit doors nor in or adjacent to any exit in such a manner as to confuse the direction of exit.

G. **Preventive Maintenance Record**

Preventive maintenance records shall be prepared by the Fire Safety Practitioner in charge and submitted to the C/MFM having jurisdiction every after inspection and test.

SECTION 10.2.21.2 PLACES OF ASSEMBLY

A. **Drills**

The employees or attendants of places or public assembly shall be trained and drilled in the duties they are to perform in case of fire, panic, or other related emergencies in order to be of greatest service in effecting the orderly exit of occupants.

B. **Opens Flame Devices**

No open flame lighting devices shall be used in any place of assembly.

Exception No. 1: Where necessary for ceremonial or religious purposes, the C/MFM having jurisdiction may permit open flame lighting under such restrictions as are necessary to avoid danger of ignition of combustible materials or injury to occupants.

Exception No. 2: Open flame devices may be used on stages where a necessary part of theatrical performances, provided that adequate precautions, satisfactory to the C/MFM having jurisdiction are taken to prevent ignition of any combustible materials.

Exception No. 3: Gas lights may be permitted, provided that adequate precautions satisfactory to the C/MFM having jurisdiction are taken to prevent ignition or any combustible materials.

C. **Special Food Service Devices**

Portable cooking equipment shall be permitted only as follows:

1. Equipment fueled by small heat sources which can be readily extinguished by water, such as candles or alcohol-burning equipment (including "solid alcohol") may be used, provided adequate precautions satisfactory to the C/MFM having jurisdiction are taken to prevent ignition of any combustible materials.
2. Candles may be used on tables for food service if securely supported on substantial non-combustible bases, so located as to avoid danger of ignition of combustible materials and only if approved by the C/MFM having jurisdiction. Candle flames shall be protected.
3. "Flaming Sword" or other equipment involving open flames and flamed dishes such as cherries jubilee, crepes suzette, etc., may be permitted, provided that necessary precautions are taken subject to the approval of the C/MFM having jurisdiction.

D. **Smoking**

1. Smoking in places of assembly shall be regulated by the C/MFM having jurisdiction.
2. In rooms or areas where smoking is prohibited, plainly visible **"NO SMOKING"** signs shall be posted.
3. No person shall smoke in prohibited areas.
4. Where smoking is permitted, suitable ash trays or receptacles should be provided in convenient locations.

E. **Decorations and Stage Scenery**

1. Combustible materials shall be treated with an effective flame retardant material. Stage settings made of combustible materials shall likewise be treated with flame retardant materials.
2. Only noncombustible materials or fire retardant pressure treated wood may be used for stage scenery or props, on the audience side of the proscenium arch.
3. The C/MFM having jurisdiction shall impose controls on the volume and arrangement of combustible contents (including decorations) in places of assembly to provide adequate level of safety to life from fire.

F. **Seating**

1. Seats in assembly occupancies accommodating more than two hundred (200) persons shall be securely fastened to the floor except together in groups of not less than three (3)

or more than seven (7) and as permitted by the next paragraph. All seats in balconies and galleries shall be securely fastened to the floor, except in places of worship.

2. Seats not secured to the floor may be permitted in restaurants, night clubs, and other occupancies where the fastening of seats to the floor may be impractical; Provided, that in the area used for seating (excluding dance floors, stage, etc.), there shall be not more than one seat for each one and four tenths square meters (1.4 m^2) of net floor area and adequate aisles to reach exits shall be maintained at all times.

SECTION 10.2.21.3 EDUCATIONAL OCCUPANCIES

A. **Drills**

1. Fire exit drills shall be conducted regularly in accordance with the applicable provisions of the following paragraphs.
2. There shall be at least four (4) exit drills a year in consultation and coordination with the C/MFM having jurisdiction.
3. Drills shall be conducted during class hours; during the changing of classes; when the school is at assembly; during recess or gymnastic periods; etc., so as to avoid distinction between drills and actual fires. If a drill is called, the pupils shall be instructed to form in line and immediately proceed to the nearest available exit in an orderly manner.
4. Every fire exit drill shall be an exercise by the school management. Teachers shall have a complete control of the class. Great stress shall be laid upon the execution of each drill in a brisk, quiet, and orderly manner. Running shall be prohibited. In case there are pupils incapable of holding their places in a line moving at a reasonable speed, provisions shall be made to have them taken care of by the more sturdy pupils, moving independently of the regular line of march.
5. BFP personnel shall be appointed to assist in the proper execution of all drills. The searching of toilets and other rooms shall be the duty of the teachers or other members of the staff.
6. As drills simulate an actual fire condition, pupils shall not be allowed to obtain anything after the alarm is sounded, even when in classrooms, which would contribute to the confusion.
7. Each class or group shall proceed to a primary assembly point outside the building and remain there until all are accounted for, leaving only when a recall signal is given to return to their classrooms, or when dismissed. Such points shall be sufficiently far away from the building and from each other as to avoid danger from any fire in the building, interference with fire department operations, or confusion between different classes or groups. An alternate assembly point shall be planned for and used during other drills to ensure safety of the children if and when the primary assembly point cannot be used.
8. Where necessary for drill lines to cross roadways, signs reading "**STOP! SCHOOL FIRE DRILL GOING ON**" or equivalent shall be carried by assigned personnel to the traffic intersecting points in order to stop the traffic flow during the drill.

B. **Signals**

1. All fire exit drill alarms shall be sounded on the fire alarm system and not on the signal system used to dismiss classes.
2. Whenever any of the school authorities determine an actual fire exists, they shall immediately call the nearest fire station. At the same time, they shall try to extinguish the fire as circumstances permit.
3. In order to ensure that pupils will not return to a burning building, the recall signal shall be one that is separate and distinct from and cannot be mistaken for any other signals.

SECTION 10.2.21.4 DAY CARE OCCUPANCIES

A. **Emergency Egress and Relocation Drills**

1. Emergency egress and relocation drill shall be conducted at least once every quarter.
2. All occupants of the building shall participate in the drill.

B. **Inspection**

Fire prevention inspection shall be conducted monthly by a trained senior member of the staff, after which a copy of the latest inspection report shall be posted in a conspicuous place in the day care facility.

C. **Furnishings and Decorations**

1. Clothing and personal effects shall not be stored in corridors, unless the building is protected by an automatic sprinkler system.
2. Artwork and teaching materials shall be permitted to be attached directly to the walls, provided it shall not exceed twenty percent (20%) of the wall area in a building that is not protected throughout by an approved, supervised automatic sprinkler system and shall not exceed fifty percent (50%) of the wall area in a building that is protected throughout by an approved, supervised automatic sprinkler system.

D. **Day Care Staff**

Adequate adult staff shall be on duty in the facility and alert at all times where clients are present.

SECTION 10.2.21.5 HEALTH CARE OCCUPANCIES

Evacuation Plan and Fire Exit Drills

A. The administration of every hospital and nursing home shall have an approved evacuation plan for the guidance of all persons in the event of fire. Copies of such plans shall be made available to all supervisors and personnel. All employees shall be instructed and kept informed of their detailed duties under the plan. A copy of the plan shall be readily available at all times, in the telephone operator's position, or at the security center.

B. Every bed intended for use by institutional occupants shall be easily movable under conditions of evacuation and shall be equipped with the type and size of casters to allow easy mobility, especially over elements of the structure such as expansion plates and elevator thresholds. The C/MFM having jurisdiction may make exceptions in equipping beds intended for use in areas limited to patients such as convalescent, self-care or psychiatric patients.

C. Fire exit drills in hospitals shall include the transmission of a fire alarm signal and simulation of emergency fire conditions, except the movement of infirm or bed-ridden patients to safe areas or to the exterior of the building. Drills shall be conducted quarterly on each shift to familiarize hospital personnel (nurses, interns, maintenance personnel and administrative staff) with signals and emergency action required under varied conditions.

SECTION 10.2.21.6 RESIDENTIAL BOARD AND CARE OCCUPANCIES

A. **Emergency Egress and Relocation Drills**

1. Emergency egress and relocation drills shall be conducted on a quarterly basis, with not less than two (2) drills conducted during the night when residents are sleeping.
2. The emergency drills shall be permitted to be announced to the residents in advance. The drills shall involve the actual evacuation of all residents to an assembly point, and shall provide residents with experience in egressing through all exits and means of escape of the building.
3. An assembly point can be located outside the building, in a separate building, or in an adjacent smoke compartment in the same building.
4. Exits and means of escape not used in any drill shall not be credited in meeting the requirements of RA 9514 and its RIRR for board and care facilities.
5. Residents who cannot meaningfully assist in their own evacuation or who have special health problems shall not be required to actively participate in the drill.

B. **Smoking**

Smoking shall be prohibited in any room, compartment, or area where flammable or combustible liquids, combustible gases, or oxygen is used or stored and in any other hazardous location, and the following also shall apply:

1. **"NO SMOKING"** (or the international symbol for no smoking) signs shall be posted in such areas.
2. Where smoking is totally prohibited, signs so indicating shall be placed at all major entrances,
3. Areas where smoking is permitted shall be clearly identified.
4. Ashtrays of noncombustible material and safe design shall be provided and required to be used in all areas where smoking is permitted.

5. Self-closing cover devices into which ashtrays can be emptied shall be made available to all areas where smoking is permitted and shall be used.
6. Where smoking is permitted, noncombustible safety-type ashtrays or receptacles shall be provided in convenient locations.

C. **Staff**

Staff shall be on duty and in the facility at all times when residents requiring evacuation assistance are present.

D. **Inspection of Door Openings**

Door assemblies for which the door leaf is required to swing in the direction of egress travel shall be inspected and tested.

SECTION 10.2.21.7 RESIDENTIAL OCCUPANCIES

A. **Hotel Emergency Organization**

All employees of hotels shall be instructed and drilled in the duties they are to perform in case of fire, panic, or other related emergencies.

Drills of the hotel emergency organization shall be held twice a year covering such points as the operation and maintenance of the available first aid fire appliances, the testing of guest alerting devices, and a study of instruction for emergency duties.

B. **Dormitories, Lodging and Rooming Houses**

Fire exit drills shall be regularly conducted at least twice a year.

SECTION 10.2.21.8 MERCANTILE, BUSINESS, AND INDUSTRIAL OCCUPANCIES

In every mercantile, business or industrial occupancy subject to occupancy by fifty (50) or more persons, fire exit drills shall be held at least twice a year.

SECTION 10.2.21.9 SPECIAL STRUCTURES

A. Waste or refuse shall not be allowed to accumulate in any area or in any manner that creates a fire hazard.

B. **Flammable or Combustible Liquids**

1. The use, mixing, dispensing, and storage of flammable or combustible liquids shall be in accordance with Chapters 3 and 4 of this Rule and the following Codes:
   a. NFPA 30, *Flammable and Combustible Liquids Code*
   b. NFPA 58, *Liquefied Petroleum Gas Code*
2. Approved flammable or combustible liquids and liquefied petroleum gases used for special effects shall be allowed.

C. Welding shall be in accordance with NFPA 51, *Standard for the Design and Installation of Oxygen-Fuel Gas Systems for Welding, Cutting, and Allied Processes*, and NFPA 51B, *Standard for Fire Prevention during Welding, Cutting, and Other Hot Work*.

D. **Audience Life Safety**. When an audience is present during productions, provisions for life safety and means of egress shall be subject to the approval of the C/MFM having jurisdiction.

E. **Emergency Services Notification**. The production company shall provide a procedure acceptable to the C/MFM having jurisdiction for notifying the public emergency services of emergency incidents

CHAPTER 3. FIRE SAFETY FOR HAZARDOUS MATERIALS

DIVISION 1. SCOPE

SECTION 10.3.1.1 APPLICABILITY

This Chapter shall apply to materials and chemicals, which are:

A. Highly flammable that may react to cause fires or explosions;

B. By their presence may create a fire or explosion hazard;

C. By their toxicity, flammability, or reactivity render firefighting dangerous;

D. Flammable or combustible that are chemically unstable and may spontaneously form explosive compounds; and

E. Flammable or combustible that may undergo spontaneous reactions of explosive violence or with sufficient evolution of heat to be a fire hazard.

DIVISION 2. FIRE SAFETY CLEARANCE

A Fire Safety Clearance (FSC) for the installation and conveyance of all hazardous materials shall be issued by the BFP as prerequisite for the issuance of appropriate permits and licenses from the local and other government agencies concerned.

DIVISION 3. CLASSIFICATION OF MATERIALS, WASTES, AND HAZARD OF CONTENTS

SECTION 10.3.3.1 HAZARDOUS MATERIAL CLASSIFICATION

Materials shall be classified into one (1) or more of the following categories of hazardous materials:

A. Corrosive solids, liquids, or gases;

B. Flammable solids, liquids and aerosols;

C. Flammable, inert and oxidizing cryogenic fluids;

D. Flammable and inert gases;

E. Organic peroxide formulations;

F. Oxidizer solids and liquids;

G. Oxidizing gases;

H. Pyrophoric solids, liquids, or gases;

I. Toxic or highly toxic solids, liquids, or gases;

J. Unstable (reactive) solids, liquids, or gases;

K. Water-reactive solids or liquids;

L. Radioactive materials; and

M. Explosives.

SECTION 10.3.3.2 CLASSIFICATION OF HIGH-HAZARD CONTENTS

A. **High-Hazard Level 1 Contents**. Materials that present a detonation hazard, including, but not limited to, the following hazard categories:

   1. Class 4 oxidizers;
   2. Detonable pyrophoric solids or liquids;
   3. Class 3 detonable and Class 4 unstable (reactive) solids, liquids, or gases; and
   4. Detonable organic peroxides.

B. **High-Hazard Level 2 Contents**. Materials that present a deflagration hazard or a hazard from accelerated burning, including, but not limited to, the following hazard categories:

   1. Combustible dusts stored, used, or generated in a manner creating a severe fire or explosion hazard;
   2. Class I organic peroxides;
   3. Class 3 solid or liquid oxidizers that are used or stored in normally open containers or systems or in closed containers or systems at gauge pressures of more than one hundred three and four tenths kilopascals (103.4 kPa);
   4. Flammable gases;
   5. Flammable cryogenic fluids;
   6. Nondetonable pyrophoric solids, liquids, or gases;
   7. Class 3 nondetonable unstable (reactive) solids, liquids, or gases; and
   8. Class 3 water-reactive solids and liquids.

C. **High-Hazard Level 3 Contents**. Materials that readily support combustion or present a physical hazard, including, but not limited to, the following hazard categories:

1. Flammable solids, other than dusts classified as High-Hazard Level 2, stored, used, or generated in a manner creating a high fire hazard;
2. Class II and Class III organic peroxides;
3. Class 2 solid or liquid oxidizers;
4. Class 3 solid or liquid oxidizers that are used or stored in normally closed containers or systems at gauge pressures of less than one hundred three and four tenths kilopascals (103.4 kPa);
5. Class 2 unstable (reactive) materials;
6. Class 2 water-reactive solids, liquids or gases;
7. Oxidizing gases; and
8. Oxidizing cryogenic fluids.

D. **High-Hazard Level 4 Contents**. Materials that are acute health hazards, including, but not limited to, the following hazard categories:

1. Corrosive solids, liquids, or gases;
2. Highly toxic solids, liquids, or gases; and
3. Toxic solids, liquids, or gases.

SECTION 10.3.3.3 MIXTURES

Mixtures shall be classified in accordance with the hazards of the mixture as a whole by an approved, qualified organization, individual, or testing laboratory.

SECTION 10.3.3.4 MULTIPLE HAZARDS

Hazardous materials that have multiple hazards shall conform to the code requirements for each applicable hazard category.

SECTION 10.3.3.5 CLASSIFICATION OF WASTE

Waste comprised of or containing hazardous materials shall be classified in accordance with Section 10.3.1.1 of this RIRR as applicable.

DIVISION 4. PERMISSIBLE STORAGE AND USE LOCATIONS

SECTION 10.3.4.1 CONTROL AREA

Hazardous materials shall be stored and used in one (1) or more control areas.

SECTION 10.3.4.2 QUANTITY OF HAZARDOUS MATERIAL

The quantity of hazardous materials in an individual control area shall not exceed the Maximum Allowable Quantity (MAQ) for the applicable occupancy set forth in Annex A.

A. For all occupancies not covered by Division 8 through 20 of Chapter 2 of this Rule, the MAQ of hazardous materials per control area shall be as specified in Annex A, Table 12.

B. The MAQ of hazardous materials per control area in mercantile, storage and industrial occupancies shall be as specified in Annex A, Table 12, with increased quantities permitted where storage or display areas comply with this Division.

C. Special Quantity Limits for Mercantile, Industrial, and Storage Occupancies

The MAQ of selected hazardous materials shall be permitted to be increased in accordance with para "D" of this Section provided in mercantile, industrial, and storage occupancies is compliant with all of the special controls set forth in para "A" above.

D. Special Controls Required for Increased Quantities

Materials shall be stored in accordance with the following limitations where quantities of hazardous materials are increased:

1. Storage and display of solids shall not exceed nine hundred seventy-six and four tenths kilogram per square meter (976.4 kg/m^2) of floor area actually occupied by solid merchandise.

2. Storage and display of liquids shall not exceed seventy-six liters per square meter (76 L/m^2) of floor area actually occupied by liquid merchandise.
3. Storage and display height shall not be more than one and eight tenths meters (1.8 m) above the finished floor.
4. Individual containers less than nineteen liters (19 L) or less than eleven kilograms (11 kg) shall be stored or displayed on pallets, racks, or shelves.
5. Racks and shelves used for storage or display shall be in accordance with NFPA 400, *Hazardous Materials Code*.
6. Containers shall be listed or approved for the intended use.
7. Individual containers shall not exceed forty-five and four tenths kilogram (45.4 kg) capacity for solids or a thirty-eight liters (38 L) capacity for liquids.
8. Incompatible materials shall be separated in accordance with NFPA 400.
9. Except for surfacing, floors shall be of non-combustible construction.
10. Aisles one and two tenths meters (1.2 m) in width shall be maintained on three (3) sides of the storage or display area.
11. Hazard identification signs shall be provided in accordance with para "H" of Division 5 of this Chapter and with NFPA 400.

E. Special Maximum Allowable Quantity Increases for Storage in Mercantile, Storage, and Industrial Occupancies.

The aggregate quantity of non-flammable solid and non-flammable or non-combustible liquid hazardous materials permitted within a single control area of a mercantile, storage, or industrial occupancy shall be permitted to exceed the MAQ specified in Annex A, Table 12, without complying with Protection Level 2, Protection Level 3, or Protection Level 4, provided that the quantities comply with Annex A, Table 21 and Annex A, Table 22 and that materials are displayed and stored in accordance with the special limitations in this Section.

SECTION 10.3.4.3 CONSTRUCTION REQUIREMENTS FOR CONTROL AREAS

A. The maximum number of control areas within a building shall be in accordance with Annex A, Table 23.

B. No special construction provisions shall be required, provided that only one (1) control area is present in a building

C. Control areas shall be separated from each other by fire barriers in accordance with Annex A, Table 23, provided that more than one (1) control area is present in a building.

SECTION 10.3.4.4 PROTECTION LEVELS

The occupancy shall comply with the requirements for Protection Level 1, Protection Level 2, Protection Level 3, or Protection Level 4, as required for the material in storage or use as defined in accordance with Chapter 6 through 21 of NFPA 400 and the latest edition of National Building Code of the Philippines (NBCP), provided that the quantity of hazardous materials in storage or use exceeds the MAQ for indoor control areas as set forth in Section 10.3.4.2 of this RIRR. Buildings required to comply with Protection Level 2 or 3 and containing quantities of high hazard contents exceeding the quantity limits set forth in Annex A, Table 24 shall be in accordance with NFPA 400 as applicable.

A. **Protection Level 1**

1. Buildings containing quantities of hazardous materials exceeding the MAQ of High-Hazard Level 1 contents permitted in control areas shall comply with applicable regulations for Protection Level 1.
2. High-Hazard Level 1 contents shall include materials that present a detonation hazard as defined in Section 10.3.3.2 of this RIRR.

B. **Protection Level 2**

1. Buildings, and portions thereof, containing quantities of hazardous materials exceeding the MAQ of High-Hazard Level 2 contents permitted in control areas shall comply with applicable regulations for Protection Level 2.
2. High-Hazard Level 2 contents shall include materials that present a deflagration hazard or a hazard from accelerated burning as defined in Section 10.3.3.2 of this RIRR.

C. **Protection Level 3**

1. Buildings, and portions thereof, containing quantities of hazardous materials exceeding the MAQ of High-Hazard Level 3 contents permitted in control areas shall comply with applicable regulations for Protection Level 3.
2. High-Hazard Level 3 contents shall include materials that readily support combustion or present a physical hazard as defined in Section 10.3.3.2 of this RIRR.

D. **Protection Level 4**

1. Buildings, and portions thereof, containing quantities of hazardous materials exceeding the MAQ of High-Hazard Level 4 contents permitted in control areas shall comply with applicable regulations for Protection Level 4.
2. High-Hazard Level 4 contents shall include materials that are acute health hazards as defined in Section 10.3.3.2 of this RIRR.

E. **Protection Level 5** shall apply to semiconductor fabrication facilities where required by the latest edition of NBCP.

SECTION 10.3.4.5 OUTDOOR CONTROL AREAS.

A. Hazardous materials shall be permitted to be stored or used in outdoor control areas in accordance with para "E" of this Section.

B. Compliance with the outdoor storage and use requirements shall not be required, provided that storage or use is in an outdoor control area,

C. Maximum Allowable Quantities (MAQ) of hazardous materials in an outdoor control area shall be as specified in Annex A, Table 21 and Annex A, Table 22 or Table 25.

D. Number of Outdoor Control Areas.

1. A single outdoor control area shall be permitted on any property.
2. A group of two (2) outdoor control areas shall be permitted where approved and where each control area is separated by a minimum distance of fifteen meters (15 m), provided that a property exceeds nine hundred twenty-nine square meters (929 m^2).
3. Additional groups of outdoor control areas shall be permitted where approved, provided that each group is separated by a minimum distance of ninety-one meters (91 m), provided that a property exceeds three thousand two hundred fifty–two square meters (3,252 m^2).

E. Outdoor Storage and Use Areas. Where the quantity of hazardous materials in outdoor storage or use exceeds the MAQ for outdoor control areas as set forth in Annex A, Table 25, the outdoor area shall comply with the applicable outdoor requirements of NFPA 400.

DIVISION 5. GENERAL REQUIREMENTS

A. The manufacture, storage, handling and use of hazardous materials and chemicals shall be safeguarded with protective facilities or devices as public safety may require.

B. The C/MFM having jurisdiction shall require the separation or isolation from other storage occupancies or buildings of any material or chemical that, in combination with other substances, may bring about a fire or explosion or may liberate a flammable or poisonous gas.

C. Globally Harmonized System Safety Data Sheet (GHS SDS), a document that describes composition of a material, hazardous properties and hazard mitigation, and disposal information, shall be made available at all times during fire safety inspection.

D. Storage, handling, and use of hazardous chemicals shall be in accordance with applicable Philippine National Standards (PNS) or internationally recognized standards.

E. Where stored for retail, storage shall be neat and orderly.

F. Cabinets for the storage of hazardous materials shall be approved and substantially constructed of one and twenty-five hundredths millimeters (1.25 mm) thick sheet iron or a minimum of two hundred fifty-four millimeters (254 mm) plywood or equivalent, painted with luminescent-type paint and shall be conspicuously labeled in red letters: **"HAZARDOUS - KEEP FIRE AWAY"** and with self-closing and self-latching doors.

G. Defective containers shall be disposed of or repaired in accordance with recognized safety practices. No spilled materials shall be allowed to accumulate on floors or shelves.

H. All hazardous chemicals as defined in this Chapter (specifically stored in buildings, storage and warehouses) shall either bear especially designed and color-coded labels consisting of four (4) diamonds arranged into one (1) large diamond indicating 1) its toxicity and health hazards; 2) its flammability; 3) its reactivity; and 4) firefighting and first aid instructions or appropriate color-coded labels based on the Globally Harmonized System (GHS) Classification and Labeling of Chemicals.

I. For hazardous materials to be transported, vehicles shall be properly marked with the corresponding GHS labels and markings, pursuant to the UN Recommendations on the Transport of Dangerous Goods, Models Regulation in accordance with Annex A, Table 26, *Classification and Labeling Summary Table*.

J. No person shall operate any tank vehicle transporting any corrosive cryogenic, hypergolic, or pyrophoric materials, unless at all time of such transportation there is displayed upon each side and the rear of the tank vehicle a sign in letter not less than seven hundred sixty-two millimeters (762 mm) in height upon a background of sharply contrasting color, which shall specifically designate the cargo.

K. All buildings and facilities shall have plan for the following during an emergency:

1. Internal security and safety operations;
2. Management of hazardous materials and waste;
3. Radioactive, biological, and chemical isolation and decontamination;
4. Control of entrance into the building/facility during emergencies;
5. Conduct of risk assessment with applicable authorities if it becomes necessary to control egress from the building/facility;
6. Control of people movement within the building/facility; and
7. Control of traffic access to the building/facility.

L. The storage areas for plastic-based, fire-supporting, fire-conductive, smoke generating, or toxic gas producing materials that are used as insulators or cushioning material for crates, boxes, walls, air conditioning ducts, beds, chairs, and the like shall be provided with automatic fire extinguishing systems of an approved type.

M. All hazardous materials enumerated in this Chapter shall be protected by automatic fire suppression system and other fire protection system appropriate to the type of hazard.

DIVISION 6. SPECIFIC REQUIREMENTS

A. Fire safety requirements for the storage, use, and handling of the following hazardous materials and Chemicals shall comply with applicable Philippine National Standards (PNS) or internationally-recognized standards.

B. Moreover, NFPA 400, *Hazardous Materials Code* and the following NFPA Codes or Standards shall also be used as the basis for fire and life safety requirements:

1. NFPA 30, *Flammable and Combustible Liquids Code*
2. NFPA 45, *Standard on Fire Protection for Laboratories Using Chemicals*
3. NFPA 51A, *Standard for Acetylene Cylinder Charging Plants*
4. NFPA 55, *Compressed Gases and Cryogenic Fluids Code*
5. NFPA 58, *Liquefied Petroleum Gas Code*
6. NFPA 59A, *Standard for the Production, Storage, and Handling of Liquefied Natural Gas (LNG)*
7. NFPA 99, *Standard for Health Care Facilities*
8. NFPA 395, *Standard for the Storage of Flammable and Combustible Liquids at Farms and Isolated Sites*
9. NFPA 430, *Code for the Storage of Liquid and Solid Oxidizers*
10. NFPA 432, *Code for the Storage of Organic Peroxide Formulations*
11. NFPA 490, *Code for the Storage of Ammonium Nitrate*

12. NFPA 495, *Explosive Materials Code*
13. NFPA 801, *Standard for Fire Protection for Facilities Handling Radioactive Materials*

C. Fire safety requirements for the transportation of hazardous materials and chemicals shall comply with applicable PNS; the Hazardous Materials Regulations of Title 49 (Transportation), US Department of Transportation-Code of Federal Regulations; or other internationally-recognized standards.

D. In case of conflict between the above-mentioned standards and the specific requirements mentioned in Division 7 of this Chapter, the specific requirements shall prevail.

DIVISION 7. MATERIAL-SPECIFIC REQUIREMENTS

SECTION 10.3.7.1 CELLULOSE NITRATE PLASTIC (PYROXYLIN)

All raw cellulose nitrate plastic (pyroxylin) materials shall be stored, handled, protected and displayed as follows:

A. **On Storage and Handling**

1. Cellulose Nitrate in excess of ten kilograms (10 kg) shall be stored in a vented and sprinklered cabinet or vault.
2. The maximum weight of raw materials to be stored in a cabinet shall be two hundred twenty-five kilograms (225 kg) with two (2) compartments equally divided.
3. The maximum weight of raw materials to be stored in a workroom shall be four hundred fifty kilograms (450 kg).
4. All raw materials in excess of four hundred fifty kilograms (450 kg) shall be stored in a vented vault with a capacity not exceeding forty-two cubic meters (42 m^3) with one (1) automatic sprinkler head for every three and a half cubic meters (3.5 m^3) of the total vault space.
5. Cellulose Nitrate Plastic shall not be stored in any room or compartment or within one meter (1 m) from any heat producing appliances, such as but not limited to steam pipes, radiators, chimneys, stove, torch, forge, flame, fire or electric, or similar equipment likely to produce spark.
6. In factories, operators working in a workroom using cellulose nitrate plastic shall be stationed at least one meter (1 m) apart, and the amount of material per operator shall not exceed one half (1/2) day supply and be limited to three (3) tote boxes.
7. All waste cellulose nitrate plastic materials such as shavings, chips, turnings, sawdust, edging and trimmings shall be stored under water in metal receptacles until removed from the premises.
8. Smoking shall be strictly prohibited in any building or establishment where cellulose plastic are stored, displayed or manufactured. A **"NO SMOKING"** sign shall be posted in conspicuous places.
9. The storage area of cellulose nitrate plastic shall be marked with a sign that states the following (or equivalent wording):

   "NITROCELLULOSE — FLAMMABLE SOLID — KEEP HEAT, SPARKS, AND FLAME AWAY"

B. **On Fire Protection**

1. All new and existing buildings or any portion thereof, including factories used for the manufacture or storage of articles of cellulose nitrate plastic (pyroxylin) in quantities exceeding forty-five kilograms (45 kg), shall be equipped with an approved, supervised sprinkler system and the storage area shall be constructed of fire resistive materials with two-hour (2-hr) fire resistance rating. The structural elements shall be of steel, iron, concrete or masonry construction.
2. Portable fire extinguishers shall be installed in buildings where storing, handling and displaying of cellulose nitrate plastic (pyroxylin) is conducted in accordance with Section 10.2.6.9 RIRR.

C. **On Display**

In stores or establishments, displays of cellulose nitrate plastic (pyroxylin) articles shall be in show cases or show windows.

Exception: Articles may be displayed and placed on tables, provided that:

1. It is not over nine hundred millimeters (900 mm) apart;
2. If displayed on counters, such counters shall be arranged in the following manner:
   a. Each table shall measure one meter (1 m) wide and three meters (3 m) long;
   b. The space beneath each table or counter shall be free of storage or obstruction of any kind; and
   c. The display tables shall be arranged and located so as not to obstruct the passage to exits in the event of emergency; and
3. Lights shall not be located directly above any cellulose nitrate material or storage, unless the light fixture is provided with a suitable guard to prevent heated particles from falling.

SECTION 10.3.7.2 COMBUSTIBLE FIBERS

All combustible fibers shall be stored, handled and protected as follows:

A. **On Storage and Handling**

1. Common Requirements:
   a. Combustible fibers shall not be stored in rooms or buildings with hazardous gases, flammable liquids, dangerous chemicals or other similar materials.
   b. Trucks or automobiles shall not enter any fiber storage room or building. They shall however be allowed to enter at loading platforms. All forklifts, vehicles and equipment used within combustible fibers storage areas shall be equipped with flash or spark suppressors or arresters.
   c. Smoking, open flame, and hot works, shall not be permitted in any area where combustible fibers are handled or stored. A **"NO SMOKING"** sign shall be posted.
   d. Agricultural products such as, but not limited to, straw and hay shall not be stored adjacent to buildings of combustible materials unless a clear distance equal to the height of the pile is maintained.
   e. Storage shall be limited to stocks of one hundred (100) metric tons. A fire resistive wall with a fire resistance rating of two (2) hours or a clear space of six meters (6m) shall be maintained between stacks.
   f. A one meter (1m) clearance shall be maintained between sprinkler pipes in protected storage vaults and top of the piles.
2. Specific Requirements for Loose Combustible Fibers
   a. Loose combustible fibers shall be stored as shown in Annex A, Table 27, *Storage of Combustible Fibers*.
   b. Loose combustible fiber exceeding twenty-eight cubic meters (28 m^3) but not more than seventy cubic meters (70 m^3) may be stored in a "loose house" or detached structure with opening properly protected against sparks and shall not be used for any other purpose.
3. Specific Requirements for Baled Combustible Fibers
   a. A single block or pile shall contain a maximum of seven hundred cubic meters (700 m^3) of baled fiber.
   b. Each block or pile shall be separated from the adjacent storage by an aisle measuring not less than one thousand five hundred millimeters (1,500 mm) wide or by barriers consisting of continuous sheets of non-combustible material extending from the floor to a height of at least three hundred millimeters (300 mm) beyond the topside of the piles.
   c. Fibers in bales bound with combustible tie ropes, as well as jute and other fibers liable to swell when wet shall be stored to allow for expansion in any direction and shall have one meter (1 m) clearance from walls to piles.
   d. If the storage compartment is less than nine meters (9 m) in width, there shall be a four

hundred fifty millimeters (450 mm) clearance from walls to piles and a center aisle of not less than one thousand five hundred millimeters (1,500 mm) width is maintained.

B. **On Fire Protection**

1. An approved, supervised sprinkler system shall be required in each building or portion thereof used for storage of combustible commodities when the area exceeds two thirds (2/3) of the sum of the floor area.
2. The design and installation of an approved, supervised sprinkler system shall conform to Section 10.2.6.7 of this RIRR.
3. Sprinkler discharge densities (liters/square meters) for combustible commodities not exceeding six and four tenths meters (6.4 m) in height shall conform to Annex A, Table 28, *Sprinkler Discharge Densities for Combustible Commodities Not Exceeding Six Hundred Forty Centimeters (640 cm) in Height, by Hazard Classification*.
4. The protection of combustible commodities six and four tenths meters (6.4 m) and seven and six tenths meters (7.6 m) in height will require up to thirty percent (30%) increase in the densities listed in the above table. Commodities piled more than seven and six tenths meters (7.6 m) in height will require multi-level sprinkler application.
5. Sprinkler system protecting combustible commodities shall be designed and installed to discharge the required water density within the following prescribed minimum areas, except that areas shall be not less than three hundred seventy square meters (370 m^2) in calculating water flows when densities of less than one thousand one hundred forty-one liters per minute per square meter (1,141 L/min/m^2) are specified:

   a. Low Hazard – three hundred seventy square meters (370 m^2)

   b. Average – three hundred seventy-eight square meters (378 m^2)

   c. High – four hundred eighteen square meters (418 m^2)

   d. Very High – five hundred fifty-seven square meters (557 m^2)
6. The above-listed minimum areas are based on the regulations for roof venting, draft curtains, aisle spacing, size pile and method of storage. Higher densities may be required in buildings that do not conform to these standards.
7. Sprinkler system shall be designed to utilize sprinklers with ordinal temperature classification, except that sprinklers with an intermediate classification may be used in the design of systems to protect high or very high hazard occupancies.
8. A minimum clearance of one meter (1 m) shall be provided between sprinkler deflectors and top of storage.
9. Draft curtains shall be provided to limit the area of sprinkler operation and to aid the operation of roof vents.
10. Draft curtains shall be at least two meters (2 m) in depth and shall be of noncombustible materials. In low or average hazard occupancies, draft curtains shall divide the under roof area into sections not to exceed nine hundred twenty-nine square meters (929 m^2). In high or very high hazard storage areas, draft curtains shall divide the under roof area into sections not to exceed five hundred fifty-seven square meters (557 m^2).
11. Portable fire extinguishers shall be installed in combustible commodities storage.

SECTION 10.3.7.3 MATCHES

Matches shall be stored, handled and protected as follows:

A. **On Storage and Handling**

1. In wholesale establishments with matches exceeding sixty (60) matchman's gross (14,400 matchsticks per matchman's gross) stored in shipping container, matches shall be arranged in piles not exceeding three meters (3 m) in height nor more than four hundred twenty-five cubic meters (425 m^3) in volume with aisles at least one and two tenths meters (1.2 m) wide between piles.
2. Where other materials or commodities are stored on the same floor with matches, a portion of the room shall be devoted to match storage exclusively, and a clear space of not less than one and a half meters (1.5 m) between match storage and such other materials or commodities shall be maintained.
3. Matches shall be stored in a building, trailer, semi-trailer, or metal shipping container with a two-hour (2-hr) fire resistance rating.

4. Matches shall not be stored within three meters (3 m) of any elevator shaft opening, open stairway, or other vertical opening.
5. Where shipping container that contains matches are opened, the contents shall be transferred to bins provided with metal-lined covers.
6. Where matches are sold in retail, original sealed packages shall be stored in shelves. When such packages are broken, individual boxes shall be stored in metal or metal-lined bins.

B. **On Fire Protection**

1. Smoking is prohibited in areas where matches are stored. A **"NO SMOKING"** sign shall be conspicuously posted in designated areas.
2. The owner shall be responsible for the prompt removal of any hazardous condition, accumulations of combustible materials, including proper maintenance of equipment and safety devices.
3. Approved, supervised sprinkler system and portable fire extinguishers shall be provided throughout the storage and manufacturing areas.

SECTION 10.3.7.4 MAGNESIUM

Magnesium shall be stored, handled and protected as follows:

A. **On Storage**

1. Magnesium ingots, pigs, and billets shall be carefully piled on firm and generally level areas. Any combustible material shall not be stored within a distance of seven and six tenths meters (7.6 m) from any pile of magnesium pigs, ingots, and billets.
2. Outdoor storage of magnesium pigs, ingots and billets shall be in piles not exceeding forty-five thousand four hundred kilograms (45,400 kg) each, separated by aisles with width not less than one half (1/2) the height of the pile.
3. Storage of pigs, ingots and billets in buildings shall be on floors of non-combustible construction. Floors shall be well drained from water. Each pile shall not be larger than twenty-three thousand kilograms (23,000 kg), and shall be separated by aisles with width not less than one half (1/2) the height of the pile.
4. All magnesium castings shall be clean and free of chips or fine particles of magnesium. The size of storage piles of heavy magnesium castings, either in cartons or crates or free of any packing material, shall be limited to thirty-six cubic meters (36 m^3). Aisle width shall be at least one half (1/2) the height of the piles and shall be at least three meters (3 m).
5. Piles of stored light magnesium castings, either in cartons or crates or without packing, shall be limited in size to twenty-eight cubic meters (28 m^3).
6. Aisle spaces in front of racks shall be equal to the height of the racks. All aisle spaces shall be kept clear.
7. Combustible rubbish, spare crates, and separators shall not be permitted to accumulate within the aisles between racks.
8. Wet magnesium scrap (chips, fines, swarf, or sludge) shall be kept under water in covered and vented steel containers at an outside location. Sources of ignition shall be kept away from the drum vent and top. Containers shall not be stacked.
9. Storage of dry scrap in quantities greater than one and four tenths cubic meters (1.4 m^3) shall be kept separated from other occupancies by fire-resistive construction without window openings or by an open space of at least fifteen meters (15 m). Such buildings shall be well-ventilated.
10. Magnesium powder shall be stored in steel drums or other closed conductive containers. The containers shall be tightly sealed and stored in a dry location.
11. Magnesium storage in quantities greater than one and four tenths cubic meters (1.4 m^3) shall be separated from storage of other materials that are either combustible or in combustible containers by aisles with a minimum width equal to the height of the piles of magnesium products.
12. Magnesium products stored in quantities greater than twenty eight cubic meters (28 m^3) shall be separated into piles each not larger than twenty eight cubic meters (28 m^3), with the minimum aisle width equal to the height of the piles but in no case shall be less than three meters (3 m).

13. Where storage in quantity greater than twenty-eight cubic meters (28 m^3) is in a building of combustible construction, or the magnesium is packed in combustible crates or cartons, or there is combustible storage within nine meters (9 m) of the magnesium, the storage area shall be protected by an automatic firefighting equipment.
14. The size of storage piles of magnesium articles in foundries and processing plants shall not exceed twenty-five cubic meters (25 m^3) and shall be separated by aisles of not less than one half (1/2) the height of the pile.
15. Storage in quantity exceeding one and four tenths cubic meters (1.4 m^3) of fine magnesium scrap shall be separated from other occupancies by fire-resistive construction without window openings or by an open space of at least fifteen and a half meters (15.5 m).
16. Storage in quantity greater than twenty-eight cubic meters (28 m^3) of fine magnesium scrap shall be separated from all buildings other than those used for magnesium scrap recovery operations by a distance of not less than thirty meters (30 m).

B. **On Handling and Processing**

1. Magnesium powder production plants shall be located on a site large enough, and shall be located at least ninety-one and a half meters (91.5 m) away from public roads and from any occupied structure, such as public buildings, dwellings, and business or manufacturing establishments, other than those buildings that are a part of the magnesium powder production plant.
2. Different production operations shall be located in separate but not adjoining buildings that are located at least fifteen meters (15 m) from each other.
3. All buildings used for the manufacture, packing, or loading for shipment of magnesium powders shall be single storey, without basements, constructed of non-combustible materials throughout.
4. Connecting ducts shall be completely without bends. Ducts shall be fabricated and assembled with a smooth interior, with internal lap joints pointing in the direction of airflow and without unused capped side outlets, pockets or other dead-end spaces.
5. At each operation, dust shall be collected by means of suitable hoods or an enclosure which is also connected to a blower located outdoors. Storage bins for powders should be sealed and purged with inert gas prior to filling.
6. Each machine shall be equipped with its individual dust separating unit. For multi-unit machines, not more than two dust-producing units may be served by one (1) separator.
7. The entire dust collection system shall be constructed of conductive material and shall be completely bonded and grounded. It shall not be provided with filters or other obstructions.
8. Dry dust collectors shall be located outside, in a safe location, and shall be provided with barriers or other means. The area around the collector shall be posted with the following:

   "**CAUTION: THIS DUST COLLECTOR CAN CONTAIN EXPLOSIBLE DUST. KEEP OUTSIDE THE MARKED AREA WHILE EQUIPMENT IS OPERATING.**"
9. All machines shall be provided with a pan or tray to catch chips or turnings, where they shall be collected every day. Magnesium fines shall be kept separated from other combustible materials.
10. All electrical wiring, fixture and equipment in the immediate vicinity of and attached to dust-producing machines, including those used in connection with separator equipment, shall be of types approved for use in Class II, Group E hazards [see the latest edition of National Building Code of the Philippines (NBCP)] and installed in accordance with the latest edition of Philippine Electrical Code (PEC).
11. The power supply to the dust-producing equipment shall be interlocked with the airflow from the exhaust blower and the liquid level controller of the wet-type dust collector.
12. All equipment shall be securely grounded by permanent ground wires.
13. In powder handling or manufacturing buildings and in the operation of dust-conveying systems, every precaution shall be taken to avoid sparks from static electricity, electrical faults, friction, or impact (e.g., iron or steel articles on stones, on each other, or on concrete).
14. Approved means shall be provided for control of magnesium fire in heat treating ovens.

15. Melt rooms shall provide access to facilitate fire control. Floors shall be of noncombustible construction and be kept clean and free of moisture and standing water.
16. Operators in melting and casting areas shall wear flame-resistant clothing, high foundry shoes, and face protection. Clothing worn where molten magnesium is present shall have no exposed pockets or cuffs.
17. Systematic cleaning of the entire grinding area, including roof members, pipes, conduits, etc., shall be carried out daily. Periodic inspections on buildings and machinery shall be carried out as frequently as conditions warrant.

C. **On Fire Protection**

1. Only approved Class D extinguishing agents or those tested and shown to be effective for extinguishing magnesium fires shall be permitted. A supply of extinguishing agent for manual application shall be kept within easy reach of personnel while they are working with magnesium. The quantity of extinguishing agent shall be sufficient to contain anticipated fires.
2. Dry sodium chloride, or other dry chemicals or compounds suitable for extinguishment or containment of magnesium fires, shall be permitted to be substituted for Class D fire extinguishers. All extinguishing materials shall be approved for use on magnesium fires.
3. Approved fire-extinguishing materials shall be provided for every operator performing machining, grinding or other processing operation on magnesium as follows:
   a. Within nine and fourteen hundredths meters (9.14 m), a supply of bulk dry extinguishing agents in an approved container with a hand scoop or shovel for applying the material; or
   b. Within twenty-two and eighty-six hundredths meters (22.86 m), an approved Class D portable fire extinguisher. Pressurized extinguishing agents shall be applied carefully on magnesium powder or chip fire, so as not to disturb or spread the magnesium powder.
4. Application of wet extinguishing agents accelerates a magnesium fire and could result in an explosion. The following agents should not be used as extinguishing agents on a magnesium fire because of adverse reaction:
   a. Water;
   b. Gaseous-based foams;
   c. Halon;
   d. Carbon dioxide; and
   e. Sand and other high Silicon Dioxide (SiO_2)-containing materials.

SECTION 10.3.7.5 FLAMMABLE AND COMBUSTIBLE LIQUIDS

All flammable and combustible liquids shall be stored, handled, transported, used and manufactured as follows:

A. **On Storage and Handling**

1. General Requirements

   Flammable and combustible liquid shall be stored on approved containers or tanks properly labeled with the physical properties of its content, flammability or combustibility and precautionary measures.

2. Specific Requirements for Portable Storage

   In the storage and dispensing of flammable and combustible liquids in safety cans, drums or other approved containers not exceeding two hundred twenty-seven liters (227 L) in individual capacity, and those portable tanks not exceeding two thousand four hundred ninety-eight liters (2,498 L) in individual capacity, on different types of occupancies, the following requirements shall be complied:

   a. Flammable or combustible liquids specified above shall not be stored near exits stairways or areas normally used as means of egress and ingress. It shall be stored either in storage cabinets or inside storage rooms.
   b. The storage of flammable and combustible liquids in closed containers shall comply with the following occupancy schedule:
      1) Residential occupancies with not more than three (3) dwelling units with detached

garages shall store flammable and combustible liquids up to a maximum of ninety-four liters (94 L).

2) Assembly, business and residential occupancies with more than three (3) dwelling units shall store Class I and Class II flammable and combustible combined liquids up to a maximum of thirty-eight liters (38 L) or two hundred twenty-seven liters (227 L) of Class IIIA liquids.

3) Educational, healthcare, and detention and correctional occupancies shall store flammable and combustible liquids up to a maximum of four liters (4 L).

4) Mercantile and industrial occupancies, where rooms or areas are accessible to the public, storage shall be limited to quantities needed for display and normal merchandising purposes which shall not exceed eighty-one liters (81 L) per square meter of gross floor area.

c. In rooms or areas not accessible to the public, storage shall be limited to two hundred twenty-seven liters (227 L) of Class IA, four hundred fifty-four liters (454 L) of Class IB, six hundred eighty-one liters (681 L) of Class 1C, nine hundred eight liters (908 L) of Class II, one thousand eight hundred ninety-three liters (1,893 L) of combustible liquids or any combination of flammable liquids totaling nine hundred eight liters (908 L).

d. Containers less than one hundred thirteen liters (113 L) capacity shall not be stacked more than one meter (1 m) or two (2) containers high, whichever is greater, unless on fixed shelving or otherwise satisfactorily secured. Containers more than one hundred thirteen liters (113 L) shall not be stacked one upon the other. All containers shall be stored in an upright position.

e. Shelving shall be in a stable construction, of sufficient depth and so arranged that containers therein will not be easily displaced.

f. Leaking containers shall be secured immediately from any possible source of ignition and the contents of which shall be transferred to an approved container and placed to a safe location not accessible to the public. The spill shall be appropriately contained and collected for proper waste disposal.

g. Dispensing of Class II or III liquids from a single container having a capacity of more than two hundred twenty-seven liters (227 L) may be permitted outside of storage and handling room, using dispensing device and fire control measures. Both the dispensing container and any reserve containers shall be considered as contributing to the total allowed capacity under para "e" above.

h. No pile shall be closer than one meter (1 m) to the nearest beam, chord, girder or other obstruction, and shall be one meter (1 m) below sprinkler deflectors, or discharge orifices of water spray, or other overhead fire protection systems or other obstructions.

i. Solid or palletized pile storage shall be so arranged that piles are separated from each other by at least one and two tenths meters (1.2 m) wide aisle.

j. Main aisle shall be provided with a minimum width of two and four tenths meters (2.4 m) or of a width providing sufficient space to operate a forklift truck, whenever necessary.

k. Where the storage of liquid is on racks, a minimum of one and two tenths meters (1.2 m) wide aisle shall be provided between adjacent rows of racks and adjacent storage of liquids.

l. Where ordinary combustible commodities are stored in the same area as liquids in containers, the minimum distance between the two (2) types of storage shall be two and four tenths meters (2.4 m) wide aisle.

m. Storage cabinets may be used where it is desired to keep more than thirty-eight liters (38 L) of flammable or combustible liquids inside buildings. Individual container shall not exceed nineteen liters (19 L) capacity and not more than one hundred ninety liters (190 L) shall be stored in one cabinet.

n. Storage cabinets shall be approved and shall be substantially constructed to one and two tenths millimeters (1.2 mm) sheet iron or twenty-five and four tenths millimeters (25.4 mm) plywood or equivalent. A minimum of fifty millimeters (50 mm) sill shall be provided, and cabinet shall be liquid tight to the top of the sill.

o. Doors shall be equipped with latching device. Cabinets shall be painted with an

approved intumescent type Fire 1 retardant paint. Cabinets shall be conspicuously labeled in red letters **"FLAMMABLE LIQUIDS"**.

p. Storage cabinets shall be located at least eight meters (8 m) away from any source of ignition.

q. Inside storage and handling rooms shall be constructed to meet the required fire-resistive rating. An approved, supervised sprinkler system shall be installed:

   1) Opening to other rooms or buildings shall be provided with noncombustible liquid-tight raised sills or ramps at least one hundred millimeters (100 mm) in height or the floor in the room shall be at least one hundred millimeters (100 mm) below the surrounding floors. A permissible alternate to the sill or ramp is an open-grated trench inside the room. A downgraded flooring shall be provided for spillage which drains to a safe location or an open-grated trench.

   2) The room shall be provided with approved self-closing fire doors. Where other portions of the building or other properties are exposed, windows shall be of fire rated construction and properly sealed to avoid the spread of vapor. Wood of at least twenty-five and four tenths millimeters (25.4 mm) nominal thickness may be used for shelving rack, dunnage scuff boards, floor overlay and similar installations.

   3) Ventilation shall be designed to provide for a complete change of air within the room at least six (6) times per hour. Ventilation shall be installed in accordance with the provisions of NFPA 91, *Blower and Exhaust System*. It shall be controlled by a switch located outside the door. The ventilation equipment and any lighting fixtures shall be operated by the same switch. A pilot light shall be installed adjacent to the switch if Class I flammable liquids are dispensed or used within the room.

   4) Inside storage and handling rooms shall contain at least one (1) aisle with a minimum width of one meter (1 m). Storage shall not be closer than one meter (1 m) to ceiling, or sprinkler heads or other obstructions.

   5) Stacking of containers shall be in accordance with Annex A, Table 29, *Indoor Portable Container Storage for Flammable Liquids*.

   6) Inside storage and handling room shall comply with approved, supervised sprinkler system as shown in accordance with Annex A, Table 30, *Sprinkler Systems for Inside Storage and Handling Rooms of Flammable Liquids*.

r. Outside Storage

   1) Storage of over one hundred (100) drums of Class I liquids shall be limited to groups of one hundred (100) drums, located at least eighteen meters (18 m) from the nearest building or line of adjacent property and each group shall be separated by at least twelve meters (12 m).

   2) Storage of over three hundred (300) drums of Class II or III liquids shall be limited to groups of three hundred (300) drums located at least fifteen meters (15 m) from the nearest building or line of adjoining property and each group shall be separated by at least nine meters (9 m).

   3) The drum shall be stored in a safe location to prevent runoff or drainage toward other storage of buildings. The area shall be kept clear of grass weeds and other foreign combustibles. Signs shall be posted prohibiting open flames and smoking. Fences or other control measures shall be provided where necessary to protect against tampering or trespassers.

   4) Storage of flammable or combustible liquids in closed containers, in quantities of eighteen thousand nine hundred twenty-five liters (18,925 L) or less, outside of buildings shall be located with respect to buildings or line of adjoining property as shown in Annex A, Table 31, *Storage of Flammable or Combustible Liquids in Closed Containers Outside of Buildings*. These distances may be reduced with respect to warehouses and industrial buildings or noncombustible or fire-resistive construction.

   5) In occupancies where the public is invited or allowed to enter, the above distances shall be double.

   6) Combustible materials shall not be stored or be permitted to accumulate adjacent to flammable or combustible liquid storage outside of buildings in such

a manner that constitutes a dangerous exposure to the liquid storage in event of fire. A distance of not less than four and a half meters (4.5 m) shall be maintained between the liquid storage and any combustible materials.

7) Storage limitation of portable tanks of flammable and combustible liquids shall be in accordance with Annex A, Table 32, *Outdoor Portable Tank Storage*.

s. Dispensing

1) The dispensing of flammable or combustible liquids is limited to not more than one hundred eight liters (108 L) per container drum at any time and shall be by approved pumps taking suction through the top of the container.

2) All mixing, blending, and similar operations involving the use of flammable or combustible liquids shall be performed in an inside storage and handling room of two-hour (2-hr) fire-resistive construction.

t. Fire Protection

The following are requirements for fire protection in the storage of flammable liquids:

1) Approved portable first aid fire protection appliances;

2) Approved, supervised sprinkler system;

3) Pre-connected hose line of thirty-eight and one tenth millimeters (38.1 mm) diameter;

4) Open flames, smoking and other sources of ignition, shall not be permitted in flammable or combustible liquid storage rooms. A **"NO SMOKING"** sign shall be posted; and

5) Materials, which react with water or other liquids to produce a hazard, shall not be stored in the same room with flammable or combustible liquids.

3. Specific Requirements for Bulk Plant and Storage

In the storage and dispensing of flammable and combustible liquids in bulk and bulk plant, the following requirements shall be complied:

a. Class I, Class II and Class III flammable liquids shall be stored in closed containers with a capacity exceeding that of portable tanks. Such tanks may be stored aboveground or underground outside the building.

b. For aboveground tanks:

1) Tanks shall be installed or rest on the ground and on concrete foundation, masonry, piling or steel. Tank foundation shall be designed to minimize the possibility of uneven settling of the tank and to minimize corrosion in any part of the tank resting on the foundation.

2) Tank support for Class I, Class II or Class III liquids shall be installed on a firm foundation either of masonry or steel.

3) Steel supports or exposed piling shall be protected with materials having a fire resistance rating of not less than two (2) hours; except that when it is supported by steel saddle, it shall not be less than three hundred millimeters (300 mm) high at the lowest point.

4) Tanks when supported by sphere, special engineering considerations shall be required to prevent excessive concentration of loads on the supporting portion of the shell.

5) For tanks located in an area subject to flooding, precautions shall be undertaken to prevent it from floating during rise of water level.

c. For underground tanks:

1) Underground tank storage for Class I, Class II or Class III liquids shall be covered with a minimum of six hundred millimeters (600 mm) earth or shall be covered with not less than three hundred millimeters (300 mm) of earth on top of which shall be placed a slab of reinforced concrete not less than one hundred millimeters (100 mm) in thickness.

2) Tanks subjected to traffic shall be protected against damage from vehicles passing over them by at least nine hundred millimeters (900 mm) of earth cover or five hundred millimeters (500 mm) of well tamped earth, and topped with

fifty millimeters (50 mm) of concrete or two hundred millimeters (200 mm) of asphalted concrete.

3) Asphalted or reinforced pavement used as part of the protection of the tank shall be extended at least three hundred millimeters (300 mm) horizontally beyond the outline of the tank in all directions.

4) Where tank may become buoyant due to rise in the level of water table or due to location in area that may be subjected to flooding, suitable precautions shall be observed to anchor the tank in place.

d. Piping systems:

1) The design, fabrication, assembly, test, and inspection of piping systems containing flammable and combustible liquids shall be suitable for the expected working pressures and structural stresses in conformity with the internationally accepted standards.

2) Joints shall be made liquid-tight and shall be either welded, flanged, or threaded, except that listed flexible connectors shall be permitted to be used where installed.

3) Threaded joints shall be made up tight with a suitable thread sealant or lubricant. Joints in piping systems handling Class I liquids shall be welded when located in concealed spaces within buildings.

4) Pipe joints, dependent upon the friction characteristics or resiliency of combustible materials for mechanical continuity or liquid-tightness of piping, shall not be used inside buildings. They shall be permitted to be used outside of buildings aboveground or underground. If used aboveground or outside of buildings, the piping shall either be secured to prevent disengagement at the fitting, or the piping system shall be so designed that any spill resulting therefrom will not expose, cause damage or harm to persons, buildings or structures and could be readily controlled by remote valves.

5) Pipe systems shall contain a sufficient number of valves to operate it properly and to protect the plant. Pipe systems connected to pumps shall contain a sufficient number of valves to control properly the flow of liquid in normal operation and in event of physical damage. Connection to pipe lines of equipment, such as tank cars or tank vehicles discharging flammable or combustible liquids into storage tanks by means of pump, shall be provided with check valves for automatic protection against backflow.

e. Vents location, arrangement, size and piping:

1) Vent pipes from tanks storing flammable or combustible liquids shall be so located that the discharge point is outside of buildings; and shall terminate not less than two and forty-two hundredths meters (2.42 m) above the fill pipe opening and not less than three and sixty-four hundredths meters (3.64 m) above the adjacent ground level. Vent pipes shall discharge only upward or horizontally (not downward) in order to disperse vapors. Vent pipes fifty millimeters (50 mm) or less in nominal inside diameter shall not be obstructed by devices that will reduce their capacity and thus cause excessive backpressure. Vent pipe outlet shall be so located that flammable vapors will not enter building openings or to be trapped under the eaves of other obstructions. If the vent pipe is less than three meters (3 m) in length or greater than fifty millimeters (50 mm) in nominal inside diameter, the outlet shall be provided with a vacuum and pressure relief device, or there shall be an approved flame arrester located in the vent line at the outlet. In no case shall a flame arrester be located more than four and a half meters (4.5 m) from the outlet and from the vent line.

2) Vent lines from tanks shall not be used for any other purpose.

3) Each tank shall be vented through piping adequate in size to prevent blowback of vapor or liquid at the fill opening while tank is being filled. Vent pipes shall not be less than thirty-two millimeters (32 mm) in nominal inside diameter.

4) Vent pipes shall be so laid as to drain toward the tank without sags or traps in which liquid can collect. They shall be so located that they will not be subjected to physical damages. Vent pipes from tanks storing the same class of liquids may be connected into one outlet pipe. The outlet pipe shall be at least one pipe size larger than the largest individual vent pipe connected thereto. In no case shall

the point of connection between vent lines be lower than the top of any fill pipe opening. The lower end of a vent pipe shall enter the tank through the top and shall not extend into the tank more than twenty-five and four tenths millimeters (25.4 mm).

f. Fill and discharge lines for Class I, II and III liquids, where practical, shall enter tanks only through the top and shall be graded toward the tank.

g. The fill-pipe opening shall be located outside of a building. For flammable and combustible liquid storage, the fill-pipe opening shall not be less than one thousand five hundred millimeters (1,500 mm) from any door or cellar opening. The fill-pipe for filling by tank car or tank truck shall not be larger than one hundred millimeters (100 mm) in nominal inside diameter and shall not be constricted. Fill-pipe opening shall be identified by a definite color scheme or other means.

h. Gauge openings, if independent of fill-pipe, shall be provided with a liquid-tight cap or cover. If inside a building, each opening shall be protected against liquid overflow and possible vapor release by means of a spring loaded check valve or other approved device.

i. Tanks used for storage of flammable or combustible liquids shall not be installed inside buildings except in industrial establishments, processing plants and service stations.

j. The storage of flammable and combustible liquids in aboveground tanks outside of buildings shall be restricted within the limits established by law or zoning ordinances.

k. Tank Loading and Unloading Facilities

In the loading and unloading of flammable and combustible liquids, the following requirements shall be complied:

1) Noncombustible materials shall be used for the construction of loading racks facilities.

2) Tank car loading or unloading facilities shall have a distance of at least seven and six tenths meters (7.6 m) for Class I liquids and at least four and six tenths meter (4.6 m) for Class II and Class III liquids, measured from the nearest fill spout or (liquid or vapor) transfer connection. Buildings for pumps or shelters for personnel may be a part of the facility.

3) Equipment such as piping, pumps and meters used for the transfer of Class I liquids between storage tanks and the fill stem of the loading rack shall not be used for the transfer of Class II or Class III liquids.

4) Remote pumps located in underground tanks shall be installed on the pump discharge side. A listed and approved leak detection device that will provide an indication if the piping system is not essentially liquid tight shall be installed. This device shall be checked and tested at least annually according to the manufacturer's specifications to insure proper installation and operation.

5) Loading at the top of a tank vehicle with Class I and Class II liquid without vapor control is allowed if the following is complied:

a) The valve used for the final control of the flow shall be of the self-closing type and shall be manually held open; and

b) Automatic means are provided for shutting off the flow when the tank is full.

6) When bottom loading a tank vehicle, with or without vapor control, a positive means shall be provided for loading a predetermined quantity of liquid, together with an automatic secondary shutoff control to prevent overfill. The connecting components between the loading rack and the tank vehicle required to operate the secondary control shall be functionally compatible.

7) When bottom loading a tank vehicle that is equipped with vapor control, but when vapor control is not used, the tank shall be vented to the atmosphere to prevent pressurization of the tank. Such venting shall be at a height not lower than the top of the cargo tank on the vehicle.

8) When bottom loading a tank vehicle, the coupling between the liquid loading hose or pipe and the truck piping shall be by means of a dry disconnect coupling.

9) Connections to the plant vapor control system shall be designed to prevent the escape of vapor to the atmosphere when not connected to a tank vehicle.

10) Loading rack facilities shall be equipped with protection against static sparks during truck filling. Protection shall consist of a bare metallic bond wire permanently electrically connected to the fill stem or some part of the fill-stem piping. The free end of such wire shall be provided with a clamp or similar device for convenient attachment to some metallic part of the cargo tank of the tank vehicle. The bond wire connection shall be securely fastened prior to the opening of the dome cover. It shall be maintained in place during the entire filling operation and the dome covers shall be closed before the bond wire is disconnected from the cargo tank.

11) Each loading rack facility or property upon which a loading rack facility is located shall be surrounded by a fence not less than one and a half meters (1.5 m) high, constructed of wire mesh, metal sheet or masonry.

12) No person shall load or unload, or allow the loading or unloading of a tank vehicle, unless such vehicle is entirely within such enclosure. No person shall drive or allow the driving of any tank vehicle, into or from the premises of a bulk plant, except while traveling in a forward direction.

13) There shall be installed on each loading rack facility, riser pipe between the ground and the outlet, and at least two (2) valves, one being of the lever-operated type and the other is of the self-closing type, which may be readily operated from the loading rack facility platform or top of the vehicle being filled. It shall be unlawful for any person to tie or unlock such self-closing valve in the open position.

14) Class I flammable liquids shall not be dispensed into containers unless:

a) the nozzle and container are electrically inter-connected;

b) the metallic floor plate on which the container stands while filling is electrically connected to the fill stem; or

c) the fill stem is bonded to the container during filling operations by means of a bond wire.

l. Drainage and Waste Disposal

1) Flammable or combustible liquids spilled at the loading or unloading areas shall not be directly discharged into the public sewer and drainage system or natural waterways. Grading driveways or intercepting canals with trench grating connected to separator pits and/or other equally effective means shall be constructed.

2) Used or accumulated residues of flammable or combustible liquids shall not be dumped on the ground, into sewers, drainage ditches or storm drains, but shall be stored in tanks or tight drums outside of any building until removed from the premises.

3) In buildings, rooms or other confined spaces in which flammable or combustible liquids are stored, no combustible waste materials shall be allowed to accumulate.

m. Electrical Equipment

All electrical wirings and electrical equipment located within seven and a half meters (7.5 m) of any portion of the loading rack facility shall be designed, operated and installed in accordance with the latest edition of the PEC.

n. Testing

All tanks, whether shop-built or field erected, shall be tested. All piping, before being covered, enclosed, or placed in use, shall be hydrostatically tested to one hundred fifty percent (150%) of the maximum anticipated pressure of the system, or pneumatically tested to one hundred ten percent (110%) of the maximum anticipated pressure of the system but not less than thirty-four and a half kilopascals (34.5 kPa) gauge at the highest point of the system. This test shall be maintained for a sufficient time to complete visual inspection of all joints and connections, but for at least ten minutes (10 min). A certificate of testing shall be submitted to the C/MFM having jurisdiction.

o. Abandonment of Tanks

1) Any tank not used for a period of ninety (90) days, shall be properly safeguarded or removed in a manner approved by the C/MFM having jurisdiction.

2) Tanks "temporarily out of service" shall have fill line, gauge opening and pump connection secured against tampering. Vent lines shall remain open and maintained in accordance with the requirements of this Rule for vent lines.

3) Any aboveground tank, which has been abandoned for a period of one (1) year, shall be removed from the property in a manner approved by the C/MFM having jurisdiction.

4) Any underground tank, which has been abandoned for a period of one (1) year, shall be removed from the ground and the hole properly filled.

5) Tanks which are to be reinstalled for flammable or combustible liquid service shall comply the same requirements in the installation of tanks.

6) Tanks which are to be placed back in service shall be tested accordingly.

p. On Fire Protection

1) Flammable or combustible liquids shall not be handled, drawn or dispensed where flammable vapors may reach a source of ignition. Smoking shall be prohibited except in designated locations. **"NO SMOKING"** signs shall be posted in conspicuous places where hazard from flammable vapors is normally present.

2) Foam fire protection shall be provided for any aboveground tank, except floating roof type, or pressure tanks operating at or above seventy and four tenths grams (70.4 g) per square centimeter gauge pressure, and used for the storage or handling of Class I flammable liquids, such that tank or group of tanks are spaced less than fifteen meters (15 m) apart, shell to shell, has a liquid surface area in excess of one hundred forty square meters (140 m^2).

3) Legible signs shall be maintained at the entrance gate or gates of each bulk plant and near each loading rack facility with the words **"NO SMOKING"**. Restriction on the use of electronic devices within the premises of bulk plants shall be observed.

4) Signs identifying the pump master switch shall be labeled **"EMERGENCY PUMP SHUTOFF".**

5) The master switch on all individual pump circuits switches shall be set in the **"OFF"** position before closing the services station for business at any time.

6) Pressure system shall incorporate with each turbine, an indicator light illuminated when the turbine is running. Said light shall be visible from the dispensing pump island, and suitably identifiable as to the system served.

4. Service Stations for Automobile

a. Service stations shall be constructed with facilities for storage, handling and dispensing of flammable and combustible liquids, including its equipment, appurtenances and service area in either inside or outside buildings.

b. Service stations or portions thereof where flammable gases such as but not limited to liquefied petroleum gases (LPG), liquefied natural gases (LNG), or compressed natural gases (CNG) shall be governed in a separate rule.

c. Buildings used for office, grocery store, rest room, utility room and the like shall conform to the succeeding paragraphs.

1) The service station location standard for facilities, clearances and distance applicable to all kinds of lots from mid-block lot, corner lot and passing-thru lot shall comply with the standards set forth under Philippine National Standards (PNS) on "*Petroleum Products-Retail Outlet-Health, Safety and Environment*" - PNS/DOE FS 1-1:2005.

2) Apparatuses dispensing Class I flammable liquids into the fuel tanks of motor vehicles of the public shall not be located at a bulk plant, unless separated by a fence or similar barrier from the area in which bulk operations are conducted.

3) Tanks shall be located to minimize the amount of maneuvering necessary for the tank truck making the product delivery to reach the fill openings, whenever possible. Deliveries shall be accomplished without the need for the truck to move or travel in reverse.

4) Tanks shall be located so that the tank truck making the product delivery will not be on public right of way, block motorists' views of roadway, or impede the flow of vehicles or pedestrians.

5) Tank edge shall not be less than one meter (1 m) from the property line or any other buildings or structures. If soil stability creates concern, qualified professional assistance is recommended.

6) Underground tanks or tanks under buildings shall be so located with respect to existing building foundation and support so that the load carried by the latter cannot be transmitted to the tanks.

7) Dispensing devices at automobile service stations shall be located that all parts of a vehicle being serviced are within the premises of the service station.

8) Dispensing devices at automobile service stations shall be located not less than six meters (6 m) from any building openings and public ways. Such dispensing devices shall also be so located that the nozzle, when hose is fully extended, shall not reach within one and a half meters (1.5 m) of any building opening.

9) All dispensing devices shall be mounted on a concrete island or shall otherwise be protected against collision damage by an acceptable means. Dispensing device shall be securely bolted in place. Dispensing devices shall be installed in accordance with the manufacturers' instruction. The minimum height of the concrete island shall be not less than one hundred fifty millimeters (150 mm).

10) Emergency controls shall be installed at a location acceptable to the C/MFM having jurisdiction, but controls shall be not more than thirty meters (30 m) from dispensers.

d. On Storage and Handling

1) Class I liquid shall be stored in closed containers or tanks located underground or in special enclosures.

a) Special enclosures shall be liquid and vapor tight without backfill. The sides, top and bottom of enclosures shall be of reinforced concrete at least one hundred fifty millimeters (150 mm) in thickness, with openings for inspection through the top.

b) Tank connection shall be a closed pipe connection or installation. Precautionary measures shall be provided whereby portable equipment may be employed to discharge to the outside any vapors, which might accumulate, should leakage occur.

2) Class I liquids shall not be stored or handled within a building having a basement or pit into which flammable vapors may travel unless such area is provided with ventilation designed to prevent the accumulation of flammable vapors therein.

3) Aboveground tanks located in an adjoining bulk plant may be connected by piping to service station underground tanks. An emergency shut-off valve shall be provided within the control of service station personnel.

4) Flammable and combustible liquids may be stored in an approved container inside service station buildings, provided that the following conditions are observed:

a) Class I liquids stored in approved closed containers of aggregate capacity not exceeding four hundred fifty-four liters (454 L), provided that a single container shall not exceed two hundred twenty-seven liters (227 L) capacity and equipped with an approved pump; and

b) Class II and III liquids stored in approved containers of not exceeding four hundred fifty-four liters (454 L) capacity for each class, with an aggregate capacity not exceeding nine hundred eight liters (908 L).

5) Piping, valves and fittings shall be in accordance with the provisions of Specific Requirement for Bulk Plant and Storage.

6) Class I liquids shall not be dispensed or transferred within a service station building, except:

a) when the dispensing device is connected to any pump motor circuit energized by a switch located on each dispenser and can be operated by removal or displacement of the nozzle in its bracket;

b) a clearly labeled manually operated pump master switch is provided in an approved location, within twenty-two meters (22 m) of, but not nearer than, four and six tenths meters (4.6 m) to any dispensing device. Where such master

switch is not visible from all dispensing devices, the location thereof shall be indicated by approved signs;

c) signs identifying the pump master switch shall be labeled **"EMERGENCY PUMP SHUTOFF"**;

d) the master switch on all individual pump circuits switches shall be set in the **"OFF"** position before closing the service station for business; and

e) pressure system shall incorporate with each turbine an indicator light illuminated when the turbine is running. Said light shall be visible from the dispensing pump island, and suitably identifiable as to the system served.

7) Class II and III liquids may be dispensed in lubrication or service station buildings, provided that flammable vapors do not reach heating equipment or other sources of ignition. Smoking shall be prohibited except in designated locations. **"NO SMOKING"** signs shall be posted in conspicuous areas where hazard from flammable vapors is normally present.

8) No delivery of any flammable or combustible liquid shall be made in portable containers, unless such container is of approved material and construction, having a tight closure with screwed or spring cover, so designed that the contents can be dispensed without spilling. The dispensing of flammable liquids into fuel tanks of vehicles or into a container shall at all times be under the supervision of a qualified attendant, except in service stations not open to the public. Such stations may be used by commercial, industrial, governmental or manufacturing establishments for fueling vehicles used in connection with their activities or operation. However, personnel of such establishments shall have knowledge and skills in dispensing flammable and combustible liquids.

9) Dispensing Services

a) Flammable and combustible Class I liquids shall be transferred from underground tanks by means of fixed pumps designed and equipped to allow control of the flow and to prevent leakage or accidental discharge. Supplemental means shall be provided outside of the dispensing device whereby the source of power may be readily disconnected in the event of fire or other related accidents.

b) Dispensing pumps that take suction at the top of the container shall be of approved type as UL and FM -listed or other equivalent internationally accepted standard.

c) Any device that operates through pressure within a storage tank or container shall not be allowed, unless the tank or container has been approved as pressure vessels. In no case shall air or oxygen pressure be used for dispensing flammable and combustible liquids.

10) Pumps pressure delivery on service station shall be installed above grade level outside of buildings and shall be located not less than three meters (3 m) from line of adjoining property of noncombustible materials with at least one (1) hour fire resistance rating or from a property line that abut upon a public right-of-way or thoroughfare.

a) Pumps installed above grade level shall be mounted on a concrete foundation and shall be protected against possible damage by vehicles.

b) Submersible or subsurface pumps shall be installed in accordance with approved standards.

11) Special dispensing device

a) Approved type are those but not limited to self-service and remote preset types. At least one (1) qualified attendant shall be on duty while the station is open to the public. The attendant's primary function shall be to supervise, observe and control the dispensing of Class I flammable and combustible liquids. It shall be the responsibility of the attendant to see to it that the dispensing of Class I liquids are in approved portable containers.

b) The attendant or supervisor on duty shall be capable of performing the functions and assuming the responsibilities covered as mentioned hereof.

c) Instructions for the operation of dispensers shall be posted in conspicuous places.

d) Remote preset type devices are to be in the **"OFF"** position while not in use so that dispensers cannot be activated without the knowledge of the attendant.

12) If the dispensing of Class I liquids at a service station available and open to the public is to be done by a person other than the service station attendant, the nozzle shall be of a listed and approved automatic closing type.

13) Every service station open to the public shall have an attendant or supervisor on duty duly qualified and/or trained by the BFP.

14) Piping, Valves and Fittings

a) Piping valves and fittings shall be designed for the working pressure and structural stresses to which they may be subjected. They shall be galvanized or otherwise protected against external corrosion with an approved material. All threaded joints or connections shall be made up tight with the use of an approved pipe joint sealing compound.

b) A check or manual valve shall be provided in the discharge dispensing supply line from the pump with a union between the valve and the same pump discharge.

c) An approved impact valve, incorporating a fusible link, designed to close automatically in the event of severe impact or fire exposure, shall be properly installed, rigidly mounted, and connected by a union in the dispensing supply line at the base of each dispensing device.

d) After completion of the installation, the system shall be tested.

15) All electrical equipment, wiring and wiring devices for service stations shall comply with the latest edition of the PEC.

16) Classified area shall not extend beyond the unpierced wall or other solid partition as shown in Annex A, Table 33, *Electrical Equipment Hazardous Area Service Stations*.

17) Drainage and waste disposal

a) Flammable or combustible liquids spilled within the premises of service stations shall not be directly discharged into the public sewer and drainage system or natural waterways. Precautionary measures to contain such spill shall be adopted but not limited to grading driveways or intercepting canals with trench grating for containment leading to a catch basin with a capacity that can accommodate the contents of the largest compartment of the tank vehicle being dispensed.

b) Used or accumulated residues of flammable or combustible liquids from separator pits and/or other equally effective means shall not be dumped on the ground, into sewers, drainage ditches or storm drains, but shall be stored in tanks or tight drums outside of any building until removed from the premises.

c) Pits intended to contain subsurface pumps or fittings from submersible pumps shall not be longer than necessary to contain the intended equipment and to permit the free movement of hand tools operated from above grade.

d) Pits and covers shall be designed and constructed to withstand the external forces to which they may be subjected. When located above any underground tank, at least three hundred millimeters (300 mm) of earth or sand cover shall be maintained over the top of the tank.

e) Pits shall be protected against ignition of vapors by any of the following methods:

i. Sealing the unpierced cover with mastic or by bolting against a gasket in an approved manner.

ii. Filling the pit with a noncombustible inert material.

4. Service stations inside buildings

a. Service stations inside buildings shall be separated from other portions of the building by wall, partition, floor, or floor-ceiling assemblies having a fire resistance rating of not less than two (2) hours.

b. The dispensing area shall be located at street level, with no dispensing device located more than fifteen meters (15 m) from which vehicles exit to, or entrance from, the outside of the building. Such area shall also be provided with an approved

mechanical or gravity ventilation system. Ventilating systems shall be electrically interlocked with Class I dispensing devices so that the same cannot be operated unless the ventilating fan motors are energized.

c. Dispensing shall be limited to the area required to serve not more than four (4) vehicles at a time;

d. Where an outside location is impractical, dispensing devices may be approved inside garages or similar establishments that store, park, service or repair automotive equipment, provided that the following requirements are complied:

1) The dispensing device shall be located in a well ventilated area of fire-resistive construction, and shall not be less than six meters (6 m) from any activity involving sources of ignition;

2) It shall be protected against physical damage from vehicles by mounting impact barriers on a concrete island or by equivalent means, and shall be located in a position where it cannot be stuck by vehicle descending a ramp or other slope out of control; and

3) A remote emergency shutoff electric power to the dispensing unit and the pump supplying it shall be provided at an accessible location and shall be clearly labeled as to its intended purpose.

e. Fire Protection

1) A minimum classification of Class 5-B or C fire extinguishers shall be provided and so located that no pump, dispenser or fill-pipe opening shall be of a greater distance than nine and fifteen hundredths meters (9.15 m) from such extinguishers and shall be readily accessible where fires are likely to occur.

2) Placement and size of fire extinguishers shall be in accordance with Annex A, Table 34, *Fire Extinguisher Size and Placement for Class B Hazards*.

3) Existing service stations with dispensing areas located below street level may be permitted, provided that an approved automatic sprinkler system is installed and the provision of para e.1 above shall be complied.

f. Safety Precaution

1) The engine of all vehicles being fueled shall be shut-off during fueling or re-fueling.

2) Smoking, use of electronic devices and open flames are strictly prohibited in areas where flammable or combustible liquids are dispensed.

3) Signs of the above prohibitions shall be posted within the premises of the service station. A warning sign shall be conspicuously posted in the dispensing area indicating that it is unlawful and dangerous to dispense gasoline into unapproved containers.

4) All vendors using open flames are also prohibited within the premises.

5) Necessary repairs of the service station involving welding, cutting and other hotworks shall comply with the applicable provisions of Division 17 of this RIRR.

6. Marine Service Stations

a. Marine service stations shall not be located at bulk plants unless separated by a fence or similar barriers from the area in which bulk operations are conducted.

b. Piers, wharves and floats where flammable or combustible liquid dispensers are located shall be of fire-resistive construction and impermeable to spills of such liquids and oils within the immediate area of the dispenser.

c. Flammable and combustible liquids may be stored in approved portable containers within marine service station buildings. Storage of Class I liquids in approved closed portable containers shall not exceed thirty-eight liters (38 L) aggregate capacity except within rooms or buildings approved for such storage or which meet the requirements of ventilation.

d. Class II or III liquids may be stored and dispensed inside marine service station buildings from approved containers of not more than four hundred fifty-five liters (455 L) capacity, provided that:

1) tanks, valves, fittings and piping for flammable or combustible liquids and liquefied petroleum gases are approved for such use and fully protected from external-corrosion.

2) there shall be no connection between any aboveground tank and any underground tank except that aboveground tanks located in an adjoining bulk plant may be connected by piping to marine service station underground tanks if, in addition to valves at the aboveground tanks, a valve is also installed within control of marine service station.

3) pipelines of marine service stations attached to piers, wharves or other structures shall be fully protected against physical damage and excessive stresses.

4) a valve capable of shutting off supply from the shore shall be provided in each product line at or near the approach of the pier, wharf or other structure; and an approved quick throw valve shall be provided above each flexible connection to stop flow to float in the event of rupture or such flexible connections.

5) not more than two (2) flexible connections shall be permitted in any line leading from any pier or wharf to a float. When unusual conditions exist, additional flexible connections may be allowed subject to the approval of the C/MFM having jurisdiction.

7) All commodity piping at marine service stations shall be welded or welded flanged of steel construction. Screwed piping of fifty millimeters (50 mm) or less in diameter shall be permitted.

8) Piping systems used in handling Class I liquids shall be grounded to control stray electrical current.

9) Testing of piping systems shall be in accordance with applicable provisions of this RIRR on testing.

e. Wharves, piers, or floats at marine service stations shall be used exclusively for the dispensing or transfer of petroleum products to or from marine craft, except that transfer of essential supplies for ship stores is permitted. Sales of ship stores or merchandise shall not be allowed in an area where fuel is dispensed into the tank of motor crafts.

1) Tanks and pumps, other than those integral with approved dispensing devices that supply flammable or combustible liquids at marine service stations, shall be located only on shore. Approved dispensing devices with or without integral pumps may be located on shore piers of solid fill type, open pier, wharves of floating docks, but only upon express permission of the C/MFM having jurisdiction.

2) Dispensing of flammable or combustible liquids and liquefied petroleum gases shall at all times be under the direct control of competent person who is fully aware of the operation, mechanics, and hazards inherent to fueling of boats.

3) Dispensing of flammable or combustible liquids into the fuel tanks of marine crafts shall be by means of an approved type hose, equipped with a listed automatic closing nozzle with latch open device.

4) Hoses used for dispensing or transferring flammable or combustible liquids shall be reeled, racked or otherwise protected from mechanical damage when not in use.

5) Fueling of floating marine crafts other than from a marine service station is prohibited.

6) No delivery of any flammable or combustible liquids shall be made into portable containers, unless such containers is of approved material and construction, having a tight closure with screwed or spring cover, so designed that the contents can be dispensed without spilling.

7) Liquefied petroleum gas cylinders shall not be filled or discharged at any petroleum marine service station without first obtaining written permission from the C/MFM having jurisdiction. Approved storage facilities for liquefied petroleum gas cylinders shall be provided.

8) The dispensing area shall be located away from other structures to provide room for safe ingress and egress of crafts to be fueled. Dispensing units shall, in all cases, be at least six meters (6 m) from any activity involving fixed sources of ignition.

f. Fire Prevention Regulations

1) All marine facilities shall be maintained in a neat and orderly manner and no

accumulation of rubbish or waste oils in excessive amounts shall be permitted. Any spills of flammable or combustible liquids at or upon the water of marine service stations shall be reported immediately to the BFP and port authorities.

2) Metal containers with tight-fitting or self-closing metal lids shall be provided for the temporary storage of combustible trash or rubbish.

3) No vessel or craft shall be allowed to moor or berth at any fuel docks serving a marine services station, except during fueling operations.

4) No construction, maintenance, repair or reconditioning work involving the use of open flames or arcs or spark-producing devices shall be performed at any marine service station facility or within fifteen meters (15 m) of the dispensing facilities including piers, wharves, or floats. The C/MFM having jurisdiction may grant permission in writing to make repair, provided no fueling is done at the pier, wharf, of float during the course of such emergency repairs.

5) All electrical wiring and equipment must comply with the latest edition of the PEC as it applies to wet, damp and hazardous location. Clearly identified emergency switches readily accessible in case of fire at any dispensing unit shall be provided on each main float and at the shore approach to the pier, wharf or floating dock, to shut off power to all pump motors from any individual location and reset only from the master switch. Each switch shall be identified by an approved sign: **"EMERGENCY PUMP SHUTOFF"**. The master switch shall be set in the **"OFF"** position before closing a marine service station. Pressure system shall incorporate with each turbine an indicator light illuminated when the turbine is running. Said lights shall be visible from the shore approach and from the dispenser location and suitably identify the system served.

6) Smoking or open flames shall be prohibited within one thousand five hundred millimeters (1,500 mm) of fueling operations. **"NO SMOKING"** signs shall be posted conspicuously within the premises. Such signs shall have letters not less than one hundred millimeters (100 mm) in height on a background of contrasting color.

7) Boat owners or operators shall not offer their craft for fueling unless the tanks being filled are properly vented to dissipate fumes to the outside atmosphere.

8) There shall be prominently displayed at the face of each wharf, pier of float at such elevation as to be clearly visible from the decks of marine craft being fueled, a sign or signs with letters not less than eighty millimeters (80 mm) in height in a background of contrasting color bearing the following or equivalent wording:

WARNING
NO SMOKING - STOP ENGINE WHILE FUELING.
SHUT OFF ELECTRICITY. DO NOT START ENGINE UNTIL AFTER
BELOW-DECK SPACES ARE VENTILATED

g. Fire Protection

1) Appropriate communication means shall be available for calling the Fire Department. Such means may consist of a proprietary alarm system, a firefighters' alarm box or telephone not requiring a coin to operate. It must be within thirty meters (30 m) of the premises of a marine service station.

2) Piers, wharves and floats at marine service stations shall be equipped with wet standpipes connected to a reliable water supply with piping not less than fifty millimeters (50 mm) in diameter.

3) Pipe fittings and joints shall be adequately treated to protect metal from corrosion. A flexible connection may be permitted between the dock or pier and any floating deck.

4) Hose stations shall be equipped with a thirty-eight millimeter (38-mm) valve, at least twenty-two meters (22 m) of approved fire hose, and a combination fog and straight streams shutoff type nozzle. Hose stations shall be so spaced as to provide protection to any portion of docks, piers, wharves or floating crafts. Hose shall be enclosed within a cabinet connected and mounted on a reel or rack for instant use. Hose stations shall be labeled **"FIRE HOSE-EMERGENCY USE ONLY".** All tests and valves must meet the approval of the C/MFM having jurisdiction.

5) Fire extinguishers each having a rating of 20-B and C shall be provided as follows: One (1) on each float and one (1) on the pier or wharf within seven and a half meters (7.5 m) of the head of the gangway to the float, except that where the

office is within seven and a half meters (7.5 m) of the gangway or is on the float, an extinguisher at the head of the gangway need not be provided.

7. Processing Plants

   a. On storage and handling

      The manner of storage, handling, dispensing and fire protection of flammable or combustible liquids in Processing Plants shall comply with the requirements and standards set forth under bulk and bulk plants storage, and the requirements and standards on portable storage. In addition, the following requirements shall also be complied:

      1) Mixing or blending rooms or buildings shall meet the design requirements in Chapter 9.9 of NFPA 30.

      2) Vessels used for mixing or blending of Class I flammable liquids shall be provided with self-closing, tight-fitting noncombustible lids that will control fire within such vessels. Where such devices are impracticable, approved automatic or manually controlled fire-extinguishing systems/devices shall be provided.

      3) All equipment, such as vessels, machinery, and piping, where an ignitable mixture could be present shall be bonded or connected to a ground. The bond or ground or both shall be physically applied or shall be inherently present by the nature of the installation. Electrically isolated sections of metallic piping or equipment shall be bonded to the other portions of the system or individually grounded to prevent the hazardous accumulation of static electricity.

8. Refineries, Chemical Plants and Distilleries

   On Storage and Handling

   The manner of storage, handling, dispensing and fire protection of flammable or combustible liquids in refineries, chemical plants and distilleries shall comply the requirements and standards for bulk and bulk plants storage, requirements and standards on portable storage. In addition, the following requirements shall also be complied:

   a. Processing units shall be located to at least one side to make it accessible for the purpose of fire control. Where topographical conditions are such that flammable or combustible liquids may flow from a processing area to constitute a fire hazard to other properties, provisions shall be made to divert or impound the flow by curbs, drains or other suitable means.

   b. Water shall be available in pressure and quantity sufficient to provide cooling streams for any unit of any tank in the processing area. Hoses and hydrants shall be available in sufficient number to provide application for cooling streams.

9. Crude Oil Production

   On Storage and Handling

   The manner of storage and fire protection of flammable or combustible liquids in crude oil production shall comply the standards and requirements for bulk and bulk plants storage and standards and requirements for portable storage. In addition, the following requirements shall also be complied:

   a. Oil wells shall have a minimum distance of fifty meters (50 m) from a surface property line.

   b. No oil well shall be drilled within fifty meters (50 m) or one and a half (1.5) times the height of the derrick, whichever is greater from any road or highway or major aboveground utility line or railroad.

   c. No oil well shall be drilled nor production equipment and storage tank installed within less than the following setbacks:

      1) One hundred sixteen meters (116 m) from an existing occupied building and/or habitable dwelling

      2) One hundred sixteen meters (116 m) from educational facility, public places assembly and institutional occupancy

   d. No boiler, fired vessel, heater-breather, open flame device or other potential sources of ignition shall be located nearer than fifty meters (50 m) to any oil well or storage tank. Vehicles and equipment used in the drilling and well servicing operations are exempt from the above provision.

e. No sump or other basin for the retention of oil or petroleum products shall exceed three and seven tenths meters (3.7 m) in width.

f. No sump or other basin for the retention of oil or petroleum products, larger than one and eight tenths meters (1.8 m) deep shall be maintained longer than sixty (60) days after the cessation of drilling operations.

g. Sumps, diversion ditches or depressions used as sumps shall be securely fenced or covered.

h. Adequate blowout prevention equipment shall be used on all well servicing operations. Blowout prevention equipment shall contain pipe rams that enable closure on the pipe being used. The choke line and kill lines shall be anchored, tied or otherwise secured to prevent whipping resulting from pressure surges.

i. Blowout prevention equipment shall be inspected daily and a preventer operating test shall be performed on each round trip, but not more than once every twenty-four (24) hours. Notation of operating tests shall be made on the daily report.

j. Drilling operations shall not proceed until blowout prevention equipment are tested and found to be serviceable.

k. Berms shall be constructed around crude oil and condensate storage tanks in the absence of remote impounding. It shall enclose an area sufficient to contain at least one hundred fifty percent (150%) of the largest single tank.

l. Not more than two (2) crude oil and condensate storage tanks shall be located within a single berm.

m. Berms shall be inspected at regular intervals to maintain containment integrity.

n. Where soundproofing material is required during oil field operations, such materials shall be non-combustible. A fire-retardant treated material may be used and maintained subject to the approval of the C/MFM having jurisdiction.

10. Tank Vehicles for Flammable and Combustible Liquids

The manner of storage, handling, operation and fire protection in tank vehicle for flammable or combustible liquids shall comply the following requirements:

a. On Storage, Handling and Operation

1) Design and Construction of Tank Vehicle

a) Tank vehicles shall be designed, constructed, equipped and maintained in accordance with NFPA 385, *Standard for Tank Vehicles for Flammable and Combustible Liquid.*

Design of the tank vehicle shall consider the structural relationship between the cargo tank, propulsion equipment, and the supporting members with due regard to the weight and temperature of the cargo, road performance, braking and required ruggedness. The general design of the cargo tank and vehicle chassis shall be arranged to give the best combination of structural characteristics and vehicle performance.

b) The material used in the construction of cargo tanks shall be compatible with the chemical characteristics of the flammable and combustible liquids to be transported.

c) If a single cargo tank is divided into compartments of different specification construction, each compartment shall conform to the specification requirements and shall be identified with a permanent non-corrosive metal plate.

d) Any cargo tank designed for transporting materials at liquid temperatures above ambient temperatures shall have a non-corrosive metal warning plate permanently affixed to the tank or tank frame located conspicuously at the right side near the front specifying the maximum allowable cargo temperature. Stamped or embossed characters shall be at least thirteen millimeters (13 mm) in height.

2) Full Trailers and Semi-Trailers

a) Trailers shall be firmly and securely attached to the vehicle drawing them, in a manner conforming to accepted engineering practice.

b) Each full trailer and semi-trailer shall be equipped with reliable brakes on all

wheels, and adequate provision shall be made for their efficient operation from the driver's seat of the vehicle drawing the trailer or semi-trailer.

c) Trailer connections shall be such that can prevent the towed vehicle from whipping or swerving from side to side dangerously or unreasonably, and shall cause the trailer to follow substantially in the path of the towing vehicle.

3) Operation of Tank Vehicles

a) Tank vehicles shall not be operated unless they are in proper state of serviceability, devoid of accumulation of grease, oil or other flammable and from leaks.

b) Drivers shall be thoroughly trained in the operation of tank vehicles and proper procedures for loading and unloading.

c) Dome covers shall be closed and latched while the tank vehicle is in transit.

d) No tank vehicle shall be operated with a cargo temperature above the maximum allowable cargo temperature specified on the warning sign.

e) Flammable and combustible liquids shall be loaded only into cargo tanks whose material used in construction shall be compatible with the chemical characteristics of the liquid being loaded. The flammable and combustible liquid being loaded shall also be chemically compatible with the liquid hauled on the previous load, unless the cargo tank compartment, piping, pumps, meters and hose has been thoroughly cleaned and completely drained.

f) Class II or Class III liquids shall not be loaded into a compartment adjacent to Class I liquids unless double bulkheads are provided, nor shall non-compatible chemicals be loaded into adjacent compartments unless separated by double bulkheads.

g) Repair of tank vehicles shall be made with caution. No repair shall be made when there is presence of hazard due to combustible vapors nor any loaded tank vehicle be repaired in a closed garage.

h) Cargo tank shall not be repaired using any method employing a flame, arc, or other sources of ignition, unless the tank is maintained vapor-free or otherwise made safe in an approved manner.

4) Loading and unloading tank vehicles

a) Loading and unloading of tank vehicles shall only be done in approved locations prescribed by the concerned agency.

b) Flammable or combustible liquid shall not be transferred to or from any tank vehicles, unless the parking brake is securely set and all other reasonable precautions have been taken to prevent motion of the vehicle.

c) The driver, operator or attendant of any tank vehicle shall not leave the vehicle while it is being filled or discharged. Delivery hose, when attached to a tank vehicle, shall be considered a part of the tank vehicle.

d) Engine of tank vehicles shall be shut down during making or breaking hose connections. If loading or unloading is done without the use of a power pump, the tank vehicle motor shall be shut down throughout such operations.

e) Cargo tank or a compartment thereof used for the transportation of any flammable or combustible liquid shall not be loaded full. The unfilled space (outage) in a cargo tank or compartment thereof used in the transportation or combustible liquids shall in no case be less than one percent (1%). Sufficient space (outage) shall be left vacant in every case to prevent leakage from or distortion of such tank or compartment by expansion of the contents due to rise in temperature in transit.

f) The driver, operator or attendant of any tank vehicle shall, before making delivery to any tank, determine the unfilled capacity of such tank by a suitable gauging device. To prevent overfilling, he shall not deliver in excess of that amount.

g) During loading, hatch covers shall be secured on all compartments except in the receiving compartments.

h) Delivery of Class I liquids to underground tanks of more than three thousand eight hundred liters (3,800 L) capacity shall be made by means of mechanically tight connections between the hose and the fill pipe.

i) Where a cargo tank is filled through bottom loading, a positive means shall be provided for loading a predetermined quantity of liquid and an automatic secondary shut-off control shall be installed in each compartment to prevent overfill. The secondary shutoff control system shall be labeled as to manufacturer and type and any electrical system used for secondary shut-off shall be in accordance with the latest edition of PEC.

j) No material shall be loaded into or transported in a tank vehicle at a temperature above its ignition temperature unless properly safeguarded in an approved manner.

k) The cargo tank shall be bonded to the fill stem or to some part of the rack structure, electrically interconnected with the fill-stem piping, except tank vehicles loading any flammable or combustible liquids through bottom connections and tank vehicles used exclusively for transporting Class II and Class III liquids when loaded at locations where no Class I liquids are handled.

l) The cargo tank shall be bonded to the fill pipe when loading. The bond-wire connection shall be made prior to opening of dome covers. It shall be maintained in place during the entire filling operation and the dome covers shall be securely closed before the bond wire is disconnected from the cargo tank.

m) No external bond-wire connection or bond-wire integral to a hose shall be needed for the unloading of flammable and combustible liquids into underground tanks or when a tank vehicle is loaded or unloaded through tight connections to an aboveground or through bottom connections.

5) Vapor Recovery Process

a) In all cases where underground tanks are equipped with any type of vapor recovery system, all connections shall be safe and designed to prevent release of vapors at grade level and shall remain connected throughout the loading and unloading process.

b) For bottom loading vehicles, where vapor recovery is not required, the tank vapor system shall be open to the atmosphere to prevent pressurization of the tank and the vapor system.

c) The vapor recovery connection of the bottom-loading tank vehicles equipped with a vapor recovery system shall be used to lead vapor away from the loading area using terminal vapor recovery system, discharge standpipe, or by opening the tank fill opening (manholes).

d) Where a "dry disconnect vapor recovery adapter" is used, provisions shall be made to ensure that the vapor recovery system is fully vented before unloading to prevent collapse of the tank.

6) Parking and Garaging

a) No person shall leave a tank vehicle unattended on any street, highway, avenue or alley;

b) No person shall park a tank vehicle at any one point for longer than one (1) hour except:

i. off a street, highway, avenue of alley.

ii. inside a bulk plant and seven and a half meters (7.5 m) from the property line or within a building approved for such use.

iii. at other approved locations not less than fifteen meters (15 m) from any building except those approved for the storage or servicing of such vehicles.

iv. in case of breakdown or other emergency, the operator must leave the vehicle to take necessary action to correct the emergency.

c) Tank vehicles shall not be parked or garaged in any building other than those specifically approved for such use by the concerned agency.

b. On Fire Protection and Other Safety Measures

1) Tank vehicles used for the transportation of any flammable or combustible liquids, regardless of the quantity being transported, whether loaded or empty, shall be conspicuously and legibly marked. Such markings shall display the following:

a) Vehicle manufacturer;

b) Manufacturer's serial number;

c) Date of manufacture;

d) Original test date;

e) Certificate date;

f) Design pressure;

g) Head material;

h) Shell material;

i) Weld material;

j) Lining material;

k) Nominal tank capacity by compartment;

l) Maximum product load;

m) Loading limits; and

n) Unloading limits.

2) These markings shall not be modified, obstructed, made inaccessible or unreadable by paints or any fixtures.

3) Installation of any plate onto the tank with these markings shall not compromise the safety of the tank.

4) Placards/ warning signs shall comply with NFPA 704, *Standard System for the* Identification *of the Hazards of Materials for Emergency Response* and/or other internationally accepted standard for signage. The size of signage shall measure at least two hundred seventy-three millimeters (273 mm) on both sides and have a thirteen millimeters (13 mm) inner solid line border. The text indicating the hazard and the hazard class should be at least forty-one millimeters (41 mm).

5) In addition to the markings and warning signs, a certification signed by a responsible official of the manufacturer of the cargo tank, or from a competent testing agency, certifying that each cargo tank is designed, constructed, and tested in compliance with NFPA 385 and other applicable standards; and such certification shall be retained in the files of the carrier at all times that such cargo tank is engaged in the transport of flammable and combustible liquids.

6) Smoking is prohibited while driving, making deliveries, filling or making repairs to tank vehicles.

7) While loading or unloading, extreme care shall be taken to keep away fire and to prevent persons in the vicinity from smoking, lighting matches, or carrying any flame or lighted cigar, pipe or cigarette.

8) Each tank vehicle shall have at least one (1) unit of twenty pounds (20 lb) or two (2) units of ten pounds (10 lbs) BC-rating portable fire extinguisher.

9) Fire extinguishers shall be kept and maintained in good operating conditions at all times. They shall be visibly located in an accessible place on each tank vehicle and shall be protected from damage and impact.

10) Trailer/tank vehicle operators, contractors, drivers, handlers and crews shall have undergone proper qualification by a concerned agency. Crews shall include repair and maintenance personnel.

B. **Fire Safety Clearance**

1. A FSC shall be obtained from the C/MFM having jurisdiction for the following:

a. Storage, handling or use of Class I flammable liquids in excess of three and eight tenths liters (3.8 L) in any dwelling or other place of human habitation; or in excess of nineteen liters (19 L) in any other building or other occupancy; or in excess of thirty-eight liters (38 L) outside of any building, except:

1). storage or use of flammable liquids in the fuel tank of a motor vehicle, aircraft, motorboat, mobile power plant or mobile heating plant.

2). liquids used for building maintenance, painting, or other similar infrequent maintenance purposes shall be permitted to be stored temporarily in closed containers safely secured outside of storage cabinets or inside storage area, limited to an amount that does not exceed six (6) days of supply at anticipated rates of use.

b. Storage, handling, or use of Class II or III liquids in excess of ninety-five liters (95 L) in a building; or in excess of two hundred twenty-seven liters (227 L) outside a building except for fuel oil used in connection with oil burning equipment.

c. Work, installation, and use of equipment and premises for the storage, handling and sale of combustible and flammable liquids.

d. Removal, abandonment, placement on temporarily out of service or otherwise disposal of any flammable or combustible liquid tank. For this purpose, a proper disposal and/or abandonment procedure shall be submitted.

2. An MSDS shall be a prerequisite in the application of such fire clearance.

3. Where more than one hundred (100) drums of flammable and/or combustible liquids are to be stored outside of the buildings, plans of storage area and building structures shall be submitted showing methods of storage, quantities to be stored, distance from buildings and property lines, access ways between group of drums, fire protection facilities, and provisions for drainage and runoff.

SECTION 10.3.7.6 CRYOGENIC FLUIDS

Cryogenic fluids except those used as refrigerants in refrigerating systems shall be stored, handled and transported as follows:

A. **Storage and Handling**

1. Cryogenic Fluids shall be stored inside containers with the following design:

a. Containers used for the storage and handling of cryogenic fluids shall be in accordance with the applicable provisions of the latest edition of Philippine Mechanical Engineering Code (PMEC), or with the applicable standards of the Department of Energy (DOE) and/or Department of Trade and Industry (DTI), or other concerned government agencies.

b. Metallic containers shall be built, inspected and tested in accordance with applicable provisions of the latest edition of PMEC for Design and Construction of Large, Welded, Low-Pressure Storage Tanks, depending on the temperature and pressure of the product stored.

c. Concrete containers shall be built in accordance with the applicable provisions of the latest edition of NBCP. Barrier materials used in connection with concrete but not functioning structurally shall be made of materials authorized by the latest edition of PMEC, *Pressure Vessel Safety Requirements.*

d. Pressurized containers shall be protected by a pressure-relieving device or devices. If only one pressure relief device is used, it shall be set to operate a pressure not to exceed the Maximum Allowable Working Pressure (MAWP). Additional relief devices may be set to operate at a higher pressure but shall not exceed one hundred ten percent (110%) of the MAWP.

1) Containers that may be subjected to an exposure to fire hazards shall be protected by pressure relieving devices designed to protect against excessive pressure caused by such exposures. Such devices shall be set to operate at a pressure not in excess of one hundred ten percent (110%) of the MAWP, and shall have a relieving capacity sufficient to prevent the pressure from rising more than twenty percent (20%) above the MAWP. If only one device is used, it shall be set to operate at a pressure not to exceed the MAWP.

2) Relief devices shall be located so that they are readily accessible for inspection and repair and shall be protected against tampering. All relief devices shall be so designed or located to prevent accumulation of moisture and freezing which would interfere with the proper operation of the device.

3) No shutoff valves shall be installed between relief valves and container, except that shutoff valves may be used on multiple valve installations where the arrangement of the valves will provide the required flow through the relief devices at all times.

4) Outer containers shall be equipped with pressure and vacuum relief devices or rupture discs to adequately protect the container.

5) Heat exchangers and similar vessels shall be protected with a relieving device of sufficient capacity to avoid pressure in case of an internal failure.

6) Safety relief valves shall normally be mounted in a vertical position and shall not be subjected to low temperature except when operating.

e) Containers shall be provided with substantial concrete or masonry foundations, or structural steel supports on firm concrete or masonry foundations. Foundations and supports shall be of a material and design to withstand the low temperature effects of cryogenic fluid spillage. Structural steel supports, above four hundred sixty millimeters (460 mm) in height, for flammable cryogenic fluid container shall be protected with protective coating having a fire-resistance rating of two (2) hours.

f. Horizontal containers shall be so mounted on foundations as to permit expansion and contraction. Every container shall be supported to prevent the concentration of excessive loads on the supporting portion of the shell. That portion on the container in contact with foundation or saddles shall be protected against corrosion.

g. Secure anchorage or elevation of container shall be provided in an area that may be subjected to flooding.

h. Storage containers, piping, valves, regulating equipment, and other accessories shall be protected against physical damage and tampering.

i. Containers shall be secured as may be necessary to prevent shifting or upset.

2. Containers shall be equipped with drainage, dikes and walls having the following conditions:

a The area surrounding a container for cryogenic fluids shall be diked to prevent accidental discharge of fluids thereby endangering adjacent containers, buildings and equipment, adjoining property or reaching waterways.

b Drainage shall be provided at a slope of not less than one percent (1%) away from the container towards an impounding basin or an appropriate means of disposal having a capacity equal to the container being served. This termination area and the route of the drainage system shall be so located that a fire occurring in drainage system will not seriously endanger adjacent containers or property.

c Where diked areas are utilized to provide the required protection, the following shall apply:

1) More than one (1) container may be installed in a single area, provided that:

a) the usable volume of the enclosure shall be at least one hundred percent (100%) of the capacity of the largest container enclosed;

b) containers shall be elevated above grade so that cryogenic liquids will not reach the outside container wall in the event of a liquid spill; or

c) if cryogenic liquids can reach the outside container wall, the material that can be wetted by spilled liquid shall be suitable for use at the temperature of the liquid with the lowest normal boiling point within the enclosure.

2) Dike walls shall be of earth or other materials compatible to the fluid stored, designed to be liquid tight, and to withstand thermal shock.

3) The dike and diked area shall be kept clear of all weeds, grass, and other combustible materials.

4) Containers of cryogenic fluids shall not be located within dikes enclosing flammable or combustible liquid containers, liquefied petroleum gas (LPG) containers or compressed gas containers.

3. Location of Aboveground Containers with Respect to Exposure

a. A cryogenic fluid container or containers with an aggregate capacity in excess of seven hundred fifteen thousand liters (715,000 L) and their loading stations shall be located at a minimum of fifteen meters (15 m) from a building utilized for the production of such fluids. Such container or containers and their loading stations shall be located at a minimum of thirty meters (30 m) from aboveground storage of flammable or noncombustible liquids and from any building of such construction or occupancy which constitutes an exposure of hazard to a container in the event of fire or explosion in said buildings. When the capacity is seven hundred fifteen thousand

liters (715,000 L) or less, the distance required from aboveground storage of flammable or combustible liquids and buildings which constitute an exposure to hazard shall be based on the capacity of the container or containers and the physical features of the installation with three meters (3 m) being the minimum distance allowed.

b. The minimum distance from the edge of a flammable cryogenic container, having a capacity in excess of seven hundred fifteen thousand liters (715,000 L), to the nearest building or group of buildings not associated with the cryogenic liquid plant, or to the property line of public way, shall be sixty meters (60 m). In no case shall the distance from the dike surrounding the container or the distance from a drainage area be less than thirty meters (30 m) from the nearest building or group of buildings or the property line or public way.

c. Flammable cryogenic fluid container with a capacity of eleven thousand liters (11,000 L) or less shall be located in accordance with NFPA 50A, *Standard for Gaseous Hydrogen Systems at Consumer Sites*.

d. Containers and equipment used in the storage and handling of liquid oxygen shall be installed and maintained in accordance with NFPA 55, *Standard for the Storage, Use, and Handling of Compressed and Liquefied Gases in Portable Cylinders*.

4. Installation of Belowground Concrete Containers

a. Belowground concrete containers shall be installed on foundation or support of concrete, masonry piling, steel or a suitable foundation of aggregate and shall be designed and constructed in accordance with the latest edition of NBCP.

b. The container storage area shall be fenced or otherwise protected. A minimum of two (2) access openings shall be provided and they shall be of sufficient size to accommodate emergency equipment.

5. Installation of Cryogenic Inground Containers

a. Natural materials such as earth shall be proven to have adequate chemical and physical properties for the construction and operation of the container at the operating temperature.

b. Containers shall be bottomed out in material naturally impermeable or made impermeable by other approved means based on internationally accepted standards.

c. Any foundation, such as those for the superstructure of roof, shall be properly designed and constructed in accordance with the latest edition of the NBCP.

d. The container storage area shall be constructed with masonry fence or otherwise protected with equally or stronger type of construction. A minimum of two (2) access openings shall be provided and they shall be of sufficient size to accommodate emergency equipment.

6. Location of Belowground and Inground Containers with Respect to Exposure

The minimum distance from the edge of belowground and inground flammable cryogenic containers to the nearest important building, property line or public way from aboveground flammable or combustible liquid shall be in accordance with the Annex A, Table 35, *Minimum Distance from the Edge of Below Ground and Inground Cryogenic Containers Based on Container Capacity*.

7. Pressure Relief Vent Piping

a. The piping of all relief vents shall be at least equal to the area of opening of the relief valve and so arranged to not unduly restrict the flow.

b. Relief devices and/or relief device vents shall be so arranged that escaping gas will discharge unobstructed to the open air and not impinge on personnel, containers, equipment and structures or enter enclosed spaces.

c. Vents shall be installed in such a manner as to exclude or remove moisture and condensate, and to prevent malfunction due to freezing or icing. Drains shall be so installed as to prevent possible flame impingement on the container, piping, equipment and structures.

8. Dispensing of flammable cryogenic fluids, liquefied, or liquid oxidizers shall be at a location not less than one and a half meters (1.5 m) in any direction away from any exterior source of ignition, openings into direct-vent (sealed combustion system) appliances, or mechanical ventilation air intakes.

9. Piping, Materials and Construction

    a. All pipings and materials such as gaskets, thread compound, etc., shall be suitable for the intended use through the full range of pressure and temperature to which they will be subjected, maintaining a safety factor of four (4) to one (1).

    b. The piping system shall be designed and constructed to provide adequate allowance for expansion, contraction, vibration, settlement, and fire exposure.

    c. Joints on all container piping and tubing over fifty millimeters (50 mm) in nominal diameter shall be made by welding or with welded flanges.

    d. Piping outside buildings may be either buried or aboveground. In either case, it shall be well supported and protected against physical damage and corrosion.

    e. All piping and tubing shall be tested after installation, at not less than one and a half (1.5) times hydraulically, or one and twenty-five hundredths (1.25) times pneumatically, at the maximum working pressure; and proven free of leaks.

B. **Equipment and Devices**

1. All cryogenic containers, equipment and devices used for the storage, handling and transportation of cryogenic fluids shall be of approved type. Approved types are those covered with appropriate certification from its manufacturers and/or certifying authority concerned.

2. Electrical Equipment

    a. Electrical installations and equipment shall conform to the provisions of the latest edition of PEC, equipment manufacturers' instruction and/or other applicable international standards as deemed necessary.

    b. Proper lighting, including emergency lights shall be provided for fire protection appliances and operating facilities such as walkways, control valves, gauges, and similar devices or servicing facilities for the cryogenic fluids.

3. Electrical Grounding or Bonding

    a. Containers, systems, and equipment used for flammable cryogenic fluids shall be grounded and/or bonded in accordance with NFPA 77, *Recommended Practice on Static Electricity*, and the latest edition of PEC. Suitable means shall be taken to protect the system against corrosion, including corrosion caused by stray electric currents.

    b. Containers and systems containing cryogenic fluids shall be equipped with lightning protection when installed outside the building/ structure.

4. Valves and Accessory Equipment

    a. All valves and equipment shall be suitable for the intended use at the temperature of the application and shall be designed for not less than the maximum pressure and the minimum temperature to which they may be subjected, maintaining a safety factor of four (4) to one (1).

    b. Shutoff valves shall be provided on all container connections. Shutoff valves shall be located as close as practicable to the container.

    c. All liquids and vapor connections on flammable cryogenic fluid containers, except relief and gauging connections over twelve millimeters (12 mm) pipe size, shall be equipped with check valves, or remotely controlled automatic quick-closing valves, and shall remain closed except during operating periods.

    d. Shutoff valves shall be installed in the piping system as needed to limit the volume of liquids discharged in the event of piping or equipment failure. Relief valves shall be installed between shutoff valves in all pipelines.

    e. All inlet and outlet connections, except relief valves, liquid level gauging devices, and pressure gauges on any container, shall be labeled to designate whether they are connected to vapor or liquid space.

C. **Warning Labels**

1. Warning labels and signs shall be posted visibly from any direction of approach on cryogenic containers and equipment. In addition, they shall be properly marked with the name of the specific cryogenic fluid, manufacturer/ supplier and contact details.

2. The name of the specific cryogenic fluid shall be conspicuously affixed at the entrances to locations where they are stored, handled, used, or dispensed, and at such other locations as may be designated by the C/MFM having jurisdiction.
3. Warning labels and signs shall be in accordance with para "H" of Division 5 of this Chapter and not be obscured or removed,
4. Markings on Containers

   Each container shall be identified by the attachment of a nameplate in an accessible place marked with the following information:

   a. Builder's name and date built;
   b. Nominal capacity, in liters;
   c. MAWP;
   d. Maximum permissible specific gravity of liquid to be stored;
   e. Maximum level to which container may be filled with stored liquid;
   f. Maximum level to which container may be filled with water for container was designed; and
   g. Minimum temperature in degrees Celsius for which container was designed.
5. Vehicles transporting cryogenic fluids shall be in accordance with para "I" of Division 5 of this Chapter and shall also bear the signs, **"FLAMMABLE GAS"** or **"OXIDIZER".**

D. **Safety Measures**

1. Insulation shall be non-combustible and shall be non-reactive with oxygen-enriched air.
2. A positive alarm or other approved device based on internationally accepted standard shall be provided to warn against overfilling.
3. Vehicles transporting cryogenic fluids shall be equipped with at least one (1) unit of approved type of fire extinguisher, with a minimum rating 20-B and C; and with adequate chock blocks.

SECTION 10.3.7.7 MEDICAL AND RELATED COMPRESSED GASES

Medical and related compressed gases such as flammable anesthetic; non-flammable medical gases in hospitals, medical schools, laboratories and similar facilities; bulk oxygen in industrial and healthcare consumer sites; and other compressed gases of similar and related uses shall be stored, handled, transported and manufactured as follows:

A. **On Storage and Handling**

1. All compressed gas containers, shall be stored in an upright position with the valve end up. For non-liquefied gases, the axis of the container shall be limited to forty-five degrees (45˚) from the vertical provided that it is properly secured, except when it is empty, its content is less than five liters (5 L) or the container is designed for use in a horizontal position.
2. Racks or fastenings shall be made to protect cylinders from accidental or physical damage or dislocation.
3. Indoor and outdoor storage of compressed gases shall comply with the material-specific requirements provided in the MSDS or manufacturer's technical specifications/ data or other applicable provisions of this RIRR.
4. Indoor storage, use areas and storage buildings shall be provided with mechanical exhaust ventilation or natural ventilation. When mechanical ventilation is provided, the system shall be operational during such time as the building or space is occupied.
5. Compressed gases shall be stored in areas dedicated to the storage of such gases without other storage or uses. If containers of compressed gases in quantities greater than the Maximum Allowable Quantity (MAQ) per control area, said containers shall be stored in a room or a gas cabinet with two-hour (2-hr) resistance rating located inside buildings or structures, with the following conditions:

   a. For rooms:

      1) Openings between the room and interior spaces shall be protected by self-closing smoke and draft-control assemblies having a fire protection rating of not less than two (2) hours.

2) Rooms having exterior walls shall be provided with at least two (2) vents in such walls, each having not less than twenty-three thousandths square meter (0.023-m^2) free area. One vent shall be within one hundred fifty-two millimeters (152 mm) of the floor and one shall be within one hundred fifty two millimeters (152 mm) of the ceiling.

3) Rooms with no exterior walls shall be exhausted through a duct to the outdoors. Supply and exhaust ducts shall be enclosed in a one-hour (1-hr) rated shaft enclosure from the room to the outdoors.

4) Approved mechanical ventilation shall comply with the requirements of the latest edition of PMEC and be provided at a minimum rate of five hundred eight hundred-thousandths cubic meter per second per square meter (0.00508 $m^3/sec/m^2$) of the area of the room.

5) Rooms shall be protected by an approved, supervised sprinkler system.

b. For gas cabinets:

1) The average velocity of ventilation at the face of access ports or windows shall not be less than sixty-one meters per second (61 m/s), with a minimum of forty-six meters per second (46 m/s) at any point of the access port or window to maintain the temperature of the cylinders at fifty-four degrees Celsius (54 °C).

2) Connected to an exhaust system.

3) Internally protected by a sprinkler system.

6. The storage of compressed gases located outdoors in quantities greater than the allowable amount shall be located as shown in the Annex B, *Illustration of the Storage of Compressed Gases*.

7. Cylinders of Medical Gas Storage containing compressed gases and containers for volatile liquids shall be kept away from radiators, steam piping, and like sources of heat. When cylinder valve protection caps are supplied, they shall be secured tightly in place unless the cylinder is connected for use. Containers shall not be stored in a tightly closed space such as a closet.

8. Compressed gas systems suitable for the intended use shall be designed and installed by a Fire Safety Practitioner. A training certificate, duly issued by the gas supplier or any government agency which has jurisdiction over such gas, of the person in charge of the compressed gas system, shall also be required prior to the issuance of FSC.

9. Materials, devices and appurtenances used in compressed gas systems shall comply with the DTI Product Standards or covered by an International Commodity Clearance (ICC). This does not limit the use of other materials, devices and appurtenances that are legally acquired and complying with other internationally accepted standards, qualified and recognized by the Chief, BFP.

10. Compressed gas system controls shall be so designed to prevent materials from entering or leaving process or reaction systems at other than the intended time, rate or path. Automatic controls shall be designed to be fail-safe.

11. Piping, including tubing, valves, fittings and pressure regulators, shall comply with the requirements of hazardous materials and chemicals handling. Piping, tubing, pressure regulators, valves and other apparatus shall be kept gas-tight to prevent leakage. Adequate pressure-relief devices shall be provided where refrigerated liquefied gas can become trapped in the piping.

12. Valves utilized on compressed gas systems shall be suitable for the use intended and shall be accessible. Valve handles or operators for required shutoff valves shall not be removed or otherwise altered to prevent access or hinder operation.

13. Venting of gases shall be directed to an approved location. Venting shall comply with the requirements of the latest edition of PMEC.

14. Compressed gas containers, except those designed for use in a horizontal position, and all compressed gas containers containing non-liquefied gases, shall be used in an upright position with the valve end up. The axis of a container being used in an upright position may be inclined as much as forty-five degrees (45˚) from the vertical, provided that it is properly secured. Use of nonflammable liquefied gases in the inverted position when the compressed gas is in the liquid state shall be allowed, provided that the container is properly secured and the dispensing apparatus is designed for such liquefied gas use.

Exception: Compressed gas containers with an internal volume less than five thousandths cubic meter (0.005 m^3) may be used in horizontal position.

15. The handling of compressed gas containers shall comply with the following requirements:
    a. Where containers are moved by hand cart, hand truck or other mobile device, such carts, trucks or devices shall be designed for the secure movement of containers. Carts and trucks utilized for moving compressed gas containers outdoors shall be so designed that the containers will be secured against dropping or otherwise striking against each other or other surfaces. Containers shall be moved using an approved method.
    b. Ropes, chains or slings shall not be used to suspend compressed gas containers unless such containers have been designed for such handling. Valves of compressed gas containers shall not be used for lifting.
16. Compressed gas containers, equipment and devices used for the storage, handling and transportation of compressed gases shall be of approved type.
17. Approved containers, equipment or devices are those covered with appropriate certification from its manufacturers and/or certifying authority concerned.
18. Electrical wiring installations and equipment shall conform to the provisions of the latest edition of the PEC, equipment manufacturers' instruction and/or other applicable international standards as deemed necessary.
19. Proper lighting, including emergency lights, shall be provided to illuminate fire protection appliances and operating facilities such as walkways, control valves, gauges, and similar devices or servicing facilities for the compressed gas
20. Lighting equipment and facilities shall be of explosion proof type.
21. Container design and construction shall be maintained as follows:
    a. Compressed gas containers shall be designed and fabricated in accordance with the specifications of the latest edition of PMEC, Boiler and Pressure Vessels or shall comply with appropriate standards of the DOE and DTI.
    b. Compressed gas containers that are not designed for refillable use shall not be refilled after use of the original contents.
    c. Partially full compressed gas containers containing residual gases shall be considered as full for purposes of the controls required.

B. **On Manufacturing**

1. The compressor air intake shall be located where no contamination from engine exhausts, fuel storage vents, vacuum system discharges, particulate matter, or odor of any type is anticipated.
2. The intake to medical air compressors shall be located outdoors above roof level at a minimum distance of three meters (3 m) from any door, window, exhaust, other intake, or opening in the building, and a minimum distance of six meters (6 m) above the ground. Intakes shall be turned down and screened or otherwise be protected against the entry of vermin or water, with screening that shall be fabricated or composed of a non-corrosive material such as stainless steel or other suitable material.
3. Ventilating systems having fans with motors or drive belts located in the air stream shall not be used as a source of medical air intake.
4. Two (2) or more compressors shall be installed as alternate for simultaneous demand. Compressors shall be sized to serve peak demand with the largest compressor out of service.
5. A device shall be provided to automatically activate the additional compressors if the unit in operation is incapable of adequately maintaining pressure. A signal indicating that the reserve compressor is running shall operate a local audio and visual alarm and serve to activate remote master alarms.
6. Compressors shall be provided with automatic or manual alternation to allow division of operating time. If automatic alternation of compressors is not provided, the facility shall arrange a proper schedule for manual alternation.
7. Each compressor shall be provided with a dedicated disconnect switch, motor starting device, and overload protection. The disconnect switches shall be installed in the

electrical circuit ahead of each motor starter. Where compressor systems having two (2) or more compressors employ a control transformer or other voltage control power device, at least two (2) such devices shall be provided. Control circuits shall be arranged in such a manner that the shutdown of one compressor does not interrupt the operation of another compressor.

8. Inflatable equipment, devices or balloons shall be pressurized or filled only with nonflammable gases.
9. Containers, systems, and equipment used for flammable compressed gases shall be grounded and/or bonded in accordance with the latest edition of PEC. Suitable means shall be provided to protect the system against corrosion including corrosion caused by stray electric currents.
10. Containers and systems containing compressed gas under pressure are not required to be equipped with lightning protection.
11. Compressed gas containers and systems shall be secured and protected against accidental or physical damage, tampering, and unauthorized entry, and shall be safeguarded in accordance with the following:
    a. Compressed gas containers and systems that could be exposed to accidental or physical damage shall be protected. Barriers, posts and/or other approved means of protection shall be provided to protect containers and systems, indoors and outdoors, from any hazards and/or damages.
    b. Compressed gas containers shall be secured to prevent movement from contact, vibration or seismic activity, utilizing one (1) or more of the following methods:
        1) Securing containers to a fixed object with one (1) or more noncombustible restraints. Containers shall not be secured to plumbing systems or electrical conduits.
        2) Securing containers on a cart or other mobile device designed for the movement of compressed gas containers.
        3) Nesting of compressed gas containers at container filling or servicing facilities or in seller's warehouses not accessible to the public shall be allowed, provided that the nested containers, if dislodged, do not obstruct any required means of egress.
        4) Securing of compressed gas containers to or within a rack, framework, cabinet or similar assembly designed for such use, except when the containers are in the process of examination, filling, transport or servicing.
        5) Securing stationary compressed gas containers to a foundation designed for such use in accordance with the construction codes.
    c. Compressed gas container valves shall be protected from physical damage by means of protective caps, collars, plugs or similar devices provided for the purpose. These devices shall always be in place except when the containers are in use or are being serviced or filled.
    d. Compressed gas containers and systems in storage or use shall be separated from materials and conditions that present potential hazards to them, or to which they present potential hazards. Separation shall be by fire barrier of two-hour (2-hr) fire resistance rating and /or distance as shown Annex B, *Illustration of the Storage of Compressed Gases*.

C. **On Fire Protection and Markings**

1. A written emergency action plan to be implemented in the event of spill or leak shall be prepared, maintained on the premises and made available at all times.
2. Automatic fire suppression and fire detection systems, where required, shall be connected to the facility fire alarm system and shall be arranged to immediately sound an alarm.
3. Vehicles shall be in accordance with para "I" of Division 5 of this Chapter and bearing the words **"COMPRESSED GAS"** or similar wording.
4. Vehicles shall be equipped with not less than one (1) approved type of fire extinguisher with a minimum rating of 20-B and C.
5. Vehicles shall be equipped with adequate chock blocks.

6. Outdoor storage shall display precautionary sign, readable from a distance of one and a half meters (1.5 m), the following words:

"CAUTION OXIDIZING GASES STORED WITHIN
NO SMOKING
NO OPEN FLAME"

7. Stationary compressed gas containers shall be properly marked as follows:
   a. The name of the gas shall be visible from any direction of approach;
   b. Hazard identification signs in accordance with para "H" of Division 5 of this Chapter; and
   c. Signs reading "**COMPRESSED GAS**" shall be conspicuously posted at the entrance to rooms or on cabinets containing compressed gases.
8. Portable compressed gas containers shall be marked in accordance with the standards prescribed by DTI and DOE.
9. Markings used for piping systems shall consist of the name of the contents and include an arrow indicating direction of flow. Markings shall be provided at each valve; at wall, floor or ceiling penetrations; at each change of direction; and at a minimum of every six and ninety-six thousandths meters (6.096 m) or fraction thereof throughout the piping run.
10. Piping that is designed or intended to carry more than one compressed gas at various times shall have appropriate signs or markings posted at the manifold, along the piping and at each point of use to provide clear identification and warning.
11. Piping within gas-manufacturing plants, gas-processing plants and similar occupancies shall be marked in an approved manner.
12. Out-of-service compressed gas containers shall be marked to indicate that they are no longer available for service.

SECTION 10.3.7.8 LIQUEFIED PETROLEUM GASES (LPG)

The storage, handling, transportation, use and the installation of fuel gas piping systems, appliances, equipment, and related accessories shall comply with the applicable provisions of NFPA 58, *Liquefied Petroleum Gas Code*, NFPA 54, *National Fuel Gas Code* and the specific requirements hereof:

A. **Tank Farms**

1. All aboveground items of LPG equipment shall be easily accessible for control, maintenance and firefighting purposes.
2. The tank farm (area around tank and loading/unloading area) shall be enclosed in at least one and eight tenths meters (1.8 m) high industrial chain link fence, or equivalent protection.
3. The enclosure shall be provided with at least two (2) remote access gates if the area is one hundred square meters (100 m^2) or more. For less than one hundred square meters (100 m^2), a single access gate may be permitted.
4. If the tank farm is enclosed in a structure where there is a necessity for lighting fixtures, explosion-proof lighting and electrical fixtures shall be provided.
5. Vehicle impact protection shall be provided.
6. The signs shall be clearly visible and legible at the applicable safety distance and should be firmly fixed to the fence or wall or the tank itself. For underground or mounded tanks to comply with the above requirement, it is recommended that notices are displayed adjacent to the installation. For unodorized product, tanks should be clearly marked as "**UNODORIZED**" or "**UNSTENCHED**". The following safety warnings shall be sufficiently and conspicuously located for general public awareness:
   a. No Smoking, No Open Flame
   b. Highly Flammable – LPG
   c. Emergency Procedures
   d. Emergency Contact Numbers
   e. No Unauthorized Entry

7. Tank farm storage containers for LPG must be designed, fabricated, tested and marked in accordance with the applicable ASME Code for Broiler and Pressure Vessel or API-ASME Code for Unfired Vessels for Petroleum Liquids and Gases for Bulk and stationary containers.
8. Each LPG tank shall have a stainless steel nameplate or data plate which contains the following information:
    a. Design Code;
    b. Manufacturer's name;
    c. Tank serial number;
    d. Water capacity in liters;
    e. Maximum operating pressure in Megapascal (MPa);
    f. Maximum design temperature in degrees Celsius;
    g. Date of manufacture/test;
    h. Inspecting authorities' identification, if any;
    i. Diameter/length; and
    j. Plate thickness – head and shell.
9. The nameplate shall be attached in such a way to minimize corrosion of the name plate or its fastening means and not contribute to corrosion of the container:
10. Where the tank is buried, mounded, insulated, or otherwise covered so the nameplate is obscured, the information contained on the nameplate shall be duplicated and installed on adjacent piping or structure in a clearly visible location.
11. Illegible data plate shall be replaced.
12. Aboveground tank shall be kept free of rust and properly painted.
13. The part of a container in contact with saddles, foundations or masonry must be coated or protected to minimize corrosion.
14. Containers/tanks shall be installed with liquid interconnections so that the maximum permitted filling level of each container is at the same elevation.
15. Pressure relief devices on containers shall be installed so that any gas release is vented upward, away from the container and unobstructed to the open air.
16. A fixed maximum liquid level gauge shall be installed on each LPG tank.
17. Container shall be properly positioned so that the pressure relief valve is in direct communication with the vapor space of the container.
18. The vaporizing chamber, tubing, pipe coils or other heat exchange surface containing LPG to be vaporized (heat exchanger) is constructed in accordance with applicable provisions of the ASME Code for a MAWP of one and seven tenths Megapascal (1.7 MPa) gauge.
19. The heat exchanger shall be permanently and legibly marked with the following:
    a. Markings as required by the ASME Code;
    b. MAWP and temperature for which the heat exchanger is designed; and
    c. Name and symbol of the manufacturer.
20. Heat exchangers for waterbath vaporizers shall be equipped with a spring-loaded pressure relief valve and provided with automatic control, which is integral with the vaporizer, to prevent the passage of liquid through the heat exchanger to the vapor discharge piping.
21. The immersion heater that provides heat to the waterbath shall be installed so as not to contact the heat exchanger.
22. A control to limit the temperature of the waterbath shall be provided.
23. LPG tanks shall be provided with the following:
    a. Pressure relief device situated at the vapor portion of the vessel;
    b. Fixed maximum liquid level device or equivalent high level arm;
    c. Liquid level gauge or indicator;
    d. Pressure gauge;

e. Drains or other means of removing liquid contents;

f. Filling connection; and

g. Service connection.

24. Adequate supply of water for fire protection purposes shall be provided. The water supply shall be capable of providing protection to the storage tanks, transport facilities and other equipment for at least sixty minutes (60 min).

25. The application of water shall be by any one of, or combination of fixed monitors, hose streams, mobile equipment or fixed spray systems, designed and installed to ensure an adequate supply of water to otherwise unprotected tank, piping system and equipment surfaces and to tank supports.

26. The tank farm shall be protected with approved insulation on such areas that may be subjected to impingement of ignited gas from pipelines or other leakage.

27. Roadways or other means of access for emergency equipment, such as fire department apparatus, shall be provided.

28. The tank farm shall be equipped with portable nine kilograms (9 kg) B and C rated fire extinguishers.

29. Loose or piled combustible material and weeds, and long dry grass shall not be permitted within three meters (3 m) of any container/tank.

B. **Pipe Line**

1. LPG liquid and vapor lines shall be properly labeled or color coded in accordance with the latest edition of PMEC.

2. Piping systems, including the interconnection of permanently installed containers/tanks shall be compensated for expansion, contraction, jarring, vibration and settling.

3. No non-metallic pipe, tubing or hose for permanently interconnecting containers/tanks shall be used.

4. Aboveground piping shall be supported and protected against physical damage by vehicles.

5. The portion of the aboveground piping in contact with a support or a corrosion-causing substance shall be protected against corrosion.

6. Metallic pipe and tubing shall be installed underground with a minimum three hundred millimeters (300 mm) cover. The cover shall be increased to four hundred sixty millimeters (460 mm) if external damage to the pipe or tubing from external forces is likely to result. If a minimum three hundred millimeters (300 mm) of cover cannot be maintained, the piping shall be installed in conduit or shall be bridged (shielded).

7. Underground metallic piping shall be protected against corrosion as warranted by existing soil condition or use Medium Density Poly Ethylene (MDPE) pipe.

8. LPG piping shall not be used as grounding electrode.

9. Piping shall be provided with Emergency Shutoff Valves (ESVs) and Backflow Check Valves (BCVs).

10. Every ESV and BCV shall be tested annually and documented. Records of annual testing shall be included in FSMR.

11. Piping system shall be tested and proven free of leaks at not less than the normal operating pressure at least once (1) a year.

C. **Building LPG System**

1. LPG pipes entering a building shall not pass through the basement or other confined spaces or highly hazardous areas. If due to space limitations and same cannot be avoided, the LPG pipe shall be protected by a secondary containment pipe which shall be provided with gas leak detectors and properly vented to permit the discharge of LPG outside the building.

2. LPG pipes shall be located so as not to obstruct ingress and egress of occupant or people entering the building.

3. LPG pipes shall be located so as to avoid damage from impact from vehicles.

4. LPG pipes must be located so as to avoid being heated, i.e. beside boilers or heaters.

5. LPG piping within a building shall be equipped with Gas Leak Sensor (GLS) at strategic areas like service entrance, or in case of enclosed structures at the base of the riser, in enclosed meter cabinets and inside residential/commercial units.
6. The GLS shall be attached to a controller and an automatic shut off device.
7. The GAS Leak Detection System (GLDS) shall be interconnected to the Fire Alarm Control Panel (FACP).
8. The GLDS shall be hard-wired to the electrical system. If same cannot be done due to limitation of any nature, the convenience outlet intended for power supply of the GLDS shall be located at the ceiling cavity.
9. The GLS shall be located equivalent to the height of the service connection (stub out) and shall not be more than one meter (1 m) above the finish floor line or in accordance with manufacturer's specifications**.**
10. The main isolating valve for the LPG pipeline of the building shall be located in an accessible location.
11. In order to prevent the distribution of gas leakage throughout the building, the LPG piping inside any building shall not be installed at the following locations:
    a. Lift shaft
    b. Flues, chimneys and gas vents
    c. Circulating air duct and ventilating duct
    d. Clothes chute
    e. Enclosed staircase
    f. In rooms provided with high voltage power facilities
    g. Air handling room
    h. Unventilated void space
    i. Fire protected/smoke free/ enclosed lift lobby areas
    j. Within protected corridors or passageways which are routes of escape/ exit
    k. Under load bearing foundations and walls
    l. In areas or locations owned or exclusively used by a third party
12. Chute used for LPG piping riser and distribution system shall not be used to house other building utilities.
13. The LPG piping system shall be inspected externally and internally, before being placed into service by authorized and qualified engineers on the following instances:
    a. After installation
    b. After construction or repairs
    c. After it has contained materials other than LPG
    d. After it has been reinstalled in other location
14. Piping system shall be tested annually and documented. Records of annual testing shall be included in FSMR.
15. LPG piping shall be properly labeled or color coded in accordance with the latest edition of PMEC.
16. Piping systems shall be compensated for expansion, contraction, jarring, vibration and settling.
17. Valve positions shall be properly labeled.
18. A gas meter shall be provided as close as possible to the point where the gas service piping enters the building. Its location shall be such that the meter, meter connections, gas service piping tee and gas service shut off valve are accessible for inspection, installation, replacement, removal, locking, unlocking and reading.
19. Gas meters shall not be located where meters will be inaccessible or subjected to damage such as in public passageways, over doors, in locations subject to dripping water or unusual moisture conditions, extreme high temperatures.
20. Gas meters shall not be located where there are possible sources of ignition. Meters shall be securely supported and shall be protected against overpressure, backpressure and vacuum.

21. All rise/meter compartments shall be naturally ventilated by fixed louvers or pre-cast concrete ventilation blocks at the top and bottom of the compartment to the atmosphere. The door of the duct opening to the lobby area shall be fire-rated.

22. The service pipe termination and internal piping termination shall be in line and parallel to the face of the door of the riser shaft or duct to enable the gas meter and control valve to be installed easily without the need to further pipe adjustments.

D. **Minimum Distances of LPG Containers Outside of Buildings**

Containers installed outside of buildings, whether of the portable type replaced on a cylinder exchange basis or permanently installed and refilled at the installation, shall be located with respect to the adjacent containers, important building, group of buildings, or line of adjoining property that can be built upon, in accordance with Annex A, Table 36, *Minimum Distances of LPG Containers Outside Buildings, by Water Capacity*. However, for existing LPG facilities with aggregate water capacity of more than eight thousand liters (8,000 L) located in heavily populated or congested areas, the citing provisions of Annex A, Table 36 shall be permitted to be modified as indicated in the fire safety analysis, and the following fire protection are provided, to wit:

1. Fixed monitor nozzle or an approved system for the application of water;
2. Fixed water spray;
3. Gas leak detector; and
4. Fire wall of approved analysis and construction.

SECTION 10.3.7.9 COMPRESSED NATURAL GAS AS VEHICLE FUEL

A. **Scope**

This Section shall govern the storage, installation, operation, repair and maintenance, fire protection and other safety measures of compressed natural gas (CNG) engine fuel systems on vehicles of all types, including the following:

1. Original Equipment Manufacturers (OEM);
2. Vehicle converters; and
3. Vehicle fuelling (dispensing) systems.

B. **General CNG and Equipment Qualifications**

1. Containers shall be for CNG service, and its repair or alteration in accordance with the ASME Boiler and Pressure Vessel Code and/or manufacturer's instruction. It shall be fabricated either of steel, aluminum, or composite materials, designed and permanently marked **"CNG"** by the manufacturer.
2. Each container or cylinder shall be fitted with one (1) or more pressure relief devices of approved type and whose discharge flow rate shall not be reduced below that required for the capacity of the container upon which the device is installed.
3. Pressure relief devices shall be appropriately installed, located, protected, repaired, adjusted, and tested in accordance with the aforementioned ASME Code and manufacturer's instruction.
4. A pressure gauge, if provided, shall be capable of reading at least one and two tenths (1.2) times the system design pressure. Such gauge shall have an opening not to exceed one and four tenths millimeters (1.4 mm) (No. 54 drill size) at the inlet connection.
5. A pressure regulator inlet and each chamber service pressure shall be with a pressure safety factor of at least four (4). Its low-pressure chambers shall provide for overpressure relief or shall be able to withstand the service pressure of the upstream pressure chamber.
6. Pipes, tubing, fittings, gaskets, and packing material for fuel lines shall be compatible with the fuel under the service conditions. Such shall be capable of withstanding a hydrostatic test of at least four (4) times the rated service pressure without structural failure. The fabrication and testing shall be in accordance with ANSI/ASME B31.3, *Chemical Plant and Petroleum Refinery Piping*. Piping components, such as strainers, snubbers, and expansion joints, shall be permanently marked by the manufacturer to indicate the service ratings.
7. Valves or shutoff valves shall have a rated service pressure not less than the rated service pressure of the entire system and shall be capable of withstanding a hydrostatic test of at least four (4) times the rated service pressure without rupture. Leakage shall not occur at not less than one and a half (1.5) times the rated service pressure, using dry air as

the test medium. The valve body shall bear the permanent marking of **"CNG"**, service ratings and ASTM or internationally accepted standards adopted by the manufacturer.

8. Hose, metallic hose, flexible metal hose, tubing, and their connections shall be resistant to corrosion and exposure to natural gas and can resist the most severe pressures and temperatures expected under normal operating conditions, with a burst pressure of at least four (4) times the service pressure. Hose and metallic hose shall be distinctly marked by the manufacturer indicating its name or trademark, applicable service identifier, and design pressure.
9. Vehicle fuelling connection devices shall be of the approved type complying with applicable ASME Code and other internationally accepted standards. The use of adapters shall be prohibited.

C. **Engine Fuel Systems**

1. Storage and Installation

   a. The storage, installation, inspection, testing, repair and maintenance, and safety measures of CNG fuel supply systems for vehicular internal combustion engines shall comply with NFPA 52, *Vehicular Fuel Systems Code*, manufacturer's instructions and other internationally accepted standards.

   b. Aluminum or copper pipe, tubing, or fittings shall not be used between the fuel container and the first-stage pressure regulator.

   c. Fuel supply containers, its piping, fittings, and valves located within, below or above the driver or passenger compartment shall be protected with a means to prevent damage that can occur due to road hazards, loading, unloading, direct sunlight, exhaust heat, and vehicle use, including accidental cargo leakage.

   d. No portion of a fuel supply container or container appurtenance shall be located ahead of the front axle or behind the point of attachment of the rear bumper to the vehicle. Container valves shall be protected from physical damage using the vehicle structure, valve protectors, or a suitable metal shield. The cylinder shall also be protected from accidental contact with overhead electrical wiring by metallic or non-metallic covers.

   e. Containers that are installed behind a rear axle of a CNG vehicle shall be installed transversely.

      Exception: Containers shall be permitted to be installed in other orientations where the container valve and fittings are located at the end of the container most protected from a source of impact.

   f. Each container rack shall be secured to the vehicle body, bed, or frame to prevent damage from road hazards, slippage, loosening, or rotation using a method capable of withstanding a static force in the six (6) principal directions of eight (8) times the weight of a fully pressurized container(s). The container weight shall not be supported by outlet valves, manifolds, or other fuel connections.

   g. Each fuel supply container in the rack shall be secured to its cradle in such a manner that it is capable of withstanding a static force applied in the six (6) principal directions of eight (8) times the weight of the fully pressurized container with a maximum displacement of thirteen millimeters (13 mm).

   h. Fuel supply containers located less than two hundred millimeters (200 mm) from the exhaust system shall be shielded against direct heat.

   i. The mounting system shall minimize fretting corrosion between the container and the mounting system. A resilient gasket that does not retain water shall be installed between metal clamping bands and their supports and container. The resilient gasket shall provide insulation to protect clamping bands from galvanic corrosion in contact with carbon fiber containers.

   j. Containers located in a vehicle compartment capable of accumulating natural gas shall install a pressure relief device vented to the outside through a metallic tube or hose and shall be maintained to prevent it from being blocked by debris.

   k. The minimum clearance from the road to a container, its housing, or fittings, whichever is lowest where the container is installed below the frame and between the axles of a CNG vehicle, with the vehicle loaded to its gross weight rating, shall be in accordance with the following:

      1) Three thousand two hundred thirty millimeters (3,230 mm) vehicle wheel base –

one hundred eighty millimeters (180 mm) minimum road clearance

2) More that three thousand two hundred thirty millimeters (3,230 mm) vehicle wheel base – two hundred thirty millimeters (230 mm) minimum road clearance.

l. The venting system for the discharge of pressure relief devices (pressure relief device channels) shall be constructed of metallic tubing with threaded compression, or flare fittings and shall be secured at the outer end. It shall not exit into a wheel well nor restrict the operation of a container pressure relief device or pressure relief device channel. It shall also be protected by caps, covers, or other means to keep water, dirt, and insects from collecting in the lines, but shall not restrict the flow of gas.

m. Fuel lines shall be mounted, braced, and supported to minimize vibration and shall be protected against damage, corrosion, or breakage due to strain or wear. A fuel line shall be installed, supported, protected, and secured in such a manner as to minimize the possibility of damage, corrosion, or breakage due to expansion, contraction, vibration, strains, or wear and to preclude any loosening while in operation. Where a fuel supply container is located on a trailer, the fuel supply line shall contain an emergency breakaway device designed to retain CNG on both sides of the breakaway point.

n. Every cylinder shall be equipped with either a manual valve or a normally closed, remotely actuated shutoff valve connected directly to the cylinder. Remotely actuated valves shall be equipped to bleed the cylinder manually. In addition, a shutoff valve shall be installed that allows isolation of the container(s) from the remainder of the fuel system.

o. A valve that automatically prevents the flow of gaseous fuel to the engine when the engine is not running, even if the ignition is switched on, shall be provided in the system. Where multiple fuel systems are installed on the vehicle, automatic valves shall be provided, as necessary, to shut off the fuel system not being used.

p. The fuel system shall be equipped with a backflow check valve that prevents the return flow of gas from the container(s) to the filling connection.

q. A pressure gauge located inside the driver or passenger compartment shall be installed in such a manner that no gas flows through the gauge in the event of failure.

r. An automatic pressure reducing regulator(s) shall be installed to reduce the fuel container pressure to a level consistent with the service pressure required by the gas-air mixer and provided with support so that their weight is not placed on the gas lines, as well as means to prevent malfunctioning due to refrigeration effects.

s. The fueling connection receptacle shall be mounted to withstand the breakaway force not greater than sixty-eight kilograms (68 kg) when applied in any horizontal direction. The receptacle shall be installed in accordance with the manufacturer's instructions. The clearance around the fueling connection shall be free of interference that prevents the connection of the fueling nozzle.

2. Maintenance, Fire Protection and Other Safety Measures

a. Safety Testing, Maintenance and Repair

1) The complete assembly shall be leak-tested using natural gas or non-flammable gas. Before use, every connection shall be verified leak-free with a non-corrosive leak detector solution or a leak detector instrument after the equipment is connected and pressurized to its service pressure. The testing shall be done under adequately ventilated conditions.

2) Where a vehicle is involved in an accident or fire causing damage to the CNG container, or if the container is subjected to a pressure greater than one hundred twenty-five percent (125%) of service pressure, the CNG container shall be replaced or removed, inspected, and retested in accordance with the document under which it was originally manufactured before being returned to service.

3) Where a vehicle is involved in an accident or fire causing damage to any part of the CNG fuel system, the system shall be repaired and retested before being returned to service.

4) All containers, container appurtenances, piping systems, venting systems, and other components shall be maintained in a safe condition. Damaged fuel lines shall be replaced and not be repaired. It shall be verified that the container retest date or expiration date is current.

5) All pressure relief devices on the cylinder shall be maintained in accordance with the manufacturer's instructions and only qualified personnel shall be permitted to service pressure relief devices.

6) Fire and other safety measures during vehicle maintenance:

   a) Close the quarter turn fuel delivery valve nearest the engine unless engine operation is required.

   b) Prohibit torches, welding, or grinding equipment on or near high-pressure fuel lines and containers.

   c) Prevent damage to containers, including actions such as dropping, dragging, or rolling of the container.

   d) Prevent exposure of composite wrapped containers to strong chemicals such as battery acid or metal cleaning solvents.

   e) Prevent hoists or jacks from coming into direct contact with containers.

   f) Provision of at least a stand-by 20-B and C type of fire extinguisher readily available to provide first aid fire protection.

7) A regulated and safe discharge of CNG from vehicle containers shall comply with the following:

   a) The venting or depressurization of a compressed natural gas container shall be performed only by trained personnel using written procedures. The gas removed from the container shall be discharged into a closed transfer system and shall be vented by an approved atmospheric venting method.

   b) Personnel performing container depressurization shall:

      i. Use grounding to prevent static electrical charge build-up;

      ii. Limit the rate of gas release from plastic-lined containers to a value not greater than that specified by the container's manufacturer; and

      iii. Restrain containers during depressurization to prevent container movement.

8) Direct gas venting shall be done through a vent tube that will divert the gas flow to the atmosphere. The vent tube shall have a gas-tight connection to the container prior to venting, and all components shall be properly grounded. The vent tube shall be constructed of Schedule 80 pipe of at least fifty millimeters (50 mm) diameter. The vent tube shall not be provided with any feature that would limit or obstruct gas flow.

b. Electrical Safety

All electrical wiring installations shall be secured and protected from abrasion and corrosion to the same standard as the original wiring on the vehicle. In addition, it shall be sized and fuse-protected.

c. Markings and Safety Labeling

1) Fuel-carrying components shall be labeled or stamped with the following:

   a) Manufacturer's name or symbol;

   b) Model designation;

   c) Design service pressure;

   d) Direction of fuel flow where necessary for correct installation; and

   e) Capacity or electrical rating, as applicable.

2) Where a manual valve is used, the valve location shall be indicated with the words **"MANUAL SHUTOFF VALVE."** A weather-resistant decal or label with red, blue, or black letters on a white or silver reflective background shall be used.

3) A vehicle equipped with a CNG fuel system shall bear the following durable labels:

   a) A label readily visible and located in the engine compartment shall include identification as a CNG-fueled vehicle, system service pressure, installer's name or company, container retest date(s) or expiration date, and total container water volume in liters (gallons); and

b). A label located at the fuelling connection receptacle shall include the identification as a CNG-fuelled vehicle, system working pressure, and container retest date(s) or expiration date.

Exception: If both labels are located in one of the above areas, the labels shall be permitted to be combined into a single label.

4) Each vehicle shall be identified in accordance with para "I" of Division 5 of this Chapter.

D. **CNG Compression, Storage, and Dispensing Systems**

1. Compression equipment shall be designed for use with CNG and for the pressures and temperatures to which it can be subjected under normal operating conditions. It shall have pressure relief devices that limit each stage pressure to the maximum allowable service pressure for the compression cylinder and piping associated with that stage of compression. Compression equipment shall incorporate a means to minimize liquid carryover to the storage system.
2. Unattended CNG compression equipment shall be equipped with a high discharge and a low suction pressure automatic shutdown control.
3. Engine-driven compressor installations shall conform, where applicable, to NFPA 37, *Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines*.
4. Control devices shall be installed so that internal or external icing or hydrate formation does not cause vehicle or fueling station malfunction.
5. The fueling connection shall prevent the escape of gas where the connector is not properly engaged or becomes separated. Fueling nozzles shall be listed in accordance with ANSI/IAS NGV1, *Standard for Compressed Natural Gas Vehicle (NGV) Fueling Connection Devices*.
6. Locations

a. Outdoors

1) A facility in which CNG compression, storage, and dispensing equipment are sheltered by an enclosure that is constructed of non-combustible or limited-combustible materials and that has at least one (1) side predominantly open and a roof designed for ventilation and dispersal of escaped gas shall be considered located outdoors.

2) Compression, storage, and dispensing equipment located outdoors shall be:

a) Aboveground and not be beneath electric power lines, located at least three meters (3 m) from the nearest important building or line of adjoining property that a building can be built upon or from any source of ignition;

b) More than three meters (3 m) from the nearest public street or sidewalk line and at least fifteen meters (15 m) from the nearest rail of any railroad main track;

c) Provided with a clear space of at least one meter (1 m) for access to all valves and fittings of multiple groups of containers;

d) Provided with a minimum separation of three meters (3 m) from readily ignitable material of any stationary container; and

e) Provided with a minimum separation of six and one tenth meters (6.1 m) between containers and aboveground tanks containing flammable or combustible liquids.

3) During outdoor fueling operations, the point where the fueling connection is made shall be located at least three meters (3 m) from any important building, mobile home, public sidewalk, highway, street, or road and at least one meter (1 m) from storage containers

4) A lesser distance shall be from buildings or walls constructed of concrete or masonry materials or of other material having a fire resistance rating of at least two (2) hours, but at least three meters (3 m) from any building openings.

b. Indoors

1) Compression, dispensing equipment, and storage containers connected for use shall be permitted to be located inside of buildings reserved exclusively for these purposes or in rooms within or attached to buildings in accordance hereof.

2) Storage shall be limited to not more than two hundred eighty-three cubic meters (283 m^3) of natural gas in each building or room.

Exception: CNG stored in vehicle-mounted fuel supply containers.

3) Deflagration (explosion) venting shall be provided in exterior walls or roof only.

4) Rooms within or attached to other buildings shall be constructed of non-combustible or limited-combustible materials. Interior walls or partitions shall be continuous from floor to ceiling, shall be securely anchored, and shall have a fire resistance rating of at least two (2) hours. At least one (1) wall shall be an exterior wall.

5) Indoor locations shall be ventilated, utilizing air supply inlets and exhaust outlets, arranged to provide uniform air movement to the extent practical. Inlets shall be uniformly arranged on exterior walls near floor level. Outlets shall be located at the high point of the room in exterior walls or the roof. A ventilation system for a room within or attached to another building shall be separate from any ventilation system for the other building.

6) Ventilation shall be by a continuous mechanical ventilation system or by a mechanical ventilation system activated by a continuously monitoring natural gas detection system where a gas concentration of not more than one-fifth (1/5) of the lower flammable limit (LFL) is present. The ventilation rate shall be at least one (1) m^3/min per twelve (12) m^3 of room volume. In either case, the system shall shut down the fueling system in the event of failure of the ventilation system. Reactivation of the fueling system shall be by manual restart conducted by trained personnel.

7) Where installed, a gas detection system shall be equipped to sound an alarm and visually indicate when a maximum of one-fifth (1/5) of LFL is reached.

8) Buildings and rooms used for compression, storage, and dispensing shall be classified in accordance with Annex A, Table 37, *Electrical Installations in CNG Service Stations*. No electrical sources of ignition other than electrical installations, as permitted by the preceding provision, shall be permitted.

9) Pressure relief devices on storage systems shall have pressure relief device channels to convey escaping gas to the outdoors and then upward to a safe area to prevent impinging on buildings, other equipment, or areas open to the public (e.g., sidewalks).

10) Access doors shall have warning signs with the words **"WARNING—NO SMOKING—FLAMMABLE GAS".** Such wording shall be in plainly legible, bright red letters on a white background with letters not less than twenty-five millimeters (25 mm) in height.

11) Fast-fill fueling indoors is permitted where storage and compression equipment is located outdoors complying the aforementioned indoor requirements. In addition, an emergency manual shutdown device shall be installed as prescribed hereto and a gas detection system equipped to sound an alarm and visually indicate when a maximum of one-fifth (1/5) of the Lower flammable limit (LFL) is reached shall be installed. The detector shall shut down the compressor and stop the flow of gas into the structure.

7. Installation of Containers and Container Appurtenances (Other Than Pressure Relief Devices)

a. Storage containers shall be installed aboveground on stable, noncombustible foundations or in vaults with ventilation and drainage. Horizontal containers shall have no more than two (2) points of support longitudinally. Where flooding can occur, each container shall be securely anchored to prevent floating.

b. Containers shall be provided with corrosion protection in accordance with the manufacturer's instructions. Horizontally installed containers shall not be in direct contact with each other.

c. Means shall be provided to prevent the flow or accumulation of flammable or combustible liquids under containers such as by grading, pads, or diversion curbs.

8. Installation of Pressure Relief Devices

    a. Pressure relief valves shall discharge to a safe area and escaping gas shall not impinge on buildings, other equipment, or areas subject to occupancy.

    b. Pressure relief valves on pressure vessels shall be in vertical positions and fitted with rain caps.

    c. An overpressure protection device, other than a rupture disc, shall be installed in the fueling transfer system to prevent overpressure in the vehicle. The set pressure of the device shall not exceed one hundred twenty-five percent (125%) of the service pressure of the fueling nozzle it supplies.

9. Installation of Pressure Regulators

    Regulators shall be installed so that their operation is not affected by weather, mud, insects, or debris.

10. Installation of Pressure Gauges

    Gauges shall be installed to indicate compression discharge pressure, storage pressure, and fuel supply container fill pressure.

11. Installation of Piping and Hoses

    a. Piping and hose shall be run as directly as practical and with adequate provisions for expansion, contraction, jarring, vibration, and settling. Exterior piping shall be either buried or installed aboveground and shall be supported and protected against mechanical damage. Underground piping shall be buried not less than four hundred sixty millimeters (460 mm) below the surface of the ground unless otherwise protected from damage by movement of the ground. Underground and aboveground piping shall be protected from corrosion in compliance with recognized practices. Threaded pipe and fittings shall not be used underground.

    b. Manifolds connecting fuel containers shall be fabricated to minimize vibration and shall be installed in a protected location, or shielded to prevent damage from unsecured objects.

    c. Piping installation, including its fittings and methods of jointing, shall comply with the applicable Plumbing Code of Practice for CNG Vehicles.

    d. Natural gas shall be vented only to a safe point of discharge. A vent pipe or stack shall have the open-end protected to prevent entrance of rain and solid material. Vertical vent pipes and stacks shall have provisions for drainage.

    e. The use of hose in an installation shall be limited to the following:

        1) A vehicle fueling hose;

        2) An inlet connection to compression equipment; or

        3) A section of metallic hose not exceeding nine hundred ten millimeters (910 mm) in length in a pipeline to provide flexibility where necessary. Each section shall be so installed that it is protected against mechanical damage and is readily visible for inspection. The manufacturer's identification shall be retained in each section.

    f. At public fueling stations, provision shall be provided to recycle gas used for calibration and testing.

12. Testing

    a. Piping, tubing and hose, and hose assemblies shall be leak tested after assembly to prove them free from leaks at a pressure equal to at least the normal service pressure of that portion of the system.

    b. Pressure relief valves shall be tested at least every five (5) years.

13. Installation of Emergency Shutdown Equipment

    a. A manually operated container valve shall be provided for each approved storage cylinder. Each group of ASME storage vessels up to a maximum combined capacity of two hundred eighty-three cubic meters (283 m^3) shall be provided with a manually operated shutoff valve.

    b. The fill line on a storage container shall be equipped with a backflow check valve to prevent discharge of natural gas from the container in case of the rupture of the line, hose, or fittings.

c. A manually operated shutoff valve shall be installed in a manifold as close to a container or group of containers as practical.

d. Gas piping from an outdoor compressor or storage system into a building shall be provided with shutoff valves located outside the building.

e. An emergency manual shutdown device shall be provided at the dispensing area and at a location remote from the dispensing area. This device, when activated, shall shut off the power supply and gas supply to the compressor and the dispenser.

f. A breakaway device shall be installed at every dispensing point. Such device shall be arranged to separate using a force not greater than sixty-eight kilograms (68 kg) when applied in any horizontal direction.

g. Control circuits shall be arranged so that, when an emergency shutdown device is activated or electric power is cut off, systems that shut down shall remain down until manually activated or reset after a safe condition is restored.

h. Each line between a gas storage facility and a dispenser at a fast-fill station shall have a valve that closes when one of the following occurs:

1) The power supply to the dispenser is cut off; or

2) Any emergency shutdown device at the refueling station is activated.

i. A fast-closing, "quarter turn" manual shutoff valve shall be provided at a fast-fill station upstream of the breakaway device, readily accessible to the person dispensing natural gas.

j. A self-closing valve shall be provided on the inlet of the compressor that shuts off the gas supply to the compressor.

14. Installation of Electrical Equipment

a. Fixed electrical equipment and wiring within areas specified in Annex A, Table 37, *Electrical Installations in CNG Service Stations* shall comply with same table and shall be installed in accordance with the latest edition of PEC and NFPA 70.

b. Electrical equipment on internal combustion engines shall be installed in accordance with NFPA 37, *Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines*.

Exception: Listed dispensers shall be permitted to be installed using classified areas in accordance with the terms of the listing.

15. Stray or Impressed Currents and Bonding

a. Where stray or impressed currents, such as those from cathodic protection, are used or present in dispensing systems, protective measures shall be taken to prevent ignition in accordance with API RP 2003, *Protection Against Ignitions Arising Out of Static, Lightning, and Stray Currents*.

b. Static protection shall not be required where CNG is transferred by conductive or non-conductive hose, flexible metallic tubing, or pipe connections where both halves of the metallic couplings are in continuous contact.

16. System Operation

a. A cylinder shall not be charged in excess of the design pressure at the normal temperature for that cylinder as per manufacturer's instructions.

b. A fuel supply container shall not have a settled pressure above the service pressure that is stamped on the container and displayed on a label near the filling connection, corrected for the ambient temperature at the time of filling.

c. CNG dispensing systems shall be equipped to stop fuel flow automatically when a fuel supply container reaches the temperature-corrected fill pressure. Where an overpressure incident that results in operation of the overpressure protection system occurs, the dispenser pressure control system shall be examined and certified by a qualified technician prior to being returned to service.

d. The transfer of CNG into a fuel supply container shall be performed in accordance with instructions posted at the dispensing station.

e. Where CNG is being transferred to or from a motor vehicle, the engine shall be turned off.

f. During the transfer of CNG to or from cargo vehicles, the hand or emergency brake of the vehicle shall be set, and chock blocks shall be used to prevent rolling of the vehicle.

g. Transfer systems shall be capable of depressurizing to facilitate disconnection.

h. Bleed connections shall lead to a safe point of discharge.

i. CNG shall not be used to operate any device or equipment that has not been designed or modified for CNG service.

j. Sources of ignition shall not be permitted within three meters (3 m) of any filling connection during a transfer operation.

k. A warning sign(s) shall be posted at the dispensing points with the following words:

A. STOP MOTOR.

B. NO SMOKING.

C. FLAMMABLE GAS.

D. NATURAL GAS VEHICLE FUEL CYLINDERS SHALL BE INSPECTED AT INTERVALS NOT EXCEEDING THREE (3) YEARS TO ENSURE SAFE OPERATION OF THE VEHICLE.

E. NATURAL GAS FUEL CYLINDERS PAST THEIR END-OF-LIFE DATE SHALL NOT BE REFUELED AND SHALL BE REMOVED FROM SERVICE.

j. A warning sign with the words **"NO SMOKING, FLAMMABLE GAS"** shall be posted in all compressor and storage areas. The lettering shall be large enough to be visible and legible from each point of transfer. The service pressure of each dispenser shall be posted in view of the operator.

17. A portable fire extinguisher having a rating of not less than 20-B and C shall be provided at the dispensing area.

18. Maintenance

a. Containers and their appurtenances, piping systems, compression equipment, controls, and devices shall be maintained in proper operating condition.

b. After the original installation, vehicle-fueling hoses shall be examined visually at such intervals as are necessary to ensure that they are safe for use. Hose shall be tested for leaks per manufacturer's requirements, but at least annually, and any unsafe leakage shall be reason for rejection.

c. While in transit, fueling hose and flexible metal hose on a cargo vehicle to be used in a transfer operation, including their connections, shall be depressurized and protected from wear and injury.

d. Pressure relief valves shall be maintained in proper operating condition.

19. Vehicle Fueling Appliances in Nonresidential Occupancies

a. Vehicle fueling appliances (VFAs) shall be of the approved type and shall not exceed a gas flow of twenty-eight hundredths standard cubic meter per minute (0.28 SCM/min).

b. VFAs shall be permitted to be used to fill stationary containers at vehicle fueling locations.

c. The installation of VFAs shall comply with the requirements of the provisions set forth in para "E" of Section 10.3.7.9 of this RIRR.

d. VFAs shall not be installed within three meters (3 m) of any storage.

Exception: Storage in the vehicle fuel supply container.

e. Where installed indoors in public assembly and educational occupancies, a VFA shall be located in a portion of the occupancy in accordance with the latest edition of NBCP or NFPA 101.

E. **Residential Fueling Facility**

The capacity of a residential fueling facility (RFF) shall not exceed fourteen hundredths standard cubic meter/min (0.14 SCM/min) of natural gas. Storage of CNG shall be prohibited; however, CNG shall be permitted to be stored in the vehicle fuel supply container.

1. General Safety Requirements
   a. All equipment related to RFF installation shall be protected to minimize the possibility of physical damage and vandalism, such as the use of an enclosure for the compressor package, similar to that of a central air conditioner.
   b. All equipment related to RFF installation shall be designed for the pressure, temperature, and service expected.
   c. Vehicles shall be considered as unclassified electrically with respect to NFPA 70.
   d. Natural gas shall not be vented to the atmosphere under normal operation.
   e. Unless specifically permitted by the installation instructions, multiple VFAs shall not be manifolded together on the discharge side.
   f. Where more than one VFA are located in a common area, spacing between VFAs shall not be less than one meter (1 m) unless permitted by the installation instructions.
2. Installation
   a. CNG compression and dispensing shall be located and conducted outdoors wherever practical. However, where not practical (e.g., where inclement weather is common), compression and dispensing shall be permitted to be located indoors.
   b. All RFF equipment shall be installed in accordance with the equipment manufacturer's instructions.
   c. The RFF shall have a nameplate marked with minimum and maximum gas inlet pressure and flow rate, gas outlet maximum pressure, and electrical requirements.
   d. Indoor Installations
      1) Where it is necessary to install the compression unit and refueling connections indoors, the compression unit shall be mounted or otherwise located such that the compression unit is vented outdoors.
      2) Where the RFF or the vehicle being fueled is located indoors, a gas detector set to operate at one fifth (1/5) the lower limit of flammability of natural gas shall be installed in the room. The detector shall be located within one hundred fifty millimeters (150 mm) of the ceiling or the highest point in the room. The detector shall stop the compressor and operate an audible or a visual alarm.
   e. Outdoor Installations

      The RFF shall be installed on a firm, noncombustible support to prevent undue stress on piping and conduit.
   f. Pressure relief valves shall have pressure relief device vents or vent lines to convey escaping gas to the outdoors and then upward to a safe area to prevent impinging on buildings, other equipment, or areas open to the public (e.g., sidewalks).
   g. For measurement and test purposes, pressure gauges maybe be installed, although not required.
   h. An RFF shall be equipped to stop fuel flow automatically when the container(s) reaches the temperature-corrected fill pressure.
   i. Piping and Hose
      1) All piping and hose from the outlet of the compressor shall be supplied as part of the RFF.
      2) All gas piping to the RFF shall be installed in accordance with NFPA 54, *National Fuel Gas Code*.
      3) The use of hose in an installation shall be restricted to the following:
         a) A fueling hose that shall be limited to a maximum length of seven and six tenths meters (7.6 m) and shall be supported above the floor/ground level or otherwise protected from mechanical damage from abrasion and being driven over by a vehicle
         b) A maximum of one meter (1 m) in length where used to prevent abrasion damage resulting from vibration on the inlet or outlet, or both
      4) Transfer systems shall be capable of depressurizing to facilitate disconnection. Bleed connections shall lead to a safe point of discharge.

j. Testing

All piping and tubing shall be tested after assembly to be proven free of leaks at a pressure equal to the maximum service pressure of that portion of the system.

k. Installation of Emergency Shutdown Equipment

1) An RFF shall be equipped with emergency manual shutdown of the gas supply and electric power. The emergency electrical switch shall be at least one and a half meters (1.5 m) from the RFF and in view of the RFF.

2) Breakaway protection shall be provided in a manner so that, in the event of a pull away, natural gas would cease to flow.

3) A breakaway device shall be installed at every dispensing point. Such a device shall be so arranged as to separate using a force not greater than sixty-eight kilograms (68 kg) when applied in any horizontal direction.

l. Operation

1) An RFF shall be operated in accordance with the manufacturer's instructions.

2) A fuel supply container shall not be charged in excess of its maximum allowable service pressure at normal temperature. Approved containers shall be charged.

3) Where CNG is being transferred to a motor vehicle, the engine shall be stopped.

m. Maintenance and Inspection

1) All RFF equipment shall be inspected and maintained in accordance with the manufacturer's instructions.

2) After installation, all hoses shall be examined visually as part of this inspection. Hoses that are kinked or worn shall be replaced.

3) All safety relief valves shall be maintained in proper operating condition in accordance with the manufacturer or supplier's recommendation.

SECTION 10.3.7.10 LIQUEFIED NATURAL GAS

Production, storage, use and handling of Liquefied Natural Gas (LNG) shall be in accordance with applicable Philippines National Standards, NFPA 59-A, *Standard for the Production, Storage and Handling of Liquefied Natural Gas* and other internationally accepted standards.

DIVISION 8. OTHER HAZARDOUS MATERIALS AND CHEMICALS

SECTION 10.3.8.1 SCOPE

This Division shall apply to the storage, handling, transport and protection of hazardous materials and chemicals not covered on Division 7 of this Chapter.

SECTION 10.3.8.2 OXIDIZING MATERIALS

A. Packaged oxidizing materials shall be stored in dry locations and separated from stored organic materials. Bulk oxidizing materials shall not be stored on or against wooden surfaces.

B. Oxidizing materials shall be stored separately from flammable solids, combustible materials, hazardous chemicals, corrosive liquids and such other non-combustible materials.

SECTION 10.3.8.3 RADIOACTIVE MATERIALS

A. Durable, clearly visible signs of warning of radiation dangers shall be placed at all entrances to areas or rooms where radioactive materials are used or stored. In addition, each container in which radioactive materials are used, stored, or transported shall bear a durable, clearly visible, appropriate warning sign. Such signs shall bear the three-bladed radiation symbol in magenta or purple on a yellow background in accordance with the Code of the Philippine Nuclear Research Institute (PNRI) Part 4, *Regulations for the Safe Transport of Radioactive Material in the Philippines*.

B. Except for liquids, signs are not required for the storage of manufactured articles such as instruments or clock dials or electronic tubes or apparatus, of which radioactive materials are a component part, and luminous compounds, when securely packed in strong containers, provided the gamma radiation at any surface of the package is less than ten (10) milliroentgens in twenty-four (24) hours.

C. When not in use, radioactive materials shall be kept in adequately shielded fire-resistant containers of such design that the gamma radiation will not exceed two hundred (200) milliroentgens per hour or its equivalent at any point of readily accessible surface.

D. The opinion of PNRI shall be obtained in all cases of doubt as to the safety of radioactive materials. The ruling of the Institute shall be final and non-appealable.

E. Storage, use and handling of Radioactive Materials shall be in accordance with applicable Codes of PNRI, NFPA 801, *Standard for Fire Protection for Facilities Handling Radioactive Materials* and other internationally accepted standards.

SECTION 10.3.8.4 POTENTIALLY EXPLOSIVE CHEMICALS

A. Potentially explosive chemicals shall be stored away from all heat-producing appliances and electrical devices and shall be protected from extreme heat, fire and explosion.

B. Explosives and blasting agents shall not be stored in the same building or in close proximity to such materials except in accordance with RA 9514 and its RIRR.

C. Good housekeeping shall be maintained. Broken or cracked bags, packages or other containers shall be transferred to new and clean container before storing. Other spilled materials and discarded containers shall be promptly gathered and destroyed in an approved manner.

D. All electric bulbs shall be equipped with guards to prevent breakage.

E. Open lights or flames and smoking shall be prohibited in or near storage areas.

F. Internal combustion motor vehicles or lift trucks shall not be parked in the room or compartment where such chemicals are located.

SECTION 10.3.8.5 ORGANIC PEROXIDES

A. A detached, well isolated, ventilated and un-heated storage building constructed with walls having a fire resistance rating of not less than two (2) hours, a non-combustible floor, and a light weight insulated roof shall be provided for the storage of twenty-two kilograms (22 kg) or more of organic peroxides. If not adequately protected by a fast-acting deluge type automatic firefighting system, the storage building shall be located at minimum distances from flammable or combustible liquid, building or highway as follows:

WEIGHT OF ORGANIC PEROXIDES	DISTANCES
22 kg to 45 kg	23 m
45 kg to 227 kg	30 m
227 kg to 445 kg	38 m
445 kg to 1,364 kg	60 m
1,364 kg to 2,270 kg	92 m

B. The organic peroxides shall be stored in the original shipping containers.

C. Care shall be taken to avoid rough handling or contamination of these chemicals.

D. Readily legible warning signs and placards as prescribed in Division 5 of this Chapter shall be prominently placed in the storage and processing areas.

SECTION 10.3.8.6 NITROMETHANE

A. A suitable isolated outdoor storage are shall be provided for nitromethane.

B. Hazardous processing shall not be permitted in the vicinity of this storage area.

C. Nitromethane shall be stored in the original shipping drums, in an underground tank with suitable corrosion protection and a minimum of six hundred millimeters (600 mm) of earth over the tank or in barricaded tanks aboveground. If the drum storage is not adequately protected by a fast-acting deluge automatic type firefighting system, the storage of nine hundred nine kilograms (909 kg) or more shall be located at minimum distances in accordance with Annex A, Table 38, *Minimum Distance of Nitromethane from Inhabited Buildings*, from inhabited buildings.

D. Care shall be taken to avoid rough handling or contamination of this chemical.

E. Readily legible warning signs and placards as prescribed in Division 5 of this Chapter shall be prominently placed in the transport, storage and processing area.

SECTION 10.3.8.7 AMMONIUM NITRATE

A. All flooring in storage and handling areas shall be of non-combustible material and shall be without drains, traps, pits or pockets into which any molten ammonium nitrate could flow and be confined in case of fire.

B. Each storage pile of bags or other authorized packages and container of such materials shall not exceed three and sixty-five hundredths meters (3.65 m) in height, three and sixty-five hundredths meters (3.65 m) in width and nine hundred fifteen millimeters (915 mm) in length.

C. Pile units shall be separated by a clear space of not less than nine hundred twenty millimeters (920 mm) in width from the top of piles, serving as cross aisles in the storage are which shall not be less than one thousand two hundred millimeters (1,200 mm) in width.

D. A clearance of not less than seven hundred sixty millimeters (760 mm) shall be maintained from building walls and partitions, and not less than nine hundred millimeters (900 mm) from ceilings of roof structural members with a minimum of four hundred fifty millimeters (450 mm) from sprinklers.

E. Ammonium nitrate storage shall be separated by a space of nine meters (9 m) or by tight non-combustible partition from storage of organic chemicals, corrosive liquids, compressed gases, flammable and combustible materials, or other contaminating substance such as sulfur, coal, flour, and metallic powders such a zinc, copper, and magnesium where storage of such materials is permitted with ammonium nitrate.

F. Quantities of ammonium or ammonium nitrate fertilizers having no organic coating, in the form of crystals, flakes, grains or pills including fertilizers, dynamic grade, nitrous oxide grade and technical grade ammonium nitrate and ammonium nitrate phosphate (containing sixty percent (60%) of ammonium nitrate by weight) or more than fifty (50) metric tons of total weight, shall be stored in well-ventilated building of fire-resistive or noncombustible construction, or in a building of other type of construction equipped with an approved automatic sprinkler system.

G. In populated areas, quantities of two thousand five hundred (2,500) tons or more shall be stored in well-ventilated buildings of one-hour fire-resistive or non-combustible construction equipped with an approved automatic sprinkler system. No combustible material or ammonium nitrate sensitizing contaminants shall be stored in this building.

H. Storage of ammonium nitrate, coated or mixed with organic anti-caking materials, except compounded blasting agent shall not be permitted in populated and congested areas. Outside such areas, quantities of five hundred (500) metric tons or less may be stored in well-ventilated buildings of fire-resistive or non-combustible construction equipped with an approved automatic firefighting system.

SECTION 10.3.8.8 HIGHLY TOXIC MATERIALS

A. Highly toxic materials shall be segregated from other chemicals and combustible and flammable substances in a room or compartment separated from other areas by walls and floor and ceiling assemblies having a fire-resistance rating of not less than one (1) hour.

B. The storage room shall be provided with adequate drainage facilities and natural or chemical ventilation to the outside atmosphere.

C. Readily legible warning signs and placards as prescribed in Division 5 of this Chapter shall be prominently placed in the transport, storage and processing area.

SECTION 10.3.8.9 POISONOUS GASES

A. Storage of poisonous gases shall be in rooms of at least one (1) hour fire-resistive construction and having natural or mechanical ventilation adequate to remove leaking gas. Such ventilation shall not discharge to a point where gases may endanger any person.

B. Readily legible warning signs and placards as prescribed in Division 5 of this Chapter shall be prominently placed in the transport, storage and processing area.

SECTION 10.3.8.10 CORROSIVE LIQUIDS

A. Satisfactory provision shall be made for containing and neutralizing or safely flushing away leakage of corrosive liquids which may occur during storage or handling.

B. Readily legible warning signs and placards as prescribed in Division 5 of this Chapter shall be prominently placed in the transport, storage and processing area.

SECTION 10.3.8.11 STORAGE CABINETS FOR HAZARDOUS MATERIALS

A. Cabinets for the storage of hazardous materials shall be approved and substantially constructed of one and twenty-five hundredths millimeters (1.25 mm) thick sheet iron or a minimum of twenty-five and four tenths millimeters (25.4 mm) plywood or equivalent.

B. Doors shall be self-closing and self-latching.

C. Cabinets shall be painted with luminescent type paint and shall be conspicuously labeled in red letters: **"HAZARDOUS - KEEP FIRE AWAY."**

SECTION 10.3.8.12 DESIGNATION OF CARGO

A. No person shall operate any tank vehicle transporting any corrosive cryogenic, hypergolic, or phyrophoric materials unless at all time of such transportation there is displayed upon each side and the rear of the tank vehicle a sign in letter not less than seven hundred sixty-two millimeters (762 mm) in height upon a background of sharply contrasting color, which shall specifically designate the cargo.

B. Readily legible warning signs and placards as prescribed Division 5 of this Chapter shall be prominently placed in the transport, storage and processing areas.

SECTION 10.3.8.13 HAZARDOUS INSULATOR/CUSHIONING MATERIALS

The storage areas for plastic-based, fire-supporting, fire-conductive, smoke generating, or toxic gas producing materials that are used as insulators or cushioning material for crates, boxes, walls, air conditioning ducts, beds, chairs, and the like shall be provided with automatic fire extinguishing systems of an approved type.

CHAPTER 4. FIRE SAFETY FOR HAZARDOUS OPERATIONS

DIVISION 1. SCOPE

This Chapter shall govern the Fire Safety Measures for the following Hazardous Operations:

A. Automobile Wrecking Yards;

B. Bowling Alleys Resurfacing and Refinishing;

C. Dust Producing Machines;

D. Explosives, Ammunitions and Blasting Agents;

E. Fire Works and Pyrotechnics;

F. Spraying, Dipping, Coating Using Flammable or Combustible Materials and Liquids;

G. Ripening Processes;

H. Fumigation and Insecticidal Fogging;

I. Repair Garages;

J. Lumber Yards, Wood Processing and Woodworking Facilities;

K. Mechanical Refrigeration;

L. Motion Picture Projection;

M. Oil Burning Equipment;

N. Manufacture of Organic Coatings;

O. Industrial Ovens and Furnaces;

P. Hot works Operations; and

Q. Safeguarding Building Construction, Alteration and Demolition Operations.

DIVISION 2. AUTOMOBILE WRECKING YARDS

SECTION 10.4.2.1 APPLICATION

This division shall cover automobile wrecking yards, including hot works and the handling and storage of fuels and fluids, tires, plastics, combustibles, and hazardous materials.

SECTION 10.4.2.2 GENERAL REQUIREMENTS

A. Automobile wrecking yard shall be operated and maintained with the following requirements:

1. No automotive wrecking yard shall be so located as to seriously expose adjacent properties to fire. Serious exposure shall include situations where materials are stored or operations performed within four and a half meters (4.5 m) of an adjacent private property line.
2. The entire premises devoted to such yard or plant shall be enclosed with a chain-linked fence not less than two and a half meters (2.5 m) in height, with two (2) gates of four and a half meters (4.5 m) width for fire department access.
3. No roof of any building located in a salvage yard shall be used for storage. This applies to all buildings on a property where salvage work is performed or waste materials are handled, including those used for storage, vehicle shelters, administration and sales.
4. No motor vehicles, or any part thereof, junk, or other waste materials, shall be stored, displayed or kept in such a manner as to unnecessarily hinder or endanger firefighting operations.
5. Vertical openings in such building shall be enclosed with approved automatic self-closing fire doors in accordance with Section 10.2.5.3 of this RIRR.
6. Picking shall be done in rooms separated from storage rooms or other occupancies by fire resistive walls and doors having a fire resistance of not less than one (1) hour. Picking rooms shall be provided with exhaust systems to adequately and safely remove dust and dirt.

SECTION 10.4.2.3 FIRE SAFETY CLEARANCE REQUIRED

In addition to Business Permit/Permit to Operate an automobile wrecking yard, an FSC issued by the C/MFM having jurisdiction for the following:

A. storage of flammable and combustible liquids

B. storage of hazardous materials

C. hot works operations and burning.

SECTION 10.4.2.4 TIRE STORAGE

A. Separation of yard storage from buildings, vehicles, flammable materials, and other exposures shall be in accordance with Annex A, Table 39, *Representative Minimum Exposure Separation Distances in Meter for Tire Storage*.

B. Sources of ignition such as cutting and welding, heating devices, and open fires shall be prohibited within the tire storage area.

C. Safeguards shall be provided to minimize the hazard of sparks from equipment such as refuse burners, boiler stacks, and vehicle exhaust when such hazards are located near the tire storage area.

D. Piles of tires or altered tire material shall not be located beneath power lines or structures.

E. Smoking shall be prohibited within the tire storage area.

F. Piles of tires or altered tire material shall be at least fifteen meters (15 m) from the perimeter fence.

G. Provisions for surface water drainage and measures to provide protection of pyrolytic oil runoff shall be directed around and away from the outdoor tire storage site to an approved location.

H. Tires shall be removed from rims immediately upon arrival at the storage site.

I. Tires shall not be stored on wetlands, flood plains, ravines, canyons, or steeply graded surfaces.

SECTION 10.4.2.5 BURNING OPERATIONS

Burning Operation is allowed provided that an FSC shall first be obtained from the C/MFM having jurisdiction in accordance with Division 4 of Chapter 5 of this Rule.

SECTION 10.4.2.6 MOTOR VEHICLE FLUIDS AND HAZARDOUS MATERIALS

A. The storage, use, and handling of motor vehicle fluids and hazardous materials shall be in accordance with Chapter 3 of this Rule.

B. Motor vehicle fluids shall be drained from salvage vehicles when such fluids are leaking.

C. Supplies or equipment capable of mitigating leaks from fuel tanks, crankcases, brake systems, and transmissions shall be kept available on site.

D. Single-use plugging, diking, and absorbent materials shall be disposed of as hazardous waste and removed from the site in a manner approved by the Department of the Environment and Natural Resources (DENR).

E. Airbag systems that have been removed from vehicles shall be handled and stored in accordance with Chapter 3 of this Rule.

F. Lead-acid batteries shall be removed from salvage vehicles when such batteries are leaking and shall be stored in a manner approved by the Department of the Environment and Natural Resources (DENR).

SECTION 10.4.2.7 HOUSEKEEPING

A. All materials not necessary for the operation of the facility should be removed as soon as practicable to reduce unnecessary accumulations of combustible materials.

B. Weeds and other vegetation should be kept clear to prevent a fire from spreading within the automobile wrecking yard or to another adjacent area.

DIVISION 3. BOWLING ALLEYS RESURFACING AND REFINISHING

SECTION 10.4.3.1 GENERAL

Bowling alleys shall conform to applicable requirements of this RIRR, as well as the provisions of this Division.

SECTION 10.4.3.2 FIRE SAFETY CLEARANCE REQUIRED

The operator/owner of a bowling establishment shall secure an FSC from the C/MFM having jurisdiction, before performing any refinishing and alley resurfacing operations involving the use of flammable liquids or materials on the premises.

SECTION 10.4.3.3 CONSTRUCTION

Pin finishes involving the application of flammable or combustible finishes, sanding or buffing operations, if done within a building, shall be done only in a room having a fire resistance rating of two (2) hours, provided with vacuum cleaner or a fixed-pipe suction system with remotely located exhauster and dust collector installed.

SECTION 10.4.3.4 OPERATION

A. During sanding and resurfacing operations, no portion of the premises shall be open to the public. Personnel who will do the sanding and resurfacing must be competent (with TESDA certification or its equivalent) to do the job.

B. When flammable solvents/chemicals are being used, an independent means of ventilation shall be provided to disperse flammable vapors to the open air.

C. Portable fire extinguishers must be provided for immediate use during work.

D. All electric motors or other equipment in the area, which is a potential source of ignition, shall be shut down. All smoking and use of open flames shall be prohibited during the application of flammable finishes and for one (1) hour thereafter.

E. Pin servicing work will not be allowed during sanding operation or for a period of twenty-four (24) hours after sanding/re-varnishing work is finished.

SECTION 10.4.3.5 PROTECTION AND MAINTENANCE

A. Sanding and buffing machines shall be equipped with approved continuous suction for collecting dust during sanding and refinishing operations. Contents shall be removed daily and disposed of safely.

B. All electric power tools shall be maintained and effectively grounded.

C. Storage of flammable or combustible liquids in any room shall not exceed an aggregate of two hundred twenty-five liters (225 L), and it shall be in flammable liquid storage cabinet or in approved safety containers not exceeding nineteen liters (19 L) individual capacity. The required distance between cabinets and containers shall be at least ten meters (10 m) to prevent fire spread. Approved metal waste bin with a self-closing cover shall be provided for all waste rags, and materials with the contents to be removed daily. Smoking shall be prohibited at all times in pin finishing rooms.

DIVISION 4. DUST PRODUCING MACHINES

SECTION 10.4.4.1 FIRE SAFETY CLEARANCE REQUIRED

No person shall construct/operate any dust producing machines such as rice mill, saw mill, feed mill, flour/starch/oat mill, hammer mill, grinders, crushers (stones, lime stones), plant pulverizing aluminum, coal, cocoa, magnesium, spices, any grain/s elevator for manufacturing, handling, processing or other material producing dust without FSC issued by the C/MFM having jurisdiction.

SECTION 10.4.4.2 CONSTRUCTION

A. Building construction, renovation, modification, reconstruction, alteration, repair, addition, change for use or change of occupancy classification, demolition, and relocation of building and structures relative thereto shall comply with the latest edition of NBCP.

B. Suitable dust collecting equipment shall be installed and accumulation of dust shall be kept at a minimum in the interior of the buildings.

C. Spaces inaccessible to housekeeping shall be sealed to prevent dust accumulation, and opening of firewalls or in fire barriers shall be protected by self-closing fire doors that have a fire resistance rating equivalent to one (1) hour, including interior stairs, elevators, and man lifts in accordance with the NFPA 221, *Standard for High Challenge Fire Walls, Fire Walls and Fire Barrier Walls*.

D. Electrical wiring, power equipment, and lightning protection system installed, shall conform to the requirements of latest edition of PEC.

E. In designing explosion prevention, relief and venting shall be directive to a safe outside location away from platforms, means of egress, or other potentially occupied areas.

F. Where the horizontal travel distance to the means of egress is less than fifteen meters (15 m) in normally unoccupied spaces, a single means of egress shall be permitted.

SECTION 10.4.4.3 OPERATION

A. Properly designed and located vents equipped with explosion proof exhaust fans shall be required in all buildings where flammable or explosive dusts are manufactured, processed or generated. The design of such equipment shall be in accordance with internationally accepted standards or NFPA 68, *Explosion Venting*.

B. During operation of the machines, if the dust explosion hazard exists in rooms or other enclosures under normal operating conditions, such areas shall be provided with explosion relief venting distributed over the exterior wall.

C. Recirculating or recycling exhaust air ventilation systems for dust explosion hazard areas, if used, shall be equipped with filter systems capable or removing dust from air.

D. Operating controls shall be designed, constructed, and installed, so that the required conditions of safety for personnel during operation are maintained.

SECTION 10.4.4.4 PROTECTION AND MAINTENANCE

A. All dust-producing or dust-agitating machinery, such as grinding mills and separators, elevators, elevator legs, spouts, hopper and other conveyors shall be provided with casing or enclosures maintained as nearly dust-tight as possible

B. All machinery and metal parts of the crushing, drying, pulverizing and conveying systems shall be provided with grounding system in accordance with the latest edition of PEC.

C. Smoking and the carrying of matches, the use of heating or other devices employing open flames, or use of any spark-producing equipment is prohibited in areas containing

dust-producing or dust-agitating operators. All wiring and electrical equipment of artificial lighting installed in such areas shall be in accordance with the provisions of the latest edition of PEC.

D. Static electricity shall be removed from all machinery and other component parts by permanent grounds and/or bonds. The design of such equipment shall be in accordance NFPA 77, *Static Electricity* and other internationally accepted standards.

E. The facility shall develop and implement a written housekeeping program that establish the frequency and methods determined best to reduce accumulations of fugitive dust on ledges, floors, equipment, and other exposed surfaces.

F. Separate dust collection systems in each department of manufacturing and handling shall be provided.

G. Heating, ventilation, and air conditioning systems shall not be used as the means to collect dust from localize sources.

H. Dust collection systems that remove material from operations that generate flame, sparks or hot material shall not be interconnected with dust collection systems that transport combustible particulate solids or hybrid mixtures.

I. Fire protection systems, where installed, shall be especially designed to address building protection, process equipment, and the chemical and physical properties of the material being processed.

J. A means of notification for occupants in the event of fire or other emergencies and annual training shall be provided. Emergency action plan of all employees shall be coordinated with local emergency responders and BFP/fire stations, and shall be included in the pre-fire planning.

K. Fire detection system shall be provided when the operation is intermittent with sound of an alarm.

L. All fire detection equipment and fire extinguishing systems shall be tested and maintained in accordance with Section 10.2.6.6 of this RIRR

DIVISION 5. EXPLOSIVES, AMMUNITION AND BLASTING AGENTS

SECTION 10.4.5.1 GENERAL

A. **Scope**

This Section shall apply to the manufacture, transportation, storage, sale, and use of explosive materials.

B. **Purpose**

This Section is intended to provide reasonable safety in the manufacture, storage, transportation, and use of explosive materials.

C. **Application**

This Division shall not apply to:

1. Explosives, ammunition and blasting agents used by the AFP; and
2. Transportation and use of explosives, ammunition, or blasting agents by the Mines and Geosciences Bureau (MGB), the NBI and the PNP Fire Arms and Explosives Unit acting in their official capacity.

SECTION 10.4.5.2 SECURITY AND SAFETY OF EXPLOSIVE MATERIALS

Explosives, including special industrial high explosive materials, shall be stored in magazines that meet the requirement of RA 9514 and its RIRR.

A. **Basic Requirements**

1. All explosive materials not in the process of manufacture, transportation, or use shall be kept in storage magazines.
2. Ammonium nitrate shall be permitted to be stored in the same magazine with blasting agents.
3. Ammonium nitrate and blasting agents shall be permitted to be stored in the same magazine with other explosive materials.

4. Where ammonium nitrate is stored in the same magazine with blasting agents, the magazine shall be designed for the storage of blasting agents.
5. Where ammonium nitrate is stored in the same magazine with explosives and/or blasting agents, the magazine shall be designed for the storage of explosives.

   In determining the maximum quantity of explosive material that is permitted to be placed in a magazine, half the weight of the ammonium nitrate shall be added to the weight of the explosive material.
6. Detonators shall be stored in a separate magazine for blasting supplies and not be stored in a magazine with other explosive materials.
7. Black Powder shall be permitted to be stored in a Type 4 magazine or a magazine of higher classification in accordance with NFPA 495, *Explosive Material Code*.
8. Blasting agents shall be permitted to be stored in a Type 5 magazine or a magazine of higher classification in accordance with NFPA 495.

B. **Magazine Construction, Classification and Use**

1. Magazine are constructed, classified and used to comply with the requirements of NFPA 495.
2. The land surrounding magazines shall be kept clear of brush, dried grass, leaves, trash and debris for a distance of at least fifteen meters (15 m).
3. Magazines shall be kept locked except when being inspected or when explosives are being placed therein or removed therefrom.
4. Magazines shall be kept clean, dry and free of grit, paper, empty packages and rubbish.
5. Magazines shall not be provided with other than approved artificial heat or light. Approved electric safety flashlights or safety lanterns may be used.
6. Blasting caps, electric blasting caps, detonating primers and primed cartridges shall not be stored in the same magazine with other explosives.
7. Packages of explosives shall not be unpacked or repacked in a magazine nor within forty-five and eight tenths meters (45.8 m) of a magazine or in close proximity to other explosives. Opened packages of explosives shall be securely closed before being returned to a magazine.
8. Magazines shall not be used for the storage of any metals, tools nor any commodity, except explosives, blasting agents and oxidizers used in compounding blasting agents. The quantity of blasting agents and oxidizers shall be included when computing the total quantity of explosives for determining distance requirements.
9. Floors of magazines shall be securely fastened in place and shall be capable of withstanding the loads imposed.
10. The roofs and exterior sides of building-type magazines shall be made of concrete materials with fire resistance rating of two (2) hours.
11. Magazines shall be ventilated to minimize dampness and heating of stored explosives. Ventilation openings shall be screened with fourteen (14) Mesh No. 21 protected in a manner that will maintain the bullet resistance of the magazine.
12. Doors and warning signs shall be in accordance with PD 1866, *Codifying The Laws on Illegal/Unlawful Possession, Manufacture, Dealing in, Acquisition or Disposition of Firearms, Ammunition or Explosives or Instruments Used in the Manufacture of Firearms, Ammunition or Explosives, and Imposing Stiffer Penalties for Certain Violations Thereof and for Relevant Purposes* and its Rules and Regulations.

C. **Warning Signs**

All access roads to explosive storage magazines shall be posted with the following warning sign:

DANGER.
NEVER FIGHT EXPLOSIVE FIRES.
EXPLOSIVES ARE STORED
ON THIS SITE.
CALL_____.

The sign shall be weather resistant with a reflective surface and lettering at least fifty millimeters (50 mm) high.

D. **Ignition Source and Control**

1. Smoking shall be prohibited in the plant site, except where permit notices are posted.
2. Matches, torches, or other flame-producing devices shall be prohibited from explosives manufacturing areas without a written permit signed by an authorized person.
3. Portable electrical and electronic equipment shall be permitted only when designated by the manufacturing process and incorporated into the standard operating instructions.

E. **Electrical Wiring and Equipment**

Electrical wiring and equipment shall be installed in accordance with the latest edition of PEC.

1. Bonding and Grounding

The non-current-carrying metal parts of electrical equipment, including electric motors, generators, proportioning devices, and other electrical enclosures serving individual manufacturing processes, shall be electrically bonded together in accordance with the requirements of the latest edition of PEC. Where the electrical system is required to be grounded, the grounding conductors shall be connected together and to the supply system grounding conductor in accordance with the requirements of the latest edition of PEC.

2. Static Electricity Hazards

a. When processes or conditions exist where the materials in process are able to be ignited by static electricity with an intensity capable of propagating ignition, means shall be provided to prevent the accumulation of hazardous levels of static charge.

b. The working area where screening, grinding, blending, and other processing of static-sensitive explosive materials is done shall be provided with approved static controls.

F. **Ventilation**

1. Mechanical ventilation systems shall be in accordance with the latest edition of Philippine Mechanical Engineering Code (PMEC) and NFPA 5000, *Building Construction and Safety Code*.
2. Local exhaust systems shall be provided to collect and remove moisture and odors, fumes, smoke, gas, mist, heat, dust, or other materials that are present in quantities above the limits according to applicable laws and regulations.
3. Electric motors used to power fans or blowers used in the ventilation system shall be located outside of the duct or portion of the system exposed to explosive materials.
4. Explosive dust shall not be exhausted into the atmosphere. Explosive dust shall be collected using a "wet" collector system or other approved means. Wetting agents shall be compatible with the explosive materials being collected.

Explosive dusts shall be removed from the collection system on a regular basis to prevent overloading and accumulation within the system.

SECTION 10.4.5.3 MANUFACTURING, USE AND HANDLING

A. The manufacture of explosives or blasting agents shall be prohibited unless such manufacture is authorized by law.

1. Emergency procedures shall be developed for each manufacturing facility.
2. Standard operating procedures governing the manufacturing process shall be located in a location and form accessible to workers.
3. Persons handling explosive materials or working in operating buildings shall be trained in the following areas:

a. The physical and health hazards of the explosive materials to be manufactured

b. The operational activities involved in processing the materials to include instructions in emergencies that are anticipated in the manufacturing process

c. The operating rules applicable to the materials in the manufacturing process

d. Plans for emergency procedures in the event of fire or explosion.

e. Where high explosives are manufactured at permanent locations, the facilities shall be enclosed by fences with gates capable of being locked. The integrity of the fences and gates shall be checked periodically.

f. All buildings containing in-process explosives and precursor chemicals shall be secured or attended by workers or security personnel.

B. Use, handling and blasting operation of explosives shall be in accordance with the Rules and Regulations of PD 1866, this Section, and the following conditions:

1. No person shall handle explosives while under the influence of intoxicants or narcotics;
2. No person shall smoke or carry matches while handling explosives or while in the vicinity thereof;
3. No open flame light shall be used in the vicinity of explosives;
4. Whenever blasting is being conducted in the vicinity of gas, electric, water, fire alarm, telephone, telegraph or steam utilities, the blaster shall notify the appropriate representative of such utilities at least twenty-four (24) hours in advance of blasting, specifying the location and intended time of such blasting. In an emergency, this time limit may be waived by the C/MFM having jurisdiction;
5. Blasting operations shall be conducted in accordance with internationally recognized standards;
6. Before a blast is fired, the person in charge shall make certain that all surplus explosives are in a safe place; all persons and vehicles are at a safe distance or under sufficient cover; and a loud warning signal has been sounded; and
7. Due precautions shall be taken to prevent accidental discharge of electric blasting caps from current induced by radio or radar transmitters, lightning, adjacent power lines, dust storms, or other sources of extraneous electricity. These precautions shall include:

a. the suspension of all blasting operations and removal of persons from the blasting area during the approach and progress of an electrical storm;
b. the posting of signs warning against the use of mobile radio transmitters on all roads within one hundred seven meters (107 m) of the blasting operations;
c. compliance with internationally recognized good practice when blasting within two and a half kilometers (2.5 km) of broadcast or high power short wave transmitters;
d. when blasting is done in a congested area or in close proximity to a building, structure, railway, highway or any other installation that may be damaged by material being thrown into the air, the blast shall be covered with an adequate blasting mat;
e. tools used for opening packages of explosives shall be constructed of non-sparking materials;
f. empty boxes and paper and fiber packing materials which have previously contained high explosives shall not be used again for any purpose, but shall be disposed of in a manner approved by the C/MFM having jurisdiction; and
g. explosives shall not be abandoned.

SECTION 10.4.5.4 TRANSPORTATION

A. Vehicles transporting explosive materials shall be driven by and be in the charge only of a licensed driver who is physically fit, careful, capable, reliable, and able to read and write the English language and who is not addicted to the use of, or under the influence of, intoxicants, narcotics, or other dangerous drugs.

B. The driver of a vehicle transporting explosive materials on public highways shall be not less than twenty-one (21) years old.

C. The driver shall be familiar with traffic regulations, applicable regulations concerning explosive materials, and provisions of this Chapter.

D. Vehicles used for transporting explosive materials shall be strong enough to carry the load and in good mechanical condition.

E. Explosive materials transported on a vehicle with an open body shall use portable magazine securely fastened to the vehicle body to store the explosive materials.

F. Vehicles used for transporting frictional spark-sensitive explosive materials such as Black Powder and primary explosives shall have no exposed spark-producing surface inside of the cargo body.

G. Every vehicle used for transporting explosives shall be equipped with not less than two (2) fire extinguishers. Extinguishers shall be so located as to be readily available for use.

H. Every vehicle transporting explosives shall be marked or labeled on both sides and rear with the word **"EXPLOSIVES"** in letters not less than eighty millimeters (80 mm) in height on a contrasting background.

I. Vehicle transporting explosives traveling in the same direction shall not be given within one hundred meters (100 m) of each other.

J. Explosive materials shall not be transported through any prohibited vehicular tunnel or over any prohibited bridge, roadway, or elevated highway.

K. Vehicles transporting explosive materials shall avoid congested areas and heavy traffic.

L. Unauthorized persons shall not ride vehicles transporting explosives.

M. Delivery shall only be made by authorized persons into approved magazines or approved temporary storage or handling area.

N. Other safety measures in transporting of explosive shall be in accordance with the applicable PNS and other internationally accepted standards.

DIVISION 6. FIREWORKS AND PYROTECHNICS

SECTION 10.4.6.1 APPLICATION

This Section shall apply to the manufacture, transportation, and storage of fireworks, pyrotechnic articles, and any component(s) thereof containing pyrotechnic or explosive compositions, distribution and retail sales of consumer fireworks and use of pyrotechnics before a proximate audience.

SECTION 10.4.6.2 FIRE SAFETY INSPECTION CERTIFICATE (FSIC) REQUIRED

No person shall manufacture, store, handle and/or use any fireworks and pyrotechnic materials of any kind or form without securing a FSIC from the C/MFM having jurisdiction, which is a prerequisite for the granting of permit issued by the PNP in accordance with RA 7183, *An Act Regulating the Sale, Manufacture, Distribution and Use of Firecrackers and Other Pyrotechnic Devices*, as amended.

SECTION 10.4.6.3 MANUFACTURING FACILITIES

A. All manufacturing facilities shall meet all the following conditions:

1. Manufacturing is restricted to production of custom fireworks, pyrotechnic articles, and any component(s) containing pyrotechnic or explosive materials that are not for general sale.
2. The facility contains not more than two and three tenths kilograms (2.3 kg) of pyrotechnic composition, of which not more than twenty-three hundredths kilogram (0.23 kg) is of explosive composition.
3. All explosive and pyrotechnic compositions are removed to a storage magazine at the end of each workday.
4. Process buildings shall be single-storey buildings and shall not have basements.
5. Wall joints and openings for wiring, plumbing, and other utilities shall be sealed to prevent the entry of dusts.
6. Horizontal ledges and surfaces upon which dust can settle and accumulate shall be minimized.
7. Floors and work surfaces shall not have cracks or crevice in which explosives or pyrotechnic compositions can lodge.
8. Floors and work surfaces in mixing and loading buildings for salute powder shall be of conductive materials.
9. Conductive footwear or other grounding techniques for personnel shall be used wherever exposed salute powder is present.
10. Stoves, exposed flames, and portable electric heaters shall be prohibited in any building where fireworks, its components, or flammable liquids are or can be present.
11. Means of egress in process buildings shall comply with the following requirements:

    a. At least two (2) remotely located means of egress shall be provided from every point in every undivided floor area of more than nine square meters (9 m^2).

b. Where process buildings are divided into rooms, means of egress shall be as follows:

1) At least two (2) means of escape shall be provided from each room of more than nine square meters (9 m^2).

2) Toilet rooms shall be permitted to have only one (1) means of egress, provided that they are located away from or shielded from process areas.

c. An unobstructed means of egress shall be located so that every point within the room or undivided floor area is within seven and six tenths meters (7.6 m) of a means of egress.

d. Exit doors shall open outward and shall be capable of being pressure actuated from the inside.

B. All persons engaged in the business of importing, manufacturing, or dealing in fireworks and pyrotechnic shall meet the following requirements:

1. They shall possess a valid license or permit from permitting agency.
2. They shall comply with all applicable state and local laws and regulations.
3. Copies of all required licenses and permits shall be posted at each manufacturing facility.
4. License and permit holders shall protect license and permits from loss, theft, defacement, destruction, or unauthorized duplication.
5. Any loss, theft, defacement, destruction, or unauthorized duplication of a license or permit shall be reported immediately to the issuing authority.
6. Licenses or permits shall not be assigned or transferred

SECTION 10.4.6.4 REQUIREMENTS FOR MANUFACTURE OF FIREWORKS AND PYTROTECHNICS

A. **Pyrotechnic Product Information**. The pyrotechnic operator shall use products provided with written information supplied by the manufacturer detailing the following information:

1. Name of the pyrotechnic device and a description of its effect.
2. Performance characteristics of the pyrotechnic device, where used as specified or, in the case of binary materials, as used in the specified amounts for the designated materials and equipment.
3. Material safety data sheet (MSDS) for the pyrotechnic materials.
4. The manufacturer's statement regarding whether the pyrotechnic device or material is intended for indoor use and whether it is to be used with any cautions or special considerations.
5. Instructions for the proper method(s) of placing, loading, and using the pyrotechnic device, including any cautions or special considerations.
6. Name, address, and phone number of the manufacturer.

B. **Identification of Pyrotechnic Devices or Binary Systems**. All pyrotechnic products or binary systems used shall have been identified or marked by the manufacturer with the following information:

1. Name of the pyrotechnic device or binary system
2. Name, address, and phone number of the manufacturer
3. Statement describing the conditions of use and potential hazards
4. Manufacturer's statement regarding whether the pyrotechnic device or binary system is intended for indoor use
5. The marking on the pyrotechnic device shall be of at least 6-point type size
6. Where the pyrotechnic device is too small to bear the label specified in para 1 through 5 above, this information shall be printed on the instruction sheet, shipping container or packaging

C. A zone shall be designed by the local government unit where a manufacturing complex may be established. The outer perimeter of this zone shall be at least three hundred meters (300 m) away from the nearest residential units. Once a zone has been defined, no residential unit shall be permitted nearer than three hundred meters (300 m) from the perimeter of such zone.

D. The manufacturing complex shall be governed by, but not limited to, the following safety measures:

1. All buildings shall have adequate ventilation, no concrete floors, must be leak-proof;
2. The warehouse must be at least fifty meters (50 m) away from any processing station of the complex; and
3. The following processing stations of the complex shall be laid out according to the indicated minimum distance from each other with all sides open:
   a. Mixing – fifty (50) metric tons
   b. Grinding – forty (40) metric tons
   c. Packaging – forty (40) metric tons
   d. Assembling ("Nagmimitsa") – twenty (20) metric tons
   e. Loading – twenty (20) metric tons
4. Firecrackers and pyrotechnic devices shall bear labels indicating the name and address of their manufacturers and warning instructions written in English or Filipino.

SECTION 10.4.6.5 STORAGE OF CONSUMER FIREWORKS AT MANUFACTURING AND DISTRIBUTION FACILITIES

A. Storage of consumer fireworks at manufacturing and distribution facilities shall comply with the following requirements:

1. Permanent buildings and structures including the following:
   a. Consumer fireworks storage buildings or areas
   b. Consumer fireworks work buildings, rooms, or areas
2. Temporary facilities including the following:
   a. Trailers
   b. Semitrailers
   c. Metal shipping containers
3. Consumer fireworks storage buildings shall not be used as a magazine.
4. Consumer fireworks shall be permitted to be stored in a magazine.
5. Consumer fireworks building shall not be used as process buildings.
6. Work room exterior door and window openings in consumer fireworks storage buildings shall be equipped with a means for locking.
7. Consumer fireworks storage buildings shall not be used for residential occupancies and shall not be located in residential areas.

B. An FSEC shall be obtained before construction of any consumer fireworks storage or work building, room, or area. The plans shall include the design, details, and specifications for the following:

1. Distances from public ways, buildings, facilities, magazines, motor vehicle fuel–dispensing stations, retail propane dispensing stations, flammable and combustible liquid aboveground tank storage, and flammable gas and flammable liquefied gas bulk aboveground storage and dispensing areas within thirty and a half meters (30.5 m) of the building used to store or handle consumer fireworks.
2. Vehicle access and parking areas.
3. Location and type of portable fire extinguishers.
4. Floor plan and layout of storage and handling to indicate compliance with this Section.
5. Means of egress.
6. Construction details:
   a. Buildings having an area not greater than seven hundred forty-three square meters (743 m^2) shall be permitted to be constructed of any approved construction materials.
   b. Buildings having an area greater than seven hundred forty-three square meters (743 m^2) shall be constructed in accordance with one of the following:
      1) Buildings shall be constructed of non-combustible or limited combustible materials.

2) Buildings with exterior walls having a fire resistance rating of not less than two (2) hours shall be permitted to have the roof decking and its supporting structure and interior partitions constructed of combustible materials.

c. Roof coverings for any building shall have a minimum rating of Class C as determined in accordance with ASTM E108, *Standard Test Methods for Fire Tests of Roof Coverings*, or ANSI/UL 790, *Standard for Standard Test Methods for Fire Tests of Roof Coverings*.

C. Automatic sprinkler system shall be installed in accordance with Section 10.2.6.7 of this RIRR shall be provided in consumer fireworks storage buildings greater than one thousand one hundred fifteen square meters (1,115 m^2).

D. Portable fire extinguishers for consumer fireworks storage or work buildings shall be located such that the maximum distance of travel to reach an extinguisher from any point shall not exceed twenty-three meters (23 m).

E. Any portion of an exterior wall of a building or other defined perimeter of a consumer fireworks storage facility shall be accessible within forty-six meters (46 m) of a public way or an approved fire apparatus access.

SECTION 10.4.6.6 RETAIL AND SELLING OF CONSUMER FIREWORKS

A. Retail sales of consumer fireworks and pyrotechnics in both new and existing buildings, structures, and facilities shall comply with the requirements of this Section unless otherwise indicated.

B. The requirements of this Section shall apply to the following:
   1. Permanent buildings and structures, including the following:
      a. Stores
      b. Consumer Fireworks Retail Sales (CFRS) facilities
   2. Temporary facilities, including the following:
      a. CFRS stands
      b. Tents
      c. Canopies
      d. Membrane structures

C. A permit for the following shall be obtained:
   1. Construction or operation of the following:
      a. Permanent building or structure
      b. Temporary structure such as a stand, tent, or canopy used for the purpose of the retail display or sale of consumer fireworks to the public
   2. Storage of consumer fireworks in connection with the retail display or sale of consumer fireworks to the public

D. Plans for facilities other than stands and tents shall include the following:
   1. Minimum distances from the following:
      a. Public ways
      b. Buildings
      c. Other CFRS facilities
      d. Motor vehicle fuel–dispensing station dispensers
      e. Retail propane-dispensing station dispensers
      f. Flammable and combustible liquid aboveground tank storage
      g. Flammable gas and flammable liquefied gas bulk aboveground storage and dispensing areas within ninety-one and a half meters (91.5 m) of the facility used for the retail sales of consumer fireworks
   2. Vehicle access and parking areas
   3. Location and type of portable fire extinguishers
   4. Floor plan and layout of storage and displays to indicate compliance with this Section and applicable laws
   5. Means of egress
   6. Construction details

E. Consumer fireworks shall only be permitted to be sold at retail in any of the following buildings or structures, provided that any new building or structure does not exceed one (1) storey in height and does not contain a basement:

1. Permanent buildings or structures constructed in accordance with the latest edition of NBCP.
2. Tents, canopies, or temporary membrane structures complying with NFPA 102, *Standard for Grandstands, Folding and Telescopic Seating, Tents, and Membrane Structures*
3. Temporary structures constructed in accordance with this Section
4. Temporary CFRS stands greater than seventy-four square meters (74 m^2) in area that also meet the requirements for a permanent structure
5. Vehicles, such as vans, buses, trailers, recreational vehicles, motor homes, travel trailers, trucks, and automobiles, complying with the applicable requirements for CFRS stands.

F. An automatic sprinkler system designed and installed in accordance with Section 10.2.6.7 of this RIRR, shall be provided throughout permanent CFRS facilities and stores in which CFRS are conducted in the following buildings:

1. New buildings greater than two hundred seventy-eight and seven tenths square meters (278.7 m^2) in area.
2. Existing buildings greater than six hundred ninety-four square meters (694 m^2) in area.
3. Storage rooms containing consumer fireworks in a new permanent CFRS facility or store shall be protected with an automatic sprinkler system installed in accordance with Section 10.2.6.7 of this RIRR, and separated from the retail sales area by a fire barrier having a fire resistance rating of not less than one (1) hour.

G. Portable fire extinguishers shall be provided as required for extra (high) hazard occupancy in accordance with Section 10.2.6.7 of this RIRR.

1. Not less than two portable fire extinguishers with a minimum 2A rating shall be provided, at least one (1) of which shall be of the pressurized-water type.
2. Where more than one portable fire extinguisher is required, at least one fire extinguisher shall be of the multipurpose dry chemical type if the facility is provided with electrical power.
3. Portable fire extinguishers for permanent CFRS facilities and stores shall be located so that the maximum distance of travel required to reach an extinguisher from any point does not exceed twenty-three meters (23 m), as specified in Section 10.2.6.9 of this RIRR.
4. Portable fire extinguishers for temporary CFRS facilities shall be installed and located so that the maximum distance of travel required to reach an extinguisher from any point does not exceed ten and six tenths meters (10.6 m).

H. Smoking shall not be permitted inside or within fifteen and a half meters (15.5 m) of the CFRS area. At least one (1) sign that reads as follows, in letters at least fifty-one millimeters (51 mm) high on a contrasting background, shall be conspicuously posted at each entrance or within three and five hundredths meters (3.05 m) of every aisle directly serving the CFRS area in a store: **"FIREWORKS — NO SMOKING"**.

I. At least one sign that reads as follows, in letters at least one hundred two millimeters (102 mm) high on a contrasting background, shall be conspicuously posted on the exterior of each side of the CFRS facility.

NO FIREWORKS DISCHARGE
WITHIN 91.5M

J. In permanent CFRS facilities greater than two hundred seventy-eight and six tenths square meters (278.6 m^2) in area, a public address system or a means for manually activating audible and visible alarm indicating devices located throughout the facility in accordance with Section 10.2.6.6 of this RIRR, shall be provided at a constantly attended location when the CFRS facility is occupied.

K. CFRS facilities and stores separation distances shall not be located within fifteen and two tenths meters (15.2 m) of the following:

1. Retail propane-dispensing station dispensing devices
2. Aboveground storage tanks for flammable or combustible liquid, flammable gas, or flammable liquefied gas
3. Compressed natural gas-dispensing station dispensing devices

L. Consumer fireworks storage or work buildings at distribution facilities shall be separated from adjacent permanent buildings and structures.

M. Consumer fireworks storage or work buildings shall not be located within fifteen and two tenths meters (15.2 m) of the following:

1. Motor vehicle fuel–dispensing station dispensing devices
2. Retail propane–dispensing station dispensing devices
3. Compressed natural gas dispensing facilities
4. Aboveground storage tanks for flammable or combustible liquid, flammable gas or flammable liquefied gas

N. Consumer fireworks storage or work buildings shall not be located within ninety-one and two tenths meters (91.2 m) of any bulk plant or bulk terminal for the following:

1. Flammable or combustible liquid
2. Flammable gas
3. Flammable liquefied gas

O. Exits provided for consumer fireworks storage or work buildings or areas shall be located such that the maximum egress travel distance as measured from the remote point to an exit along the natural and unobstructed path of egress travel shall not exceed sixty and eight tenths meters (60.8 m).

P. Dead end aisles shall not exceed fifteen and two tenths meters (15.2 m) in length.

Q. CFRS Facility Requirements:

The following construction materials requirements shall apply to new permanent CFRS facilities not exceeding one (1) storey in height and does not contain a basement:

1. Buildings having an area up to and including seven hundred forty-three square meters (743 m^2) shall be permitted to be constructed of any approved construction materials.
2. Buildings having an area greater than seven hundred forty-three square meters (743 m^2) shall be constructed in accordance with one of the following:
   a. Buildings shall be constructed of noncombustible or limited-combustible materials.
   b. Buildings with exterior walls having a fire resistance rating of not less than two (2) hours shall be permitted to have the roof decking and its supporting structure and interior partitions constructed of combustible materials.
3. Roof coverings for any building shall have a minimum rating of Class C as determined in accordance with ASTM E108, *Standard Test Methods for Fire Tests of Roof Coverings*, or ANSI/UL 790, *Standard for Standard Test Methods for Fire Tests of Roof Coverings*.

R. No motor vehicle or trailer used for the storage of consumer fireworks shall be parked within three meters (3 m) of a CFRS facility, except when delivering, loading, or unloading fireworks or other merchandise and materials used, stored, or displayed for sale in the facility.

SECTION 10.4.6.7 STORAGE AND TRANSPORTATION OF FIRE WORKS

A. Storage and transportation of fireworks and other pyrotechnic shall be in accordance with RA 7183, as amended. Any storage, handling, assembly, testing, or transportation of fireworks materials and devices intended for outdoor display prior to their delivery to the display site shall be in accordance NFPA 1124, *Code for the Manufacture, Transportation, Storage, and Retail Sales of Fireworks and Pyrotechnic* to include the following:

1. Preparation of Fireworks:
   a. Shells shall be kept in their shipping cartons until they are prepared, loaded, or set up for display.
   b. Preparation area(s) for display fireworks shall be secured from public access by at least thirty meters (30 m).
   c. Preparation area(s) shall have only authorized personnel in them at any time display fireworks are being prepared.
   d. All fireworks shall be handled carefully while being unloaded from the delivery vehicle, prepared, loaded, or set up.

e. The assembly, minor repair, and installation of fuses and electric match, and similar activities shall be permitted to be performed in a preparation area, and shall not be considered manufacturing

f. All electric matches that are attached to display fireworks shall have a shroud protecting the match head.

B. **Inspection**

1. Fireworks and pyrotechnics shall be inspected by the operator or assistants following their delivery to the display site at any time prior to the shells being loaded into their mortars or into ready boxes.
2. Any fireworks and pyrotechnics having tears, leaks, broken fuses, or signs of having been wet shall be set aside for review by the operator.
3. If the operator determines that any fireworks and pyrotechnics cannot be repaired shall be handled as follows:
   a. Fireworks and pyrotechnics shall be inspected by the operator or assistants. They shall not be fired and, after the display, such shells shall be either returned to the supplier or disposed of in accordance with the supplier's instructions.
   b. At the display site, assembly or repair of fireworks shall not be performed within fifteen and two tenths meters (15.2 m) of fireworks storage.
   c. Assembly of fireworks at the display site shall be limited to ground display pieces from finished fireworks or pyrotechnic devices and the attachment of black matches, electric matches, or other ignition sources to fireworks and pyrotechnic devices.
   d. Repair of fireworks and pyrotechnic devices at the display site shall be limited to repairs that do not require disassembly of the device.

C. **Ready Boxes**

1. A ready box shall be a portable, weather resistant, and fire-resistive container that protects contents from burning debris with a self-closing cover or equivalent means of closure.
2. Tarpaulins shall not be used as ready boxes.
3. Manually fired fireworks and pyrotechnics used to reload mortars shall be stored in ready boxes and shall be separated according to size and designation as salutes.
4. During the performance of an outdoor fireworks display, ready boxes shall be located at a distance not less than nine meters (9 m) upwind from the mortar placements.
5. If the wind shifts during a display, the ready boxes shall be relocated to be not less than nine meters (9 m) upwind from the fireworks and pyrotechnic placements.

SECTION 10.4.6.8 DISPLAY CENTER AND SITE SELECTION

A. Display centers for selling firecrackers and pyrotechnics shall be separated from each other by a firewall with a fire resistance rating of not less than two (2) hours:

1. All malls and other similar establishments shall not be utilized as display centers for selling of firecrackers and pyrotechnics unless done through media presentation or other means without necessarily displaying the said firecrackers therein:
2. Fire extinguisher/s shall be provided in accordance with Section 10.2.6.9 of this RIRR;
3. Smoking within fifteen meters (15 m) from a display center shall not be allowed;
4. Testing of firecrackers and pyrotechnics shall be prohibited; and
5. Stoves, exposed flames, and portable electric heaters shall be prohibited.

B. Site Plan shall be submitted to the C/MFM having jurisdiction within a time period required prior to the display.

1. The site plan shall include the dimensions of the display site and location of discharge site(s), spectator viewing area(s), parking area(s), fallout area(s), and the associated separation distances.
2. After review of the site plan, the C/MFM having jurisdiction shall inspect the area depicted on the site plan.

3. When trenches or holes are dug into the ground in order to place mortars, the operator shall consult with the sponsor and the C/MFM having jurisdiction in order to locate any buried utility lines in the discharge site.
4. The site for the outdoor land or water display shall have a radius at least as great as specified for those items in the display with the greatest required radius.
5. For fireworks and pyrotechnics, the minimum required radius of the display site shall be twenty-two meters (22 m) per twenty-five millimeters (25 mm) of the internal mortar diameter of the largest fireworks and pyrotechnics to be fired'
6. For Roman candles and cakes, the minimum required radius shall be that specified for chain-fused aerial shells, comets, or mines, depending on whether they produce fireworks and pyrotechnics, comet, or mine effects.
7. For Roman candles and cakes producing both aerial shell and comet or mine effects, the minimum required radius shall be that for aerial shells.
8. During the firing of the display, cakes shall be located a minimum of three meters (3 m) from any ready box and mortars to be reloaded.

C. **Other Site Requirements to be Considered:**

1. Distances from the point of discharge of any firework to a health care or detention and correctional facility shall be at least twice the distances specified.
2. The requirements shall not apply where approved by the health care or detention and correctional facility.
3. The distance between the discharge site and bulk storage areas of materials that have a flammability, explosive, or toxic hazard shall be twice that required.
4. The fuel tanks on vehicles or other motorized equipment located in the display site shall not be considered bulk storage.
5. No spectators or spectator parking areas shall be located within the display site.
6. Dwellings, buildings, and structures shall be permitted to be located within the display site with the approval the C/MFM having jurisdiction and the owner of the dwelling, building, or structure, provided that the dwelling, building, or structure is unoccupied during the display, or if the structure provides protection for the occupants through noncombustible or fire-resistant construction.
7. The area selected for the discharge of aerial shells shall be located so that the trajectory of the shells shall not come within seven and six tenths meters (7.6 m) of any overhead object.

D. **Fallout Area**

1. The fallout area shall be an open area.
2. Spectators, unauthorized vehicles, watercraft, or readily combustible materials shall not be located within the fallout area during the display.
3. Fire protection and other emergency response personnel and their vehicles shall remain at or beyond the perimeter of the display site during the actual firing of the display.

E. **Minimum Spectator Separation Distance Requirements**

1. The minimum spectator separation distance from the point of discharge of each firework shall be at least as great as those specified in this Section.
2. For aerial shells and comets and mines, Roman candles, and cakes that are discharged vertically from firing positions elevated seven and six tenths meters (7.6 m) or less aboveground level, the minimum required spectator separation distance shall be the same as the minimum required radius specified.
3. For aerial shells and comets and mines, and Roman candles and cakes, which are discharged vertically from firing positions elevated more than seven and six tenths meters (7.6 m) aboveground level, the minimum required spectator separation distance required shall be increased by seven and six tenths meters (7.6 m) and an additional seven and six tenths meters (7.6 m) for each thirty-meter (30-m) of elevation.
4. For ground display pieces and mines containing only stars or non-splitting or non-bursting comets fired vertically from any elevation, the minimum required spectator separation distance from the point of discharge shall be the same as the minimum display site radius.

SECTION 10.4.6.9 FLOATING VESSELS AND FLOATING PLATFORMS

A. Floating vessels and floating platforms shall be permitted to be manned or unmanned, provided that the firework and pyrotechnic crew remains in control of the site and firing of the display.

B. Floating vessels and floating platforms shall be held in control at all times, whether self-propelled, controlled by another vessel, or secured by mooring or anchoring.

C. **Construction of Floating Vessels and Floating Platforms**

1. Floating vessels and floating platforms shall be of sufficient strength and stability to safely allow the firing of the display.
2. The types of fireworks and placement of the fireworks launch tubes and accompanying equipment shall be such that, when fired, the stability of the site structures and seaworthiness of the floating vessels or platforms shall not be jeopardized.
3. Floating vessels and floating platforms that are manned during electrical firing shall have a safety shelter meeting the following requirements:
   a. It shall be of sufficient size to accommodate all personnel present during the actual firing of the display.
   b. It shall have a minimum of three (3) sides and a roof.
   c. It shall have walls and a roof constructed of at least nineteen-millimeter (19 mm) plywood or equivalent material.
4. A minimum of two (2) separate egress paths shall be provided at all times.
5. Only one (1) egress path from protective barricades or safety shelters shall be required.

D. **Rooftops, Bridges, Towers, Parking Decks, and any other Structures**

1. Rooftops, bridges, towers, parking decks, and any other structures used as discharge sites shall be of sufficient strength and stability to safely allow the firing of the display.
2. Rooftops, bridges, towers, parking decks, and any other structures used as discharge sites shall be approved by the C/MFM having jurisdiction and the owner (or his/her agent).
3. Other dwellings, buildings, and structures shall be permitted to be located within the display site, provided all the following requirements are met:
   a. Approval of the C/MFM having jurisdiction.
   b. Approval of the owner of the dwelling, building, or structure.
   c. Assurance that the dwelling, building, or structure is unoccupied during the display, or the occupants are protected by the dwelling, building, or structure or other means.

E. **Operation of the Display**

1. The sponsor of the display shall make provisions for fire protection of the display.
2. The sponsor shall consult with the C/MFM having jurisdiction and the operator to determine the level of fire protection required.
3. The following shall apply to crowd control:
   a. Ushers whose sole duty is the enforcement of crowd control shall be located around the display site and at other locations as determined by the sponsor.
   b. The C/MFM having jurisdiction and the operator shall approve the provisions for crowd control.
4. Ushers shall be positioned around the display site to prevent spectators or any other unauthorized persons from entering the discharge site.
5. Where required by the C/MFM having jurisdiction, approved delineators or barriers shall be used to aid in crowd control.
6. Portions of the display site, other than the discharge site(s), shall be permitted to be open to the public prior to the display as long as the preparation arena(s) for display fireworks shall be secured from public access by at least thirty meters (30 m) are maintained.
7. Unescorted public access to the discharge site shall not be permitted where pyrotechnic materials are present during the period before the display.
8. The discharge site shall be restricted throughout the display and until the discharge site has been inspected after the display.

9. The operator shall have primary responsibility for safety.
10. The operator shall be responsible for ensuring that a sufficient number of assistants are available for the safe conduct of the fireworks display.
11. Only the operator, authorized assistants, and inspector(s) representing the C/MFM having jurisdiction shall be permitted in the display site while the display is in progress.
12. The operator shall be responsible for ensuring that all assistants are trained in the performance of their assigned tasks and that they are educated with regard to safety hazards.
13. During the firing of the display, all personnel in the discharge site shall wear the following:
    a. Head protection
    b. Eye protection
    c. Hearing protection
    d. Foot protection
    e. Cotton, wool, or similarly flame-resistant, long-sleeved, long legged clothing
14. Personal protective equipment (PPE), as necessary, shall be worn by the operator and assistants during the setup and cleanup of the display.
15. Wherever, in the opinion of the operator, any hazardous condition exists, the fireworks display shall be stopped until the condition is corrected.
16. If, in the opinion of the operator, the lack of crowd control poses a hazard, the fireworks display shall be postponed or discontinued immediately until such time as the situation is corrected.
17. If high winds, precipitation, or other adverse weather conditions prevail or begin such that a hazard exists in the opinion of the operator or the C/MFM having jurisdiction, the fireworks display shall be postponed or discontinued until weather conditions improve.
18. One (1) or more spotters shall watch the flight and behavior of aerial shells and other aerial fireworks to verify that they are functioning as intended.

    If any unsafe condition is detected, such as hazardous debris falling into the audience, the spotter shall signal the shooter to cease firing until the unsafe condition is corrected.
19. The spotters shall be in direct communication with the shooter during the conduct of the display.
20. In the event of a condition that requires the entry of fire protection or other emergency response personnel into the fallout area or security perimeter, the display shall be halted until the situation is resolved and the area is once again clear.
21. Operators and assistants shall use only flashlights, electric lighting, or other non-incendive illumination such as chemiluminescent devices for illuminating the firing area and the ready box area.
22. Control of Ignition Sources:
    a. Smoking materials, matches, lighters, or open flame devices shall not be permitted within fifteen meters (15 m) of any area where fireworks or other pyrotechnic materials are present.
    b. Devices such as fuses, port fires, and torches shall be permitted to be used to ignite fireworks.

SECTION 10.4.6.10 USE OF PYROTECHNICS BEFORE A PROXIMATE AUDIENCE

The protection of property, operators, performers, support personnel, and the viewing audiences where pyrotechnic effects are used indoors or outdoors with a proximate audience shall be in accordance with NFPA 1126, *Standard for the Use of Pyrotechnics Before a Proximate Audience.*

SECTION 10.4.6.11 TYPES OF FIRECRACKERS AND PYROTECHNIC DEVICES ALLOWED

The following common types of firecrackers and pyrotechnic devices may be manufactured, sold, distributed and used:

A. **Firecrackers**

1. ***Baby rocket***. A firecracker with a stick so constructed that lighting of the wick

will propel the whole thing to lift a few meters before exploding. The firecracker is about thirty-eight millimeters (38 mm) in length by nine and a half millimeters (9.5 mm) in diameter while the stick is about a foot in length;

2. ***Bawang***. A firecracker larger than a triangulo with one and four tenths grams (1.4 g) of powder packed in cardboard tied around with abaca strings and wrapped in shape of garlic;
3. ***Small Triangulo***. A firecracker shaped like a triangle with powder content less than the bawang and usually wrapped in brown paper measuring nineteen millimeters (19 mm) length in its longest side;
4. ***Pulling of Strings***. A firecracker consisting of a small tube about twenty-five millimeters (25 mm) in length and less than six and four tenths millimeters (6.4 mm) in diameter with strings on each end. Pulling both strings will cause the firecracker to explode;
5. ***Paper caps***. Minute amount of Black Powder spread in either small strips of paper on a small sheet used for children's toy guns;
6. ***El diablo***. Firecrackers tubular in shape about thirty-two millimeters (32 mm) in length and less than six and four tenths millimeters (6.4 mm) in diameter with a wick; also known as labintador;
7. ***Judah's Belt***. A string of firecrackers consisting of either diablos or small triangulos that can number up to a hundred or thereabout and culminating in large firecracker usually a bawang;
8. ***Sky Rocket (Kwitis)***. A large version of a baby rocket designed to be propelled to a height of twelve and two tenths meters (12.2 m) to fifteen and two tenths meters (15.2 m) before exploding;
9. Other types equivalent to the foregoing in explosive content.

B. **Pyrotechnic Devices**

1. ***Sparklers***. Pyrotechnic devices usually made of Black Powder on a piece of wire or inside a paper tube designed to light up and glow after igniting;
2. ***Luces***. Any of several kinds of sparklers;
3. ***Fountain***. A kind of sparkler conical in shape which is lighted on the ground and designed to provide various rising colors and intermittent lights upon being ignited;
4. ***Jumbo Regular and Special***. A kind of sparkler similar to a "fountain" but bigger in size;
5. ***Mabuhay***. Sparklers bunched into a bundle of a dozen pieces;
6. ***Roman candle***. A sparkler similar to a "fountain" but shaped like a big candle;
7. ***Trompillo***. A pyrotechnic device usually fastened at the center and designed to spin first clockwise and then counter-clockwise and provides various colored lights upon being ignited;
8. ***Airwolf***. A kind of sky rocket shaped like an airplane with a propeller to rise about twelve and two tenths meters (12.2 m) to fifteen and two tenths meters (15.2 m) and provide various kinds of light while aloft;
9. ***Whistle device***. Any of the various kinds of firecrackers or pyrotechnic designed to either simply emit a whistle-like sound or explode afterwards upon being ignited;
10. ***Butterfly***. Butterfly-shaped pyrotechnic device designed to lift aboveground while providing light;
11. All kinds of pyrotechnic devices (pailaw);
12. Other types equivalent to the foregoing devices.

SECTION 10.4.6.12 PROHIBITED TYPES OF FIRECRACKERS AND PYROTECHNIC DEVICES

Below is a list of the firecrackers prohibited for sale and manufacture in the country by the Department of Health (DOH) and the Department of Trade and Industry (DTI).

1. ***Watusi***. Also known as the "dancing firecracker". It is usually reddish in color, about thirty-eight millimeters (38 mm) in length and three millimeters (3 mm) in width. It is usually ignited by friction to produce a dancing movement and a crackling sound. It was initially allowed for sale and manufacture under RA 7183, but was eventually banned because it causes poisoning when ingested, especially among children.

2. ***Piccolo***. The Department of Health banned it in 2007 because it can explode in the hands, and may cause death when ingested.
3. **Mother Rockets**. Firecrackers with a stick designed as a propellant upon lighting the wick.
4. ***Pillbox***. A firecracker that causes a series of sparks when lit.
5. ***Boga***. Traditional canon made from PVC pipe using denatured alcohol as explosive ingredient.
6. ***Big Judah's belt***. A string of firecrackers consisting of smaller firecrackers that number up to a hundred, and culminating in a larger and more powerful firecracker.
7. ***Big Bawang***. A firecracker packed in cardboard tied around with abaca strings, giving it the shape of a large garlic.
8. ***Kwiton***. Aerial firecracker which explodes several times when lit.
9. ***Goodbye Philippines***. Giant triangle-shaped firecracker which packs a powerful explosion.
10. Other banned firecrackers include the Atomic Bomb, Five Star, Pla-pla, Og, Giant Whistle Bomb, Super Lolo and Atomic Big Triangulo, Lolo Thunder, Kabasi and unlabeled firecrackers.

SECTION 10.4.6.13 CLEARANCE FOR FIREWORKS EXHIBITION

No person shall be allowed to conduct firework exhibition without first securing a clearance from the C/MFM having jurisdiction.

SECTION 10.4.6.14 REQUIREMENTS FOR FIREWORKS EXHIBITION

A. A permit to possess and display fireworks shall first be secured from the PNP.
B. Fireworks shall be fired at a distance of three and forty-eight hundredths meters (3.48 m) away from people.
C. All fireworks shall project upward.
D. A responsible person of at least twenty-one (21) years and with adequate knowledge of handling fireworks shall be assigned to supervise fireworks display.
E. Sufficient approved type of first aid fire protection equipment shall be on hand at the site during fireworks exhibitions.
F. The nearest fire station shall be notified of such exhibitions.

SECTION 10.4.6.15 DISPOSAL OF UNFIRED FIREWORKS

A. Any fireworks that remain unfired after the display is concluded shall be immediately disposed properly.
B. Fireworks and pyrotechnics shall be fired in accordance with RA 9514 and its RIRR.
C. Package of unfired fireworks and pyrotechnics shall be returned to the supplier in compliance with all applicable regulations.

DIVISION 7. SPRAYING, DIPPING, COATING USING FLAMMABLE OR COMBUSTIBLE MATERIALS AND LIQUIDS

SECTION 10.4.7.1 FIRE SAFETY CLEARANCE

An FSC from the C/MFM having jurisdiction shall be issued for spraying and dipping operations utilizing flammable liquid, and powders included within the scope of this RIRR.

SECTION 10.4.7.2 DIPPING, COATING, AND PRINTING USING FLAMMABLE OR COMBUSTIBLE LIQUIDS

A. This Section shall apply to dipping, roll coating, flow coating, curtain coating, printing, cleaning, and similar processes, hereinafter referred to as "coating processes" or "processes," in which articles or materials are passed through tanks, vats, or containers, or passed over rollers, drums, or other process equipment that contain flammable or combustible liquids. It shall also apply to cleaning processes that utilize a solvent vapor, such as vapor degreasing processes; and to processes that use water-borne, water-based, and

water-reducible materials that contain flammable or combustible liquids or that produce combustible deposits or residues.

B. It shall not apply to processes:

1. that use only non-combustible liquids for processing and cleaning. It shall also not apply to processes that use only Class IIIB liquids for processing or cleaning, provided the liquids or mixtures thereof maintain their Class IIIB classification at their point of use.
2. that use a liquid that does not have a fire point when tested in accordance with ASTM D92, *Standard Test Method for Flash and Fire Points by Cleveland Open Cup* up to the boiling point of the liquid or up to a temperature at which the sample being tested shows an obvious physical change.

C. It shall not apply to fluidized bed powder application.

SECTION 10.4.7.3 LOCATION OF DIPPING, COATING AND PRINTING PROCESSES

A. **Location**

Areas in which dipping, coating, or printing operations are conducted shall be protected with approved automatic sprinkler systems that are designed and installed in accordance with Section 10.2.6.7 of this RIRR. It shall not be located in any building that is classified as an assembly, educational, day care, health care, ambulatory health care, detention/ correctional, residential, mercantile, business or storage occupancy, unless the following requirements are met:

1. The process area is separated both vertically and horizontally from all surrounding areas by construction having a fire resistance rating of at least two (2) hours.
2. The process area is protected by an approved, automatic sprinkler system designed and installed in accordance with Section 10.2.6.7 of this RIRR.

B. **Basement**

Processes utilizing combustible liquids in basements shall be captured and directed

SECTION 10.4.7.4 DESIGN AND CONSTRUCTION OF DIPPING, COATING, AND PRINTING EQUIPMENT AND SYSTEMS

A. **General Requirements**

1. Dipping and coating equipment shall be constructed of steel, reinforced concrete, masonry, or other noncombustible material and shall be securely and rigidly supported. Supports for dipping and coating tanks that exceed either one thousand nine hundred liters (1,900 L) capacity or one square meter (1 m^2) of liquid surface shall have a fire resistance rating of at least one (1) hour.
2. Rolls shall be permitted to be covered with polymeric or other combustible materials.
3. If the dipping or coating equipment is enclosed for the purpose of confining vapors and mists, any panels for light fixtures or for observation shall be of heat-treated glass, laminated glass, wired glass, or hammered-wired glass, and the panels shall be sealed to confine vapors or mists to the enclosure.
4. Panels for light fixtures shall be separated from the fixture to prevent the surface temperature of the panel from exceeding ninety-three degrees Celsius (93 °C).
5. The panel frame and method of attachment shall be designed not to fail under fire exposure before the vision panel fails.

B. **Height**

The top of any tank that holds flammable or combustible liquids shall be at least one hundred fifty millimeters (150 mm) above the floor.

C. **Overflow Prevention**

To prevent the overflow of burning liquid from a tank if a fire in the tank actuates automatic sprinklers, one (1) or more of the following shall be done:

1. Drain boards shall be arranged so that sprinkler discharge will not flow into the tank.
2. The tank shall be equipped with automatic-closing covers.
3. The tank shall be equipped with overflow pipes.

D. **Liquid Level**

The liquid in any dipping or coating tank shall be maintained at a level that is at least one

hundred fifty millimeters (150 mm) below the top of the tank to allow effective application of extinguishing agents in the event of fire.

E. **Overflow Pipes**

1. Dipping or coating tanks that exceed five hundred seventy liters (570 L) of capacity or one square meter (1 m^2) of liquid surface shall be equipped with a trapped overflow pipe leading to a safe location.
2. Depending on the area of the liquid surface and the length and pitch of pipe, overflow pipes for dipping or coating tanks that exceed five hundred seventy liters (570 L) capacity or one square meter (1 m^2) of liquid surface shall be capable of handling either the maximum rate of delivery of process liquid or the maximum rate of automatic sprinkler discharge, whichever is greater. The overflow pipe shall be at least seventy-five millimeters (75 mm) in diameter.
3. Piping connections to drains and in overflow lines shall be designed to permit access for inspection and cleaning of the interior of the piping.
4. The connection of the overflow pipe to the tank shall be made at a point that is at least one hundred fifty millimeters (150 mm) below the top of the tank.

F. **Bottom Drains**

Dipping or coating tanks that exceed one thousand nine hundred liters (1,900 L) capacity shall be equipped with bottom drains arranged to drain the tank in the event of fire.

1. Bottom drains shall be both manually and automatically operable. Manual operation shall be from a safe and accessible location.
2. Where gravity flow is impractical, automatic pumps shall be provided.
3. Drains shall be trapped and shall discharge to a closed, vented salvage tank or to a safe location.

G. **Salvage Tanks**

1. Where a salvage tank is employed, a pumping arrangement shall be provided for the retrieval of the contents
2. The salvage tank shall be emptied before the dipping or coating tank is refilled.
3. The capacity of the salvage tank or tanks shall be greater than the capacity of the dipping or coating tank or tanks to which they are connected.

H. **Conveyor Systems**

Conveyor systems shall be arranged to stop automatically in the event of fire. It shall be arranged to stop automatically if the required rate of ventilation is not maintained. However, this requirement shall not apply to web or sheet transport system.

I. **Control of Liquid Temperature**

1. The dipping or coating tank shall be equipped with a listed, manual reset, high temperature limit control designed to shut down the conveyor system, if any, and the heating system if excess temperatures are reached.
2. Heating and cooling units for liquids shall be of an approved type and shall be controlled, serviced, and maintained in accordance with the manufacturers' instructions.
3. Work pieces shall not be dipped or coated if their surface temperature exceeds the boiling point of the liquid or a temperature that is fifty-five degrees Celsius (55 °C) less than the auto ignition temperature of the liquid.
4. Heating systems shall be automatically shut down if the level of liquid in the dipping or coating tank exceeds or falls below the manufacturers' recommended operating level.

SECTION 10.4.7.5 VENTILATION

A. **Requirements**

1. Dipping and coating process areas shall be provided with mechanical ventilation that is capable of confining the vapor to an area not more than one thousand five hundred twenty-five millimeters (1,525 mm) from the vapor source and removing the vapors to a safe location. The concentration of the vapors in the exhaust air stream shall not exceed twenty-five percent (25%) of LFL.
2. Where the process does not allow adequate removal of vapors by mechanical ventilation alone, an enclosure shall be provided and the ventilation shall be capable of confining all vapors to the enclosure.

3. Controls shall be provided to automatically shut down the dipping or coating process and sound an alarm if the ventilating system fails.

   Mechanical ventilation shall be kept in operation at all times while dipping or coating processes are being conducted and shall continue to operate until the area no longer constitutes a vapor source.

4. Where dipping or coating processes are conducted automatically without an attendant constantly on duty, the operating controls of the apparatus shall be arranged so that the apparatus cannot function unless the exhaust fans are operating.

B. **Make-Up Air**

Clean make-up air shall be provided to compensate for the air exhausted from dipping or coating processes. The intake for this make-up air shall be located so that the air exhausted from dipping or coating processes is not re-circulated.

C. **Routing of Exhaust Ducts**

Air exhausted from processes shall be conducted by ducts directly to the outside of the building. Exhaust ducts shall follow the shortest route to the point of discharge and shall meet the following conditions:

1. Exhaust ducts shall not penetrate a fire wall or fire barrier wall.
2. Exhaust discharge shall be directed away from any air intakes.
3. Exhaust discharge point shall be at least one thousand eight hundred thirty millimeters (1,830 mm) from any exterior wall or roof.
4. Exhaust discharge point shall be at least three thousand forty eight millimeters (3,048 mm) from openings into the building.
5. Exhaust discharge point shall be at least three thousand forty eight millimeters (3,048 mm) above adjoining grade.
6. Exhaust duct shall not discharge in the direction of any combustible construction that is within seven thousand six hundred twenty-five millimeters (7,625 mm) of the exhaust duct.
7. Exhaust duct shall not discharge in the direction of any unprotected opening in any noncombustible or limited-combustible construction that is within seven thousand six hundred twenty-five millimeters (7,625 mm) of the exhaust duct discharge point.
8. Exhaust duct shall not discharge in the direction of any exit discharge or public way that is within seven thousand six hundred twenty-five millimeters (7,625 mm) of the exhaust duct discharge point.

D. **Recirculation of Exhaust**

Air exhausted from processes shall not be re-circulated unless all of the following requirements have been met:

1. Recirculation particulate filters as defined in NFPA 34, *Standard for Dipping, Coating, and Printing Processes Using Flammable or Combustible Liquids,* shall be used to remove particulates from the re-circulated air.
2. The concentration of vapors in the exhaust airstream shall not exceed twenty-five percent (25%) of LFL.
3. Listed equipment shall be used to monitor the concentration of vapors in all exhaust airstreams.
4. The equipment specified in para 3 above shall initiate a local alarm and shall automatically shut down the processes if the concentration of any vapor in the exhaust airstream exceeds twenty-five percent (25%) of LFL.

   All equipment installed to process and remove contaminants from the air exhausted from the processes shall be approved by the C/MFM having jurisdiction.

5. For occupied process areas where a portion of the exhaust air is re-circulated within the process area, toxicity and worker exposures shall be addressed.

E. **Materials of Construction**

Exhaust plenums, and exhaust ducts and fasteners shall be constructed of steel. Concrete shall be permitted to be used. The interior surfaces of the concrete exhaust plenum or exhaust duct shall be smooth and sealed to facilitate cleaning. Other materials of construction shall be permitted to be used in cases where the conveyed materials are not compatible with steel.

F. **Support of Exhaust Ducts**

Exhaust ducts shall be supported to prevent collapse under fire conditions:

1. Duct supports shall be designed to carry the weight of the duct system itself, plus the anticipated weight of any residues. If sprinkler protection is provided inside the duct system, then the duct supports shall also be designed to carry the anticipated weight of any accumulation of sprinkler discharge.
2. Hangers and supports shall be fastened securely to the building or to the structure to avoid vibration and stress on the duct system.
3. Hangers and supports shall be designed to allow for expansion and contraction.
4. Exhaust ducts shall not use building walls, floors, ceilings, or roofs as component parts. This provision shall not disallow the use of concrete exhaust plenums or exhaust ducts where some or all of the plenum or duct is part of the concrete floor.

G. **Exhaust Duct Cross-Section**

Exhaust ducts shall be permitted to be round, rectangular, or any other suitable shape.

H. **Exhaust Duct Access**

Exhaust ducts shall be provided with doors, panels, or other means to facilitate inspection, maintenance, cleaning, and access to fire protection devices.

I. **Exhaust Fans and Drives**

1. The rotating element of the exhaust fan shall be non-ferrous or the fan shall be constructed so that a shift of the impeller or shaft will not permit two (2) ferrous parts of the fan to rub or strike. Necessary allowances shall be made for ordinary expansion and loading, and to prevent contact between moving parts and the duct or fan housing. Fan blades shall be mounted on a shaft that shall maintain alignment even when the blades of the fan are heavily loaded. All bearings shall be of the self-lubricating type or shall be provided with accessible lubricating ports.
2. All bearings shall be of the self-lubricating type or shall be lubricated from a point outside the duct or fan housing. Electric motors that drive exhaust fans shall not be placed inside any duct or fan housing.
3. Belts shall not enter any duct or fan housing unless the belt and pulley are completely enclosed.

J. **Drying Areas**

1. Freshly dipped or coated work pieces or materials shall be dried only in spaces that are ventilated to prevent the concentration of ignitable vapors from exceeding twenty-five percent (25%) of LFL.
2. If removed from the dipping or coating process area, work pieces or material shall be dried only in areas that are ventilated to prevent the concentration of vapors from exceeding twenty-five percent (25%) of LFL.

SECTION 10.4.7.6 STORAGE, HANDLING, AND DISTRIBUTION OF FLAMMABLE AND COMBUSTIBLE LIQUIDS

A. **General**

Storage, handling, distribution, and mixing of flammable and combustible liquids shall meet all applicable requirements of NFPA 30, *Flammable and Combustible Liquids Code*. Storage, handling, and mixing of flammable and combustible liquids at process areas also shall meet the requirements of this Chapter.

Open or glass containers shall not be used for transportation or storage of liquids.

B. **Storage in Process Areas**

1. The volume of Class I, Class II, and Class IIIA liquids stored in a storage cabinet shall not exceed four hundred fifty-four liters (454 L).
2. The total aggregate volume of Class I, Class II, and Class IIIA liquids in a group of storage cabinets shall not exceed the maximum allowable quantity (MAQ) of flammable and combustible liquids per control area based on the occupancy where the cabinets are located.
3. For industrial occupancies, the total aggregate volume of Class I, Class II, and Class IIIA liquids in a group of storage cabinets in a single fire area shall not exceed the MAQ of flammable and combustible liquids per control area for industrial occupancies as set

forth in the Table 42, *Maximum Allowable Quantity of Flammable and Combustible Liquids per Control Area*.

C. **Storage in the Vicinity of Process Areas**

The quantity of liquid located in the vicinity of the dipping or coating process area but outside a storage cabinet, an inside storage room, a cutoff room or attached building, or other specific process area that is cut off by at least a two-hour (2-hr) fire-rated separation from the dipping or coating process area.

D. **Transporting Liquids**

Liquids shall be transported from their storage area to the process area only in closed shipping containers, approved portable tanks and intermediate bulk containers, approved safety cans, or a piping system.

E. **Handling Liquids at Point of Final Use**

1. Class I and Class II liquids shall be kept in closed original shipping containers, metal containers, metal or portable tanks, or metal intermediate bulk containers when not in use.
2. Where liquids are used or handled, means shall be provided to clean and dispose of leaks or spills in a prompt and safe manner.
3. Class I and Class II liquids shall be transferred between their original shipping containers and process tanks, containers, or portable tanks within a building only by means of the following:
   a. containers with a capacity of nineteen liters (19 L) or less
   b. approved safety cans
   c. through a closed piping system
   d. from a portable tank or container by means of an approved pump device drawing through an opening in the top of the tank or container
   e. by gravity through a listed self-closing valve or self-closing faucet
4. Transferring liquids by means of pressurizing the container with air shall be prohibited. Transferring liquids by pressure of inert gas shall be permitted, provided that the containers that are pressurized comply with all applicable requirements of the ASME *Boiler and Pressure Vessel Code*, Section VIII, for construction, test, and maintenance.
5. Class I liquids shall not be dispensed into metal containers or process tanks unless the nozzle or fill pipe is in electrical contact with the container or process tank. This shall be accomplished by maintaining metallic contact during filling, by a bond wire, or by any other conductive path having an electrical resistance not greater than one hundred six (106) ohms.
6. If a heater is used to heat liquids, the heater shall be low- pressure steam, low- pressure hot water, or electric.
7. If the heating system is electric, it shall be approved and listed for the specific location in which it is used.
8. Heaters shall not be subject to accumulation of residue.
9. If used, agitators shall be driven by compressed air, water, low- pressure steam, or electricity. If powered by an electric motor, the motor shall be approved and listed for the specific location in which it is used.

F. **Liquid Piping Systems**

1. Piping systems that convey flammable or combustible liquids between storage tanks, mixing rooms, and dipping and coating areas shall be of steel or other material having comparable properties of resistance to heat and physical damage. Piping systems shall be properly bonded and grounded.
2. Where a tank is filled from the top, the free end of the fill pipe shall be within one hundred fifty millimeters (150 mm) of the bottom of the tank. Where Class I liquids are handled, the tank and fill pipe shall have a metallic bond wire permanently connected to the fill pipe. In addition, for Class I liquids, the tank, piping system, and storage tank shall be bonded and grounded.
3. Protection against siphoning shall be provided for fill lines having connections below liquid-level that are not permanently piped to the supply system.

4. Where a pump is used to supply liquid to a process, the piping, tubing, hose, and other accessories shall be designed to withstand the maximum working pressure of the pump, or means shall be provided to limit the discharge pressure of the pump.
5. Process tanks shall be provided with a limit device to prevent overfilling tanks.
6. Process pumps shall be interlocked with fire detection or automatic fire-extinguishing systems for the process to shut down the pumps in case of fire.

SECTION 10.4.7.7 PROTECTION

A. **Automatic Fire Protection for Small Dipping Processes**

1. Automatic-closing process tank covers shall be actuated by approved automatic devices and also shall be arranged for manual operation.
2. Covers shall be substantially constructed of non-combustible materials, shall overlap the sides of the tank by at least twenty-five millimeters (25 mm), and shall have a recess or flange that extends downward around the tank when it is closed.
3. Chains, wire ropes, or other approved noncombustible apparatus shall be used to support the cover or operating mechanism. All pulleys, catches, and other fasteners shall be metal and shall be attached to noncombustible mountings.

B. **Automatic Fire Protection for Enclosed Processes and Large Processes**

1. The system shall be designed to protect the following areas:
   a. For dip tanks: the tank, its drain board, freshly coated work pieces above the drain board, and exhaust ducts
   b. For curtain and flow coaters: open troughs and tanks, canopies or hoods, vapor drying tunnels, and exhaust ducts
   c. For roll coaters and similar processes: open troughs and tanks, coating and transfer rolls, the web, and open containers of coating materials
   d. For vapor degreasers using flammable liquids: the tank and any areas within the unit that can have solvent accumulation.
2. The extinguishing system shall be designed to simultaneously discharge into the entire protected area.

C. **Requirements for All Fire Protection Systems**

Fire protection systems shall be designed and installed so as to minimize splashing of the solvent or coating materials due to discharge of the fire suppression agent.

D. **Specific Requirements for Automatic Carbon Dioxide, Dry Chemical, Clean Agent, and Water Mist Systems**

The fire protection systems shall be capable of discharging their agents into the entire protected area simultaneously.

E. **Specific Requirements for Water-Based Fire Protection Systems.**

Water-based fire protection systems shall be designed to allow drainage of water without raising the level of the coating material to the overflow level.

F. **Automatic Fire Protection for Printing Processes**

Automatic fire protection shall be provided for the following areas:

1. All printing process areas that contain ordinary combustibles, flammable or combustible liquids, or combustible construction
2. All printing operations areas, at the ceiling level
3. Areas of printing presses that are shielded from ceiling protection and where combustibles exist.

SECTION 10.4.7.8 OPERATIONS AND MAINTENANCE

A. **General**

1. Areas in the vicinity of process operations, especially drain boards and drip pans, shall be cleaned on a regular basis to minimize the accumulation of combustible residues and unnecessary combustible materials.
2. Combustible coverings (thin paper, plastic, and so forth) and strippable coatings shall be permitted to be used to facilitate cleaning operations in dipping and coating areas.

3. If excess residue accumulates in work areas, ducts, duct discharge points, or other adjacent areas, then all process operations shall be discontinued until conditions are corrected.
4. For printing processes, good housekeeping shall be provided throughout the process area, with special attention given to presses, ducts, ink troughs, folders, and driers. Particular attention shall be given to assessing the degree of ink residue and dust accumulation in the vicinity of the press. Paper scrap, flammable liquids, and cleaning rags shall not be allowed to accumulate.

B. **Waste Containers**

1. Rags, other absorbent materials, or wastes that are impregnated with flammable or combustible liquids shall be deposited in approved waste containers immediately after use.
2. Storage beyond the immediate work shift shall be in closed metal containers.
3. The closed metal containers shall be placed in a designated location.
4. The lid of the waste container shall remain fully closed and latched when not in use.
5. Waste containers containing flammable liquids shall be located in ventilated areas
6. Waste containers for flammable liquids shall be constructed of conductive materials and shall be bonded and grounded.

C. **Inspection and Testing**

Monthly inspections and tests shall be conducted on all process tanks, including covers, overflow pipe inlets, overflow outlets and discharges, bottom drains, pumps and valves, electrical wiring and utilization equipment, bonding and grounding connections, ventilation systems, and all extinguishing equipment. Any defects found shall be corrected.

D. **Combustible Dusts and Residues**

1. Equipment that produces combustible dusts, such as paper and starch, and surrounding areas shall be kept clean
2. All process areas shall be kept free of excessive accumulation of deposits of combustible residues
3. Combustible coverings (thin paper, plastic) and strippable coatings shall be permitted to be used to facilitate cleaning operations in process areas.
4. When plastic covering is used, it shall be of a static dissipative nature or shall have a maximum breakdown voltage of four kilovolts (4 kV) to prevent accumulation of a hazardous static electric charge.

E. **Smoking**

Signs stating "**NO SMOKING OR OPEN FLAMES**" shall be conspicuously posted in all process areas and in flammable and combustible liquids storage areas.

F. **Hot Works**

Welding, cutting, and other spark-producing operations shall not be permitted in or adjacent to dipping or coating operations until an FSC for such work has been issued. The permit shall be issued by C/MFM having jurisdiction following inspection of the area to ensure that proper precautions have been taken and will be followed until the job is completed.

SECTION 10.4.7.9 SOLVENT DISTILLATION UNITS (SOLVENT RECYCLERS)

This Section shall apply to solvent distillation units having distillation chambers or still pots that do not exceed two hundred twenty-seven liters (227 L) capacity and are used to recycle Class I, Class II, and Class IIIA liquids.

A. **Solvents**

Solvent distillation units shall only be used to distill liquids for which they have been investigated and that are indicated on the unit's marking or instruction manual. Unstable or reactive liquids or materials shall not be processed unless they have been specifically indicated on the system's markings or in the instruction manual.

B. **Location**

Solvent distillation units shall be used only in locations in accordance with their approval or listing. They shall not be located in basements. They shall be located away from potential sources of ignition, as indicated on the unit's marking.

SECTION 10.4.7.10 ELECTROSTATIC DETEARING APPARATUS

A. **Construction**

1. A safe distance of six meters (6 m) or at least twice (2) the sparkling distance shall be maintained between the object or material being deteared, painted or treated and the electrodes, electrostatic atomizing heads or conductors. A suitable sign indicating this safe distance shall be conspicuously posted near the assembly.
2. Electrostatic apparatus shall be equipped with automatic means that will de-energize and ground the high voltage elements and to signal the operator under any of the following conditions:
   a. Stopping of ventilation fans or failure of ventilating equipment from any cause.
   b. Stopping of the conveyor carrying goods through the high voltage.
   c. Occurrence of a ground fault or excessive current leakage at any point on the high voltage system.
   d. Reduction of clearances to below that specified in para 1 above.
   e. De-energizing of the primary side of the power supply.
3. Adequate booths, fencing, railing, or guards shall be placed around the equipment so that, by either their location or character, or both, they assure that a safe isolation of the process is maintained from plant storage or personnel. Such railings, fencing, and guards shall be of conductive material, adequately grounded, and shall be at least one and a half meters (1.5 m) from processing equipment.
4. Electrodes and electrostatic atomizing heads shall be adequately supported in permanent locations, and shall be effectively insulated from the ground. Electrodes and electrostatic atomizing heads which are permanently attached to their bases, supports, or reciprocators, shall be deemed to comply with this Section. Insulators shall be non-ferrous and non-combustible.
5. High-voltage leads to electrodes shall be supported on insulators and shall be guarded against accidental contact or grounding. Insulators shall be kept clean and dry. Automatic means shall be provided for grounding the electrode system when it is electrically de-energized for any reason.

B. **Operation**

1. Electrostatic apparatus and devices used in connection with paint spraying and paint detearing operations shall be in accordance with internationally approved standards.
2. Transformers, power packs, control apparatus, and all other electric portions of the equipment, shall be located outside of the spraying or vapor areas, and shall conform to the requirements of the other provisions of this RIRR.

C. **Protection and Maintenance**

1. Process zone that are dangerous with regard to fire and accident shall be designated.
2. Signs designating the process zone as dangerous because of fire and accident hazards shall be conspicuously posted.
3. All electrically conductive objects and devices (such as paint containers, wash cans and guards) in the process area, except those objects required by the process to be at high voltage, shall be electrically connected to the ground with a resistance of not more than one (1) megohm.
4. Access shall be restricted to qualified personnel only.
5. Drip plates and screens subject to deposits of coating materials shall be cleaned regularly to prevent excess accumulation of residues.
6. The spraying area shall be adequately ventilated.

SECTION 10.4.7.11 SPRAYING USING FLAMMABLE OR COMBUSTIBLE MATERIALS

A. **General Application**

1. This Section shall apply to the spray application of flammable or combustible materials, as herein defined, either continuously or intermittently by any of the following methods:
   a. Compressed air atomization
   b. Airless or hydraulic atomization

c. Electrostatic application methods

d. Fluidized bed application methods

e. Electrostatic fluidized bed application method

f. Other means of acceptable application means

2. It shall also apply to spray application of water-borne, water-based, and water-reducible materials that contain flammable or combustible liquids or that produce combustible deposits or residues.

3. It shall apply to spray application processes or operations that are conducted both indoors and outdoors within temporary membrane enclosures.

4. This Section shall not apply to spray operations that use less than one liter (1 L) of flammable or combustible liquid in any eight-hour (8-hr) period.

5 It shall not apply to spray application processes or operations that are conducted outdoors.

6. This Section shall not apply to the use of portable spraying equipment that is not used repeatedly in the same location.

7. This shall not apply to the use of aerosol products in containers up to and including one liter (1 L) capacity that are not used repeatedly in the same location.

8. This shall not apply to the spray application of non-combustible materials.

9. This shall also not apply to the hazards of toxicity or to industrial health and hygiene.

10. Operations involving the spray application of flammable and combustible materials shall be in accordance with NFPA 33, *Standard for Spray Application Using Flammable or Combustible Materials*.

B. **Operations and Maintenance**

1. Combustible Deposits

a. All spray areas shall be kept free of excessive accumulation of deposits of combustible residues.

b. Combustible coverings (thin paper, plastic) and strippable coatings shall be permitted to be used to facilitate cleaning operations in spray areas.

c. Where plastic covering is used, it shall be of a static dissipative nature or shall have a maximum breakdown voltage of four kilovolts (4 kV) to prevent accumulation of a hazardous static electric charge.

d. If residue accumulates to excess in booths, duct or duct discharge points, or other spray areas, all spraying operations shall be discontinued until conditions have been corrected.

2. High-pressure Hose Lines

High-pressure hose lines, which convey flammable or combustible coating material in "airless" spray application operations, shall be inspected daily and shall be repaired or replaced as necessary. Hose lines and equipment shall be located so that, in the event of a leak or rupture, coating material will not be discharged into any space having a source of ignition.

3. Maintenance Procedures

a. Overspray collectors shall be inspected daily; and clogged filters shall be discarded and replaced. Maintenance procedures shall be established to ensure that overspray collector filters are replaced before restriction to airflow is reduced below the minimum.

b. At the close of the day's operation, all discarded overspray collector filters, residue scrapings, and debris contaminated with residue shall be removed immediately to a designated storage location, placed in a noncombustible container with a tight-fitting lid, or placed in a water-filled metal container.

4. Waste Containers

a. Approved waste containers shall be provided wherever rags or waste are impregnated with sprayed material, and all such rags or waste shall be deposited therein immediately after use. The contents of waste containers shall be placed in a designated storage location.

b. Waste containers for flammable liquids shall be constructed of conductive materials and shall be bonded and grounded.

C. **Handheld Electrostatic Spray Equipment**

This provision shall apply to any equipment using electrostatically charged elements for the atomization, charging, and/or precipitation of flammable and combustible materials for coatings on articles or for other purposes in which the charging or atomizing device is handheld and manipulated during the spraying operation.

1. Handheld Apparatus

   a. Handheld electrostatic spray apparatus and devices shall be listed. The high-voltage circuits shall be designed so that they cannot produce a spark capable of igniting the most hazardous vapor–air mixture or powder–air mixture likely to be encountered and so that they cannot result in an ignition hazard upon coming into contact with a grounded object under all normal operating conditions.

   b. The electrostatically charged exposed elements of the hand gun shall be capable of being energized only by an actuator that also controls the coating material supply.

   c. Where the liquid coating material is electrically energized, precautions shall be taken to prevent electric shock.

2. Electrical Components

   Transformers, high-voltage supplies, control apparatus, and all other electrical portions of the equipment, with the exception of the hand gun itself and its connections to the power supply, shall be located outside the spray area.

3. Grounding

   a. The handle of the spray gun shall be electrically connected to ground by a conductive material. It shall be constructed so that the operator, in normal operating position, is in electrical contact with the grounded handle by a resistance of not more than one (1) megohm to prevent buildup of a static charge on the operator's body. Signs indicating the necessity for grounding persons entering the spray area shall be conspicuously posted.

   b. All electrically conductive objects in the spray area, except those objects required by the process to be at high voltage, shall be electrically connected to ground with a resistance of not more than one (1) megohm. This requirement shall apply to containers of coating material, wash cans, guards, hose connectors, brackets, and any other electrically conductive objects or devices in the area. This requirement also shall apply to any personnel who enter the area.

   c. Conductive objects or material being coated shall be electrically connected to ground with a resistance of not more than one (1) megohm. Areas of contact shall be sharp points or knife edges, where possible, and those areas of contact shall be protected from overspray, where practical.

   d. Highly resistive objects (i.e. surface conductivity between one hundred eight (108) and one thousand eleven (1,011) ohms per square) that exhibit a surface voltage below two thousand five hundred volts (2,500 V), as measured using a non-loading kilo-voltmeter and when subjected to coronal current not less than that expected in the application process, shall be considered adequately grounded.

   e. Objects or material transported by a conveyor shall be maintained in electrical contact with the conveyor or other grounding contacts. Hooks and hangers shall be cleaned to ensure grounding.

D. **Drying, Curing, and Fusion Processes**

1. Spray Booths and Spray Rooms Used for Ambient Air Drying

   If a spray booth or spray room is also used for air-drying, curing, or fusing operations and the air temperature therein is not elevated above ambient conditions, the ventilation system shall maintain the concentration of any vapors in the exhaust stream below twenty-five percent (25%) of LFL. If the temperature in the spray area is elevated for the purpose of accelerating the drying or curing process

2. Spray Booths and Spray Rooms Used for Drying at Elevated Temperatures

   a. The interior surfaces (especially the floor) of the spray area shall be cleaned regularly to minimize the accumulation of deposits of combustible residues.

b. For fully enclosed spray booths and spray rooms, a high temperature limit switch shall be provided to automatically shut off the drying apparatus if the air temperature in the spray area exceeds ninety-three degrees Celsius (93 °C). When industrial air heaters are used to elevate the air temperature for drying or curing in a closed-top, open-front, or open-face spray booth, a high-limit switch shall be provided to automatically shut off the drying apparatus if the air temperature in the spray booth exceeds the maximum discharge air temperature allowed by the standard under which the heater is listed or ninety-three degrees Celsius (93 °C), whichever is less.

c. Spraying apparatus, drying apparatus, and the ventilating system shall be equipped with interlocks arranged so that the spraying apparatus cannot be operated when drying apparatus is in operation or is energized.

d. Where industrial air heaters are used to elevate the air temperature for drying, curing, or fusing operations, means shall be provided to deter entry into the spray booth or spray room during the drying, curing, or fusing operation. Interlocks shall be provided to shut down the drying, curing, or fusing operation if entry is made.

e. Radiant drying apparatus that is permanently attached to the walls, ceiling, or partitions of the spray area shall be listed for exposure to flammable or combustible vapors, mists, dusts, residues, or deposits.

f. Radiant drying, curing, or fusion apparatus, which is permanently attached to the structure of a spray booth and is pendent-mounted or employs the use of a track or similar system but is suitable only for use in an Ordinary Hazard (general purpose) location, shall be permitted to be used.

g. Any containers of flammable or combustible liquids shall be removed from the booth before the drying apparatus is energized.

h. Fuel tanks containing fuel other than gasoline or diesel fuel shall be removed from any vehicle brought into the spray area.

i. Explosion relief shall not be required for a spray booth or spray room that is alternately used for drying, curing, or fusing, if all of the following conditions exist:

   1) The spray booth or spray room is used for batch-type spray application operations only.

   2) The air heater is not within the re-circulated air path.

   3) The ventilation system complies with the applicable requirements of NFPA 86.

3. Flash-Off Areas

   a. Flash-off areas that are heated above ambient temperatures to accelerate release of vapors shall meet the requirements of NFPA 86.

   b. Open flash-off areas shall be protected in accordance with the requirements of the occupancy in which they are located.

   c. Enclosed flash-off areas shall be provided with an approved automatic fire protection system.

4. Spray Booths or Spray Rooms Adjacent or Connected to Rooms or Equipment Used for Drying, Curing, or Fusing

   a. Interconnecting doors and related interlocks shall meet the requirements of NFPA 86. An interlock shall be provided to prevent spray application operations when the interconnecting doors are open.

   b. Where an interconnecting door is not used, a nine hundred fifteen millimeters (915 mm) minimum pressurized vestibule shall be provided for separation. Airflow into the vestibule shall be proven and interlocked, so that loss of ventilation or airflow shuts down the spray application equipment or the heating equipment. Airflow into the connected spray booth or spray room shall be capable of confining vapors and mists to the spray booth or spray room.

   c. A high temperature limit switch shall be provided to automatically shut off the drying apparatus if the air temperature in the spray area exceeds ninety-three degrees Celsius (93 °C).

   d. Fusion apparatus shall be ventilated at a rate that maintains the concentration of ignitable vapors in the area at or below twenty-five percent (25%) of LFL.

   e. Drying, curing, or fusing apparatus shall be affixed with a permanently attached, prominently located warning sign *(refer to text immediately after this paragraph)*

indicating that ventilation shall be maintained during the drying, curing, or fusing period and that spraying shall not be conducted in the vicinity in such manner as to deposit residue on the apparatus.

WARNING: MAINTAIN VENTILATION DURING DRYING, CURING OR FUSING PERIOD

E. **Miscellaneous Spray Operations**

1. Vehicle Undercoating and Body Lining

a. There shall be no open flames or spark-producing equipment within six and one tenth meters (6.1 m) of the spray operation while the spray operation is being conducted.

b. There shall be no drying, curing, or fusion apparatus in use within six and one tenth meters (6.1 m) of the spray operation while the spray operation is being conducted.

c. Any solvent used for cleaning procedures shall have a flash point not less than thirty-seven and eight tenths degrees Celsius (37.8 °C).

d. The coating or lining materials used shall meet one of the following criteria:

1) Be no more hazardous than UL Class 30-40, when tested in accordance with ANSI/UL 340, *Test for Comparative Flammability of Liquids*

2) Not contain any solvent or component that has a flash point below thirty-seven and eight tenths degrees Celsius (37.8 °C).

3) Consist only of Class IIIB liquids and not include any organic peroxide catalyst

e. Spray undercoating operations that do not meet the requirements of vehicle undercoating and body lining shall meet all applicable requirements of NFPA 33 pertaining to spray finishing operations.

f. If spray finishing operations are performed at or in a preparation workstation, the preparation workstation shall be considered an unenclosed spray area and shall meet all requirements of an unenclosed spray area.

g. Limited finishing workstation shall be designed and constructed to have all the following:

1) a dedicated make-up air supply and air supply plenum;

2) curtains or partitions that are noncombustible or limited-combustible;

3) a dedicated mechanical exhaust and filtration system; and

4) an approved automatic extinguishing system.

h. The amount of material sprayed in a limited finishing workstation shall not exceed three and eight tenths liters (3.8 L) in any eight-hour (8-hr) period.

i. Curtains or partitions shall be fully closed during any spray application operations.

j. The area inside the curtains or partitions shall be considered a Class I, Division 1; Class I, Zone 1; Class II, Division 1; or Zone 21 hazardous (classified) location

k. A Class I, Division 2; Class I, Zone 2; Class II, Division 2; or Zone 22 hazardous (classified) location, as applicable, shall extend nine hundred fifteen millimeters (915 mm) both horizontally and vertically beyond the volume enclosed by the outside surface of the curtains or partitions.

l. Any limited finishing workstation used for spray application operations shall not be used for any operation that is capable of producing sparks or particles of hot metal or for operations that involve open flames or electrical utilization equipment capable of producing sparks or particles of hot metal.

m. Where industrial air heaters are used to elevate the air temperature for drying, curing, or fusing operations, a high-limit switch shall be provided to automatically shut off the drying apparatus if the air temperature in the limited finishing workstation exceeds the maximum discharge-air temperature allowed by the standard that the heater is listed to or ninety-three degrees Celsius (93 °C), whichever is less.

n. A means shall be provided to show that the limited finishing workstation is in the drying or curing mode of operation and that the limited finishing workstation is to be unoccupied.

o. Any containers of flammable or combustible liquids shall be removed from the limited finishing workstation before the drying apparatus is energized.

p. Portable spot-drying, curing, or fusion apparatus shall be permitted to be used in a limited finishing workstation, provided that it is not located within the hazardous (classified) location when spray application operations are being conducted.

F. **Powder Coating**

1. Enclosures

Powder shall be confined by conducting coating operations within one of the following:

a. A completely enclosed, ventilated room of noncombustible or limited-combustible construction with smooth surfaces designed to prevent accumulation of powder and to facilitate cleaning

b. A ventilated spray booth having enclosed, ventilated containers (tanks, bins, etc.)

2. Electrical and Other Sources of Ignition

a. Where the object or material being coated is preheated, the controls shall be set so that the surface temperature of the object or material does not come within twenty-eight degrees Celsius (28 °C) of the auto-ignition temperature of the powder used.

b. All electrically conductive objects in the spray area, except those objects required by the process to be at high voltage, shall be electrically connected to ground with a resistance of not more than one (1) megohm. This requirement shall also apply to any personnel who enter the area.

3. Ductwork

a. Where non-deposited, air-suspended powder (powder overspray) is conveyed by ductwork to a recovery system, sufficient airflow shall be provided in the ductwork to maintain the powder concentration in the ductwork at not more than fifty percent (50%) of the minimum explosive concentration (MEC) of the powder in use. If the MEC of the powder has not been established, then the exhaust duct powder concentration shall be maintained below fifteen grams per cubic meter (15 g/m^3).

b. Exhaust equipment shall bear an identification plate stating the ventilation rate for which it was designed.

c. If the coating operation is conducted at an exhaust duct concentration above fifty percent (50%) of the MEC, listed explosion suppression equipment shall be provided.

d. Air exhausted from the recovery system of a powder operation shall not be recirculated unless the concentration of particulate matter in the exhaust air has been reduced to a level that is considered safe for personnel occupational exposure and equipment continuously monitors the filtration system to signal the operator and to automatically shut down the operation in the event the filtration system fails to maintain the air in this condition.

e. Enclosures shall either be listed for the specific application or shall be designed to resist the destructive effects of an internal deflagration. Any enclosure that is not so listed and is effectively tight, such as a spray booth, dust collector, powder recovery device, or other enclosure, shall be provided with one of the following:

1) deflagration venting that meets the requirements of NFPA 68; or

2) deflagration suppression system that meets the requirements of NFPA 69.

f. Ventilation for powder coating being applied via fluidized beds and electrostatic fluidized beds shall be designed to prevent escape of non-deposited powder from the enclosure

g. The ventilation system shall confine air-suspended powder to the booth and the recovery system at all times.

4. Drying, Curing, and Fusing Equipment

The temperature of the object or material being coated shall be maintained at least twenty-eight degrees Celsius (28 °C) below the auto ignition temperature of the powder.

5. Operation and Maintenance

a. The area surrounding the spray area, including horizontal surfaces such as ledges, beams, pipes, hoods, and floors, shall be maintained to prevent the accumulation of powder.

b. Surfaces outside of the spray area shall be cleaned in a manner that does not scatter powder or create dust clouds. Vacuum sweeping equipment, where used, shall be of a type approved for use in hazardous locations.

c. The booth exhaust shall remain on during spray are cleaning operations to confine airborne combustible dust.

d. Means shall be provided to prevent tramp metal or spark-producing material from being introduced into the powder being deposited.

e. Signs stating **"NO SMOKING OR OPEN FLAMES"** in large letters on contrasting color background shall be conspicuously posted at all powder coating areas and powder storage rooms.

6. Electrostatic Fluid Beds

a. The high-voltage circuits shall be designed so that any discharge produced when the charging electrodes of the bed are approached or contacted by a grounded object cannot produce a spark that is capable of igniting the most hazardous powder-air mixture.

b. Transformers, power packs, control apparatus, and all other electrical portions of the equipment, with the exception of the charging electrodes and their connections to the power supply, shall be located outside the area classified as hazardous.

c. All electrically conductive objects within the powder coating area, except those objects required by the process to be at high voltage, shall be electrically connected to ground with a resistance of not more than one (1) megohm. This requirement shall also apply to any personnel who might enter the area. The powder coating equipment shall carry a prominent, permanently installed warning regarding the necessity for grounding these objects.

d. Highly resistive objects (i.e. surface conductivity between one hundred eight (108) and one thousand eleven (1,011) ohms per square) that exhibit voltage below two thousand five hundred volts (2,500 V), as measured using a non-loading kilo-voltmeter and when subjected to coronal current not less than that expected in the application process shall be considered adequately grounded.

e. Objects or material being coated shall be maintained in electrical contact less than one (1) megohm with the conveyor or other support to ensure grounding.

f. Hangers shall be cleaned to ensure effective contact. Areas of contact shall be sharp points or knife edges where possible.

g. The electrical equipment and compressed air supplies shall be interlocked with the ventilation system so that the equipment cannot be operated unless the ventilation fans are in operation.

h. The temperature of the object or material being coated shall be maintained at least twenty-eight degrees Celsius (28 °C) below the auto-ignition temperature of the powder.

i. The temperature of the object or material being coated shall be maintained at least twenty-eight degrees Celsius (28 °C) below the auto-ignition temperature of the powder.

7. Powder Coating Delivery and Circulation

a. All bins, hoppers, and fluid beds that are actively in use in the powder application process shall be grounded

b. Bins, hoppers, and fluid beds shall be vented to prevent the accumulation of powder outside of the application process

c. The compressed air supply shall be interlocked with the ventilation system so that the equipment cannot be operated unless ventilation is in operation.

8. Powder Unloading, Bag Dumping Stations, and Pneumatic Conveying Systems.

Powder unloading, bag dumping stations, and pneumatic conveying systems located in, connected to, or adjacent to the spray area shall be Class II, Division 2.

9. Screening or Sieving Operations

Ventilation for screening or sieving operations shall be designed to contain and prevent the accumulation of powder outside of the operation.

10. Storage and Handling

Containers, such as but not limited to, bags, jars, boxes, totes, bins, super-sacks, hoppers, collectors, and so on, containing powder coating material shall be permitted to be stored directly adjacent to spray areas provided that the container meets all of the following requirements:

a. Is not actively used in the spray process;

b. Is covered or sealed;

c. Is labeled with the contents; and

d. Does not interfere with equipment operation.

11. Housekeeping

a. Areas around the spray area, including horizontal surfaces such as ledges, beams, pipes, hoods, and floors, shall be cleaned to prevent accumulation of powder.

b. Surfaces shall be cleaned in a manner that does not scatter powder or create dust clouds.

c. Vacuum sweeping equipment, where used, shall be approved for Class II, Division 2.

12. Spill Clean-up

a. All sources of ignition shall be removed from the area of a spill or accidental release of powder.

b. Tools used for the clean-up shall be of a type that cannot produce a spark.

c. Vacuum sweeping equipment shall be approved for Class II, Division 2 or Zone 22 locations.

d. The use of brooms for sweeping up the powder shall be done in a way that does not scatter powder or create dust clouds.

e. Disposal of the spill material shall be in accordance with applicable Philippine National Standards (PNS).

f. Compressed air, unless in a booth or vented coating area, shall not be permitted during clean-up.

g. Compressed air lines shall be conductive and grounded.

G. **Organic Peroxides and Plural Component Coatings**

1. General

Spray application operations that involve the use of organic peroxide formulations and other plural component coatings shall be conducted in spray areas that are protected by approved automatic sprinkler systems

2. Prevention of Contamination

Measures shall be taken to prevent the contamination of organic peroxide formulations with any foreign substance. Only spray guns and related handling equipment that are specifically manufactured for use with organic peroxide formulations shall be used. Separate fluid-handling equipment shall be used for the resin and for the catalyst, and they shall not be interchanged.

a. The wetted portions of equipment and apparatus that handle organic peroxide formulations shall be constructed of stainless steel (three hundred (300) series), polyethylene, Teflon, or other materials that are specifically recommended for the application.

b. Measures shall be taken to prevent contamination of organic peroxide formulations with dusts or overspray residues resulting from the sanding or spray application of finishing materials.

c. Spills of organic peroxide formulations shall be promptly removed, so there are no residues. Spilled material shall be permitted to be absorbed by use of a noncombustible absorbent, which is then disposed of promptly in accordance with the manufacturer's recommendations.

3. Storage of Organic Peroxides

Organic peroxide formulations shall be stored in accordance with the requirements of NFPA 400 and with the manufacturers' recommendations.

4. Handling of Organic Peroxides

   Measures shall be taken to prevent handling of organic peroxide formulations to avoid shock and friction, which can cause decomposition and violent reaction.

5. Mixing of Organic Peroxides with Promoters

   Organic peroxide formulations shall not be mixed directly with any cobalt compounds or other promoters or accelerators, due to the possibility of violent decomposition or explosion. To minimize the possibility of such accidental mixing, these materials shall not be stored adjacent to each other.

6. Smoking

   Smoking shall be prohibited. **"NO SMOKING"** signs shall be prominently displayed, and only non-sparking tools shall be used in any area where organic peroxide formulations are stored, mixed, or applied

7. Trained Personnel

   Only designated personnel trained to use and handle organic peroxide formulations shall be permitted to use these materials.

8. Material Safety Data Sheets (MSDS)

   Where organic peroxide formulations are used, the MSDS or its equivalent shall be consulted.

H. **Styrene Cross-Linked Composites Manufacturing (Glass Fiber-Reinforced Plastics)**

1. Scope

   The herein provisions shall apply to manufacturing processes involving spray application of styrene cross-linked thermoset resins (commonly known as glass fiber reinforced plastics) for hand lay-up or spray fabrication methods, that is, resin application areas, and where the processes do not produce vapors that exceed twenty-five percent (25%) of LFL.

2. Resin Storage

   The quantity of flammable and combustible liquids located in the vicinity of resin application areas outside an inside storage room or storage cabinet in any one process area shall not exceed the greater of any of the following:

   a. A supply for one day;

   b. The sum of ninety-five liters (95 L) of Class IA liquids in containers and four hundred fifty-four liters (454 L) of Class IB, IC, II, or III liquids in containers; or

   c. One approved portable tank not exceeding two thousand five hundred liters (2,500 L) of Class IB, IC, II, or III liquids.

3. Electrical and Other Hazards

   a. Electrical wiring and utilization equipment located in resin application areas that is not subject to deposits of combustible residues

   b. Electrical wiring and utilization equipment located in resin application areas that is subject to deposits of combustible residues shall be listed for such exposure and shall be suitable for Class I, Division 2 or Class I, Zone 2 locations, if applicable

   c. All metal parts of resin application areas, exhaust ducts, ventilation fans, spray application equipment, work pieces or containers that receive the spray stream, and piping that conveys flammable or combustible liquids shall be electrically grounded.

   d. Space heating appliances or other hot surfaces in resin application areas shall not be located where deposits or residues accumulate.

4. Ventilation

   a. Mechanical ventilation shall be designed and installed throughout the resin application area, however buildings that are not enclosed for at least three-quarters (3/4) of their perimeter shall not be required to meet this requirement.

   b. Local ventilation shall be provided where personnel are under or inside of the work piece being fabricated.

5. Use and Handling

   a. Excess catalyzed resin, while still in the liquid state, shall be drained into an open-top,

noncombustible container. Enough water shall be added to the container to cover the contained resin by at least fifty millimeters (50 mm).

b. In areas where chopper guns are used, paper, polyethylene film, or similar material shall be provided to cover the exposed surfaces of the walls and floor to allow the buildup of overchop to be removed. When the accumulated overchop has reached an average thickness of fifty millimeters (50 mm), it shall be disposed of after a minimum curing time of four (4) hours.

c. Used paper, polyethylene film, or similar material shall be placed in a noncombustible container and disposed of when removed from the facility.

I. **Spray Application Operations in Membrane Enclosures**

1. Scope

a. This provision shall apply to spray application operations and processes for coating the exterior of a workpiece conducted in membrane enclosures.

b. Spray application operations and processes within the enclosure shall only be permitted for the workpiece for which the enclosure was erected.

c. Spray application operations for parts removed from the workpiece shall be conducted in accordance with applicable requirements of NFPA 33.

2. General

Membrane enclosures shall be erected for one hundred eighty (180) days or less.

a. Enclosures erected shall only be used for the duration of a spray operation at a fixed location which can involve multiple coats for a single workpiece.

b. Membrane material shall not be reused for any other spray application operations.

c. Operations conducted within the enclosure other than spray applications shall meet the fire and safety requirements for those operations.

d. These operations shall not take place while the spray application operation is in progress.

3. Location

a. Outside of Buildings. The spray area shall be separated from permanent structures by a minimum of four and six tenths meters (4.6 m).

b. Inside Buildings. Membrane enclosures for spray painting shall be permitted to be installed in buildings provided all the requirements in Chapter 18, NFPA 33 are complied.

4. Membrane Material

Material used for membrane enclosures shall have been tested and passed the NFPA 701 Test 2 requirements. Testing shall have been performed by an independent test laboratory.

5. Membrane Enclosure Occupancy

a. During the spray process, only personnel required for the process shall be allowed inside the membrane enclosure, vessel, or work piece.

b. Travel distance to an exit from within a membrane enclosure shall comply with Table 40.2.6 for *General Industrial Occupancies*, NFPA 101.

6. Operations and Maintenance within Temporary Enclosures

a. The spray area shall consist of the interior of the membrane enclosure.

b. No hot works, welding, grinding, or cutting shall take place in the spray area while it is permitted for spray painting

c. No vehicles, ordinary combustibles, portable buildings, or container storage shall be located in the one and a half meters (1.5 m) Class I Division 2; Class I Zone 2 area during spray operations.

d. No smoking or open flames shall be allowed in the paint spray area including the membrane enclosure while it is permitted for spray painting

e. Hot works adjacent to designated spray painting operations in membrane enclosures shall be performed only when authorized by the competent person designated for spray painting.

7. Ventilation
    a. The ventilation system shall be designed and installed to ensure that the enclosure is maintained at a pressure that is negative relative to the surrounding environs.
    b. The concentration of the vapors and mists in the exhaust stream of the ventilation system during spray operations and ambient air drying operations shall not exceed ten percent (10%) of LFL.
    c. All spray operations within the membrane enclosure shall cease operations when the concentration of the vapors and mists in the exhaust stream of the ventilation system reaches or exceeds ten percent (10%) of LFL.
    d. An interlock shall be provided so that the spray apparatus is automatically stopped if the ventilation system fails to maintain the concentration of the vapors and mists in the exhaust stream below ten percent (10%) of LFL.
    e. Where interlocks cannot be effectively provided for ventilation equipment that uses plant air, large air storage tanks, or equipment that cannot be instantly shut off, an audible alarm upon loss of ventilation that will alert all spray paint operators may be permitted prior to the approval of the C/MFM having jurisdiction.
    f. Exhaust air shall be taken from one (1) or more points within three hundred millimeters (300 mm) of the floor of the enclosure.
    g. The location of both the exhaust and make-up air openings shall be arranged to provide air movement throughout the enclosure and across all portions of the floor to prevent accumulation of flammable vapors.
    h. Air exhausted from the membrane enclosure shall not be re-circulated.
8. Drying
    a. Membrane enclosures used for spray application of flammable or combustible materials shall not be used for drying, curing, or fusing operations at elevated temperature.
    b. Freshly sprayed work pieces shall be dried only in spaces that are ventilated to prevent the concentration of vapors from exceeding ten percent (10%) of LFL.
9. Record Keeping
    a. All equipment shall bear a permanent unique number or other designation to identify equipment in use.
    b. Records of approved equipment shall be kept on file for twelve (12) months. Such records shall be in the form of a memorandum stating the equipment number, the owner of the equipment, and the lessor of the equipment, if any, and state that the owner has accepted the equipment for use at the facility.
10. Storage and Handling of Flammable and Combustible Liquids
    a. Coating Material Handling. Flammable and combustible paints, coatings, and cleaning agents for equipment within the membrane enclosure and its one and a half meters (1.5 m) Class I Division 2; Class I Zone 2 area shall not exceed thirty-seven and nine tenths liters (37.9 L) total at any time.
    b. All mixing and storage shall be done outside the membrane enclosure area.
    c. When mixing and storage operations are located inside buildings, they shall be protected
11. Protection
    a. Portable fire extinguishers shall be installed, inspected, and maintained in accordance with Section 10.2.6.9 of this RIRR.
    b. Portable fire extinguisher placement shall be determined for each level where multiple work area levels exist within a membrane enclosure.
    c. The minimum size of all extinguishers shall be 4A:80B:C.
    d. Pre-engineered extinguishing systems shall not be utilized for fire protection unless specifically listed for use in membrane enclosures.

DIVISION 8. RIPENING PROCESSES

SECTION 10.4.8.1 FIRE SAFETY INSPECTION CERTIFICATE (FSIC) REQUIRED

An FSIC shall be issued by the C/MFM having jurisdiction as required for any fruit and crop ripening processes using combustible or flammable gas, such as ethylene, acetylene and the like.

SECTION 10.4.8.2 CONSTRUCTION

A. The location of buildings in which fruit ripening processes utilizing combustible or flammable gas are conducted shall be approved by the C/MFM having jurisdiction. In towns or municipalities without existing fire stations, the approving authority is the Provincial Fire Marshal having jurisdiction.

B. Containers storing the gas or materials from which they are generated shall be built in accordance with internationally recognized practice.

C. Electrical wiring and equipment shall be installed in accordance with the standards of the latest edition of PEC.

D. The room shall be air tight to prevent too much of the ethylene from leaking out.

E. Lighting shall be by approved electric lamps or fixtures.

F. Ethylene generators shall be listed and labeled including documentation that ethylene concentration gas does not exceed twenty-five percent (25%) of the lower explosive limit (LEL).

SECTION 10.4.8.3 OPERATION

A. Gas piping shall be of iron pipe. Flexible connectors and hose, when used, shall be of approved type. Tubing shall be of brass or copper with not less one and twenty-five hundredths millimeters (1.25 mm) wall thickness.

B. Ethylene gas shall be discharged only into approved rooms or enclosures. Valves controlling discharge shall be provided by positive and fail-closed control of flow.

C. Ripening room shall be open for at least twenty minutes (20 min) every twelve (12) hours of operation.

D. Heating of ripening rooms shall be by indirect means utilizing low pressure steam, hot water, or warm air. Approved electric heaters or approved gas or kerosene heaters shall have sealed combustion chambers.

E. Steam, hot water pipes and radiators, shall have a clearance of at least twenty-five millimeters (25 mm) to combustible material.

F. Gas heaters and their vents shall be installed in accordance with internationally recognized standards and practice. Gas heaters shall be equipped with an automatic pilot device to shut off the gas supply whenever the flame is extinguished.

G. Burners for gas or kerosene heaters shall be installed in such a manner that the air for combustion is taken from outside the ripening room and the products of combustion are discharged to the outside.

H. Kerosene heaters shall be installed in accordance with the applicable provisions of Division 4 of this Chapter.

I. Electric heaters shall be of a type having no exposed surface at a temperature higher than four hundred twenty-six degrees Celsius (426 °C) and with thermostatic elements that produce no sparks and shall be of a type approved for use in hazardous locations.

J. Protective guards shall be provided around heaters to prevent the possibility of their being knocked over.

K. Ripening rooms must have adequate refrigeration and air circulation systems

L. Refrigeration and air circulation systems shall be installed with the applicable provisions of Division 12 of this Chapter.

SECTION 10.4.8.4 PROTECTION AND MAINTENANCE

A. Portable fire extinguisher shall be installed in building or structure with ripening rooms.

B. Ripening rooms shall be cleared of all combustible materials at all time. Waste materials shall be disposed of properly.

C. The combustible or flammable gas shall be introduced by some means under positive

control and measured so that the quantity introduced does not exceed one (1) part of gas to one thousand (1,000) parts of air.

D. Containers other than those in actual use shall be stored outside of the building or in a special building, except that not more than two portable approved containers not in actual use may be stored inside the building premises. Such inside rooms or portions of a building used for storage of these containers shall be constructed of fire resistive walls and doors with a fire resistive rating of not less than two (2) hours.

E. Open flame heaters and open lights shall be prohibited in the ripening rooms.

F. **"NO SMOKING"** signs shall be posted at every entrance and smoking shall be prohibited in the ripening rooms.

G. Approved warning signs indicating the danger involved and necessary precautions shall be posted in conspicuous places.

DIVISION 9. FUMIGATION AND THERMAL INSECTICIDAL FOGGING

SECTION 10.4.9.1 FIRE SAFETY CLEARANCE (FSC)

No person shall engage in fumigation or thermal insecticidal fogging without an FSC from the C/MFM having jurisdiction. An operational license for fumigators from the Fertilizer and Pesticide Authority (FPA) is a prerequisite for the issuance of such clearance.

For the issuance of clearance, the following must be complied with:

A. The C/MFM having jurisdiction shall be notified in writing at least three (3) days before closing any structure or ship for fumigation or opening spaces for fogging.

B. Notification shall provide the following information:

1. Business name of the applicant, its address and contact number;
2. Location or name of establishment/address to be fumigated or where fogging operations are to be conducted;
3. Fumigants or insecticides, as well as thermal devices, to be used;
4. Person(s) responsible for the operation; and
5. Date and time of operation.

C. Notice of any fumigation or thermal insecticidal fogging shall be served at least one (1) day to the occupants involved in the premises to give them sufficient time for evacuation or appropriate preparation for the operation.

SECTION 10.4.9.2 SOURCES OF IGNITION

A. All fires, open flames and similar sources of ignition shall not be allowed in spaces under fumigation or thermal insecticidal fogging. Heating, if needed, shall be done by indirect means with steam or hot water.

B. Electricity shall be shut off during operations, except where circulating fans are used. Such equipment shall be designed and installed in accordance with the latest edition of PEC.

SECTION 10.4.9.3 WATCH PERSONNEL

A. During operation, the premises shall be sealed to keep the fumigant suspended in the air. The owner/building administrator shall be responsible for the supervision of the operation. Indoor fogging operations shall be supervised within three (3) to five (5) hours from the time the premises are fumigated/fogged until all ventilation work is completed.

B. For outdoor operations, the requesting party shall be the one responsible for the supervision.

SECTION 10.4.9.4 SEALING OF BUILDING

Depending on the construction of the building, doors, windows, and all crevices, cracks or openings in the building, or portion thereof, to be fumigated, except the exit, shall be sealed with tape and plastic sheet before fumigation materials are applied. In case of houses, a rubber tent shall be placed over the entire house to confine the poisonous gases or prevent them from escaping. Irrespective of the type of fumigant employed, paper or other similar non-fire retardant materials used as sealing or cover materials for buildings, except for approved tarpaulins, in excess of that required is prohibited.

SECTION 10.4.9.5 WARNING SIGNS

Whenever fumigants are used or stored, conspicuous warning signs bearing the "skull and crossbones" emblem with the words **"DANGER, POISON GAS! KEEP OUT!"** shall be posted on all doors and entrances to the premises and upon all gangplanks and ladders from the deck, pier or land to the ship. The signs shall also include the name of the fumigant used; the fumigator's name and his/her address and telephone number; and the date and time of operation. Notices shall be printed in red ink on white background. Letters in the headlines must be at least fifty-one millimeters (51 mm) in height. A warning shall state that the occupied premises must be vacated at least two (2) to three (3) hours before the operation begins and shall not be reentered until the danger signs are removed by the proper authorities.

SECTION 10.4.9.6 VENTING AND CLEANUP

At the end of the exposure period, fumigators shall safely and properly ventilate the premises and contents and properly dispose all fumigant containers, residues, debris and other materials used in the fumigation.

SECTION 10.4.9.7 THERMAL INSECTICIDAL FOGGING LIQUIDS

No thermal insecticidal fogging liquid with a flash point below thirty-eight degrees Celsius (38 °C) shall be used. During operation, fog shall not be blasted directly against any combustible object or materials, e.g. cartons, papers, curtains and, or within three meters (3 m) therefrom.

SECTION 10.4.9.8 RESTRICTED FUMIGANTS

Carbon Disulfide (CS2) and Hydrocyanic Acid (HCN) shall be used only in agricultural fumigations.

DIVISION 10. REPAIR GARAGES

SECTION 10.4.10.1 CONSTRUCTION

A. Repair garages shall be built in accordance with the latest edition of NBCP, and the provisions of this Section.

B. A repair garage shall not be located within or attached to a building or structure used for any purpose other than a repair garage unless separated by walls and floor or floor-ceiling assemblies having a fire resistance rating of not less than two (2) hours.

C. Any single area occupied for sales rooms, showrooms, offices, or similar spaces shall be separated from vehicle repair or parking areas by walls and floor or floor-ceiling assemblies having a fire resistance rating of not less than two (2) hours.

D. Ceiling assemblies shall be constructed in such a manner as to restrict the passage of smoke, vehicle exhaust gases, and odors from the repair or parking area to these spaces.

E. In cases of parts storage areas, it shall also be separated from all other portions of the building by walls or partitions and floor or floor-ceiling assemblies having a fire resistance rating of not less than two (2) hours.

F. In areas of repair garages used for repair or servicing of vehicles, floor assemblies shall be constructed of noncombustible materials or, if combustible materials are used in the assembly, shall be surfaced with approved noncombustible material. Floors shall be liquid tight to prevent the leakage or seepage of liquids and shall be sloped to facilitate the movement of water, fuel, or other liquids to floor drains.

G. In areas of repair garages where motor fuels are dispensed or where vehicles are serviced, floor drains shall be provided. They shall be properly trapped and shall discharge through an oil separator to the sewer or to an outside vented sump.

H. The contents of oil separators and traps of floor drainage systems shall be collected at sufficiently frequent intervals to prevent oil from being carried into the sewers. Disposal of which shall be in accordance with Division 2 of this Chapter and Section 10.3.7.5 of this RIRR.

I. Pits and sub-floor work areas shall comply with the following:

   1. Walls, floors, and piers shall be constructed of masonry, concrete, or other suitable noncombustible material.

   2. Pits shall have a minimum of two (2) unobstructed means of egress. Steps shall be noncombustible, slip resistant, and constructed with no accessible storage space beneath.

3. Pits and sub-floor areas shall be provided with an individual ventilating system capable of providing a complete air change every five minutes (5 min) with the intake located near floor level.

J. Repair garages shall be limited in height and area, depending on the type of construction, and shall be provided with proper ventilation fire protective system in accordance with this RIRR.

K. Below-grade areas occupied for repairing, or communicating areas located below a repair garage, shall be continuously ventilated by a mechanical ventilating system having positive means for exhausting indoor air at a rate of not less than one (1) m^3/min per square meter of floor area. An approved means of ventilation shall be provided for introducing an equal amount of outdoor air.

SECTION 10.4.10.2 OPERATION

A. **Welding, Cutting and Hotworks Operations**

1. Welding, cutting and hotworks operations shall be in accordance with Division 17 of this Chapter.
2. Electric arc welding generators or transformers, electrical wiring for light, power, heat, and signal or control circuits, as well as electrically operated equipment, tools, portable appliances, and devices shall be in accordance with the latest edition of PEC.

B. **Spray Painting and Undercoating**

1. Spray application operations, and processes shall be confined to spray booths, spray rooms, or spray areas. There shall be no open flame devices or spark-producing electrical equipment or appliances within six and one tenth meters (6.1 m) radial distance horizontally while such operations are conducted.
2. Undercoating materials shall be dry before starting the engine of the undercoated vehicle.
3. Where only a small portion of a vehicle is spray painted and no accumulations of paint residues are allowed to form, such occasional painting shall be permitted in an open area located not less than six and one tenth meters (6.1 m) radial distance horizontally from all open flame devices or spark-producing electrical equipment or appliances.

SECTION 10.4.10.3 PROTECTION AND MAINTENANCE

A. **Fire Protective System**

1. Approved, supervised automatic sprinkler system shall be provided in repair garages in accordance with Section 10.2.6.7 of this RIRR and under the following conditions:
   a. Repair garages more than one (1) storey in height or located beneath another occupancy wherein such repair garage exceeds an area of seven hundred forty-three square meters (743 m^2).
   b. One-storey repair garages exceeding an area of one thousand one hundred fifteen square meters (1,115 m^2).
   c. All below-grade floors of repair garages, the ceilings of which are less than sixty-one hundredths meter (0.61 m) above grade.
2. Approved portable fire extinguishers shall be provided in all repair garages conforming to the provisions of Section 10.2.6.9 of this RIRR.
3. All repair garages that exceed a height of fifteen and two tenths meters (15.2 m), have parking levels below grade, or are unsprinklered and more than one (1) storey in height shall be provided with one (1) or more standpipes conforming to the provisions Section 10.2.6.8 of this RIRR.

B. **Housekeeping**

1. An authorized employee/officer of the firm, or the owner shall make daily inspections of the garage and shall be responsible for the prompt removal or repair of any hazardous condition, including proper maintenance of equipment and safety devices and the immediate removal of accumulations of combustible materials.
2. Clear aisle space shall be maintained to permit ready access to and the use of firefighting equipment.

3. The contents of oil separators and traps of floor drainage systems shall be collected at sufficiently frequent intervals to prevent oil from being carried into the sewers.
4. Floors shall be kept clean and free of oil and grease. Only approved water solutions or detergents, floor-sweeping compounds, and grease absorbents shall be used for cleaning floors.
5. Metal lockers shall be provided for employees' clothes.
6. Approved metal receptacles with self-closing covers shall be provided for the storage or disposal of oil-soaked waste or clothes.
7. Combustible rubbish shall be placed in covered metal receptacles until removed to a safe place for disposal. Contents of such containers shall be removed daily.
8. **"NO SMOKING"** signages shall be conspicuously posted on hazardous areas in accordance with Division 3 of Chapter 5 of this Rule.

DIVISION 11. LUMBER YARDS, WOOD PROCESSING AND WOODWORKING FACILITIES

SECTION 10.4.11.1 CONSTRUCTION

A. **Open Yard Storage**

1. Driveways between and around lumber piles shall be at least four and a half meters (4.5 m) wide and maintained free from the accumulation of rubbish, equipment or other articles or materials. Driveways shall be so spaced that a maximum grid system unit of fifteen meters (15 m) by forty-five meters (45 m) is produced.
2. Permanent lumber storage, operating under a permit from appropriate government agencies, shall be surrounded with a suitable fence at least one and eight tenths meters (1.8 m) in height, unless storage is within a building.

B. **Wood Processing and Woodworking Facilities**

1. Building constructions shall be in accordance with the latest edition of NBCP and other accepted international standards.
2. Processing and wood working facilities shall be properly compartmentalized and protected through fire walls and fire barriers to prevent spread of fire and explosions or both between sections of the facility with different hazards in accordance with Section 10.2.6.10 of this RIRR.
3. Fire protection features shall include separation of adjacent building by open space, or separation of adjoining building areas by firewalls and fire partitions, or draft curtain boards as well as elimination of unnecessary opening through floors.
4. Raw material storage, finished product storage, manufacturing areas, non-manufacturing areas and high hazard occupancies shall be considered as different hazards.
5. Walls, floor, doors and openings shall comply with the following:
   a. If walls are erected as firewalls between adjoining buildings, then they shall be designed for a minimum of four-hour (4-hr) fire resistance rating.
   b. Interior walls erected as fire barrier between adjoining areas shall be designed for a minimum of one-hour (1-hr) fire resistance rating.
   c. All penetrations of floors and walls shall be provided with fire stopping having a fire resistance rating equal to that of the floor or wall.
   d. Piping and ductwork shall not be embedded in firewalls.
   e. Interior walls erected to isolate dust explosion hazards shall be designed for sufficient explosion resistance to preclude damage to these walls before the explosion pressure can be safely vented to the outside.
   f. Where there are openings in fire-rated assemblies, including conveyor and chute openings, such shall be protected by approved, automatic-closing fire doors or fire dampers that have a fire resistance rating equivalent to the fire-rated assembly.
   g. Fire doors shall be installed in accordance with Section 10.2.5.3 of this RIRR.
   h. Where there are openings in walls designed to be explosion resistant, such shall be protected by doors that provide the same degree of explosion protection as

the walls. Such doors shall be kept closed at all times when not in use. Such doors shall not be considered as part of a means of egress. Such doors shall be marked **"NOT AN EXIT."**

6. Surfaces and ledges in dusty areas shall comply with the following:
   a. Interior surfaces and ledges shall be designed to minimize dust accumulation.
   b. Surfaces not readily accessible for cleaning shall be inclined at an angle of not less than forty-five degrees (45˚) from the horizontal to minimize dust accumulation.

SECTION 10.4.11.2 OPERATION

A. **Open Yard Storage**

1. Lumber shall be piled with due regard to stability of piles, and in no case higher than three meters (3 m). Where lumber is piled next to a property line, it shall not be less than three meters (3 m) in distance.
2. The burning of shavings, sawdust, and refuse materials shall be permitted only under boilers, in furnaces, or in incinerators or refuse burners safely constructed which will eliminate the danger from sparks such as an expansion chamber, baffle, walls, or other effective arrangements. At boilers or other points where sawdust of shavings are used as fuel, a storage bin of non-combustible, with raised sill, shall be provided.
3. Smoking shall be prohibited except in specified safe locations in buildings. Large **"NO SMOKING"** signs shall be painted on exterior buildings walls and on signs, erected at driveways' edges. **"NO SMOKING"** signs shall be posted throughout all buildings except in specified locations designated as safe for smoking purposes.
4. Weeds shall be kept down throughout the entire year, and shall be sprayed as often as needed with a satisfactory weed killer, or grubbed out. Dead weeds shall be removed.
5. Debris such as sawdust, chips and shorts shall be removed daily. Proper housekeeping shall be maintained at all times.

B. **Wood Processing and Woodworking Facilities**

Dust collecting system, thermal oil heating system, wood pulverizing operations, and composite board plants shall be designed in accordance with the latest edition of Philippine Mechanical Engineering Code (PMEC) and NFPA 664, *Standard for the Prevention of Fires and Explosions in Wood Processing and Woodworking Facilities*.

SECTION 10.4.11.3 PROTECTION AND MAINTENANCE

A. **Open Yard Storage**

An approved yard hydrant system or water barrels and pails shall be provided for in open storage yards. Yard hydrant systems shall be installed in accordance with internationally accepted standards. Water barrels with three (3) pails each shall be located at driveways so that a travel distance of at least ten meters (10 m) but not more than twenty-three meters (23 m) along driveways is needed from any part of the open yard to reach a barrel. Portable fire extinguishers shall be provided in accordance with Section 10.2.6.9 of this RIRR.

B. **Wood Processing and Woodworking Facilities**

1. **Deflagration venting**
   a. If a dust explosion hazard exists in equipment, rooms, buildings, or other enclosures, such areas shall be provided with deflagration venting. An approved fire suppression system installed in accordance with Section 10.2.6.7 of this RIRR.
   b. Where room or building dust accumulations exceed three millimeters (3 mm) or where visible dust clouds exist, it shall be considered an explosion hazard. In such rooms or buildings, an explosion hazard shall be provided with damage-limiting construction, including deflagration venting to a safe outside location
2. **Housekeeping**
   a. Removal of static dust shall be made for systematic, thorough cleaning of the entire plant at sufficient intervals to prevent the accumulations of finely divided wood dust that might be dislodged and lead to an explosion.
   b. The use of compressed air or other similar means to remove dust accumulations from areas that are not readily accessible for cleaning by other methods shall be permitted only if done frequently enough to prevent hazardous concentrations of

dust in suspension. Any open flame or spark-producing equipment shall not be used during blowdown.

c. Any metal scrap, such as nails, band iron, or any wood containing metal, shall be separately collected and disposed so that it will not enter the wood-handling or processing equipment, the dust-collecting system, or the scrap wood hog.

3. **Electrical Installation and Maintenance**

a. All electrical installation and maintenance shall comply with the provisions of the latest edition of PEC.

b. Static electricity shall be prevented from accumulating on machines or on equipment that is subject to accumulation of static electric charge by the following methods:

1) Permanent grounding and bonding wires

2) Grounded metal combs

3) Other effective means

c. Lightning protection, if necessary, shall be installed in accordance with the latest edition of PEC.

4. **Fire Protective System**

a. Portable fire extinguishers, and standpipes and hose systems, where required, shall be provided in accordance with Section 10.2.6.9 of this RIRR. Hose stations of thirty-eight millimeters (38 mm) diameter shall be provided throughout all woodworking facilities.

b. Automatic sprinklers, where required, shall comply with Section 10.2.6.7 of this RIRR. Deluge heads shall be used to protect hard-to-reach areas, such as spaces between press cylinders.

DIVISION 12. MECHANICAL REFRIGERATION

SECTION 10.4.12.1 GENERAL

A. **Scope**

The principal applications of refrigeration systems include, but are not limited to, the following:

1. Industrial, refining, and chemical processes

a. Controlling vapor pressure of volatiles during distillation, separation, or processing.

b. Shifting solubility relationships to permit segregation and removal of undesired contents, such as asphalt or wax, in lubricating oils.

2. Manufacturing, freezing, preservation, and distribution of food products
3. Air conditioning
4. Manufacturing, preservation, and distribution of medicine and drugs
5. Environment testing chambers
6. Cold treatment of metals
7. Industrial testing
8. Miscellaneous

a. Cold storage of flowers and furs

b. Ice making and skating rinks

B. **Applicability**

1. Refrigeration unit and system installations having a refrigerant circuit containing more than one hundred kilograms (100 kg) of Group A1 or thirteen and six tenths kilograms (13.6 kg) of any other group refrigerant shall be in accordance with the hereunder provisions and the latest edition of PMEC.
2. When approved, temporary and portable installations shall be exempt from the requirements of hereunder provisions.

C. **Fire Safety Clearance**

An FSC shall be secured from C/MFM having jurisdiction.

D. **Plans and Specifications**

Plans and specifications for devices and systems required by hereunder provisions shall be submitted to the C/MFM having jurisdiction for review and approval prior to installation.

E. **Reference Codes and Standards**

1. All mechanical refrigeration systems shall be designed and installed in accordance with the provisions of this Division; latest edition of PMEC; latest edition of NBCP; American Society of Heating and Refrigerating and Air Conditioning Engineers (ASHRAE), Inc.; Safety Code for Mechanical Refrigeration; International Mechanical Code (IMC); and other related acceptable codes.
2. Refrigeration systems using ammonia as a refrigerant shall also comply with the American National Standards Institute/International Institute of Ammonia Refrigeration (ANSI/IIAR) 2, *Standard for Equipment, Design and Installation of Closed-Circuit Ammonia Mechanical Refrigerating Systems*.

SECTION 10.4.12.2 SAFETY FEATURES

A. **Emergency Pressure Control System**

Refrigeration systems containing more than three kilograms (3 kg) of flammable, toxic, or highly toxic refrigerant or ammonia shall be provided with an emergency pressure control system.

1. High and Intermediate Pressure Zones

Each high and intermediate pressure zone in a refrigeration system shall be provided with a single automatic valve providing a crossover connection to a lower pressure zone. Automatic crossover valves shall comply with the following:

a. Automatic crossover valves shall be provided to automatically relieve excess system pressure to a lower pressure zone if the pressure in a high or intermediate pressure zone rises to within ninety percent (90%) of the set point for emergency pressure relief devices;

b. Automatic crossover valves shall be capable of manual operation;

c. Refrigeration system zones that are connected to a higher pressure zone by an automatic crossover valve shall be designed to safely contain the maximum pressure that can be achieved by interconnection of the two zones; and

d. Operation of an automatic crossover valve shall cause all compressors on the affected system to immediately stop in accordance with the following:

1) Dedicated pressure-sensing devices located immediately adjacent to crossover valves shall be permitted as a means for determining operation of a valve.

2) To ensure that the automatic crossover valve system provides a redundant means of stopping compressors in an overpressure condition, high pressure cutout sensors associated with compressors shall not be used as a basis for determining operation of a crossover valve.

2. Low Pressure Zone

a. The lowest pressure zone in a refrigeration system shall be provided with a dedicated means of determining a rise in system pressure to within ninety percent (90%) of the set point for emergency pressure relief devices; and

b. Activation of the overpressure sensing device shall cause all compressors on the affected system to immediately stop.

B. **Treatment, Flaring, and Diffusion Systems for Refrigerant Discharge**

1. Required systems

Refrigeration systems that are designed to discharge refrigerant vapor to the atmosphere shall be provided with an approved treatment, flaring, or diffusion system.

a. Systems containing toxic or highly toxic refrigerants shall discharge vapor to the atmosphere only through an approved treatment system in accordance with Sections 10.3.6.5 and Section 10.3.7.7 of this RIRR or flaring system in accordance with para 2 below.

b. Systems containing flammable refrigerants shall discharge vapor to the atmosphere in accordance with the following:

1) For refrigerants having a density equal to or greater than the density of air,

discharge shall be through an approved treatment system or flaring system.

2) For refrigerants having a density less than the density of air, discharge to the atmosphere shall be permitted, provided that the point of discharge is located outside of the structure at not less than four and six tenths meters (4.6 m) above the adjoining grade level and not less than six and one tenth meters (6.1 m) from any window, ventilation opening, or exit.

c. Systems containing ammonia refrigerant shall discharge vapor to the atmosphere through a treatment system, through a flaring system, through an approved ammonia diffusion, or by other approved means, except as follows:

1) Discharge through a treatment, flaring, or diffusion system shall not be required for ammonia–water absorption unit systems installed outdoors serving a dwelling unit, provided that the discharge is shielded and dispersed.

2) Discharge through a treatment, flaring, or diffusion system shall not be required for ammonia-water absorption unit systems containing less than ten kilograms (10 kg) of ammonia and for which the ammonia circuit is located entirely outdoors.

2. Design of Flaring Systems

a. Flaring systems for incineration of flammable, toxic, or highly toxic refrigerants or ammonia shall be designed to incinerate the entire discharge.

b. The products of refrigerant incineration shall not pose health or environmental hazards.

c. Incineration shall be automatic upon initiation of discharge, shall be designed to prevent blowback, and shall not expose structures or materials to threat of fire.

d. Standby fuel, such as LPG, and standby power shall have the capacity to operate for one and a half the required time for complete incineration of refrigerant in the system.

3. Design of Ammonia Diffusion Systems

a. Ammonia diffusion systems shall include a tank containing four liters (4 L) of water for each kg of ammonia that will be released in one (1) hour from the largest relief device connected to the discharge pipe.

b. The water used shall be prevented from freezing without the use of salt or chemicals by burial of the discharge pipe below frost depth or other approved means.

c. The discharge pipe from the pressure relief device shall distribute ammonia in the bottom of the tank, but no lower than ten meters (10 m) below the maximum liquid level.

d. The tank shall contain the volume of water and ammonia, described in para 3.a. above, without overflowing.

e. The tank shall be substantially constructed of not less than two and fifty-one hundredths millimeters (2.51 mm) (10 gauge) steel.

f. The horizontal dimensions of the tank shall be equal to or less than a half of the height.

g. The tank shall have a hinged cover or, if the enclosed type, shall have a vent hole at the top.

h. Pipe connections shall be through the top of the tank.

C. **Refrigeration Machinery Rooms**

Where required by the latest edition of PMEC, refrigeration systems shall be provided with a refrigeration machinery room, which shall comply with the following:

1. Refrigerant Vapor Detection, Monitoring, Alarm, and Electrical Systems. Refrigeration machinery rooms shall have an approved refrigerant vapor detection, monitoring, and alarm system in accordance with the following and the latest edition of PMEC.

a. The refrigerant vapor detector shall activate approved visual and audible alarm signaling devices at one of the following refrigerant thresholds:

1) At a value not greater than the corresponding TLV-TWA (or toxicity measure consistent therewith); not to exceed twenty-five percent (25%) of LFL.

2) For ammonia, at a concentration not exceeding one thousand (1,000) parts per million

b. Audible and visual alarm signaling devices shall be located inside the refrigeration machinery room and outside the room at each entrance into the room.

c. Audible alarm signaling devices shall provide a sound level of at least fifteen (15) dB above the operating ambient noise sound pressure level of the space in which they are installed and shall provide approved, distinctive audible and visual alarms.

d. Where the quantity of a Group A2, B2, A3, or B3 refrigerant, other than ammonia, in an independent circuit would exceed twenty-five percent (25%) of LFL if released to the surrounding room, either of the following shall apply:

   1) Electrical equipment shall comply with the requirements of NFPA 70, *National Electrical Code* for Class I, Division 2.

   2) The refrigerant vapor detection system required by this paragraph shall automatically de-energize all electrical power within the space at vapor concentrations at or above twenty-five percent (25%) of LFL.

e. Refrigerant vapor detection and alarm systems shall be powered and supervised as required for fire alarm systems in accordance with NFPA 72.

f. Refrigerant vapor detection and alarm systems shall transmit a signal to an approved location.

g. Detection and alarm systems shall be installed and maintained in accordance with the equipment manufacturers' specifications and para "B" of this Section.

2. Prohibited Sources of Ignition

Open flames or devices having an exposed surface temperature exceeding four hundred twenty-seven degrees Celsius (427 °C) shall be prohibited in refrigeration machinery rooms except as follows:

a. Momentary temperature excursions such as electrical contacts in Group A1 and B1 systems shall be permitted.

b. Open flames or devices having an exposed surface temperature exceeding four hundred twenty-seven degrees Celsius (427 °C) shall be permitted in refrigeration machinery rooms used exclusively for direct-fired absorption equipment.

c. Existing nonconforming installations, where the combustion system is interlocked with the refrigerant detection system to shut off at the Permissible Exposure Limit (PEL).

d. Direct-vented combustion equipment shall be permitted in accordance with the latest edition of PMEC.

3. Ventilation Systems

a. Fans providing emergency purge ventilation for refrigerant escape from a refrigeration room shall have a clearly identified switch of the break-glass type providing on-only control immediately adjacent to, and outside of, each refrigerant machinery room means of egress.

b. An emergency purge control shall be provided with a manual reset only.

c. Purge fans shall also respond automatically to the refrigerant concentration detection system set to activate the ventilation system at the threshold levels set forth by this Section.

d. Mechanical ventilation systems serving refrigeration rooms shall have switches to control the power to each fan.

e. The switches shall be key-operated or within a locked glass-covered or tamper-resistant enclosure at an approved location adjacent to and outside of the principal entrance to the refrigeration machinery room.

f. Key necessary for operation of ventilation systems shall be located in a single approved location.

g. Switches controlling fans providing continuous ventilation shall be of the two-position, on/off type.

h. Switches controlling fans providing intermittent or emergency ventilation shall be of the three-position, automatic on/off type.

i. Switches shall be labeled identifying both the function and the specific fan being controlled.

j. Two (2) colored and labeled indicator lamps responding to the differential pressure created by airflow shall be provided for each switch.

k. One (1) lamp shall indicate flow, and the other shall indicate no flow.

l. Exhaust from mechanical ventilation systems in refrigeration rooms shall be discharged six and one tenth meters (6.1 m) or more from a property line or openings into buildings.

m. Discharges capable of exceeding twenty-five percent (25%) of LFL or fifty percent (50%) of the immediately dangerous to life and health (IDLH) value shall be equipped with approved treatment systems to reduce the discharge concentrations to these values or lower, except for the following:

1) A treatment system shall not be required when an approved engineering analysis of plume dispersion demonstrates that the limiting value will not be exceeded at the property line.

2) A treatment system shall not be required for ventilation provided for an ammonia refrigeration system.

4. Electrical

a. The refrigeration machinery room shall not be required to be classified as a hazardous location for electrical equipment except as provided in the latest editions of PMEC, PEC or NFPA 70.

b. Refrigeration machinery rooms used exclusively for direct-fired absorption equipment shall be permitted not to be classified as a hazardous location for electrical equipment in accordance with NFPA 70.

c. Electrical equipment and electrical installations in refrigeration machinery rooms shall comply with the latest edition of PEC and NFPA 1.

d. Where treatment, detection, or alarm systems are required, such systems shall be connected to a secondary source of power to automatically supply electrical power in the event of loss of power from the primary source.

e. A clearly identified switch of the break-glass type or with an approved tamper-resistant cover shall provide off-only control of refrigerant compressors, refrigerant pumps, and normally closed, automatic refrigerant valves located in the machinery room. In addition, this equipment shall be automatically shut off whenever the refrigerant vapor concentration in the machinery room exceeds the vapor detector's upper detection limit or twenty-five percent (25%) of LFL, whichever is lower.

In machinery rooms where only nonflammable refrigerants are used, only compressors shall be required to be stopped by vapor detection or the cut-off switch.

D. **Signs and Labels**

1. General

Refrigeration units or systems shall be provided with approved hazard identification signs in accordance with NFPA 704, *Standard System for the Identification of the Hazards of Materials for Emergency Response* or *Globally Harmonized System (GHS) of Classification and Labeling of Chemicals*; emergency operational signs, charts, and labels in accordance with the latest edition of PMEC, and the following:

a. Name and address of the manufacturer or installer;

b. Type and total number of pounds of refrigerant contained in the system; and

c. Field test pressure applied.

2. Systems containing more than fifty kilograms (50 kg) of refrigerant shall be provided with signs having letters not less than twelve and seven tenths millimeters (12.7 mm) high, designating the following:

a. Main shutoff valves to each vessel;

b. Mainstream or electrical controls;

c. Remote control switch; and

d. Pressure-limiting device.

SECTION 10.4.12.3 OPERATIONS, MAINTENANCE, AND TESTING

A. **Operations and Maintenance**

1. General

Refrigeration systems shall be operated and maintained in a safe and operable condition, free from accumulations of oil, dirt, waste, excessive corrosion, other debris, or leaks, and in accordance with ASHRAE 15 and the latest edition of PMEC. Ammonia refrigerator systems shall be maintained in accordance with ANSI/IIAR 7, *Developing Operating Procedures for Closed-Circuit Ammonia Mechanical Refrigerating Systems*.

2. Access to System

Refrigeration systems shall be maintained accessible to the BFP.

3. Storage in Machinery Rooms

a. Flammable and combustible materials shall not be stored in refrigeration machinery rooms except for incidental materials necessary for the safe and proper operation and maintenance of the system.

b. Storage of materials in a refrigeration machinery room, including reserve supplies of refrigerants or refrigerant oils, shall be in accordance with other applicable chapters of this Division.

4. Changing of Refrigerant Type

Refrigerant types shall not be changed without prior notification and approval of the C/MFM having jurisdiction.

5. Records of Refrigerant Quantities

The person in charge of the premises wherein a refrigeration unit or system subject to these regulations is installed or maintained shall keep a written record of refrigerant quantities brought onto and removed from the premises, which shall be made available to the C/MFM having jurisdiction upon request.

6. Permissible Refrigerant Discharges

Refrigerant shall be only permitted to be released to atmosphere in the following circumstances:

a. Refrigeration systems operating at pressures below atmospheric and incorporating automatic purge cycles;

b. Incidental operation of automatic pressure relief valves resulting in minor release of the refrigerant charge;

c. Incidental minor releases associated with service operations after system pump-down has been accomplished; or

d. In an emergency.

7. Notification of Fugitive Releases

The BFP shall be notified upon discharges of refrigerant that are not in accordance with para 6 above.

B. **Testing of Equipment**

1. Acceptance Testing

The following emergency devices or systems shall be tested to demonstrate their safety and effectiveness upon completion of the installation or alteration:

a. Treatment and flaring systems

b. Ammonia diffusion systems

c. Fans and associated equipment intended to operate emergency purge ventilation systems

d. Refrigerant vapor detection and alarm systems

2. Periodic Testing

The following emergency devices or systems shall be tested in accordance with the manufacturers' specifications at intervals not exceeding one (1) year:

a. Treatment and flaring systems

b. Fans and associated equipment intended to operate emergency purge ventilation systems

c. Refrigerant vapor detection and alarm systems

3. Records of Required Testing

A written record of required testing shall be maintained on the premises.

4. Testing Personnel Qualifications

Tests of emergency devices or systems required shall be conducted by persons trained in such testing.

DIVISION 13. MOTION PICTURE PROJECTION

SECTION 10.4.13.1 CONSTRUCTION

A. Every motion picture projection equipment, except those portable types, shall be kept securely fastened to a stable surface.

B. Electrical wiring installation and location of associated electrical equipment and emergency systems/devices shall conform to the latest edition of PEC.

C. Every projection booth shall be of not less than one (1) hour fire resistive construction throughout and the walls and ceiling shall be finished with incombustible materials. The ceiling shall be not less than two and four tenths meters (2.4 m) from the finished floor. The room shall have floor area of not less than seven square meters (7 m^2) and three and a half square meters (3.5 m^2) for each additional machine.

D. Every motion picture projection equipment, regardless of the type of film used, shall be enclosed in a motion picture projection room as provided in para "C" of this Section.

E. No person shall handle, store, use, test, repair, duplicate, transport or destruct nitrate-based motion picture film without clearance, health and safety training and proper monitoring from the C/MFM having jurisdiction.

SECTION 10.4.13.2 OPERATION

A. Processes like splicing, cleaning, repairing, cataloging and marking shall be done in projection rooms only.

B. No person shall smoke or maintain any other source of ignition within any projection room; nor shall a manager or projectionist allow any person to smoke or to maintain any other source of ignition within said room.

SECTION 10.4.13.3 PROTECTION AND MAINTENANCE

A. As a prerequisite for the issuance of FSIC, projectionists/operators shall undergo the required fire safety orientation/seminar to be conducted by the BFP.

B. In every projection room there shall be installed at least two (2) approved first aid fire protection appliances of Class ABC type.

C. The operator or any occupant shall, at all times, observe good housekeeping of the projection room.

DIVISION 14. OIL-BURNING EQUIPMENT

SECTION 10.4.14.1 APPLICATION

A. The provisions of this Division shall apply to the following:

1. Installation of stationary liquid fuel-burning appliances, including but not limited to industrial, commercial, and residential -type steam, hot water, or warm air heating appliances; domestic-type range burners; space heaters; and portable liquid fuel-burning equipment.

2. All accessories and control systems, whether electric, thermostatic, or mechanical, and all electrical wiring connected to liquid fuel-burning appliances.

3. Installation of liquid fuel storage and supply systems connected to liquid fuel–burning appliances.

4. Multi-fueled appliances in which a liquid fuel is one of the standard or optional fuels.

B. NFPA 31, *Standard for the Installation of Oil-Burning Equipment* shall also be used as basis for fire and life safety requirements.

C. This Division shall not apply to internal combustion engines, oil lamps, or portable devices not specifically covered in this Division.

SECTION 10.4.14.2 BASIC INSTALLATION AND OPERATION

This Section shall apply to the basic installation and operation requirements for oil-burning appliances and equipment.

A. **Installation of Oil-Burning Appliances and Equipment**

1. Before installing or remodeling any oil-burning appliance or equipment for commercial or industrial application, plans or sketches that show the relative location of burners, tanks, pumps, piping, and elevations of buildings and their lowest floors or pits relating to the proposed installation or alteration shall be submitted to the C/MFM having jurisdiction.
2. The installation shall be made in accordance with manufacturers' instructions, applicable PNS and international rules and regulations.
    a. Such instructions shall include directions and information for attaining proper and safe installation, maintenance, and use of the appliance or equipment.
    b. The instructions shall be left with the owner.
    c. If for any reason it becomes necessary to change, modify, or alter a manufacturer's instructions in any way, a written approval shall be obtained from the manufacturer before doing so.
3. The installation shall be made by qualified, competent technicians experienced in making such installations.
4. The installation shall be accessible for cleaning heating surfaces; for removing burners; for replacing motors, controls, air filters, chimney connectors, draft regulators, and other working parts; and for adjusting, cleaning, and lubricating parts requiring such attention.
5. Oil-burning appliances shall not be installed or located in areas where combustible dusts or flammable liquids, gases, or vapors are normally present. Return air for warm air units shall not be taken from such areas.
6. Oil-burning appliances and equipment shall be installed so that a minimum nine tenths meter (0.9 m) separation is maintained from any electrical panel board and a minimum one and a half meters (1.5 m) separation is maintained from any unenclosed fuel oil tank.
7. After installation, the appliance or equipment shall be tested for proper operation and combustion performance to make certain that the burner is operating in a safe and acceptable manner and that all accessory equipment, controls, and safety devices function as intended.
8. Contractors installing industrial oil-burning systems shall furnish diagrams showing the main oil lines and control valves, one of which shall be posted at the equipment and another at some point that will be readily accessible in case of emergency.
9. After completing the installation, the installer shall instruct the owner or operator on the proper operation of the equipment. The installer also shall furnish the owner or operator with name(s) and telephone numbers of person(s) to contact for technical information or assistance and for routine or emergency services.

B. **Electrical Services**

1. Electrical wiring and utilization equipment used in connection with oil-burning appliances or equipment shall be installed in accordance with the latest edition of PEC and NFPA 70.
2. Safety control circuits shall be two-wire, one side grounded, with a nominal voltage not exceeding one hundred fifty volts (150 V).
3. Safety controls or protective devices shall be connected so that they interrupt the ungrounded conductor and shut all fuel flow to the appliance, including fuel flow to any pilot flame or burner.

4. The control circuit shall be connected to a power supply branch circuit fused at not more than the value appropriate for the rating of any control or device included in the circuit.
5. Acceptable Liquid Fuels
    a. The type and grade of liquid fuel used in a liquid fuel-burning appliance shall be that liquid fuel for which the appliance is listed and approved or is stipulated by the manufacturer. Liquid fuels shall meet one (1) of the following specifications and shall not contain gasoline or any other flammable liquid:
        1) ASTM D 396, *Standard Specification for Fuel Oils*
        2) ASTM D 3699, *Standard Specification for Kerosene*
        3) ASTM D 6448, *Industrial Burner Fuels from Used Lube Oils*
        4) ASTM D 6751, *Standard Specification for Biodiesel Fuel Blend Stock (B100) for Middle Distillate Fuel*
        5) ASTM D 6823, *Commercial Burner Fuels from Used Lube Oils*
    b. Crankcase oil or used oil shall not be used as fuel unless all of the following conditions are met:
        1) The installation is in a commercial or industrial occupancy.
        2) The oil-burning appliance is designed to burn crankcase oil or used oil and is listed for such use.
        3) The appliance is installed in accordance with the manufacturer's instructions and with the terms of its listing.
        4) The installation meets the applicable requirements of Chapter 12, *Used Oil-Burning Appliances* of NFPA 31.
    c. Where heavy oils are used, the following shall be required:
        1) The oil-burning appliance shall be designed to burn such fuels.
        2) Means shall be provided to maintain the oil at its proper atomizing temperature.
        3) Automatically operated burners that require preheating of oil shall be arranged so that no oil can be delivered for combustion until the oil is at the proper atomizing temperature.
        4) An oil-fired appliance that is listed in accordance with ANSI/UL 296A, *Standard for Waste Oil-Burning Air-Heating Appliances* shall be used.
    d. A properly sized and rated oil filter or strainer shall be installed in the oil supply line to an oil burner.
6. Use of Crankcase Oil and Used Oil
    a. During any storing, handling, or burning of crankcase oil and used oils, care shall be taken to not mix gasoline with the crankcase oil or used oil.
    b. When a mixture could have a flash point below thirty-eight degrees Celsius (38 °C) or when a mixture could be heated above its flash point, attention shall be given to electrical installations in areas where flammable vapors or gases can be present in the atmosphere.
    c. Where a supply tank is used, provisions shall be made to prevent stratification of fuel in the tank.
    d. Areas where oil leakage can occur, such as at pumps, heaters, strainers, and burners, or where maintenance is performed shall be provided with adequate ventilation. Confined fuel-handling areas and burner sites shall also be provided with adequate ventilation. Mechanical ventilation shall be provided where necessary.
    e. Means shall be provided to safely dispose of spills.
7. Temporary Heating

    Where salamanders, space heaters, or other heating appliances are used for temporary heating, all requirements of this Division, including those for maximum operating temperatures, clearances to combustible materials, venting of combustion gases, fuel storage, safety, shutoffs, combustion and ventilation air, and electrical wiring, where applicable, shall be met and all such equipment shall be used in accordance with its listing.

SECTION 10.4.14.3 AIR FOR COMBUSTION AND VENTILATION

A. **Applicability**

This Section shall apply to those requirements necessary to ensure that adequate air for safe combustion is provided for oil-burning appliances and equipment.

B. **Basic Requirements**

1. Oil-burning appliances and equipment shall be installed in locations where available ventilation permits satisfactory combustion of oil, proper venting of combustion gases, and maintenance of safe ambient temperatures under normal conditions of use.
2. Appliances shall be located so that they do not interfere with the supply of air within the space.
3. Where buildings are so tight that normal infiltration does not provide sufficient air for combustion, outside air shall be introduced.
   a. Ducts used to convey air from outdoors shall have the same cross-sectional area as the free area of the openings to which they connect.
   b. The smaller dimension of rectangular air ducts shall not be less than seventy-five millimeters (75 mm).
4. For residential and similar installations, the requirements of this Section shall be permitted to be met by application of either one of the methods covered in para "C" and "D" below. For commercial and industrial installations, the requirements of para "D" below shall apply.

C. **Appliances Located in Unconfined Spaces**

1. In unconfined spaces in buildings of conventional frame, brick, or stone construction, air for combustion and ventilation shall be permitted to be supplied by normal infiltration.
2. If normal infiltration is not sufficient because of tight construction, air for combustion and ventilation shall be obtained directly from outdoors or from spaces that freely communicate with outdoors by means of a permanent opening or openings having a total free area of not less than six hundred forty-five and sixteen hundredths square millimeters (645.16 mm^2) per five thousand (5,000) Btu/hr (4.4 cm^2/kW), based on the total input rating of all appliances in the space.

D. **Appliances Located in Confined Spaces**

For appliances installed in confined spaces, air for combustion and ventilation shall be provided using one of the methods set forth in the hereunder provisions.

1. All Air Taken from Inside the Building
   a. The confined space shall be provided with two permanent openings, one near the top of the space and one near the bottom.
   b. Each opening shall have a free area of not less than six hundred forty-five and sixteen hundredths square millimeters (645.16 mm^2) per one thousand (1,000) Btu/hr (22 cm^2/kW), based on the total input rating of all appliances in the space.
   c. Each opening shall freely communicate with interior areas of the building that, in turn, have adequate infiltration from the outside.
2. All Air Taken from Outdoors
   a. The confined space shall be provided with two permanent openings, one in or near the top of the space and one in or near the bottom.
   b. The openings shall communicate directly or by means of ducts with the outdoors or to spaces, such as an attic or crawl space, that themselves freely communicate with the outdoors.
   c. Where communicating with the outdoors directly or by means of vertical ducts, each opening shall have a free area of not less than six hundred forty-five and sixteen hundredths square millimeters (645.16 mm^2) per four thousand (4,000) Btu/hr (5.5 cm^2/kW), based on the total input rating of all appliances in the space.
   d. Where communicating with the outdoors by means of horizontal ducts, each opening shall have a free area of not less than six hundred forty-five and sixteen hundredths square millimeters (645.16 mm^2) per two thousand (2,000) Btu/hr (11 cm^2/kW), based on the total input rating of all appliances in the space.

3. Ventilation Air Taken from Inside the Building-Combustion Air Taken from Outdoors

   a. The confined space shall be provided with two (2) openings for ventilation.

   b. There shall be one (1) opening communicating directly with the outdoors or to spaces, such as an attic or crawl space, that freely communicates with the outdoors and has a free area of not less than six hundred forty-five and sixteen hundredths square millimeters (645.16 mm^2) per five thousand (5,000) Btu/hr (4.4 cm^2/kW), based on the total input of all appliances in the space.

E. **Combustion Air for Commercial and Industrial Installations**

For commercial and industrial oil-burning equipment, permanent means for supplying an ample amount of outside air shall be provided in accordance with this Section.

1. For furnace or boiler rooms adjacent to outside walls and where combustion air is provided by natural ventilation from the outside, there shall be a permanent air supply inlet having a total free area of not less than six hundred forty-five and sixteen hundredths square millimeters (645.16 mm^2) per four thousand (4,000) Btu/hr (5.5 cm^2/ kW), based on the total input rating of the burner or burners, but in no case less than four hundred twenty-five thousandths square meter (0.425 m^2).
2. For furnace or boiler rooms that are not adjacent to outside walls, the supply of combustion air shall be in accordance with the latest edition PMEC a.

F. **Louvers and Grilles**

1. In calculating the free area required by para "B" through "E" above, the blocking effect of louvers, grilles, or screens protecting openings shall be taken into consideration.
2. Screens used in louvers or grilles shall not be smaller than six and three tenths millimeters (6.3 mm) mesh and shall be accessible for cleaning.
3. If the free area through a particular design of louver or grille is known, it shall be used in calculating the size of the opening needed to provide the free area required. If the free area of the design is not known, it shall be assumed that wood louvers will have twenty percent (20%) to twenty-five percent (25%) free area and metal louvers and grilles will have sixty percent (60%) to seventy-five percent (75%) free area.

G. **Special Conditions**

Where an appliance is installed in a location where the operation of exhaust fans, kitchen ventilation systems, clothes dryers, or fireplaces can create conditions of unsatisfactory combustion or venting, special provisions shall be made subject to the approval of the C/MFM having jurisdiction.

H. **Specially Engineered Installations**

The size of combustion air openings required by para "C" through "E" shall not govern when special engineering methods approved by the C/MFM having jurisdiction ensure an adequate supply of air for combustion and ventilation.

SECTION 10.4.14.4 VENTING OF COMBUSTION (FLUE) GASES

A. This Section shall apply to those requirements necessary to ensure the safe venting of combustion and flue gases from oil-burning appliances and equipment.

B. **Basic Requirements**

1. Oil-burning appliances and equipment other than direct-fired heaters, listed kerosene stoves, and listed portable kerosene heaters shall be connected to venting systems and chimneys to remove combustion (flue) gases from the combustion chamber of the appliance or equipment and to direct them to a point outside the building, as required by this Chapter.

   Exception: As provided for in para "G" of this Section.

2. The installation of oil-burning appliances and equipment shall require careful consideration of positive and negative pressures in the venting system and chimney and the formation of corrosive condensate throughout the system.
3. The venting system and chimney shall be designed, constructed, and maintained to ensure that a positive flow is developed and that this flow is sufficient to remove products of combustion to the outside atmosphere.

C. **Draft**

1. A chimney shall be capable of producing the minimum draft recommended by the manufacturer of the appliance.
2. A draft fan, installed so that the fuel supply to the main burner is immediately shut off if the draft fan fails, shall be permitted to be used to increase low draft.
3. Two (2) or more oil-burning appliances shall be permitted to be connected to a single chimney, provided that sufficient draft is available for safe combustion in each appliance and that all products of combustion are safely removed to the outdoors.
4. Where chimney downdraft conditions cause faulty operation that creates a hazard, corrective steps shall be taken.

D. **Draft Regulators**

1. A draft regulator shall be provided for each oil-burning appliance that is connected to a chimney or power venting system unless the appliance design, conditions of installation, or combinations thereof preclude excessive chimney draft, or the appliance is listed for use without one.
2. A manually operated damper shall not be placed in the chimney connector from an oil-burning appliance.

   Exception: Where two (2) or more oil-burning appliances are connected to a common chimney, manual isolating dampers shall be permitted and shall be interlocked to prevent burner operation unless the damper is in the full-open position.
3. Automatically operated dampers shall be of an approved type, shall be designed to maintain a safe damper opening at all times, and shall be arranged to prevent starting of the burner unless the damper is fully opened.
4. Fixed baffles shall be permitted to be installed in the appliance flue collar where they are specified by the appliance manufacturer.

   Baffles shall be securely fastened into position. When in a closed position, baffles shall not block off more than eighty percent (80%)of the chimney connector area.

E. **Chimney Connectors**

1. An oil-burning appliance shall be placed so that the chimney connector is as short as practicable.
   a. For natural-draft appliances, the horizontal length of a chimney connector shall not exceed three meters (3 m) unless a draft fan is used.
   b. For appliances requiring a negative chimney draft, the chimney connector shall not be longer than seventy-five percent (75%) of the portion of the chimney above the chimney connector inlet.
2. A chimney connector shall not pass through a floor or ceiling.
3. A chimney connector of a low, medium, or high -heat industrial appliance shall not pass through a combustible wall or partition.
4. Chimney connectors of appliances other than industrial appliances shall not pass through combustible walls or partitions unless the installation complies with the following:
   a. Chimney connectors shall be permitted to pass through a combustible wall or partition if guarded at the point of passage by one of the following:
      1) Metal ventilated thimbles not less than three hundred millimeters (300 mm) larger in diameter than the diameter of the connector
      2) Metal or burned fire-clay thimbles built in brickwork or other approved fireproofing materials and extending not less than two hundred millimeters (200 mm) beyond all sides of the thimble.
   b. Chimney connectors shall be permitted to pass through a combustible wall or partition if all combustible material in the wall or partition is cut away from the chimney connector a sufficient distance to provide the clearance required from the connector and non-combustible insulating material is used to close up the opening.
   c. Chimney connectors shall be permitted to pass through a combustible wall or partition if a listed, commercially available or factory-built vent assembly, such as a Type L vent, that is approved for use with oil-fired appliances is used.

5. In masonry chimneys, the chimney connector shall extend through the chimney wall to the inner face or liner, but not beyond, and shall be firmly cemented in place.

   A thimble shall be permitted to be used to facilitate removal of the chimney connector for cleaning, in which case the thimble shall be permanently cemented in place with high-temperature cement.

6. The chimney connector shall be sized in accordance with one of the following methods:

   a. The connector shall be sized using approved engineering methods, and the connected appliance shall be marked to indicate the maximum firing rate that can be used with the venting system.

   b. The connector shall be sized in accordance with the manufacturer's instructions.

7. The connector, for its entire length, shall not be smaller in effective cross-sectional area than the flue collar of the appliance, as delivered or as modified in accordance with the manufacturer's instructions. Any change in size made to accommodate a chimney lining system shall be done at the connection to that system.

8. The chimney connector shall be of steel, refractory masonry, or corrosion-resistant material and shall be maintained in good condition.

9. Where insulation of the chimney connector is required to maintain the temperature of the combustion products, an insulated Type L chimney connector or a factory-built chimney connector listed for that purpose shall be used.

10. The chimney connector shall maintain a pitch or rise of at least twenty millimeters per meter (20 mm/m) of horizontal length of pipe from the appliance to the chimney.

11. The chimney connector shall be installed to minimize the number of elbows and to avoid sharp turns or other construction features that might create excessive resistance to the flow of flue gases.

12. Any device that will obstruct the free flow of gases shall not be installed in a chimney connector or chimney.

    Exception: This requirement shall not be construed as prohibiting the use of devices specifically listed for installation in a chimney connector, such as heat reclaimers, automatic dampers, or safety controls.

13. The chimney connector shall be securely supported.

14. Each joint of the chimney connector shall be fastened together with at least three (3) screws.

15. Clearance from combustible construction or materials shall be as specified in Annex A, Table 44, *Clearances to Combustible Material*, except as permitted by this Section and Annex A, Table 45, *Reduction of Clearances with Specified Forms of Protection*.

16. The entire length of the chimney connector shall be accessible for inspection, cleaning, and replacement.

17. Placement of the chimney connector shall maintain minimum fire protection clearances.

18. A connector shall not be connected to a chimney flue serving a fireplace unless the fireplace opening is sealed or the chimney flue that vents the fireplace is permanently sealed below the connection.

19. Connectors serving appliances operating under natural draft shall not be connected into any portion of a mechanical draft system operating under a positive pressure.

20. Connectors for appliances installed in attics or crawl spaces shall be either a Type L chimney connector or a factory-built chimney connector listed for the purpose, or the appliance shall be attached directly to the chimney.

21. If two (2) or more openings are provided into a chimney flue, they shall be at different levels and the smaller connector shall enter at the higher level consistent with available head room or clearance to combustible material.

22. Regardless of the fuel(s) used, two (2) or more connectors shall not be joined unless the common connector, the manifold, and the chimney are sized to serve the appliances connected thereto. Adequate draft shall be available to remove all products of combustion to the outdoors without leakage, spillage, or backflow from the connectors, manifold, chimney, or appliances.

23. Two (2) or more oil-burning appliances shall be permitted to be connected to a common venting system, provided the following conditions are met:
    a. Each appliance is equipped with a primary safety control.
    b. The venting system is designed to meet the requirements of NFPA 211, *Standard for Chimneys, Fireplaces, Vents, and Solid Fuel-Burning Appliances*.
24. Oil-burning appliances that are connected to a common venting system shall be located within the same storey of the building, unless the vent system is specifically designed for the purpose and has been approved by the C/MFM having jurisdiction.
25. Solid fuel–burning appliances shall not be connected to a chimney flue serving another appliance burning other fuels, unless specifically listed for such connection.
26. Gas utilization appliances and appliances burning liquid fuel shall be permitted to be connected to the same chimney flue through separate openings.
27. Gas utilization appliances and appliances burning liquid fuel shall be permitted to be connected to the same chimney flue through a single opening, provided the appliances are joined by a suitable fitting located as close as practicable to the chimney and provided the following conditions are met:
    a. Sufficient draft is available for the safe combustion of each appliance and for the removal of all products of combustion.
    b. The appliances so connected are equipped with primary safety controls.
28. Single-wall connector pipe shall be installed by one of the following methods:
    a. In accordance with the appliance manufacturer's instructions
    b. With the crimped end toward the chimney
29. The minimum thickness for steel pipe connectors shall meet the requirements of the Annex A, Table 46, *Minimum Thickness for Steel Pipe Connectors*.

F. **Chimneys**

1. Masonry and metal chimneys shall be erected in accordance with the latest edition of NBCP.
2. Masonry chimneys shall meet the requirements of Chapter 7 of NFPA 211.
3. Metal chimneys shall meet the requirements of Chapter 8 of NFPA 211.
4. Factory-built chimneys shall be listed, installed, and used in accordance with their listings and with manufacturers' instructions.
5. Factory-built chimneys shall meet the requirements of Chapter 6 of NFPA 211.
6. The flue gas exit of a chimney shall be at least nine tenths meter (0.9 m) above the highest point where it passes through the roof of a building and shall be at least six tenths meter (0.6 m) higher than any portion of a building within three meters (3 m) of the chimney.
7. Prior to the installation of a new or replacement oil burner or oil-burning appliance, the installer shall perform a visual inspection of the chimney or flue gas venting system and shall verify the proper size of the chimney or flue gas venting system.
    a. The inspection shall be limited to the clean-out and to the area where the flue gas connector enters the chimney or flue gas venting system and to the extent possible with artificial lighting and conventional tools such as a mirror.
    b. If deterioration exists or if the chimney or flue gas venting system is found to inhibit the performance of the oil burner or oil-burning appliance, as specified by the manufacturer, the owner shall be notified in writing, stating that the chimney or flue gas venting system to which the appliance is connected shall be examined by a qualified person in accordance with the requirements of Chapter 14 of NFPA 211.
8. Masonry chimneys shall be lined with an approved clay tile liner or a listed chimney lining system installed in accordance with manufacturers' instructions.
9. When chimneys are relined, the liner shall be listed or shall be of an approved material that will resist corrosion, softening, or cracking from the flue gases, at a temperature appropriate to the class of service.
10. All portions of a mechanical draft system under positive pressure during operation shall be designed and installed so as to prevent leakage of flue gas into the building.

G. **Special Venting Systems**

1. Type L Venting Systems
   a. Listed Type L venting systems shall be permitted to be used with appliances that are listed as suitable for installation with Type L venting systems.
   b. Type L venting systems shall be installed and used in accordance with their listings and the manufacturers' instructions.
   c. Type L venting system shall be capable of producing the minimum draft recommended by the manufacturer of the appliance.
   d. The flue gas exit of a Type L venting system shall be at least six tenths meter (0.6 m) above the highest point where it passes through the roof of a building and at least six tenths meter (0.6 m) higher than any portion of a building within three meters (3 m) of such Type L venting system.
2. Direct Vent Appliances
   a. Direct vent appliances (sealed combustion system appliances) shall be listed. They shall be installed in accordance with their listing and with manufacturers' instructions.
   b. The combustion air inlet and flue gas outlet of a direct vent appliance shall terminate in the same plane and in the same ambient pressure zone when they terminate in the outside wall of the structure.
3. Termination of Special Venting Systems
   a. A venting system that terminates in the sidewall of a structure shall terminate at least nine tenths meter (0.9 m) above any air inlet to the structure that is within three meters (3 m) of the termination point.

      Exception No. 1: This requirement shall not apply to the combustion air intake of a direct vent appliance.

      Exception No. 2: This requirement shall not apply to the separation distance between the circulating air inlet and the vent discharge of a listed outdoor appliance.

   b. The flue gas outlet of an appliance other than a direct vent appliance shall terminate at least one and two tenths meters (1.2 m) below, one and two tenths meters (1.2 m) horizontally from, or three tenths meter (0.3 m) above any door, window, or gravity air inlet of the structure and also shall terminate at least three tenths meter (0.3 m) above grade.
   c. The combustion air inlet and flue gas outlet of a direct vent appliance or the flue gas outlet of an appliance other than a direct vent appliance shall terminate at least three tenths meter (0.3 m) from the soffit of the roof of the structure and at least nine tenths meter (0.9 m) from an inside corner of an L-shaped structure.
   d. The exit terminal of a mechanical draft system shall not be less than two and one tenth meters (2.1 m) above grade when located adjacent to public walkways.
   e. Any air inlet and any flue gas outlet of any appliance shall terminate at least one and a half meters (1.5 m) from the vent outlet of a liquid fuel supply tank.

SECTION 10.4.14.5 INSTALLATION OF OIL BURNERS AND OIL-BURNING APPLIANCES

This Section shall apply to installation of oil burners and oil-burning appliances and equipment.

A. **Basic Requirements**

1. Installation of oil-burning boilers with inputs of twelve million five hundred thousand (12,500,000) Btu/hr (3,663 kW) and above shall meet the applicable requirements of NFPA 85, *Boiler and Combustion Systems Hazards Code*.
2. Installation of oil-burning ovens and furnaces within the scope of NFPA 86, *Standard for Ovens and Furnaces*, shall meet the applicable requirements of that standard.
3. Oil burners shall be permitted to be installed in boilers and furnaces.
4. Oil burners shall be permitted by the C/MFM having jurisdiction for use in firing ovens, water heaters, ranges, special furnaces, and the like.

5. Where oil burners are installed in appliances originally designed for solid fuel, the ash door of the appliance shall be removed or bottom ventilation shall be provided to prevent the accumulation of vapors in the ash pit.

   Exception: Where the ash pit is used as part of the combustion chamber.

6. Oil-burning appliances shall be installed in rooms that are large compared with the size of the appliance.

   Exception: An appliance specifically listed for installation in a confined space, such as an alcove or closet, shall be permitted to be so installed when the installation complies with its listing.

7. For installations in confined spaces, the clearances from the appliance to the walls and ceilings shall not be less than those specified in the listing, regardless of the type of construction.

8. The oil-burning appliance shall have a suitable combustion chamber of firebrick, stainless steel, or other material, either furnished by the manufacturer or specified in the manufacturers' installation instructions.

9. Prior to installation of an oil burner, the furnace, boiler, or appliance into which it is installed shall be examined and shown to be in good condition. The combustion chamber and flue gas passages shall be examined and shown to be tight against leaks.

B. **Posting of Instructions.**

Complete instructions for the care and operation of the appliance, as furnished by the manufacturer, shall be conspicuously posted near the appliance.

C. **Operating Controls**

1. Oil burners, other than oil stoves with integral tanks, shall be provided with some means for manually stopping the flow of oil to the burner.

   a. Such device or devices shall be placed in a readily accessible location at a safe distance from the burner.

   b. For electrically powered appliances, the above-cited requirement shall be accomplished by an identified switch in the burner supply circuit, placed outside of and adjacent to the entrance to the room where the appliance is located.

   c. For appliances that are not electrically powered, an identifiable valve in the oil supply line, operable from a location that can be reached without passing near the burner, shall be used.

2. An electrical service disconnect switch, arranged to stop and start the oil burner, shall be installed at the appliance and shall be located so that it is within easy reach of the service technician for control of the oil burner while observing the flame.

3. Oil burners shall be equipped with a listed primary safety control of a type appropriate for the burner.

4. Each oil-burning appliance shall be provided with automatic limit controls that will prevent unsafe pressure or low water in a steam boiler, low water or over-temperature in a water boiler, or over-temperature in a furnace or heater.

5. Limiting controls and low-water shutoffs intended to prevent unsafe operation of heating equipment by opening an electrical circuit to the burner or oil shutoff device shall be so arranged as to effect the direct opening of that circuit, whether the switching mechanism is integral with the sensing element or remote from same.

   Exception: A limit control that interrupts the pilot circuit of a magnetic-type motor controller, which, in turn, directly opens the safety circuit when it is necessary to interrupt a single-phase circuit carrying a load greater than the capacity of available limit controls or to interrupt a multiphase circuit, is acceptable.

6. A water heater shall be provided with water pressure, temperature, and vacuum-relief devices.

7. Means shall be provided to prevent siphoning in any boiler or tank with a circulating water heater attached.

8. Electric motor-driven oil burners with integral oil pumps and electric motor-driven pump sets for use with burners not equipped with integral pumps shall be provided with a motor controller that incorporates no-voltage protection and is wired into the power supply to the motor.

9. In systems where either steam or air is used for atomizing the fuel oil or where air for combustion is supplied by a source that can be interrupted without shutting off the oil supply, the fuel oil supply and the steam or air supply shall be interlocked so that the fuel oil supply is shut off immediately upon failure of the steam or air supply.
10. Where automatically operated oil burners are used in installations equipped with forced- or induced-draft fans, or both, means shall be provided to shut off the oil supply immediately upon fan failure.
11. Oil burners not equipped to provide safe automatic restarting after shutdown shall require manual restarting after any control functions to extinguish the burner flame.
12. An acceptance test of the primary safety control shall be conducted on any appliance where more than one burner is fired in a single combustion chamber or where one burner is adapted to fire in two (2) or more combustion chambers.

    The test shall ensure that the primary safety control will function properly in the event of ignition failure or unsafe flame extinguishment at any of the burners.

D. **Specific Requirements for Installation of Boilers, Furnaces, Floor-Mounted Unit Heaters, and Water Heaters**

1. Appliances shall be installed with clearances from combustible material not less than those indicated in Annex A, Table 45, *Reduction of Clearances with Specified Forms of Protection*.

   Exception: Appliances specifically listed for installation with lesser clearances shall be permitted to be installed in accordance with their listing.

   a. In no case shall the clearances used interfere with providing combustion air or providing access to the appliance.
   b. Chimney connectors shall be installed in accordance with para "E" of Section 10.4.14.4 of this RIRR.
   c. When multiple-fueled appliances using solid fuels are installed, the clearances and mounting requirements of NFPA 211, shall apply.

2. Appliances shall be permitted to be installed in rooms, but not in alcoves or closets, with lesser clearances to combustible material, provided the combustible material or appliance is protected as described in Annex A, Table 44, *Clearances to Combustible Material*.
3. Floor-mounted appliances shall be placed in one the following ways:
   a. On floors of fire-resistive construction with non-combustible flooring or surface finish and with no combustible material against the underside thereof.
   b. On fire-resistive slabs or arches having no combustible material against the underside thereof.
   c. In accordance with their listing, if listed specifically for installation on a floor constructed of combustible material.
   d. Such construction shall extend not less than three tenths meter (0.3 m) beyond the appliance on all sides.

      Exception No. 1: Appliances shall be permitted to be placed on combustible floors although not listed for such installation, provided the floor under the appliance is protected in accordance with the latest edition of NBCP.

      Exception No. 2: An appliance listed for installation under Form I or II in Annex A, Table 44, *Clearances to Combustible Material* shall be permitted to be placed on a combustible floor that is protected with hollow masonry not less than one hundred millimeters (100 mm) thick covered with sheet metal not less than twenty-four (24) gauge. Such masonry shall be laid with ends unsealed and joints matched in such a way as to permit free circulation of air from side to side through the masonry. For such installations, the furnace shall be securely anchored to maintain the clearances required in Annex A, Table 44, *Clearances to Combustible Material*.

4. The supply and return duct system of a central heating appliance shall be installed in accordance with NFPA 90A, *Standard for the Installation of Air-Conditioning and Ventilating Systems*, or NFPA 90B, *Standard for the Installation of Warm Air Heating and Air-Conditioning Systems*, whichever is applicable.

5. A return system shall be arranged so that negative pressure from the circulating fan cannot affect the air supply for combustion or act to draw products of combustion from joints or openings in the appliance, chimney connectors, or chimney.
6. A down-flow furnace shall be installed so that there are no open passages in the floor through which flame or hot gases from a fire originating in the room below the floor can travel to the room above.
7. A down-flow furnace shall be automatically operated and equipped with an approved temperature limit control that will limit outlet air temperature to ninety-three degrees Celsius (93 °C). The furnace shall be designed to prevent unsafe temperatures in the event of reverse flow.

E. **Specific Requirements for Attic Furnaces**

A furnace installed in an attic shall be listed for such installation and installed in accordance with its listing.

F. **Specific Requirements for Duct Furnaces**

1. A duct furnace shall be installed with clearances of at least one hundred fifty millimeters (150 mm) to adjacent walls, ceilings, and floors of combustible material, unless listed for installation at lesser clearance and installed in accordance with its listing.
2. A duct furnace and its chimney connector shall be permitted to be installed in a room, but not in a confined space such as an alcove or closet, with reduced clearances to combustible material, provided the combustible material is protected as described in Annex A, Table 45, *Reduction of Clearances with Specified Forms of Protection* and the requirements for combustion air and accessibility comply with Section 10.4.14.3 and Section 10.4.14.4 of this RIRR.
3. A duct furnace flue pipe shall be installed to provide a clearance to combustible material of not less than four hundred fifty millimeters (450 mm).
4. A duct furnace shall be firmly supported.
5. Access panels shall be provided in the ducts on both the upstream and downstream sides of the furnace.
6. Controls shall be located outside the duct except for the sensing element of a control.

G. **Specific Requirements for Floor Furnaces**

1. Floor furnaces shall not be installed in floors of combustible construction unless specifically listed for such installation and installed in accordance with their listing.
2. The floor around the furnace shall be braced and headed with a framework of material not lighter than the floor joists.
3. Floor furnaces shall be supported independently of the floor grilles.
4. A floor furnace shall be placed not closer than one hundred fifty millimeters (150 mm) to the nearest wall and shall be so placed that a door, drapery, or similar object cannot be nearer than three hundred millimeters (300 mm) to any portion of the register of the furnace.
5. Wall-register models shall be placed not closer than one hundred fifty millimeters (150 mm) to a corner.
6. The bottom of a floor furnace shall have at least one hundred fifty millimeters (150 mm) clearance from the ground.
    a. Where the ground must be excavated to provide this clearance, the excavation shall extend at least three hundred millimeters (300 mm) beyond the furnace on all sides and at least four hundred fifty millimeters (450 mm) on the control side.
    b. Where the excavation exceeds three hundred millimeters (300 mm) or where the ground contour or moisture condition is such that water seepage is likely, a watertight pan constructed of copper, galvanized iron, or other suitable corrosion-resistant material, properly anchored in place, or a waterproof concrete pit, shall be provided under the furnace. The sides of the pan or pit shall extend one hundred millimeters (100 mm) aboveground level.
7. Floor furnaces shall be made accessible.
    a. Openings in foundation walls and trap doors in floors shall not be smaller than four hundred fifty millimeters (450 mm) by six hundred millimeters (600 mm) in dimension.

b. Underfloor passageways to the furnace shall not be smaller than six hundred millimeters (600 mm) by six hundred millimeters (600 mm).

8. Provision shall be made for proper air supply for combustion.
9. Listed floor furnaces shall be permitted to be installed in an upper floor of a building, provided the furnace assembly projects below into a utility room, closet, garage, or similar non-habitable space.
   a. In such installations, the floor furnace shall be completely enclosed (entirely separated from the non-habitable space), with means for air intake and with access facilities for servicing on the control side.
   b. The minimum furnace clearances shall be one hundred fifty millimeters (150 mm) to all sides and bottom.
   c. The enclosure shall be constructed of Portland cement plaster on metal lath or material of equal fire resistance.
10. A floor furnace shall not be installed in the floor of any aisle or passageway of an auditorium, public hall, or public assembly room or in an exit way from any such room or space.
11. A floor furnace chimney connector shall be installed with not less than two hundred twenty-five millimeters (225 mm) clearances to combustible material, unless the combustible material is protected as described in Annex A, Table 45, *Reduction of Clearances with Specified Forms of Protection*.

H. **Specific Requirements for Furnaces Used with Refrigeration Systems**

1. A furnace shall not be installed in conjunction with a refrigeration coil where circulation of cooled air is provided by the blower unless the blower has sufficient capacity to overcome the external static resistance imposed by the duct system, furnace, and cooling coil at the airflow required for heating or cooling, whichever is greater.
2. To avoid condensation within heating elements, furnaces used in conjunction with cooling equipment shall be installed in parallel with or on the upstream side of cooling coils unless the furnace has been specifically listed for downstream installation.
3. With a parallel flow arrangement, the dampers or other means used to control the flow of air shall be sufficiently tight to prevent any circulation of cooled air through the unit.
4. Where furnaces are to be located upstream from cooling units, the cooling units shall be designed or equipped so that excessive temperatures or pressures are not developed.
5. Furnaces shall be permitted to be installed downstream from evaporative coolers or air washers if the heating element is made of corrosion-resistant material.
   a. Stainless steel, ceramic-coated steel, or aluminum-coated steel in which the bond between the steel and the aluminum is an iron-aluminum alloy shall be considered corrosion-resistant.
   b. Air washers operating with chilled water, which deliver air below the dew point of the ambient air at the appliance, shall be considered refrigeration systems.

I. **Specific Requirements for Industrial Furnaces and Boilers-Stationary Type**

1. Stationary-type industrial furnaces and power boilers shall include low-heat, medium-heat, and high-heat appliances.
2. Low-Heat Appliances
   a. Low-heat appliances shall be installed with clearances not less than those specified by Form III in Annex A, Table 44, *Clearances to Combustible Material*.
      1) Low-heat appliances that are approved for installation with lesser clearances than specified in the above-cited provision shall be permitted to be installed in accordance with their listing.
      2) Low-heat appliances shall be permitted to be installed with lesser clearances to combustible material, provided the combustible material is protected as specified in Annex A, Table 45, *Reduction of Clearances with Specified Forms of Protection*.
   b. Floor-mounted low-heat appliances shall be installed in one of the following ways:
      1) On the ground

2) On floors of fire-resistive construction with non-combustible flooring or surface finish and with no combustible material against the underside thereof

3) On fire-resistive slabs or arches having no combustible material against the underside thereof:

a) The construction described in para 2.a above and para 2.c below and shall extend not less than three tenths meter (0.3 m) beyond the appliance on all sides.

b) Appliances that are listed specifically for installation on a floor constructed of combustible material shall be permitted to be placed in accordance with the conditions of their listing.

c. Low-heat appliances shall be permitted to be placed on combustible floors although not listed for such installation, provided the floor under the appliance is protected in accordance with the latest edition of NBCP.

3. Medium-Heat Appliances

a. Medium-heat appliances shall be installed with clearances not less than those indicated by Form IV in Annex A, Table 44, *Clearances to Combustible Material.*

b. Medium-heat appliances shall be installed in one of the following ways:

1) On the ground

2) On floors of fire-resistive construction with non-combustible flooring or surface finish and with no combustible material against the underside thereof

3) On fire-resistive slabs or arches having no combustible material against the underside thereof

a) The construction described in this paragraph and para "c" below shall extend not less than nine hundred millimeters (900 mm) beyond the appliance on all sides.

b) Medium-heat appliances shall be permitted to be placed on combustible floors although not listed for such installation, provided the floor under the appliance is protected in accordance with the latest edition of NBCP.

c. Rooms containing medium-heat appliances shall be provided with ventilation to prevent accumulation of hot air over or near the appliance.

4. High-Heat Appliances

a. High-heat appliances shall be installed with clearances to combustible material of not less than three meters (3 m) at the sides and rear, not less than four and a half meters (4.5 m) above, and not less than nine meters (9 m) at the front or side where hot products are removed.

b. Rooms containing high-heat appliances shall be provided with ventilation to prevent accumulation of hot air over or near the appliance.

c. High-heat appliances shall be placed in either of the following ways:

1) On the ground

2) On floors of fire-resistive construction with non-combustible flooring or surface finish and with no combustible material against the underside thereof, with floors extending at least three meters (3 m) on all sides and at least nine meters (9 m) at the front or side where hot products are removed

J. **Specific Requirements for Miscellaneous Heaters (Air Heaters, Salamanders, and so forth).**

1. A direct-fired heater or salamander shall not be used in an enclosed space or in proximity to combustible material.

2. A direct-fired heater or salamander shall be permitted to be used where salamanders fired by coal or coke are allowed.

3. An air heater shall be of a type designed to discharge air at a temperature not exceeding one hundred twenty-one degrees Celsius (121 °C).

4. An air heater installed inside a building shall be provided with a chimney connector to conduct the flue gases to the outside.

5. Flexible ducts shall be made of material resistant to heat and flame and that can withstand prolonged exposure to temperatures as high as one hundred twenty-one degrees Celsius (121 °C).

K. **Specific Requirements for Recessed Wall Furnaces**

1. Listed recessed wall furnaces shall be permitted to be installed in walls of combustible construction.
2. Recessed wall furnaces shall be installed in accordance with the manufacturers' instructions.
3. Recessed wall furnaces shall be located so as not to cause a hazard to walls, floors, curtains, furniture, doors, and so forth.
4. The face of a warm-air register shall be at least nine hundred millimeters (900 mm) from any wall or combustible surface that is directly opposite the register.
5. Panels, grilles, and access doors that must be removed for normal servicing operations shall not be attached to the building construction.
6. Adequate combustion and circulating air shall be provided.

L. **Specific Requirements for Floor-Mounted Restaurant-Type Cooking Appliances**

1. Floor-mounted restaurant-type cooking appliances shall be installed with clearances to combustible material of not less than four hundred fifty millimeters (450 mm) at the sides and rear of the appliance and from the chimney connector thereof and not less than one thousand two hundred millimeters (1,200 mm) above the cooking top and at the front of the appliance.
2. Floor-mounted restaurant-type cooking appliances that are listed for installation with lesser clearances than specified in the provision above shall be permitted to be installed in accordance with the conditions of their listing.
3. Floor-mounted restaurant-type cooking appliances shall be permitted to be installed in rooms, but not in confined spaces such as alcoves, with lesser clearance to woodwork or other combustible material, provided the combustible material is protected as specified by Annex A, Table 45, *Reduction of Clearances with Specified Forms of Protection*.
4. Where a wall or cabinet of combustible material is located adjacent to the cooking top section of the appliance and is not shielded from the cooking top section by a high shelf, warming closet, or other such part of the appliance, the protection specified in the provision above shall extend for a distance of at least six hundred millimeters (600 mm) above the surface of the cooking top.

   Such wall or cabinet shall be protected even though the appliance is listed for "close-to-the-wall" installation.
5. Floor-mounted appliances shall be placed in either of the following ways:
   a. On floors of fire-resistive construction with non-combustible flooring or surface finish and with no combustible material against the underside thereof
   b. On fire-resistive slabs or arches having no combustible material against the underside thereof, with such construction in all cases extending not less than three hundred millimeters (300mm) beyond the appliance on all sides
      1) Floor-mounted appliances that are specifically listed for installation on a floor constructed of combustible material shall be permitted to be placed in accordance with the conditions of their listing.
      2) Floor-mounted appliances shall be permitted to be placed on combustible floors although not listed for such installation, provided the floor under the appliance is protected in accordance with the latest edition of NBCP.

M. **Specific Requirements for Suspended-Type Unit Heaters**

1. Suspended-type unit heaters shall be installed with clearances to combustible material not less than those specified by Annex A, Table 44, *Clearances to Combustible Material.*
   a. Suspended-type unit heaters that are listed for installation with lesser clearances shall be permitted to be installed in accordance with their listing.
   b. Suspended-type unit heaters shall be permitted to be installed with lesser clearances to combustible material, provided the combustible material is protected as specified by Annex A, Table 45, *Reduction of Clearances with Specified Forms of Protection.*
2. Suspended-type heaters shall be safely and adequately supported.

3. Hangers or brackets supporting heaters shall be metal.
4. The location of any suspended unit heater or its ductwork shall be such that a negative pressure will not be created in the room where the unit heater is located.
5. A suspended unit heater shall not be attached to a warm-air duct system unless listed for such installation.

N. **Specific Requirements for Appliances on Roofs**

1. Appliances installed on roofs shall be designed or enclosed to withstand expected climate conditions.
2. If the appliance is enclosed, the enclosure shall permit easy entry and movement, shall be of reasonable height, and shall have at least a seven hundred fifty millimeters (750 mm) clearance between the entire service access panel of the equipment and the wall of the enclosure.
3. The roof where the appliance is to be installed shall be capable of supporting the additional load or shall be reinforced to support the additional load.
4. All access locks, screws, and bolts shall be of corrosion-resistant material.
5. Appliances shall be installed in accordance with their listings and with manufacturers' instructions.
6. Appliances shall be installed on a well-drained surface of the roof.
7. At least one and eight tenths meters (1.8 m) of clearance shall be maintained between any part of the appliance and the edge of the roof or similar hazard.

   Exception: Rigidly fixed rails or guards at least one meter (1 m) high shall be permitted to be used as an alternate to the one and eight tenths meters (1.8 m) clearance. Parapets or other parts of the building structure that are at least one meter (1 m) high shall be permitted to be used in lieu of rails or guards.
8. Appliances requiring an external source of electrical power shall be provided with a readily accessible electrical disconnect that will completely de-energize the equipment.
   a. This disconnect shall be installed within sight of the equipment.
   b. A one hundred twenty volt (120-V) AC grounding-type receptacle outlet shall be provided adjacent to the equipment.
   c. This receptacle outlet shall be connected to the supply side of the electrical disconnect.
9. Where water stands on the roof at the equipment or in the passageways leading to the equipment or where the roof is of a water-sealed design, a suitable platform or walkway or both shall be provided above the water line and adjacent to the equipment and the control panels so that equipment can be safely serviced.
10. Appliances located on roofs or other elevated platforms shall be accessible.

O. **Installation of Outdoor Appliances**

1. Appliances listed for outdoor installation shall be permitted to be installed without additional environmental protection in accordance with the terms of their listing and shall be accessible for servicing.
2. Appliances that are not listed for outdoor installation shall be permitted to be installed outdoors if approved for such installation.

   In determining suitability for outdoor installation, the following factors shall be considered:

   a. Protection from physical damage;
   b. Location of combustion air and other openings into the appliance;
   c. Surface temperatures;
   d. Weatherproofing;
   e. Adequate and safe venting; and
   f. Clearances to adjacent combustibles.

DIVISION 15. MANUFACTURE OF ORGANIC COATINGS

SECTION 10.4.15.1 APPLICABILITY

A. The provisions of this Division shall apply to facilities that use flammable and combustible liquids, as herein defined, to manufacture organic coatings for automotive, industrial, institutional, household, marine, printing, transportation, and other applications.

B. These provisions shall not apply to the following:

1. Operations involving the use or application of coating materials
2. Storage of organic coatings in locations other than the manufacturing facility

C. NFPA 35, *Standard for the Manufacture of Organic Coatings* shall also be used as basis for fire and life safety requirements.

SECTION 10.4.15.2 LOCATION OF PLANTS AND BUILDINGS

A. **Location**

1. Organic coatings manufacturing operations shall not be located in the same building with other occupancies. Operations incidental to or connected with organic coatings manufacturing shall not be classed as "other operations or occupancies."
2. Organic coatings manufacturing operations and processes shall be located so that they are accessible from at least two sides to provide access for firefighting and other emergency operations.
3. Where topographical conditions will allow an accidental release of flammable or combustible liquids to flow from organic coatings manufacturing operations and processes so as to present a fire hazard to other facilities, drainage shall be provided in accordance with para "B" of Section 10.4.15.3 of this RIRR.

B. **General Layout and Design**

1. Laboratories, offices, and storage areas that are located in the same building as organic coatings manufacturing operations shall be separated from the manufacturing operations by a wall that meets both of the following requirements:
   a. The wall shall have a minimum two-hour (2-hr) fire resistance rating.
   b. Openings in the wall between these areas and the manufacturing area shall be protected by fire doors having a minimum one and a half hour (1.5-hr) fire protection rating.
2. Areas where unstable liquids are handled or processed shall be separated from all adjacent areas by walls that meet both of the following requirements:
   a. The wall shall have a minimum two-hour (2-hr) fire resistance rating.
   b. Openings in the walls between these areas and all adjacent areas shall be protected by fire doors having a minimum one and a half hour (1.5-hr) fire protection rating.
3. Process Vessels
   a. Process vessels shall be located in accordance with Annex A, Table 47, *Location of Process Vessels* and Table 48, *Reference for Table 47, Location of Process Vessels*.

      Exception: As provided for in para "c" below.

   b. Where unstable liquids are processed and protection for exposures is not provided, the distance required by para "a" above shall be doubled.
   c. The distances required in para "a" above shall be permitted to be waived where both of the following criteria are met:
      1) The vessels are housed within a building.
      2) The exterior wall of the building facing the line of adjoining property that can be built upon is a blank wall having a minimum two-hour (2-hr) fire resistance rating.
   d. Where Class IA or unstable liquids are handled, the blank wall specified in para c.2 above shall be designed to provide resistance to damage from an explosion originating inside the building and the building shall meet all applicable requirements of para "E" of Section 10.4.15.3 of this RIRR.

SECTION 10.4.15.3 BUILDING CONSTRUCTION

A. **General Construction**.

Buildings that house organic coatings manufacturing operations shall meet the requirements of this Section.

1. The buildings shall be of fire-resistive or non-combustible construction without basements.
2. The first floor of the buildings shall be at or above the grade to provide water drainage and vapor diffusion.
3. Flammable raw materials and finished stock shall be stored in a detached building or in an area that is separated from manufacturing areas by a wall that meets both of the following requirements:
   a. The wall shall have a minimum two-hour (2-hr) fire resistance rating.
   b. Openings in the wall shall be protected by fire doors having a minimum one and a half hour (1.5-hr) fire protection rating.
4. Internal partitions shall not interfere with ventilation or with means of egress, and shall be of non-combustible construction.
5. In multi-storey buildings, stairways and elevators shall be enclosed by walls that meet both of the following requirements:
   a. The walls shall have a minimum two-hour (2-hr) fire resistance rating.
   b. Openings in the walls shall be protected by fire doors having a minimum one and a half hour (1.5-hr) fire protection rating.
6. Means of egress shall be in accordance with Division 5 of Chapter 2 of this Rule. Means of egress shall not be exposed by the drainage facilities required by para "B" below.
7. Load-bearing supports for vessels and equipment capable of releasing enough liquid to result in a fire of sufficient intensity and duration to cause structural damage shall be protected by one (1) or more of the following:
   a. Drainage to prevent accumulation of burning liquid under vessels or equipment
   b. Fire-resistive construction
   c. Fire-resistant protective coatings or systems
   d. Water spray systems designed and installed in accordance with NFPA 15, *Standard for Water Spray Fixed Systems for Fire Protection*
   e. Alternative means that are acceptable to the C/MFM having jurisdiction

B. **Drainage**

1. Emergency drainage systems for leaks of flammable or combustible liquids and for fire protection system discharge shall be provided and shall meet the requirements of NFPA 30.
2. If an emergency drainage system is connected either to a public sewer system or discharges into public waterways, it shall be equipped with traps or separators.

C. **Building Heating**

If building heating is provided in areas handling Class I liquids, it shall be provided by indirect means such as water, steam or warm air, or the heating equipment that is listed and approved for use within the electrically classified area where it is installed.

D. **Ventilation**

1. Enclosed process areas that handle or use Class I, Class II or Class III liquids heated to temperatures at or above their flash points shall be ventilated continuously during operation of any equipment. Ventilation shall be sufficient to maintain the concentration of vapors within the area at or below twenty-five percent (25%) of the lower flammable limit (LFL).
   a. Ventilation shall be provided at a rate determined by one of the following:
      1) Calculation methods based on anticipated fugitive emissions
      2) Sampling of the actual vapor concentrations under normal operating conditions. The vapor concentration used to determine the required ventilation rate shall be the highest measured concentration during the sampling procedure.

b. Ventilation shall be provided at a rate of not less than three tenths (0.30) $m^3/min/m^2$ of solid floor area.

2. Ventilation shall be accomplished by mechanical means and shall take suction at floor level.
3. Provision shall be made for introduction of sufficient make-up air to ensure proper operation of the system.
4. The location of both suction and make-up air openings shall be arranged to avoid short-circuiting and to provide air movement across all portions of the floor to prevent accumulation of flammable vapors.
5. Ventilation shall be arranged to include all floor areas or pits where flammable vapors can collect.
6. Exhaust ventilation discharge shall be to a safe location outside the building.
7. Recirculation of the exhaust air shall be permitted only where it is monitored continuously using a fail-safe system that is designed to automatically sound an alarm, stop recirculation, and provide full exhaust to the outside in the event that vapor–air mixtures exceed twenty-five percent (25%) of LFL.
8. Local or spot ventilation shall be permitted to be utilized for up to seventy-five percent (75%) of the required ventilation.
9. Where there is a potential for vapor emission due to evaporation of Class I liquids, ventilation shall be provided during shutdown periods at a rate sufficient to maintain a safe atmosphere.

E. **Deflagration (Explosion) Venting**

Deflagration venting shall be provided for buildings and structures in which a deflagration hazard exists

F. **Electrical Equipment**

1. All electrical wiring and equipment shall be installed and maintained in accordance with the latest edition of PEC and NFPA 70.
2. Where Class I liquids are exposed to the air, or where Class II or Class III liquids are exposed to the air at temperatures equal or above their flash points, the equipment used in the building and the ventilation of the building shall be designed so that flammable vapor–air mixtures are confined under normal operating conditions to the inside of the equipment, and to a zone that extends not more than one and a half meters (1.5 m) from the equipment.
3. Annex A, Table 49, *Electrical Area Classification Specific to Organic Coatings Manufacture* and NFPA 30, *Flammable and Combustible Liquids Code* shall be used to determine the extent of hazardous (classified) locations for purposes of installation of electrical equipment and wiring.
4. In establishing the extent of hazardous (classified) locations, such locations shall not extend beyond floors, walls, roofs, or other solid partitions that have no communicating openings into the hazardous (classified) locations.
5. Where the provisions of this Section require the installation of Class I, Division 1 or Class I, Division 2 electrical equipment, ordinary electrical equipment, including switch gear, shall be permitted to be used if the following requirements are met:
   a. The electrical equipment shall be installed in a room or enclosure that is maintained under positive pressure with respect to the classified area in accordance with NFPA 496, *Standard for Purged and Pressurized Enclosures for Electrical Equipment.*
   b. Ventilation makeup air shall not be contaminated.
   c. Pressurized rooms and enclosures in classified areas shall be designed to prevent the flow of liquids into the rooms or enclosures.

SECTION 10.4.15.4 PROCESS EQUIPMENT AND OPERATIONS

A. **Transfer of Flammable and Combustible Liquids**

1. Transfer of Class I, Class II, and Class III liquids from storage tanks to process areas shall be through a closed piping system by means of gravity flow or by pumps.
   a. Where liquid transfer is by gravity flow, one (1) or more fail-closed, remotely actuated valves shall be provided at suitable locations in the piping system to stop the flow of

liquids in an emergency. Operation of these valves shall be by means of emergency shut-offs located near each point of use and at the storage tanks.

Exception: Emergency shut-offs shall not be required at the storage tanks if the remotely actuated valves are closed automatically by a fire detection, fire suppression, or fire alarm system.

b. Where liquid transfer is by pumps, one (1) or more emergency switches shall be provided to shut down all pumps and to stop the flow of liquids in an emergency. The emergency switches shall be located at exits from the process areas, at other safe locations outside the process areas, and at the pumps.

Exception: Emergency switches shall not be required at the pumps if the pumps are shut off automatically by a fire detection, fire suppression, or fire alarm system.

2. Transfer of liquids to and from vessels, containers, tanks, and piping systems by means of air or inert gas pressure shall be permitted only where all of the following requirements are met:
   a. Vessels, containers, tanks, and piping systems shall be designed for such pressurized transfer and shall be capable of withstanding the anticipated operating pressure.
   b. Safety and operating controls, including pressure relief devices, shall be provided to prevent overpressure of any part of the system.
   c. Where necessary, fail-closed, remotely actuated valves shall be provided at suitable locations in the piping.
   d. Only inert gas shall be used to transfer Class I liquids.
   e. Inert gas shall be used to transfer Class II and Class III liquids that are heated above their flash points.
3. Positive displacement pumps shall be provided with pressure relief discharging back to the supply tank or vessel, the pump suction, or another suitable location or shall be provided with interlocks to prevent overpressure.
4. Dispensing of the following liquids from large containers to smaller containers shall be by means of an approved drum pump or by gravity using an approved self-closing valve:
   a. Class I liquids
   b. Class II or Class III liquids heated to temperatures at or above their flash points
5. Containers and mix tanks that contain Class I, Class II, or Class III liquids shall be covered with rigid lids to prevent spills whenever they are moved or transported from one location to another.

B. **Piping, Valves, and Fittings**

Piping, valves, and fittings shall be designed and installed in accordance with Chapter 27 of NFPA 30, F*lammable and Combustible Liquids Cod*e, and the subsequent requirements:

1. All piping, valves, and fittings in flammable or combustible liquid service shall be designed for the working pressures and structural stresses to which they will be subjected.
2. Piping, valves, and fittings shall be of steel or other material approved for the service intended. Cast-iron valves, fittings, and pipe shall not be used.
3. Valves shall be of types that indicate whether they are open or closed (e.g., a rising stem, plug, or ball valve). Valves shall be mounted in a manner so that vibration will not cause them to open.
4. Terminal valves on remote pumping systems shall be of the spring-loaded, self-closing type and shall be permitted to be held open manually or by a fusible link.
5. Pumps of remote pumping systems shall be controlled by valves, or by operation of a meter, or shall be automatically shut off by a fire detection, fire suppression, or fire alarm system.
6. Piping for Class I, Class II, and Class III liquids shall meet the following requirements:
   a. Piping shall not be routed through enclosed exits.
   b. Piping having flanged connections, valves, checks, meters, or other joints or devices that can leak shall not be run through tunnels, stair towers, elevator towers or other

areas where personnel could be confined, or in concealed spaces or in trenches with solid covers

7. Piping systems shall be provided with a means of relieving trapped liquids, such as relief valves or drainage.
8. Listed flexible connectors shall be permitted to be used where vibration exists or where frequent movement is necessary.
9. Approved hose shall be permitted to be used at dispensing stations and transfer stations.
10. Solvent piping that enters equipment such as mixers and kettles shall be bonded to the equipment and shall be designed to minimize generation of static electricity due to free fall or excessive agitation.
11. Before being placed in service, all piping shall be hydrostatically tested to not less than one and a half (1.5) times the expected working pressure for a minimum of thirty minutes (30 min) to determine whether the piping is free of leaks.

C. **Kettles, Reactors, and Vessels**

Closed Reactors and Thin-Down Tanks

1. Reactor systems shall be designed to safely manufacture the products assigned to them. Design factors shall include, but not be limited to, materials of construction, pressure rating, emergency vent system, cooling and heating capacity, condenser capacity, instrumentation, and other design features.
2. The following safeguards shall be provided for all reactors:
   a. Furnace room ventilation shall be maintained with a high-level exit and a low-level entry.
   b. Gas furnaces shall be provided with an accessible, identified external gas shutoff valve for emergency use.
   c. Reactors shall be provided with emergency pressure relief systems sized and located using an approved design method.
   d. Discharge piping from pressure relief systems shall be directed to a blow-down tank or catch tank that is sized and located using an approved design method or to a safe location.
3. The following additional safeguards shall be provided for direct-fired heaters:
   a. The fire box shall be instrumented to shut down fuel in case of flameout to prevent explosions within.
   b. The external area under the kettle where the fire box or furnace is located shall be completely sealed from the process area, particularly the operating floor, to prevent any spills from being ignited.
   c. The furnace air intake shall be remotely located from the process area.
   d. The exhaust from the fire box shall be piped or ducted away from the process area to prevent its igniting flammable materials due to spills or upsets during processing.
   e. Combustible materials shall not be stored in the furnace room, nor shall the furnace room contain any piping of flammable materials except those connected to the kettle or fire box as part of the process.
   f. The reactor shall be provided with a high-temperature limit switch that will automatically shut down heating and, if desired, initiate automatic cooling.
4. Reactors and thin-down tanks shall be designed and procedures shall be established to prevent violent foaming when materials are added to hot reactor contents.

D. **Dispersion Equipment**

1. Two-roll mills or other mills operating with close clearances and that are used for the processing of flammable and heat-sensitive materials, such as nitrocellulose, shall be located in a detached building or in a non-combustible structure without other occupancy.
   a. The amount of nitrocellulose or other flammable material brought into the area shall be no more than that required for a single batch.
   b. A remote, manually operated water spray system, designed in accordance with NFPA 15, *Standard for Water Spray Fixed Systems for Fire Protection*, shall be provided to protect mills.

2. Installations that consist of a single disperser and drive that can be used in more than one fixed mix tank shall be equipped with a device to lock the disperser and drive's agitator in place to prevent contact between the agitator blades and the walls of the mix tank.
    a. The agitator shall be bonded to the tank when in use.
    b. Each tank shall be provided with a cover.

E. **Ball Mills and Pebble Mills**

1. Ball mills and pebble mills shall be grounded.
2. Metal chutes or funnels used for adding flammable or combustible liquids to mills shall be extended into the mill as far as possible to minimize free fall. They shall be bonded to the mill or to ground so that static electric charges can dissipate.
3. Where it is necessary to pressure-unload a ball mill or pebble mill, inert gas shall be used. Air shall not be used.
4. Each mill shall be provided with a relief valve to protect it from overpressure. The pressure relief valve shall be set no higher than the design pressure of the vessel.

F. **Mixers and Mixing Tanks**

1. Tanks and other vessels needed for processing and manufacturing of organic coatings shall be permitted in the process area, but shall not be considered storage tanks for purposes of application of this Section.
2. Mixers used for flammable or combustible products shall be equipped with rigid covers. Covers shall be permitted to have slots or openings to accommodate mixer shafts or other operational needs.
3. Where gravity flow is used, a shutoff valve shall be installed as close as practical to the vessel being unloaded and a control valve shall be provided near the end of the discharge pipe. Discharge piping shall be bonded to the receiving container so that static electric charges can dissipate.
4. Mixing tanks shall be designed to safely manufacture the products assigned to them. Mixing tanks that are provided with heating systems shall be provided with safe operating temperature limit controls that will automatically shut off the heating system when the limits are exceeded. The safe operating limits shall be determined by means of a process hazard analysis.
5. Portable process mixing tanks and containers shall be secured to prevent the tank from moving, as well as to prevent contact between the mixing blade and the tank/container.

SECTION 10.4.15.5 MATERIAL STORAGE AND HANDLING

A. **Tank Car and Tank Vehicle Unloading and Loading**

Tank car and tank vehicle unloading and loading facilities shall be designed and operated in accordance with NFPA 30.

B. **Flammable and Combustible Liquid Storage**

1. The storage of Class I, Class II, and Class III liquids shall meet the requirements NFPA 30.
2. Where liquids cannot be stored in outside aboveground tanks or in underground tanks because of temperature or production considerations, tanks shall be permitted to be installed inside of buildings or structures, provided the installation is in accordance with NFPA 30.
3. Storage tanks inside buildings shall be permitted only in areas that meet the following requirements:
    a. The areas shall be at or above grade.
    b. The areas shall have drainage.
    c. The areas shall be separated from process areas by construction having a minimum two-hour (2-hr) fire resistance rating.
    d. Openings to other rooms or buildings shall be provided with non-combustible, liquid-tight raised sills or ramps at least one hundred millimeters (100 mm) in height, or the floor in the storage area shall be at least one hundred millimeters (100 mm) below the surrounding floor. An open-grated trench inside the room that drains to a safe location shall be permitted as an alternative.

e. Openings to other rooms or buildings shall be provided with fire doors having a minimum one and a half hour (1.5-hr) fire protection rating.

f. The areas shall be liquid-tight where the walls join the floor.

4. Hot box installations shall include the following controls:

a. Unless the area is provided with adequate containment, the hot box shall have containment for at least the volume of the largest container or portable tank.

b. Containers shall be sealed.

c. If there is the potential for overheating, the system shall be designed with high temperature limits to actuate audible alarms and shut down the heating source.

d. When electrical equipment is provided, all electrical wiring and utilization equipment shall be suitable for Class I, Division 2 locations if the enclosed liquids are either Class I or are Class II or Class III heated up to or above their flash points.

5. Portable drum heaters shall be designed for the hazardous locations in which they are used and shall be maintained in accordance with the manufacturer's specifications.

C. **Storage of Finished Products**

1. Finished products in containers, intermediate bulk containers, and portable tanks that are Class I, Class II, or Class III liquids shall be stored outdoors, in a separate building, or in a room separated from the process area by a wall or partition having a minimum two-hour (2-hr) fire resistance rating.

Openings in such walls shall be protected by fire doors having a minimum one and a half hour (1.5-hr) fire protection rating.

2. Inside storage shall meet applicable requirements of NFPA 30.

D. **Outdoor Storage**

Outdoor storage of liquids in containers, intermediate bulk containers, and portable tanks shall meet the requirements NFPA 30.

E. **In-Plant Transportation and Storage of Portable Shipping Tanks.**

The storage of portable shipping tanks shall be in accordance with NFPA 30.

1. Full or partially full portable shipping tanks shall be permitted to be stacked two-high, provided they are of the nesting design.

2. All materials-handling equipment used for transporting or lifting portable shipping tanks shall be of ample capacity to lift or transport the full load safely and shall meet the requirements of NFPA 505, *Fire Safety Standard for Powered Industrial Trucks Including Type Designations, Areas of Use, Conversions, Maintenance, and Operations*.

3. Floors of buildings and shipping docks shall be structurally able to carry the wheel loads resulting from transporting full portable shipping tanks by means of materials-handling equipment.

4. Portable shipping tanks shall be permitted to be emptied by any of the following three (3) methods:

a. Contents shall be permitted to be pumped from the top. The pump, pipelines, hose, or other containers or tanks shall be bonded and grounded.

b. Contents shall be permitted to be pumped from a valve at the bottom of the portable shipping tank. The pump, pipelines, hose, or other containers or tanks shall be bonded and grounded.

c. Contents shall be permitted to be discharged by gravity from a valve at the bottom of the portable shipping tank. The portable shipping tank, pipelines, hose, and receiving vessel shall be bonded and grounded.

5. Portable shipping tanks shall not be pressure-unloaded unless done in accordance with para A.2 of Section 10.4.15.4 of this RIRR.

6. Portable shipping tanks shall be filled by gravity or pump. Where filling through an open manhole, the fill pipe shall be bonded to the portable shipping tank.

F. **Power-Operated Industrial Trucks**

1. Only those power-operated industrial trucks that are approved and designated as Type DX or EX, as defined in Rule 3 of this RIRR, shall be permitted to be used in areas where ignitable vapors exist under normal operating conditions.

2. Power-operated industrial trucks that are approved and designated as Type DX, EX, EE, or DY shall be permitted to be used in areas where Class I liquids and their vapors are normally within a closed system or container from which the liquid or vapor can escape only in the event of accidental rupture or breakdown of such equipment.
3. Power-operated industrial trucks that are approved and designated as Type CNS, GS, LPS, DS, ES, GS/CNS, or GS/LPS shall be permitted to be used in areas where Class I liquids are stored in sealed containers if permitted by the Department of Energy (DOE).
4. Only those power-operated industrial trucks that are approved and designated as Type DX or EX shall be permitted to be used in areas where combustible dusts are or can be in suspension in the air continuously, intermittently, or periodically under normal operating conditions in quantities that can produce ignitable mixtures.
5. Power-operated industrial trucks that are approved and designated as Type DX, EE, EX, or DY shall be permitted to be used in areas where combustible dusts are present but not normally in suspension in the air, and where dusts will not be thrown into suspension in the air by the normal operation of equipment in quantities that can produce ignitable mixtures, but where deposits of such dusts can be ignited by arcs or sparks originating in the truck.

SECTION 10.4.15.6 SPECIAL HAZARDS

A. **Nitrocellulose**

1. Handling
   a. Handling of containers of nitrocellulose shall be done in a manner that prevents generation of frictional heat.
   b. The following precautions shall be taken when moving containers of nitrocellulose:
      1) When containers are moved using a wheeled hand truck, the hand truck shall be fitted with a "grab" to hold the top of the container.
      2) When power-driven industrial trucks are used, the containers shall be held in place on the transportation pallet, if used, or held in place by a properly designed drum-holding device to ensure the container is secure during movement.
   c. Containers shall not be dropped. If containers must be lowered from one (1) elevation to another, handling equipment shall be used and the containers kept under control at all times.
2. Storage
   a. Inside areas used to store nitrocellulose shall meet the following requirements:
      1) The room or building shall be separated from the production area by construction having a minimum two-hour (2-hr) fire resistance rating with any penetrations sealed or protected in accordance with the provisions of NFPA 221, *Standard for High Challenge Fire Walls, Fire Walls, and Fire Barrier Walls*.
      2) Openings into the room or building shall be protected by fire doors or by other opening protectives having a minimum one and a half hour (1.5-hr) fire resistance rating.
      3) The room or building shall be protected by an automatic sprinkler system, either wet-pipe, preaction, or deluge, that provides a density of fourteen and three tenths (14.3) L/min/m^2 over the entire storage area.
      4) The electrical area classification of a room or an attached building shall be determined based on the classification of the adjacent process area.
      5) A detached building shall not be required to be classified for purposes of electrical installation.
   b. Outside storage of nitrocellulose shall meet the following requirements:
      1) Storage shall be on a detached pad or in a detached non-combustible structure such as a roofed shed that is located in accordance with Annex A, Table 50, *Separation Distances for Nitrocellulose Storage*.
      2) Where storage is protected by a sprinkler system that provides a density of fourteen and three tenths (14.3) L/min/m^2 over the entire storage area, the distances in Annex A, Table 50, *Separation Distances for Nitrocellulose Storage* shall be permitted to be reduced by fifty percent (50%).

3) Detached storage areas shall not be classified for purposes of electrical installations, and general-purpose electrical equipment and wiring methods shall be permitted.

c. Storage of other commodities in the same area as nitrocellulose shall be limited to inert materials and non-combustible materials that are chemically compatible with the nitrocellulose. Such materials shall be separated from the nitrocellulose by a minimum distance of six meters (6 m)

d. Storage of flammable liquids shall not be permitted in the same storage area as nitrocellulose.

e. Nitrocellulose shall be stored only in its original shipping container or a container that is approved for storing nitrocellulose.

f. Containers of nitrocellulose shall not be opened in the main storage area but only at the point of use or at a location set aside for the purpose.

g. Containers of nitrocellulose shall be stored in an upright position with the lid up and shall not be stacked more than two-high.

h. Nitrocellulose shall be stored in such a manner that the stock will be rotated to ensure that the oldest material is used first and that nitrocellulose is not stored for more than two (2) years.

i. Where building heat is necessary, it shall be provided by indirect means, such as low-pressure steam, hot water, or warm air. Heating units, radiators, steam and hot water pipes, and warm air outlets shall be located so that containers of nitrocellulose do not come in contact with them.

j. The storage area shall be marked with a sign that states **"NITROCELLULOSE — FLAMMABLE SOLID — KEEP HEAT, SPARKS, AND FLAME AWAY"**, or equivalent wording.

3. Use in Process Area

a. The amount of nitrocellulose brought into the operating area at any one time shall not exceed the amount required for a single shift.

b. Containers shall remain closed until ready for use.

c. Where only part of a container is used, the lid and closure shall be replaced immediately and the closure securely fastened.

d. If it is necessary to fork or scoop nitrocellulose out of a container, a spark-resistant scoop shall be used.

e. Spilled nitrocellulose shall be cleaned up immediately. Clean-up procedures shall include the following:

1) Material that has dried or is suspected of having dried shall be wet with water or solvent and placed in a covered metal container.

2) The material shall be removed at the end of the day or shift and disposed of properly.

f. After containers of nitrocellulose are emptied, the covers shall be replaced and the closure securely fastened.

g. Used nitrocellulose shall be placed in a covered waste container, wet down with water, and removed at the end of the day or shift and disposed of daily.

h. Containers, rim rings of fiber containers, and vessels shall be bonded and grounded during transfer operations.

4. Waste Disposal

Sweepings and other small quantities of nitrocellulose that cannot be used shall be wet down with water or solvent and placed in a covered metal container. The waste material shall be disposed of in accordance with applicable regulations.

B. **Monomers**

Monomers shall be stored, handled, and used in accordance with manufacturers' instructions.

1. Bulk Storage of Liquid Monomers

a. Storage tanks for liquid monomers shall meet all applicable requirements of NFPA 30.

b. Storage tanks for liquid monomers shall not be located in the same diked area as or in the drainage path of any storage tank that holds a material that is incompatible with the monomer.

c. Storage tanks for liquid monomers shall be provided with separate normal vents that meet the requirements of NFPA 30.

d. Storage tanks for liquid monomers shall be provided with emergency vents that meet the following requirements:

1) The emergency vents shall be capable of relieving the excess internal pressure and evolution of gas, liquid, or vapour resulting from polymerization or runaway reaction.

2) The emergency vents shall be designed in accordance with methods that are appropriate for the specific monomer.

2. Storage of Solid Monomers

Solid monomers shall be stored, handled, and used in accordance with the manufacturers' instructions.

3. Waste Disposal

Waste monomers or material contaminated with monomers shall be disposed of according to applicable government regulations regarding hazardous waste.

C. **Organic Peroxide Formulations.**

Organic peroxide formulations shall be stored in accordance with NFPA 400, *Hazardous Materials Code*, and shall be handled and used in accordance with the manufacturers' instructions.

SECTION 10.4.15.7 CONTROL OF IGNITION SOURCES

A. **Ignition Sources**

Precautions shall be taken to prevent the ignition of flammable materials in organic coatings manufacturing facilities by sources including, but not limited to the following:

1. Open flames
2. Lightning
3. Hot surfaces
4. Radiant heat
5. Smoking
6. Hot works
7. Spontaneous ignition
8. Frictional heat or sparks
9. Static electricity
10. Electrical sparks
11. Stray currents
12. Ovens, furnaces, and heating equipment

B. **Smoking** shall be limited to designated areas that are identified and provided with disposal containers.

C. **Hot Works** shall not be performed unless an FSC for hot works operations have been secured from the C/MFM having jurisdiction.

D. **Repair of Electrical Equipment**

Where electrical equipment is repaired or replaced, the integrity of the area's electrical classification shall be maintained in accordance with para "F" of Section 10.4.15.3 of this RIRR.

E. **Static Electricity Hazards**

1. All equipment such as tanks, machinery, and piping, where a flammable mixture might be present, shall be bonded and connected to a ground.

a. The bond or ground, or both, shall be physically applied or shall be inherently present by the nature of the installation.

b. For purposes of dissipating static electric charges, the resistance to ground of a metallic grounding path shall not exceed twenty-five (25) ohms and the resistance to ground of a non-conductive or semi-conductive grounding path shall not exceed one (1) megohm.

c. Electrically isolated sections of metallic piping or equipment shall be bonded to the other portions of the system or grounded to prevent external ignition hazards.

d. Where flammable liquids are transferred to or from portable containers greater than three and eight tenths liters (3.8 L) in size, all metallic elements, including the containers, shall be bonded together, and one element shall be grounded.

e. A bond or ground connection shall meet the following requirements:

1) All materials shall be electrically conductive.

2) Materials used shall have sufficient mechanical strength, corrosion resistance, and flexibility for the service intended.

3) If wire is used, it shall be no smaller than No. 10 AWG wire, preferably uninsulated.

4) Permanent connections shall be made with electrical cable lugs or bolted clamps or by brazing, welding, or other suitable means.

f. Bonding clamps for portable equipment shall be of the opposed-point type and shall be attached so that metal-to-metal contact with bonded equipment is assured.

Exception: Other types of clamps that provide secure metal-to-metal contact shall be permitted to be used.

g. Rubber or leather belts used to transmit power shall be made of conductive material or treated with a conductive belt dressing. Such dressings shall be checked periodically to ensure reliability.

h. When adding powders to Class I liquids, it shall be done in a manner that minimizes the generation of static electricity.

2. Powders shall not be conveyed through solid plastic piping that is not antistatic.

3. Fill pipes or side diverters shall be used to transfer nonconductive Class I liquids in quantities greater than two hundred twenty-seven liters (227 L) at a time.

4. Plastic packaging film, including stretch wrap and shrink wrap, shall not be applied or removed in any area that is designated as a hazardous (classified) location.

F. **Lightning Protection**

Where required by the C/MFM having jurisdiction, lightning protection systems meeting the requirements of the latest edition of PEC and NFPA 780, *Standard for the Installation of Lightning Protection Systems*, shall be provided.

SECTION 10.4.15.8 MANAGEMENT OF FIRE HAZARDS

A. **Scope**

This Section shall apply to the management methodology used to identify, evaluate, and control the fire and explosion hazards involved in manufacturing organic coatings.

B. **Basic Requirements**

Organic coatings manufacturing operations that involve the use of flammable and combustible liquids shall be reviewed to ensure that fire and explosion hazards resulting from loss of containment of liquids are provided with corresponding fire prevention and emergency action plans.

Exception: Operations that involve only the use of Class II or Class III liquids handled at temperatures below their flash points and that do not involve the use of Class I liquids need not undergo this review.

C. **Evaluation of Hazards**

The extent of fire prevention and control that is provided shall be determined by means of an engineering evaluation of the operation and application of fire protection and process engineering principles. The hazard evaluation shall include, but not be limited to, the following:

1. Analysis of the fire and explosion hazards of the operation;

2. Analysis of hazardous materials and chemicals and hazardous reactions used in the operation and the safeguards taken to control them;

3. Analysis of the applicable facility design requirements in this Section;
4. Analysis of the applicable operation and protection requirements in this Section;
5. Analysis of local conditions, such as exposure to and from adjacent properties and exposure to floods, earthquakes, and windstorms; and
6. Analysis of the emergency response capabilities of the local emergency services.

D. **Emergency Action Plans**

A written emergency action plan that is consistent with available resources and personnel shall be established to respond to fires and related emergencies. The emergency action plan shall include, but not be limited to, the following:

1. Procedures to be followed in case of fire, such as sounding the alarm, notifying the fire department, evacuating personnel, and controlling and extinguishing the fire;
2. Procedures and schedules for conducting drills of these procedures;
3. Appointment and training of personnel to carry out assigned duties. These duties shall be reviewed at the time of initial assignment, as responsibilities or response actions change, and whenever anticipated duties change;
4. Maintenance of fire protection equipment; and
5. Procedures for shutting down or isolating equipment to reduce the release of liquid. This shall include assigning personnel responsible for maintaining critical plant functions or the shutdown of plant processes.

E. **Management of Change**

The hazard evaluation conducted in accordance with para "C" above shall be repeated whenever the fire or explosion hazards change significantly. Conditions that might require repeating a review include, but are not limited to, the following:

1. Changes in the materials in process;
2. Changes in process equipment;
3. Changes in process controls; and
4. Changes in operating procedures or assignments.

F. **Fire Investigation**

All fires shall be investigated.

SECTION 10.4.15.9 FIRE PROTECTION

A. **Scope**

This Section shall apply to the commonly recognized management control systems and methods used to prevent or minimize the loss from fire or explosion in organic coatings manufacturing facilities.

B. **Automatic Sprinkler Protection**

1. Important manufacturing and storage buildings shall be protected by sprinkler systems installed in accordance with Section 10.2.6.7 of this RIRR.
2. An automatic sprinkler system shall be permitted to be equipped with firefighting foam that is compatible with the materials protected. Such systems shall be designed in accordance with one of the following:
   a. NFPA 13, *Standard for the Installation of Sprinkler Systems.*
   b. NFPA 11, *Standard for Low, Medium, and High -Expansion Foam Systems.*
   c. NFPA 16, *Standard for the Installation of Foam-Water Sprinkler and Foam-Water Spray Systems.*
3. Water supplies for fire protection systems shall be capable of providing the pressure and capacity needed to meet the highest flow demand in any fire, with ample reserve for necessary hose demand.
4. Drainage facilities shall be provided for water from sprinkler systems.

C. **Fire Hydrants**

Where public hydrants and water mains are not available or are inadequate, private hydrants and water mains shall be provided in accordance with NFPA 24, *Standard for the Installation of Private Fire Service Mains and Their Appurtenances*.

D. **Emergency Notification**

An approved means for prompt notification of fire to those within the plant and to the available public or private fire department shall be provided.

E. **Portable Fire Extinguishers**

Listed portable fire extinguishers shall be provided in accordance with Section 10.2.6.9 of the RIRR.

F. **Standpipe and Hose Systems**

Where provided, standpipe and hose systems shall be installed in accordance with NFPA 14. Only combination nozzles or spray nozzles shall be used.

G. **Hose Connections**

Where provided, thirty-eight and one tenth millimeters (38.1 mm) hose connections shall be installed in accordance with Section 10.2.6.7 of this RIRR. Only combination nozzles or spray nozzles shall be used.

H. **Fixed Local Application Extinguishing Systems**

Manufacturing equipment and tanks shall be permitted to be protected by foam, inert gas, or dry chemical extinguishing systems.

SECTION 10.4.15.10 TRAINING AND EMERGENCY PLANNING

A. **Basic Training Requirements**

1. Personnel responsible for the use and operation of portable fire control equipment shall be trained in the use of that equipment. Refresher training shall be conducted at least annually.
2. Personnel shall be trained in the methods of manually actuating fixed extinguishing systems and of notifying public or private fire departments and emergency organizations.
3. All personnel shall be made aware of special hazards and shall be instructed as to the identity and potential dangers of hazardous materials.
4. Personnel shall be trained in proper procedures for safe operation of processes, as well as emergency shutdown procedures.

B. **Emergency Planning**

1. Planning for fire control measures shall be coordinated with local emergency response agencies.
2. Procedures shall be established to provide for safe shutdown of operations under emergency conditions.
3. Provisions shall be made for training, inspection, and testing of associated alarms, interlocks, and controls.

   Exception: Where shutdown of an operation would increase the hazard, other emergency procedures shall be permitted to be established.
4. The emergency procedure shall be kept readily available and up to date.

SECTION 10.4.15.11 INSPECTION AND MAINTENANCE

A. **General**

1. Fire protection equipment shall be tested and maintained in accordance with applicable PNS and other internationally accepted standards.
2. Inspection and testing of fire protection equipment shall be performed in accordance with recommendations of the equipment manufacturer.
3. Water-based fire protection systems shall be inspected, tested, and maintained in accordance with NFPA 25.
4. Procedures shall be established to control leakage and prevent spillage of liquids during maintenance operations.
5. Combustible waste material and residues in operating areas shall be kept to a minimum, stored in covered metal containers, and disposed of daily.
6. Outside storage areas shall be kept free of weeds, trash, or other unnecessary combustible materials.

7. Aisles established for movement of personnel shall be maintained clear of obstructions to permit orderly evacuation and ready access for manual firefighting activities.

B. **Confined Space Entry**

Where it is necessary for an employee to enter a tank, a pit, a manhole, or any other confined space, such entry shall be authorized by the individual-in-charge.

C. **Cleaning Tanks and Vessels**

Cleaning of storage tanks and process vessels shall be done in a manner and with controls to prevent fires.

D. **Floor Cleaning**

Floor cleaning shall be done in a manner that minimizes fire hazards.

DIVISION 16. INDUSTRIAL OVENS AND FURNACES

SECTION 10.4.16.1 GENERAL

A. **Applicability**

1. The hereunder provisions shall apply to ovens, dryers, and furnaces; thermal oxidizers; and any other heated enclosure used for processing of materials and related equipment. The terms "ovens", "dryers", and "furnaces" are used interchangeably.
2. Stated provisions shall apply to new installations and to alterations or extensions to existing equipment.
3. Industrial ovens and furnaces shall comply with this Division and the applicable provisions of NFPA 86, *Standard for Ovens and Furnaces*.

B. **Fire Safety Clearance**

An FSC shall be secured from the C/MFM having jurisdiction.

C. **Plans and Specifications**

Plans and specifications for devices and systems required by hereunder provisions shall be submitted to the C/MFM having jurisdiction for review and approval prior to installation.

SECTION 10.4.16.2 LOCATION AND CONSTRUCTION

A. **Location**

1. General
   a. Furnaces and related equipment shall be located so as to protect personnel and buildings from fire or explosion hazards.
   b. Furnaces shall be located so as to be protected from damage by external heat, vibration, and mechanical hazards.
   c. Furnaces shall be located so as to make maximum use of natural ventilation, to minimize restrictions to adequate explosion relief, and to provide sufficient air supply for personnel.
   d. Where furnaces are located in basements or enclosed areas, sufficient ventilation shall be supplied so as to provide required combustion air and to prevent the hazardous accumulation of vapors.
   e. Furnaces designed for use with special atmospheres or fuel gas with a specific gravity greater than air shall be located at or above grade and shall be located so as to prevent the escape of the special atmosphere or fuel gas from accumulating in basements, pits, or other areas below the furnace.
2. Structural Members of the Building
   a. Furnaces shall be located and erected, so that the building structural members are not affected adversely by the maximum anticipated temperatures or by the additional loading caused by the furnace.
   b. Structural building members shall not pass through or be enclosed within a furnace.
3. Location in Regard to Stock, Processes, and Personnel
   a. Furnaces shall be located so as to minimize exposure to power equipment, process equipment, and sprinkler risers.

b. Unrelated stock and combustible materials shall be located at a distance from a furnace, a furnace heater, or ductwork, so that the combustible materials will not be ignited, with a minimum separation distance of eight tenths meter (0.8 m).

c. Furnaces shall be located so as to minimize exposure of people to possible injury from fire, explosion, asphyxiation, and hazardous materials and shall not obstruct personnel travel to exitways.

d. Furnaces shall be designed or located so as to prevent an ignition source to flammable coating dip tanks, spray booths, and storage and mixing rooms for flammable liquids or to prevent exposure to flammable vapor or combustible dusts.

e. The requirement of para "d" above shall not apply to integral quench systems.

f. Equipment shall be protected from corrosive external processes and environments, including fumes or materials from adjacent processes or equipment that produces corrosive conditions when introduced into the furnace environment.

4. Floors and Clearances

a. Space shall be provided above and on all sides for the following:

1) Inspection, maintenance, and operation purposes

2) Operation of explosion venting

3) Operation and unobstructed discharge of sprinklers

b. In addition to the requirement of para "a" above, provisions shall be included for the installation of automatic sprinklers and the functioning of explosion venting, if applicable.

c. Furnaces shall be constructed and located to keep temperatures at combustible floors, ceilings, and walls less than seventy-one degrees Celsius (71 °C).

d. Where electrical wiring is present in floor channels, the wiring shall be installed in accordance with the latest edition of PEC and NFPA 70.

e. Floors in the area of mechanical pumps, oil burners, or other equipment using oil shall be provided with a non-combustible and non-porous surface to prevent floors from becoming soaked with oil.

B. **Furnace Design**

1. Furnaces and related equipment shall be designed to minimize the fire hazard inherent in equipment operating at elevated temperatures.

2. Furnace components exposed simultaneously to elevated temperatures and air (oxygen) shall be constructed of noncombustible material.

3. Furnace structural supports and material-handling equipment shall be designed with the structural strength needed to support the furnace and work when operating at maximum operating conditions, including maximum temperature.

4. Furnaces shall withstand the strains imposed by expansion and contraction, as well as static and dynamic mechanical load.

5. Heating devices and heating elements of all types shall be constructed or located so as to resist mechanical damage from falling work, material handling, or other mechanical hazards.

6. Furnace and related equipment shall be designed and located so as to provide access for required inspection and maintenance.

a. Ladders, walkways, or access facilities shall be provided, so that equipment can be operated or accessed for testing and maintenance.

b. Means shall be provided for entry by maintenance and other personnel.

7. Radiation shields, refractory material, and insulation shall be retained or supported so they do not fall out of place under designed use and maintenance.

8. External parts of furnaces that operate at temperatures in excess of seventy-one degrees Celsius (71 °C) shall be guarded by location, guard rails, shields, or insulation to prevent accidental contact with personnel.

a. Bursting discs or panels, mixer openings, and other parts of the furnace from which flame or hot gases could be discharged shall be located or guarded to prevent injury to personnel.

b. Where impractical to provide adequate shields or guards, warning signs or permanent floor markings visible to personnel entering the area shall be provided.

9. Observation ports or other visual means for observing the operation of individual burners shall be provided and shall be protected from radiant heat and physical damage.
10. Each portion of a closed cooling system that can exceed the design pressure shall be equipped with the following:
    a. Pressure relief
    b. Flow switches equipped with audible and visual alarms
11. Open cooling systems utilizing unrestricted sight drains observable by the operator shall not require flow switches.
12. Where a cooling system is critical to continued safe operation of a furnace, the cooling system shall continue to operate after a safety shutdown or power failure.
13. Furnaces shall be designed to minimize fire hazards due to the presence of combustible products or residue in the furnace.
14. Furnace hydraulic systems shall utilize either fire-resistant fluids or flammable hydraulic fluids where approved and failure of hydraulic system components cannot result in a fire hazard.
15. The metal frames of furnaces shall be electrically grounded.
16. Water-cooled components, such as vacuum vessels, shall be designed with minimum wall thicknesses in accordance with vessel standards.
17. A corrosion allowance shall be specified where appropriate.

C. **Explosion Relief**

1. Fuel-fired furnaces and furnaces that contain flammable liquids, gases, or combustible dusts shall be equipped with unobstructed explosion relief for freely relieving internal explosion pressures, except in the following cases:
    a. Explosion-relief shall not be required on furnaces with shell construction having four and eight tenths millimeters (4.8 mm) or heavier steel plate shells reinforced with structural steel beams and buckstays that support and retain refractory or insulating materials that are required for temperature endurance, which makes them unsuitable for the installation of explosion relief.
    b. Explosion-relief panels shall not be required for low-oxygen atmosphere ovens designed and protected in accordance with NFPA 86.
    c. The requirements for explosion relief shall not apply to thermal oxidizers.
    d. The requirements for explosion relief shall not apply to Class D furnaces.
    f. Explosion-relief panels shall not be required in the work chamber of indirect-fired ovens where it is demonstrated by calculation that the combustible concentration in the work chamber cannot exceed twenty-five percent (25%) of the lower flammable limit (LFL) under any conditions.
    g. Explosion relief shall not be required for the combustion chamber of an indirect-fired oven that incorporates a single combustion airflow path through the heat exchanger and does not recirculate the products of combustion.
2. Explosion relief shall be based on one of the following:
    a. The amount of explosion relief area shall be at least ninety-three thousandths square meter (0.093 m^2) of relief area for each four hundred twenty-four thousandths cubic meter (0.424 m^3) of furnace volume.
    b. The amount of explosion relief shall be based on the requirements of NFPA 68, *Standard on Explosion Protection by Deflagration Venting*.
3. Hinged panels, openings, or access doors equipped with approved explosion-relief hardware shall be permitted to be included in the ratio specified in para 2 above.
4. Explosion-relief vents shall be arranged so that, when open, the full vent opening provides an effective relief area.
    a. The operation of vents to their full capacity shall not be obstructed.
    b. Warning signs shall be posted on the vents.

5. Explosion-relief vent(s) shall be located as close as practical to each known source of ignition to minimize damage.
6. Explosion-relief vents shall be located or retained so that personnel are not exposed to injury by operation of the vents.
7. Where explosion relief is required, explosion-relief vents shall activate at a surge pressure that does not exceed the design pressure of the oven enclosure.
8. Explosion-relief vents for a long furnace shall be distributed throughout the entire furnace length with the maximum distance between explosion-relief vents not to exceed five times the oven's smallest inside dimension (width or height).

D. **Ventilation and Exhaust System**

1. Building Makeup Air

   A quantity of makeup air shall be admitted to oven rooms and buildings to provide the air volume required for oven safety ventilation and combustion air.

2. Fans and Motors
   a. Electric motors that drive exhaust or recirculating fans shall not be located inside the oven or ductwork, except within vacuum furnaces.
   b. Oven recirculation and exhaust fans shall be designed for the maximum oven temperature and for material and vapors being released during the heating process.
3. Ductwork
   a. Ventilating and exhaust systems, where applicable, shall be installed in accordance with NFPA 91, unless otherwise noted in these provisions.
   b. Wherever furnace ducts or stacks pass through combustible walls, floors, or roofs, either non-combustible insulation or clearance, or both, shall be provided to prevent combustible surface temperatures from exceeding seventy-one degrees Celsius (71 °C).
   c. Where ducts pass through non-combustible walls, floors, or partitions, the space around the duct shall be sealed with non-combustible material to maintain the fire resistance rating of the barrier.
   d. Ducts shall be constructed entirely of sheet steel or other non-combustible material capable of meeting the intended installation and conditions of service, and the installation shall be protected where subject to physical damage.
   e. Access doors shall be provided to allow for inspection and cleaning of the interior surfaces of ducts handling flammable vapors or combustible solids.
   f. No portions of the building shall be used as an integral part of the duct leading to the approved point of discharge.
   g. All ducts shall be made tight throughout and shall have no openings other than those required for the operation and maintenance of the system.
   h. All ducts shall be braced where required and shall be supported by metal hangers or brackets.
   i. Ducts handling flammable vapors shall be designed to minimize the condensation of the vapors out of the exhaust airstream onto the surface of the ducts.
   j. Ducts handling combustible solids shall be designed to minimize the accumulation of solids within the ducts.
   k. Hand holes for damper, sprinkler, or fusible link inspection or resetting and for purposes of residue clean-out shall be equipped with tight-fitting doors or covers.
   l. Exposed hot fan casings and hot ducts [temperatures exceeding seventy-one degrees Celsius (71 °C)] shall be guarded by location, guard rails, shields, or insulation to prevent injury to personnel.
   m. Exhaust ducts shall not discharge near openings or other air intakes where effluents can be entrained and directed to locations creating a hazard.

E. **Mountings and Auxiliary Equipment**

1. Pipes, valves, and manifolds shall be mounted so as to provide protection against damage by heat, vibration, and mechanical hazard.

2. Furnace systems shall have provisions such as motion stops, lockout devices, or other safety mechanisms to prevent injury to personnel during maintenance or inspection.
3. Instrumentation and control equipment shall meet the following criteria:
   a. Located for ease of observation, adjustment, and maintenance
   b. Protected from physical and thermal damage and other hazards
4. Auxiliary equipment such as conveyors, racks, shelves, baskets, and hangers shall be non-combustible and designed to facilitate cleaning.
5. External Heat Exchangers

   External heat exchangers used for the purpose of extracting heat from a recirculating cooling gas shall be enclosed in a vacuum-tight chamber that has a leak rate not exceeding the leak rate specified by the manufacturer for the furnace chamber.
   a. Heat exchangers, components, and connections shall be free from water and air leaks.
   b. Heat exchangers shall be installed or located to prevent damage from vibration and thermal damage due to expansion and contraction.
   c. Heat exchanger components shall have the design strength to resist permanent deformation while exposed to the simultaneous maximum pressure of the coolant source and the maximum vacuum or pressure attained in the furnace.
6. Fans and Motors for Gas Quenching Systems
   a. Fans shall not be exposed to any temperature in excess of their design temperature rating.
   b. Electric fan motors shall be interlocked to prevent operation at less than a chamber pressure of forty-eight kilopascals (48 kPa) absolute in order to prevent motor failure.
   c. Where motor windings are exposed to Argon gas or other ionizing gases, the voltage on the motor shall be limited to two hundred sixty volts (260 V) maximum.
7. Quenching Gas

   When introduced at the quenching temperature, the recirculating gas shall be one that is not harmful to the heating elements, furnace heat shields or insulation, or work.

SECTION 10.4.16.3 COMMISSIONING, OPERATIONS, MAINTENANCE, INSPECTION AND TESTING

A. **Commissioning**

1. Commissioning shall be required for all new installations or for any changes that affect the safety system.
2. All pertinent apparatus shall be installed and connected in accordance with the system design.
3. The furnace shall not be released for operation before the installation and checkout of the required safety systems have been successfully completed.
4. Any changes to the original design made during commissioning shall be reflected in the documentation.
5. Set points of all safety interlock settings shall be documented.
6. During commissioning, all furnace piping that conveys flammable liquids or flammable gases shall be inspected for leaks.

B. **Training**

1. Personnel who operate, maintain, or supervise the furnace shall be thoroughly instructed and trained in their respective job functions under the direction of a qualified person(s).
2. Personnel who operate, maintain, or supervise the furnace shall be required to demonstrate an understanding of the equipment, its operation, and practice of safe operating procedures in their respective job functions.
3. Personnel who operate, maintain, or supervise the furnace shall receive regularly scheduled refresher training and shall demonstrate understanding of the equipment, its operation, and practice of safe operating procedures in their respective job functions.
4. The training program shall cover startup, shutdown, and lockout procedures in detail.

5. The training program shall be kept current with changes in equipment and operating procedures, and training materials shall be available for reference.

C. **Operations**

1. The furnace shall be operated in accordance with the design parameters.
2. Operating instructions that include all of the following shall be provided by the furnace manufacturer:
   a. schematic piping and wiring diagrams;
   b. startup procedures;
   c. shutdown procedures;
   d. emergency procedures, including those occasioned by loss of special atmospheres, electric power, inert gas, or other essential utilities; and
   e. maintenance procedures, including interlock and valve tightness testing.
3. When the original equipment manufacturer no longer exists, the user shall develop inspection, testing, and maintenance procedures.
4. Operating procedures shall be established that cover normal and emergency conditions.
5. Operating procedures shall be directly applicable to the equipment involved and shall be consistent with safety requirements and the manufacturer's recommendations.
6. Procedures shall be consistent with safety requirements and shall be kept current with changes in equipment and personnel.
7. Where different modes of operation are possible, procedures shall be prepared for each operating mode and for switching from one mode to another.
8. Personnel shall have access to operating instructions at all times.
9. Safety devices shall not be removed or rendered ineffective.

D. **Inspection, Testing, and Maintenance**

1. Safety devices shall be maintained in accordance with the manufacturer's instructions.
2. It shall be the responsibility of the furnace manufacturer to provide instructions for inspection, testing, and maintenance.
3. It shall be the responsibility of the user to establish, schedule, and enforce the frequency and extent of the inspection, testing, and maintenance program, as well as the corrective action to be taken.
4. All safety interlocks shall be tested for function at least annually.
5. The set point of temperature, pressure, or flow devices used as safety interlocks shall be verified at least annually.
6. Safety device testing shall be documented at least annually.
7. Calibration of continuous vapor concentration high limit controllers shall be performed in accordance with the manufacturer's instructions and shall be performed at least once per month.
8. Pressure and explosion relief devices shall be visually inspected at least annually to ensure that they are unobstructed and properly labeled.
9. Valve seat leakage testing of safety shutoff valves and valve proving systems shall be performed in accordance with the manufacturer's instructions.
   a. Testing frequency shall be at least annually.
   b. The installation of a valve proving system or a valve with proof of closure shall not replace the requirement for seat leakage testing.
10. Safety shutoff valves shall be replaced before they exceed their maximum allowable number of lifetime open-closed cycles. The number of safety shutoff valve cycles shall be determined in one of the following ways:
    a. By counting the number of actual safety shutoff valve open-closed cycles
    b. By estimating the time to reach ninety percent (90%) of lifetime total cycles based on normal cycling rates
11. Manual shutoff valves shall be maintained in accordance with the manufacturer's instructions.

12. Lubricated manual shutoff valves shall be lubricated and subsequently leak tested for valve closure at least annually.
13. Equipment isolation valves and emergency shutoff valves shall be exercised at least annually.
14. Oxygen piping and components shall be inspected and maintained.
15. The temperature indication of the excess temperature limit interlock shall be verified to be accurate.
16. Whenever any safety interlock is replaced, it shall be tested for function.
17. Whenever any temperature, pressure, or flow device used as a safety interlock is replaced, the set point setting shall be verified.
18. An inspection shall be completed at least annually to verify that all designed safety interlocks are present and have not been bypassed or rendered ineffective.

E. **Record Retention**

Records of inspection, testing, and maintenance activities shall be retained for a period of one (1) year or until the next inspection, testing, or maintenance activity, whichever is longer.

F. **Procedures**

The user's operational and maintenance program shall include procedures that apply to entry into equipment in accordance with all applicable regulations.

SECTION 10.4.16.4 FIRE PROTECTION

A. **General**

A study shall be conducted to determine the need for fixed or portable fire protection systems for ovens, furnaces, or related equipment.

1. The determination of the need for fire protection systems shall be based on a review of the fire hazards associated with the equipment.
2. Where determined to be necessary, fixed or portable fire protection systems shall be provided.

B. **Types of Fire Protection Systems**

1. Where automatic sprinklers are provided, they shall be installed in accordance with NFPA 13, unless otherwise permitted para 2 below.
2. Where sprinklers that protect only ovens are installed and connection to a reliable fire protection water supply is not feasible, a domestic water supply connection shall be permitted to supply these sprinklers subject to the approval of the C/MFM having jurisdiction.
3. Where water spray systems are provided, they shall be installed in accordance with NFPA 15.
4. Where carbon dioxide protection systems are provided, they shall be installed in accordance with NFPA 12, *Standard on Carbon Dioxide Extinguishing Systems*.
5. Where foam extinguishing systems are provided, they shall be installed in accordance with NFPA 11.
6. Where dry chemical protection systems are provided, they shall be installed in accordance with NFPA 17.
7. Where water mist systems are provided, they shall be installed in accordance with NFPA 750.

C. **Special Considerations**

1. Where water from a fixed protection system could come in contact with molten materials, such as molten salt or molten metal, shielding shall be provided to prevent water from contacting the molten material.
2. Galvanized pipe shall not be used in sprinkler or water spray systems in ovens, furnaces, or related equipment.
3. Where sprinklers are selected for the protection of ovens, furnaces, or related equipment, the use of closed-head sprinkler systems shall be prohibited, and only deluge sprinkler systems shall be used where the following conditions exist:

a. In equipment where temperatures can exceed three hundred twenty-nine degrees Celsius (329 °C).

b. Where flash fire conditions can occur.

D. **Drawings and Calculations**

Prior to the beginning of installation of a fixed fire protection system, installation drawings and associated calculations depicting the arrangement of fixed protection installations shall be submitted to the C/MFM having jurisdiction for review and approval.

E. **Means of Access**

Where manual fire protection is determined to be necessary as a result of the review required in para "C" above, doors or other effective means of access shall be provided in ovens and ductwork so that portable extinguishers and hose streams can be used effectively in all parts of the equipment.

F. **Inspection, Testing, and Maintenance of Fire Protection Equipment**

All fire protection equipment shall be inspected, tested, and maintained as specified in the following standards:

1. NFPA 10, *Standard for Portable Fire Extinguishers*
2. NFPA 11, *Standard for Low, Medium, and High -Expansion Foam*
3. NFPA 12, *Standard on Carbon Dioxide Extinguishing Systems*
4. NFPA 13, *Standard for the Installation of Sprinkler Systems*
5. NFPA 15, *Standard for Water Spray Fixed Systems for Fire Protection*
6. NFPA 17, *Standard for Dry Chemical Extinguishing Systems*
7. NFPA 17A, *Standard for Wet Chemical Extinguishing Systems*
8. NFPA 25, *Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems*
9. NFPA 750, *Standard on Water Mist Fire Protection Systems*

DIVISION 17. WELDING, CUTTING, AND OTHER HOT WORK OPERATIONS

SECTION 10.4.17.1 GENERAL

A. **Applicability**

1. Welding, cutting and other hot work shall comply with NFPA 51B, *Standard for Fire Prevention During Welding, Cutting, and Other Hot Work*, and this Division.
2. This Division shall apply to the following welding, cutting and other hot work processes:
   a. Welding and allied processes;
   b. Heat treating;
   c. Grinding;
   d. Thawing pipe;
   e. Powder-driven fasteners;
   f. Hot riveting;
   g. Torch-applied roofing systems installation in conjunction with Chapter 9 of NFPA 241, *Standard for Safeguarding Construction, Alteration, and Demolition Operations*; and
   h. Similar applications producing or using a spark, flame, or heat.
3. This Division shall NOT apply to the following:
   a. Candles;
   b. Pyrotechnics or special effects;
   c. Cooking operations;
   d. Electric soldering irons;
   e. Design and installation of gas cutting equipment and welding equipment covered in NFPA 51, *Standard for the Design and Installation of Oxygen–Fuel Gas Systems for Welding, Cutting*, and Allied Processes;

f. Additional requirements for welding, cutting and other hot work operations in confined spaces; and

g. Lockout/tagout procedures during welding, cutting and other hot work possible oxygen deficiency.

4. Acetylene cylinder charging plants shall comply with NFPA 51A, *Standard for Acetylene Cylinder Charging Plants*.

B. **Fire Safety Clearance**

An FSC shall be secured from the C/MFM having jurisdiction concerned prior to any welding, cutting and other welding, cutting and other hot work operation, according to the following schedules:

1. Annual – for business establishments requiring almost daily repair or maintenance due to its nature of business or operations.
2. Per Project Duration – for new construction or renovation. For project duration exceeding one (1) year, a new FSC valid for one (1) year or a fraction thereof shall be secured.

SECTION 10.4.17.2 RESPONSIBILITY FOR WELDING, CUTTING AND OTHER HOT WORKS

A. **Management**. Safety officer or building administrator shall be responsible for the safe operations of welding, cutting and other hot work activity.

1. Management shall establish permissible areas for welding, cutting and other hot work.
2. Management shall designate a Permit Authorizing Individual (PAI).
3. All equipment shall be examined to ensure it is in a safe operating condition.
4. When found to be incapable of reliable safe operation, the equipment shall be repaired by qualified personnel prior to its next use or be withdrawn from service and tagged out of service.
5. Management shall ensure that only approved apparatus, such as torches, manifolds, regulators or pressure-reducing valves, and acetylene generators, are used.
6. Management shall ensure that all individuals involved in the welding, cutting and other hot work operations, including contractors, are familiar with the provisions of this Division.
   a. Individuals involved in welding, cutting and other hot work operations shall be trained in the safe operation of their equipment and in the safe use of the process.
   b. Individuals involved in welding, cutting and other hot work operations shall have an awareness of the inherent risks involved and understand the emergency procedures in the event of a fire.
7. Management shall advise all contractors about site-specific flammable materials, hazardous processes or conditions, or other potential fire hazards

B. **Permit Authorizing Individual (PAI).** In conjunction with management, the PAI shall be responsible for the safe operation of welding, cutting and other hot work activities.

1. The PAI shall consider the safety of the hot work operator and fire watch with respect to personal protective equipment (PPE) for other special hazards beyond welding, cutting and other hot work.
2. The PAI shall determine site-specific flammable materials, hazardous processes, or other potential fire hazards that are present or likely to be present in the work location.
3. The PAI shall ensure the protection of combustibles from ignition by the following means, otherwise, welding, cutting and other hot work shall not be performed :
   a. Considering alternative methods to welding, cutting and other hot work;
   b. Moving the work to a location that is free from combustibles;
   c. If the work cannot be moved, moving the combustibles to a safe distance or having the combustibles properly shielded against ignition; and
   d. Scheduling welding, cutting and other hot work so that operations that could expose combustibles to ignition are not begun during welding, cutting and other hot work operations.
4. The PAI shall determine that fire protection and extinguishing equipment are properly located at the site.

5. Where a fire watch is required in accordance with para "D" of Section 10.4.17.2 of this RIRR, the PAI shall be responsible for ensuring that a fire watch is at the site.
6. Where a fire watch is not required, the PAI shall make a final check thirty minutes (30 min) after the completion of welding, cutting and other hot work operations to detect and extinguish smoldering fires.

C. **Hot Work Operator.** The hot work operator shall handle equipment safely and use it as follows so as not to endanger lives and property:

1. The operator shall have the PAI's approval before starting welding, cutting and other hot work operations.
2. All equipment shall be examined to ensure it is in a safe operating condition, and, if found to be incapable of reliable safe operation, the equipment shall be repaired by qualified personnel prior to its next use or be withdrawn from service.
3. The operator shall cease welding, cutting and other hot work operations if unsafe conditions develop and shall notify management, the area supervisor, or the PAI for reassessment of the situation.

D. **Fire Watch**

1. The fire watch shall be trained to understand the inherent hazards of the work site and of the welding, cutting and other hot work.
2. The fire watch shall ensure that safe conditions are maintained during welding, cutting and other hot work operations.
3. The fire watch shall have the authority to stop the welding, cutting and other hot work operations if unsafe conditions develop.
4. The fire watch shall have fire-extinguishing equipment readily available and shall be trained in its use.
5. The fire watch shall be familiar with the facilities and procedures for sounding an alarm in the event of a fire.
6. The fire watch shall watch for fires in all exposed areas and try to extinguish them only when the fires are obviously within the capacity of the equipment available. If the fire watch determines that the fire is not within the capacity of the equipment, the fire watch shall sound the alarm immediately.
7. The fire watch shall be allowed to perform additional tasks, but those tasks shall not distract him or her from his or her fire watch responsibilities, except as outlined in para "D" of Section 10.4.17 of this RIRR.

E. **Contractors.** Before starting any welding, cutting and other hot work, contractors and their clients shall discuss the planned project completely, including the type of hot work to be conducted and the hazards in the area.

F. **Mutual Responsibility.** Management, contractors, the PAI, the fire watch, and the operators shall recognize their mutual responsibility for safety in welding, cutting and other hot work operations.

SECTION 10.4.17.3 FIRE PREVENTION PRECAUTIONS

A. Personal protective clothing shall be selected to minimize the potential for ignition, burning, trapping hot sparks, and electric shock.

B. **Permissible Areas**

1. Welding, cutting and other hot work shall be allowed only in areas that are or have been made fire safe.
2. Welding, cutting and other hot work shall be performed only in designated areas.
3. In order for a location to be a designated area, the area shall meet the requirements in para D.2 below.
4. Prior to the start of any welding, cutting and other hot work in a designated area, at a minimum, the hot work operator shall perform the following:

   a. The location is verified as fire resistant.

   b. The requirements of para D.2.c below are met.

   c. Fire extinguishers are in working condition and readily available.

d. Ventilation is working properly.

e. Equipment is in working order.

5. Permanent areas designated for welding, cutting and other hot work shall be reviewed at least annually by the PAI.

6. Signs shall be posted designating welding, cutting and other hot work areas as deemed necessary by the PAI.

C. Welding, Cutting and Other Hot Work Operations shall not be allowed in the following areas:

1. In areas not authorized by Management;

2. In sprinklered buildings where sprinklers are impaired, unless the requirements of NFPA 25 are met;

3. In the presence of explosive atmospheres (i.e., where mixtures of flammable gases, vapors, liquids, or dusts with air exist);

4. In the presence of uncleaned or improperly prepared equipment, drums, tanks, or other containers that have previously contained materials that could develop explosive atmospheres; and

5. In areas with an accumulation of combustible dusts that could develop explosive atmospheres.

D. **Certification issued by the Management for Welding, Cutting and Other Hot Work Operations**

1. Before welding, cutting and other hot work operations begin in a non-designated location, the Management upon the recommendation of PAI shall issue a certification allowing such welding, cutting and other hot work operations, which is a prerequisite for the issuance of FSC.

2. The certification shall indicate the period of welding, cutting and other hot work activities.

3. Before issuing a certification allowing welding, cutting and other hot work operations, the following conditions shall be verified by the PAI:

a. The welding, cutting and other hot work equipment to be used shall be in satisfactory operating condition and in good repair.

b. Where combustible materials, such as paper clippings, wood shavings, or textile fibers, are on the floor, the floor shall be swept clean for a radius of eleven meters (11 m) and the following criteria also shall be met:

1) Combustible floors shall be kept wet, covered with damp sand, or protected by a listed welding blanket, welding pad, or equivalent.

2) Where floors have been wet down, personnel operating arc welding equipment or cutting equipment shall be protected from possible shock.

c. All combustibles shall be relocated at least eleven meters (11 m) in all directions from the work site, and the following criteria also shall be met:

1) If relocation is impractical, combustibles shall be protected by a listed welding blanket, welding pad, or equivalent.

2) To prevent the entrance of sparks, the edges of covers at the floor shall be tight including at the point at which several covers overlap where a large pile is being protected.

d. Openings or cracks in walls, floors, or ducts within eleven meters (11 m) of the site shall be covered or sealed with listed fire-rated or noncombustible material to prevent the passage of sparks to adjacent areas.

e. Ducts and conveyor systems that might carry sparks to distant combustibles shall be shielded, or shut down, or both.

f. If welding, cutting and other hot work is done near walls, partitions, ceilings, or roofs of combustible construction, they shall be protected by a listed welding curtain, welding blanket, welding pad, or equivalent.

g. If welding, cutting and other hot work is done on one side of a wall, partition, ceiling, or roof, one of the following criteria shall be met:

1) Precautions shall be taken to prevent ignition of combustibles on the other side by relocating the combustibles.

2) If it is impractical to relocate combustibles, a fire watch shall be provided on the side opposite from where the work is being performed.

h. Welding, cutting and other hot work operations shall not be attempted on a partition, wall, ceiling, or roof that has a combustible covering or insulation, or on walls or partitions of combustible sandwich-type panel construction.

i. Welding, cutting and other hot work operations that is performed on pipes or other metal that is in contact with combustible walls, partitions, ceilings, roofs, or other combustibles shall not be undertaken if the work is close enough to cause ignition by conduction.

j. Fully charged and operable fire extinguishers that are appropriate for the type of possible fire shall be available immediately at the work area.

k. If existing hose lines are located within the welding, cutting and other hot work area defined by the permit, they shall be connected and ready for service but shall not be required to be unrolled or charged.

l. The following shall apply to welding, cutting and other hot work operations done in close proximity to a sprinkler head:

1) A wet rag shall be laid over the sprinkler head and then removed at the conclusion of the welding or cutting operation.

2) During welding, cutting and other hot work operations, special precautions shall be taken to avoid accidental operation of automatic fire detection or suppression systems (e.g., special extinguishing systems or sprinklers).

m. The operator and nearby personnel shall be suitably protected against dangers such as heat, sparks, and slag.

n. In instances where the scope of work and the tools used to conduct welding, cutting and other hot work operations result in possible travel of slag, sparks, spatter, or similar mobile sources of ignition farther than eleven meters (11 m), the PAI shall be allowed to extend the distances and areas addressed in para D.2 through para D.4 of this Section.

o. In instances where the scope of work and tools used to conduct welding, cutting and other hot work operations are known to be incapable of generating slag, sparks, spatter or similar mobile sources of ignition capable of leaving the immediate area of the applied welding, cutting and other hot work, the PAI shall be allowed to do the following:

1) Reduce the distances and areas addressed in para D.2 through para D.4 of this Section to distances and areas that he or she considers fire safe for the intended operation.

2) Describe those distances and areas on the certification for welding, cutting and other hot work.

4. The area shall be inspected by the PAI at least once per shift while the certification for welding, cutting and other hot work is in effect to ensure that it is a fire-safe area.

E. **Fire Watch**

1. A fire watch shall be required by the PAI when welding, cutting and other hot work is performed in a location where other than a minor fire might develop or where the following conditions exist:

a. Combustible materials in building construction or contents are closer than eleven meters (11 m) to the point of operation.

b. Combustible materials are more than eleven meters (11 m) away from the point of operation but are easily ignited by sparks.

c. Wall or floor openings within an eleven-meter (11 m) radius expose combustible materials in adjacent areas, including concealed spaces in walls or floors.

d. Combustible materials are adjacent to the opposite side of partitions, walls, ceilings, or roofs and are likely to be ignited.

2. A fire watch shall be maintained for at least thirty minutes (30 min) after completion of welding, cutting and other hot work operations in order to detect and extinguish smoldering fires. The duration of the fire watch shall be extended if the PAI determines the fire hazards warrant the extension.

3. More than one fire watch shall be required if combustible materials that could be ignited by the welding, cutting and other hot work operation cannot be directly observed by the initial fire watch.

F. Hot tapping or other cutting and welding on a flammable gas or liquid transmission or distribution utility pipeline shall be performed by a crew that is qualified to make hot taps.

G. Cylinder use and storage shall be in accordance with NFPA 1, *Fire Code, Chapter 63, Compressed Gases and Cryogenic Fluid*s.

SECTION 10.4.17.4 PUBLIC EXHIBITIONS AND DEMONSTRATIONS

A. The hereunder provisions shall apply to oxy-fuel gas welding and cutting operations at public exhibitions, demonstrations, displays, and trade shows, referred to hereinafter as the "site," in order to promote the safe use of compressed gases in public gatherings.

B. Installation and operation of welding, cutting, and related equipment shall be done by, or under the supervision of, a competent operator, to ensure the personal protection of viewers and demonstrators as well as the protection from fire of materials in and around the site and the building itself.

C. **Site**

1. Sites involving the use and storage of compressed gases shall be located so as not to interfere with egress during an emergency.
2. The site shall be constructed, equipped, and operated in such a manner that the demonstration minimizes the possibility of injury to viewers.

D. **Fire Protection**

1. Each site shall be provided with a portable fire extinguisher of appropriate size and type in accordance with Section 10.2.6.9 of this RIRR.
2. The public, combustible materials, and compressed gas cylinders at the site shall be protected from flames, sparks, and molten metal.
3. The C/MFM having jurisdiction shall be notified in advance of the use of a site for public exhibitions, demonstrations, and trade shows.

E. **Cylinders**

1. Gas Capacity Limitation
   a. Cylinders containing compressed gases for use at the site shall not be charged in excess of one-half (1/2) of their maximum permissible content.
   b. Cylinders of non-liquefied gases and acetylene shall be charged to not more than one-half (1/2) of their maximum permissible charged gauge pressure (kPa).
   c. Cylinders of liquefied gases shall be charged to not more than one-half (1/2) of the maximum permissible capacity (kg).
2. Storage
   a. Cylinders located at the site shall be connected for use.
   b. A sufficient number of additional cylinders shall be allowed to be stored at the site to furnish approximately one (1) day's consumption of each gas used.
   c. Other cylinders shall be stored in an approved storage area, but not near a building exit.
3. Cylinders in excess of eighteen kilograms (18 kg) total weight being transported to or from the site shall be carried on a hand truck or motorized truck.
4. Process hose shall be located and protected so that they will not be physically damaged.
5. Cylinder valves shall be closed when equipment is unattended.
6. If cylinders are designed to be equipped with valve protection caps, such caps shall be in place, except when the cylinders are in service or are connected and ready for service.
7. Cylinders shall be secured so that they cannot be knocked over.

F. **Arc Welding Equipment**

1. Electrical equipment shall be of an approved type and shall be installed and used in accordance with NFPA 1, *Fire Code, Chapter 11.1, Electrical Fire Safety* and manufacturers' requirements.
2. Damaged cables shall be removed from service until repaired or replaced.

DIVISION 18. SAFEGUARDING BUILDING CONSTRUCTION, ALTERATION AND DEMOLITION OPERATIONS

SECTION 10.4.18.1 GENERAL REQUIREMENTS

A. Structures undergoing construction, alteration, or demolition operations, including those in underground locations, shall be in accordance with NFPA 241, *Standard for Safeguarding Construction, Alteration, and Demolition Operations*, and this Division.

B. A fire protection plan shall be submitted to the C/MFM having jurisdiction for approval.

C. In buildings under construction, adequate escape facilities shall be maintained at all times for the use of construction workers. Escape facilities shall consist of doors, walkways, stairs, ramps, fire escapes, ladders, or other approved means or devices arranged in accordance with Division 5 of Chapter 2 of this Rule insofar as they can reasonably be applied to buildings under construction.

D. Fire department access roads provided in accordance with Section 10.5.7.2 of this RIRR shall be provided at the start of a project and shall be maintained throughout construction.

E. Permanent fire department access road markings shall not be required until the building is complete or occupied for use.

SECTION 10.4.18.2 PROCESSES AND HAZARDS

A. **Temporary Heating Equipment**

1. Temporary heating equipment shall be installed taking into consideration its clearance to combustible material, equipment, or construction.
2. Temporary heating equipment shall be installed, used, and maintained in accordance with the manufacturer's instructions, except as otherwise provided in para 3 below.
3. Where instructions, as addressed in para 2 above, are not available, temporary heating equipment shall be used in accordance with recognized safe practices.
4. Temporary heating equipment shall be situated so that it is secured.
5. Only personnel familiar with the operation of the temporary heating equipment shall be allowed to operate such devices.
6. Temporary heating equipment, where utilized, shall be monitored for safe operation and maintained by properly trained personnel.
7. Temporary heating equipment and devices noted to be damaged or considered to be a potential safety hazard shall not be used.
8. Temporary heating equipment using exposed radiant heating wires shall not be used.
9. Temporary electrical heating equipment shall be equipped with tip-over protection and overheat cutoffs.
10. Chimney or vent connectors, where required from direct-fired eaters, shall be maintained at least four hundred sixty millimeters (460 mm) from combustibles and shall be installed in accordance with NFPA 211.
11. Oil-fired heaters shall comply in design and installation features of NFPA 1, *Fire Code, Section 11.5, Heating Appliances*.
12. Fuel supplies for liquefied petroleum gas-fired heaters shall comply with Section 10.3.7.8 of this RIRR.
13. Refueling operations shall be conducted in an approved manner. This might necessitate the removal of the heater prior to refueling. The appliance also should be allowed to cool prior to refueling.

B. **Waste Disposal**

1. Accumulations of combustible waste material, dust, and debris shall be removed from the structure and its immediate vicinity at the end of each work shift or more frequently as necessary for safe operations.
2. Rubbish shall not be burned on the premises without first obtaining an FSC from the C/MFM having jurisdiction.
3. Materials susceptible to spontaneous ignition, such as oily rags, shall be stored in an appropriate disposal container.

4. Trash chutes, where provided, shall comply with the following:
    a. A trash chute safety plan shall be submitted to and approved by the C/MFM having jurisdiction.
    b. Trash chutes used on the exterior of a building shall be of noncombustible construction. If trash chutes are of combustible construction, it shall be protected in accordance with the following:
        1) The interior of combustible trash chutes shall be provided with not less than one temporary automatic sprinkler within a recess near the top of the chute.
        2) The temporary sprinkler shall be protected by the recess as well as an appropriate sprinkler guard.
        3) The temporary sprinkler shall be connected to any available water supply with an appropriate fire hose, or a flexible, commercial rubber hose, with a diameter of not less than nineteen millimeters (19 mm) and an appropriate flexible connector.

C. **Flammable and Combustible Liquids and Flammable Gases**

1. Storage of flammable and combustible liquids shall be in accordance with Section 10.3.7.5 of this RIRR, except as modified by the following:
    a. Storage of Class I and Class II liquids shall not exceed two hundred twenty-seven liters (227 L) within fifteen meters (15 m) of the structure.
    b. Storage areas shall be kept free of weeds, debris, and combustible materials not necessary to the storage.
    c. Open flames and smoking shall not be permitted in flammable and combustible liquids storage areas.
    d. Such storage areas shall be appropriately posted as **"NO SMOKING"** areas.
    e. Storage areas shall be appropriately posted with markings in accordance with NFPA 704, *Standard System for the Identification of the Hazards of Materials for Emergency Response* or Globally Harmonized System of Classification and Labeling of Chemicals (GHS).
2. Handling of flammable and combustible liquids at point of final use
    a. Handling of flammable and combustible liquids shall be in accordance with Section 10.3.7.5 of this RIRR, except as modified by the following:
    b. Class I and Class II liquids shall be kept in approved safety containers.
    c. Means shall be provided to dispose of leakage and spills promptly and safely.
    d. Class I liquids shall be dispensed only where there are no open flames or other sources of ignition within the possible path of vapor travel.
3. Storage and Handling of Combustible and Flammable Gases
    a. Storage and handling of combustible and flammable gases shall be in accordance with Section 10.3.7.5 of this RIRR.
    b. Open flames and smoking shall not be permitted in flammable gas storage areas.

SECTION 10.4.18.3 FIRE PROTECTION

A. **Fire Safety Program**

1. An overall construction or demolition fire safety program shall be developed.
2. All of the following items shall be addressed in the fire safety program:
    a. Good housekeeping
    b. On-site security
    c. Fire protection systems
        1) For construction operations, installation of new fire protection systems as construction progresses
        2) For demolition operations, preservation of existing fire protection systems during demolition
    d. Organization and training of an on-site fire brigade
    e. Development of a pre-fire plan with the C/MFM having jurisdiction

f. Rapid communication

g. Consideration of special hazards resulting from previous occupancies

h. Protection of existing structures and equipment from exposure fires resulting from construction, alteration, and demolition operations

B. **Owner's Responsibility for Fire Protection**

1. The owner shall designate a Safety Officer who shall be responsible for the fire prevention program and who shall ensure that it is carried out to completion.

   a. The Safety Officer shall have the authority to enforce the provisions of NFPA 241, *Standard for Safeguarding Construction, Alteration, and Demolition Operations* and other applicable fire protection standards.

   b. The Safety Officer shall have knowledge of the applicable fire protection standards, available fire protection systems, and fire inspection procedures.

   c. Inspection records shall be available for review by the C/MFM having jurisdiction.

2. Where guard service is provided, the Safety Officer shall be responsible for the guard service.

3. Pre-fire Plans

   a. Where there is a fire brigade, the Safety Officer shall be responsible for the development of pre-fire plans in conjunction with the BFP.

   b. Pre-fire plans shall be updated as necessary.

   c. The pre-fire plan shall include provisions for on-site visits by the C/MFM having jurisdiction.

4. Safety Officer Responsibilities

   a. The Safety Officer shall be responsible for ensuring that proper training in the use of protection equipment has been provided.

   b. The Safety Officer shall be responsible for the presence of adequate numbers and types of fire protection devices and appliances and for their proper maintenance.

   c. The Safety Officer shall be responsible for supervising the permit system for welding, cutting and other hot work operations.

   d. A weekly self-inspection program shall be implemented, with records maintained and made available.

   e. Impairments to the fire protection systems or fire alarm, detection, or communications systems shall be authorized only by the Safety Officer.

   f. Temporary protective coverings used on fire protection devices during renovations, such as painting, shall be removed promptly when work has been completed in the area.

5. Site Security

   a. Where guard service is provided, the guard(s) shall be trained in all of the following:

      1) Notification procedures that include calling the nearest fire station and management personnel

      2) Function and operation of fire protection equipment

      3) Familiarization with fire hazards

   b. Guards shall be informed of any special status of emergency equipment or hazards.

   c. Security fences shall be provided.

   d. Entrances (e.g., doors and windows) to the structure under construction, alteration, or demolition shall be secured.

C. **Fire Alarm Reporting**

1. There shall be a readily available fire alarm box near the premises, telephone service to the responding fire department, or equivalent facilities.

2. Instructions shall be issued for the immediate notification of the BFP in the case of a fire. Where telephone service is employed, the local BFP station number and site address shall be conspicuously posted near each telephone.

D. **Access for Fire Fighting**

1. A suitable location at the site shall be designated as a command post and provided with plans, emergency information, keys, communications, and equipment, as needed.
2. The Safety Officer shall respond to the location command post whenever fire occurs.
3. Where access to or within a structure or an area is unduly difficult because of secured openings or where immediate access is necessary for life-saving or firefighting purposes, the C/MFM having jurisdiction shall be permitted to require a key box to be installed in an accessible location.
4. The key box shall be an approved type and shall contain keys to gain access.

E. **Stairs**

1. In all buildings over one (1) storey in height, at least one stairway shall be provided that is in usable condition at all times and that meets the requirements of NFPA 101.
2. This stairway shall be extended upward as each floor is installed in new construction and maintained for each floor still remaining during demolition.
3. The stairway shall be lighted.
4. During construction, the stairway shall be enclosed where the building exterior walls are in place.
5. All exit stairs shall be provided with stair identification signs to include the floor level, stair designation, and exit path direction as required to provide for safe egress.

F. **Standpipes**

In all new buildings in which standpipes are required or where standpipes exist in buildings being altered or demolished, such standpipes shall be maintained in conformity with the progress of building construction in such a manner that they are always ready for use.

G. **First-Aid Firefighting Equipment**

1. The suitability, distribution, and maintenance of portable fire extinguishers shall be in accordance with Section 10.2.6.9 of this RIRR.
2. Wherever a tool-house, storeroom, or other shanty is located in or adjacent to the building under construction or demolition, or where a room or space within that building is used for storage, a dressing room, or a workshop, at least one (1) approved portable fire extinguisher shall be provided and maintained in an accessible location, unless otherwise permitted by para 3 below.
3. The requirement of para 2 above shall be permitted to be waived where the structure does not exceed fourteen square meters (14 m^2) in floor area or is equipped with automatic sprinklers or other approved protection.
4. At least one (1) approved fire extinguisher also shall be provided in plain sight on each floor at each usable stairway as soon as combustible material accumulates.
5. Suitable fire extinguishers shall be provided on self-propelled equipment.
6. Free access to permanent, temporary, or portable first-aid fire equipment shall be maintained at all times.

SECTION 10.4.18.4 SAFEGUARDING CONSTRUCTION AND ALTERATION OPERATIONS

A. **Scaffolding, Shoring, and Forms**

1. Accumulations of unnecessary combustible forms or form lumber shall be prohibited.
2. Combustible forms or form lumber shall be brought into the structure only when needed.
3. Combustible forms or form lumber shall be removed from the structure as soon as stripping is complete.
4. Those portions of the structure where combustible forms are present shall not be used for the storage of other combustible building materials.
5. During forming and stripping operations, portable fire extinguishers or charged hose lines shall be adequately provided to protect the additional combustible loading.

B. **Temporary Separation Walls**

1. Protection shall be provided to separate an occupied portion of the structure from a portion of the structure undergoing alteration, construction, or demolition operations

when such operations are considered as having a higher level of hazard than the occupied portion of the building.

2. Walls shall have at least a one-hour (1-hr) fire resistance rating.
3. Opening protectives shall have at least a forty-five minute (45-min) fire resistance rating.
4. Non-rated walls and opening protectives shall be permitted when an approved automatic sprinkler system is installed.

C. **Fire Protection During Construction**

1. Water Supply
   a. A water supply for fire protection, either temporary or permanent, shall be made available as soon as combustible material accumulates.
   b. There shall be no delay in the installation of fire protection equipment.
   c. Where underground water mains and hydrants are to be provided, they shall be installed, completed, and in service prior to commencing construction work on any structure.
2. Sprinkler Protection
   a. If automatic sprinkler protection is to be provided, the installation shall be placed in service as soon as practicable.
   b. The details of installation shall be in accordance with NFPA 13.
   c. Where sprinklers are required for safety to life, the building shall not be occupied until the sprinkler installation has been entirely completed and tested so that the protection is not susceptible to frequent impairment caused by testing and correction, unless otherwise permitted by para "d" below.
   d. The provision of para "c" above shall not prohibit occupancy of the lower floors of a building, even where the upper floors are in various stages of construction or protection, provided that both of the following conditions are satisfied:
      1) The sprinkler protection of the lower occupied floors has been completed and tested in accordance with para "c" above.
      2) The sprinkler protection of the upper floors is supplied by entirely separate systems and separate control valves so that the absence or incompleteness of protection in no way impairs the sprinkler protection of the occupied lower floors.
   e. The operation of sprinkler control valves shall be permitted only by properly authorized personnel and shall be accompanied by the notification of duly designated parties.
   f. Where the sprinkler protection is regularly turned off and on to facilitate connection of newly completed segments, the sprinkler control valves shall be checked at the end of each work shift to ascertain that protection is in service.
3. Standpipes
   a. General
      1) The pipe size, hose valves, hose, water supply, and other details for new construction shall be in accordance with Section 10.2.6.8 of this RIRR.
      2) On permanent Type II and Type III standpipes, hose and nozzles shall be provided and made ready for use as soon as the water supply is available to the standpipe, unless otherwise permitted by para 3 below.
      3) In combined systems where occupant hose is not required, temporary hose and nozzles shall be provided during construction.
   b. Standpipe Installations in Buildings Under Construction. Where required by the C/MFM having jurisdiction, in buildings under construction, a standpipe system, either temporary or permanent in nature, shall be installed in accordance with the following provisions.
      1) The standpipes shall be provided with conspicuously marked and readily accessible fire department connections on the outside of the building at the street level and shall have at least one (1) standard hose outlet at each floor.
      2) The pipe sizes, hose valves, hose, water supply, and other details for new construction shall be in accordance with NFPA 241.
      3) The standpipes shall be securely supported and restrained at each alternate floor.

4) At least one (1) approved hose valve for attaching fire department hose shall be provided at each intermediate landing or floor level in the exit stairway, as determined by the C/MFM having jurisdiction.

5) Valves shall be kept closed at all times and guarded against mechanical injury.

6) Hose valves shall have National Hose (NH) standard external threads for the valve size specified in accordance with NFPA 1963, *Standard for Fire Hose Connections*, unless modified by para 7 below.

7) Where local fire department connections do not conform to NFPA 1963, the C/MFM having jurisdiction shall designate the connection to be used.

8) The standpipes shall be extended up with each floor and shall be securely capped at the top.

9) Top hose outlets shall be not more than one floor below the highest forms, staging, and similar combustibles at all times.

10) Temporary standpipes shall remain in service until the permanent standpipe installation is complete.

D. **Alteration of Buildings**

1. Where the building is protected by fire protection systems, such systems shall be maintained operational at all times during alteration.
2. Where alteration requires modification of a portion of the fire protection system, the remainder of the system shall be kept in service and the fire department shall be notified.
3. When it is necessary to shut down the system, the C/MFM having jurisdiction shall have the authority to require alternate measures of protection until the system is returned to service.
4. The fire department shall be notified when the system is shut down and when the system is returned to service.
5. All required exit components shall be maintained in accordance with Division 5 of Chapter 2 of this Rule as deemed necessary by the C/MFM having jurisdiction.
6. Fire-resistive assemblies and construction shall be maintained.

E. **Fire Safety During Demolition**

1. If a building intended to be demolished contains a sprinkler system, the C/MFM having jurisdiction shall be notified before rendering the system inoperative.
2. Demolition operations involving the use of welding, cutting and other hotwork shall be in accordance with Division 17 of this Chapter.
3. Combustible waste material shall not be burned at the demolition site unless approved by the C/MFM having jurisdiction. Combustible materials shall be removed from the site as often as necessary to minimize the hazards therefrom.
4. Upon the determination by the C/MFM having jurisdiction that the demolition site is of a hazardous nature, qualified personnel shall serve as an on-site fire watch.

F. **Torch-Applied Roofing Systems**

1. An FSC shall be secured from C/MFM having jurisdiction.
2. Torch-applied roofing systems shall be installed in accordance with NFPA 241.

G. **Tar Kettles**

1. General

a. These provisions shall apply to any type of equipment including, but not limited to, chassis-mounted equipment used for preheating or heating tar, asphalt, pitch, or similar substances for roofs, floors, pipes, or similar objects.

b. An FSC shall be secured from C/MFM having jurisdiction.

c. Operating kettles shall not be located inside of or on the roof of any building.

d. The kettle shall be operated in a controlled area. The area shall be identified by the use of traffic cones, barriers, and other suitable means as approved by the C/MFM having jurisdiction.

e. Kettle Supervision

1) An operating kettle shall be attended by a minimum of one (1) employee who is knowledgeable of the operations and hazards.

2) The employee shall be within seven and six tenths meters (7.6 m) of the kettle and shall have the kettle within sight.

f. Fire Extinguishers

1) Two (2) approved 4-A:40-B:C fire extinguishers shall be provided and maintained within seven and six tenths meters (7.6 m) of the operating kettle.

2) A minimum of one (1) approved 4-A:40-B:C fire extinguisher shall be provided and maintained on the roof in close proximity to the roofing operations while the roofing material is being applied.

3) Fire extinguishers shall be mounted in an accessible and visible or identified location.

g. Exits

1) Roofing kettles shall not block exits, means of egress, gates, roadways, or entrances.

2) Kettles shall not be closer than three meters (3 m) from exits or means of egress.

2. Fuel System

a. Fuel containers shall be constructed and approved for the use for which they were designed.

b. LPG hose, container, regulators and burners shall be in accordance with Section 10.3.7.8 of this RIRR and NFPA 58.

c. LPG cylinders shall be secured to prevent accidental tip-over.

d. Regulators shall be required on any cylinders.

e. Upon determination by the C/MFM having jurisdiction that the physical damage to the container is a danger, protection shall be provided to prevent such physical damage.

f. LPG containers for roofing kettles shall not be used in any building.

3. Maintenance

a. Roofing kettles and all integral working parts shall be in good working condition and shall be maintained free of excessive residue.

b. All piping used for pumping heated material to the roof shall be installed in a manner to prevent loss of heated material.

c. Flexible steel piping shall not be used on the vertical extension of piping systems.

d. Flexible steel piping shall be limited to those connections that are immediately adjacent to the pump kettle or discharge outlet.

e. No single length of flexible piping shall exceed one and eight tenths meters (1.8 m) in length, and all piping shall be able to withstand a pressure of at least four (4) times the working pressure of the pump.

f. Roofing Kettle Doors

1) All roofing kettles shall have doors permanently attached.

2) Roofing kettle doors shall be installed in a workmanlike manner and shall be provided with handles that allow them to be opened without the operator having to stand in front of same.

3) All kettles shall have an approved, working visible temperature gauge that indicates the temperature of the material being heated.

g. All kettle doors shall be tightly closed and latched when in transit.

4. Construction

a. Minimum Requirements

1) This provision shall apply to all roofing kettles or tar pots in excess of three and eight tenths liters (3.8 L) capacity.

2) No roofing kettle shall have a capacity in excess of five barrels (5 bbl).

b. The materials and methods of construction of roofing kettles shall be acceptable to the C/MFM having jurisdiction.

c. Roofing kettles of two-barrel (2-bbl) capacity or less shall be constructed of steel sheet having a thickness of not less than two and sixty-seven hundredths millimeters (2.67 mm) (*No. 12 Manufacturers' Standard Gauge*). Kettles of more than two-barrel (2-bbl) capacity shall be constructed of steel sheet having a thickness of not less than three and forty-three hundredths millimeters (3.43 mm) *(No. 10 Manufacturers' Standard Gauge*). All supports, corners, and the top and bottom of the fire box shall be bound with angle iron or other reinforcements approved by the C/MFM having jurisdiction. All doors shall be hinged, closely fitted, and adequately latched. Fire boxes shall be of sufficient height from the ground or shall be provided with a system of shields or insulation to prevent heat damage to the street surface.

d. Lids that can be gravity operated shall be provided on all roofing kettles. The tops and covers of all kettles shall be constructed of steel sheet having a thickness of not less than one and nine tenths millimeters (1.9 mm) (*No. 14 Manufacturers' Standard Gauge*) that is close fitting and attached to the kettle with hinges that allow gravity to close the lid.

e. The chassis shall be substantially constructed and capable of carrying the load imposed upon it whether it is standing still or being transported.

f. Fuel containers, burners, and related appurtenances of roofing kettles in which LPG is used for heating shall be in accordance with Section 10.3.7.8 of this RIRR.

g. Fuel containers that operate under air pressure shall not exceed seventy-six liters (76 L) in capacity.

h. All fuel containers shall be maintained in accordance with applicable PNS, NFPA and other internationally accepted codes and standards or shall be at least three meters (3 m) from the burner flame or at least six tenths meter (0.6 m) therefrom when properly insulated from heat or flame.

H. **Asbestos Removal**

1. The C/MFM having jurisdiction shall be notified twenty-four (24) hours prior to the commencement and closure of asbestos removal operations.

2. Approved signs shall be posted at the entrance, exit and exit access door, decontamination areas, and waste disposal areas for asbestos removal operations.

   a. The signs shall state that asbestos is being removed from the area; that asbestos is a suspected carcinogen; and that proper respiratory protection is required.

   b. Signs shall have a reflective surface, and lettering shall be a minimum of fifty-one millimeters (51 mm) high.

3. Handling, storage and transportation of asbestos shall be in accordance with RA 6969, *Toxic Substances and Hazardous and Nuclear Wastes Control Act of 1990* and DENR Administrative Order No. 2000-02, *Chemical Control Order for Asbestos*.

CHAPTER 5. MISCELLANEOUS SAFETY MEASURES

DIVISION 1. WATER AND WASTE WATER TREATMENT PLANTS

SECTION 10.5.1.1 SCOPE

This Division shall cover the fire safety measures and explosion prevention at water and waste water treatment units, plants or facilities, including but not limited to their unit processes and operations, such as collection and pumping, liquid and solid treatment systems, and related appurtenances, service areas and premises.

SECTION 10.5.1.2 GENERAL SAFETY PRACTICES

A. Basic control procedures shall be adopted by the plant owner or operator to minimize potential fire and explosion incidents in water or waste water treatment plants, and shall be contained in the FSCR or FSMR as prerequisite for the issuance of FSC and/or FSIC by the C/MFM having jurisdiction. It shall include hazard evaluation, process and equipment controls, ventilation, materials of construction, and education.

B. Observance of fundamental electrical safety practices shall be pursued by the plant owner or operator through proper electrical classification of hazardous locations, and the proper selection, installation, and operation of electrical equipment, motors, and devices that are suitable for these locations. Electrical systems, devices and installations, and its operations and maintenance shall comply with the latest edition of PEC and manufacturer's instructions and in cases where applicable, with the NFPA 70, NEC and other internationally accepted standards.

C. The plant owner or operator or their duly authorized representatives shall ensure that the handling of chemicals, fuels and materials used, including but not limited to solvents, oxidizing materials, chlorine, lime, hydrogen, oxygen, acetylene, petroleum liquids, oils, and a variety of chemicals and specialty gases used in treatment processes, laboratory analyses and instrumentation calibration, and generated wastes in or around water or waste water treatment plants that present potential hazards of fire and explosion, shall be made in compliance with the applicable provisions of this RIRR.

SECTION 10.5.1.3 HAZARD EVALUATION

A. A hazard evaluation shall be initiated early in the design process and hazard prevention and protection recommendations shall be integrated into plant process specifications and design considerations.

B. Identification of potential hazards associated with the raw water or raw waste water entering the plant, the materials used in the treatment processes, and materials or wastes produced by the treatment processes and operations shall be completely understood and evaluated.

C. Risk evaluation shall prescribe specific control measures to be incorporated at the design stage of the plant, as well as during the operation and maintenance of the plant. These measures shall include, but not be limited to, address fail-safe design, emergency controls, redundant instrumentation, occurrence of leaks and spills, venting and pressure relief systems, pipe and equipment support, anchorage and vibration prevention, and damage limiting construction in relation to fire and/or explosion.

D. Special attention shall be given to more potential hazards associated with fuel gases, sewer and sludge gases, specialty gases, liquids, solids, dusts, their mixture or when mixed or reacted with oxygen or other gases, construction and maintenance materials, repairs and welding, cutting and other hotworks as sources of ignition, fire and/or explosion. As a result of this evaluation, a written plant safety plan shall be prepared and carried out through an integrated safety program, done and implemented in close coordination with the C/MFM having jurisdiction.

E. The evaluation shall be reviewed and updated periodically as conditions at the plant change. A report shall be prepared and maintained by the plant operator/owner and shall be made available to the C/MFM having jurisdiction.

SECTION 10.5.1.4 PROCESS AND EQUIPMENT CONTROL

A. Plant processes and equipment operations manuals shall be prepared and made available at all times to plant technicians and/or operators at their respective stations, readily made accessible for reference, even to the Fire Safety Inspectors. These manuals shall identify or prescribed control of fire and explosions, covering among others the removal of possible accumulation of source of fuel or explosive materials, limitation of oxygen required for combustion, removal of sources of ignition, and means of fire suppression and explosion venting (prevention) and shielding (protection), as well as emergency evacuation when applicable.

B. Identification of different potential sources of ignition shall be considered in each part of the plant system, whether collection, liquid treatment, solid treatment, or fuel and chemical handling. Control of ignition resulting from one (1) or more causes, such as open flames and hot surfaces, electrical arcs, sparks, or chemical reactions, shall be covered by the above-mentioned manuals and shall comply with the applicable provisions of this RIRR and/or in applicable cases by therein adopted Code of Practices prescribed by the manufacturer or internationally accepted standards.

C. To address control and/or reduce the potential for ignition within the plant, the following measures are prescribed:

   1. All entry sites within a plant, collection system, manholes, pumping stations and other facilities shall be properly protected from unauthorized entries. It shall be provided with

appropriate security system and protection by or in combination of security fencing, lockable gates/doors, at least two (2) hours fire rated compartmentation, posting of guards and/or installation of electronic video camera monitoring system as applicable, and made accessible only to authorized personnel and/or persons in authority.

2. Introduction of ignition sources at these sites, as well as other parts of the plant, shall be limited and regulated by an accepted life and safety procedural guidelines, supervised by a Fire Safety Practitioner. As a general rule, introduction of ignition sources in these sites or areas shall be limited and adequate ventilation shall always be provided. Provided further, in cases where welding, cutting and other hotworks or repair, rehabilitation, maintenance and other related activities that may introduce ignition are carried in a water or wastewater treatment plant, an appropriate FSC shall first be secured from C/MFM having jurisdiction.
3. Removal by vacuum or coverage with foam shall be necessary in the event that a foreign combustible material enters the sewer system.
4. Chemicals and fuels shall always be stored in accordance with applicable provisions of this RIRR and/or manufacturer's instructions or international acceptable standards as adopted in the plant. In cases of having two (2) or more degrees of safety, the most stringent degree of requirement shall prevail.

SECTION 10.5.1.5 VENTILATION

A. Ventilation rates for enclosed spaces containing used water or waste water exposed to the atmosphere shall be based on the calculated vaporization rate of the most volatile liquid anticipated to be present in the plant.

B. In considering ventilation requirements, the designer shall base his/her calculations upon the surface area of channels, tanks, or other vessels containing the used water or waste water exposed to atmosphere, the temperature of used water or waste water, the ambient air temperature, and the vaporization rate of the volatile liquid. Allowance shall be made for vaporization of volatile liquid from the free water surface in connecting sewers within a reasonable distance from the structure, turbulence that may accelerate vaporization of the volatile liquid, inefficiency of the ventilation system in purging the enclosures, and any other factors that the designer could reasonably expect to effect the rate of release of the flammable vapour to the structure.

C. Ventilation rate shall conform to Annex A, Table 51**,** *Minimum Ventilation Rates in Water and Waste Water Treatment Plants* which presents typical ventilation rates for various areas in the treatment plants or shall be based on actual calculations whichever is greater.

SECTION 10.5.1.6 MATERIALS OF CONSTRUCTION

A. For the purpose of this RIRR, the selection and/or usage of materials for the construction of treatment plants shall require the understanding of its classification and suitability of its application as divided in three basic categories, such as: (1) combustible, (2) non-combustible, and (3) limited combustibility, and shall comply with NFPA 220, *Standards Types of Building Constructio*n, or applicable internationally accepted standards for treatment plants.

B. Construction materials being considered for treatment plants shall be selected based on the fire hazard and fire risk evaluation. The application of these materials shall be based on the reduction or elimination of the effects of fire or explosion by maintaining structural integrity, controlling fire spread and smoke generation, preventing the release of toxic products of combustion, and maintaining serviceability and operation of the facility.

C. All buildings or unit processes that are considered critical to the integrity of treatment plants shall be of non-combustible type and shall be constructed in accordance with the latest edition of National Building Code of the Philippines (NBCP). Fire safety measures in buildings as prescribed in this RIRR and other internationally accepted standards shall also be observed.

D. In specific cases for waste water treatment plants, notwithstanding the applicability of some provisions to water treatment plants for similar applications, the following prescriptions shall be observed strictly:

1. Sewers that handle or may handle flammable or hazardous materials shall be of non-combustible materials.

2. Manholes, factory-built pumping stations, and other structures entered by personnel that handle raw or partially treated waste water shall be constructed only of non-combustible materials.
3. Non-combustible materials shall be used for air supply and exhaust systems. Provided, in cases when combustible or limited combustible materials are used to control corrosion, approved smoke and fire dampers shall be installed. A separate smoke ventilation system shall be preferred; however, smoke venting shall be allowed as integrated into normal ventilation system using automatic or manually positioned dampers and motor speed control.
4. No cellular or foamed plastic materials shall be used as interior finish. Interior finishes shall provide a maximum degree of fire resistance, with minimum flame spread rate and smoke generation for particular application. This information shall be secured from material manufacturers and supported by test certificates attesting to its validity.
5. In cases of plastic or fibreglass-reinforced plastic products and/or materials of construction in unit process, such as rotating biological contactors, bio-towers, filters or trickling filters, inclined plate or tube settlers, ventilation ducts, and other equipment which may be subject to corrosion, extreme care shall be taken with open flames, such as cutting torches, during maintenance or repair operations, as these materials may present a considerable fuel load, if ignited.

SECTION 10.5.1.7 EDUCATION

A. The role of education in the promotion of general safety and mitigation measure shall be given importance in this particular case. In-house training programs, such as but not limited to plant emergency organization, and housekeeping, operation, repair and maintenance (preventive and rehabilitation), first aid, occupational health and safety, fire prevention and suppression techniques, for all plant personnel shall be established. A priority objective shall be to provide information on how to (1) understand, (2) identify, (3) prevent, and (4) handle hazardous sources or situation relating to potential fire, explosion, and toxicity problems.

B. A close liaison shall be established, pursued and sustained between the C/MFM having jurisdiction, including other authorized emergency personnel, and treatment plant's owner or operator, specially its safety personnel so that mutually approved emergency procedures, including familiarity of the plant, shall be established.

SECTION 10.5.1.8 FIRE PROTECTION

The fire protection and suppression measures in treatment plants shall include but not be limited to the following:

A. **Automatic Sprinkler Systems**

Approved, supervised sprinkler systems shall be installed in buildings or structures located at the treatment plant in accordance with Section 10.2.6.7 of this RIRR and/or other internationally accepted standards. Provided further, that in certain areas, such as chemical storage areas, underground tunnels or structures, or areas where electrical hazard is a principal concern, the use of other appropriate fire protection measures shall be considered based on manufacturer's instructions and/or internationally accepted standards, subject to the evaluation and approval of the C/MFM having jurisdiction.

B. **Chemical Suppression System**

Clean agent, chemical wetting agent, foam, and dry chemical systems shall be installed or used whenever applicable, in buildings or structures located at treatment plants based on manufacturer's instructions and/or internationally accepted standards, subject to the evaluation and approval of the C/MFM having jurisdiction.

1. Chemical wetting agents, ionized water mists, and foam extinguishing systems shall be used, whenever applicable, for wet wells, grit and screening processes, primary clarifiers, and pits and tanks, where floating flammable liquid may collect on the surface.
2. Clean agents, ionized water mists, inert gas suppressants, and carbon dioxide extinguishing systems shall be used, whenever applicable, where electronics and computer equipment are located.
3. Clean agent, ionized water mists, carbon dioxide, and dry chemical extinguishing systems shall be considered or used in chemical storage areas, underground tunnels or structures, or where electrical hazard is a principal concern and where water damage would seriously impair the integrity of the treatment plant.

C. **Standpipes and Hydrants**

Standpipes, hose streams, and hydrants shall be provided where appropriate in buildings or structures located at treatment plants in accordance with Section 10.2.6.8 of this RIRR and/or other internationally accepted standards.

D. **Fire Suppression Supply Systems**

1. Water supplies shall be capable of delivering the total demand of sprinklers, hose streams, foam and other chemical systems in accordance with Sections 10.2.6.7 and 10.2.6.8 of this RIRR.
2. In areas where there is no public water supply or where the public water supply is inadequate, treatment plant effluent or recycled water shall be used for fire protection.
3. In cases when the plant water system is used as the principal source for fire protection, the system shall be capable of providing an adequate quantity and pressure, and have sufficient standby capacity to meet all fire water flow requirements. If the plant water system is used as back up to public water supply, the system shall provide easy access and connections for pumper equipment or firefighting apparatus.
4. When fire pumps are the source of supply used in the plant water system, multiple pumps with sufficient capacity to meet fire flow requirements, even with the largest pump out of service shall be provided. Pumps used shall be automatic starting with manual shutdown or mechanical equipment.

E. **Fire Extinguishers**

Portable fire extinguishers of appropriate types shall be provided in buildings or structures located at treatment plant in accordance with Section 10.2.6.9 of this RIRR and/or other internationally accepted standards. In some areas of treatment plant, such as basements, underground pipe galleries connecting buildings, and other areas which are not occupied continuously, optional reduction of the portable units shall be considered and may be requested, depending on frequency of occupancy, intended use and equipment contained in the space, and hazards potential for fire and/or explosion subject to the evaluation and approval of the C/MFM having jurisdiction.

F. **Special Fire Protection and Miscellaneous Measures**

Special fire protection and miscellaneous measure shall be considered in some treatment plants and processes having unique problems or situations, such as but not limited to the following:

1. Applicable special or alternative fire protection measures during construction at both new and existing treatment plant facilities shall be considered based on safety to life, protection of property, and potential for delays in construction, as well as plant or unit process start up as recommended by qualified Fire Safety Practitioner and subject to the evaluation and approval of the C/MFM having jurisdiction.
2. Lightning protection shall be provided for structures in accordance with the latest edition of PEC and NFPA 780, *Lightning Protection Guide, Appendix L (Principles of Lightning Protection)*.
3. Traffic flow and crowd management arrangements shall be made to permit rapid entry to the plant by firefighters, police and other authorized personnel of concerned government agencies, in cases of fire or other emergencies.
4. The plant emergency organization, where provided, shall be properly instructed and trained in the use of all fire protection equipment located at the treatment plant.
5. Early detection and notification system in case of fire and explosion shall also be established to protect the integrity of the buildings and unit processes. Protective measures to detect flame, heat or smoke shall be selected and installed where needed in accordance with Section 10.2.6.4 of this RIRR and/or manufacturer's instruction and other internationally accepted standards, subject to the evaluation and approval of the C/MFM having jurisdiction.
6. Where appropriate, central station, local protective auxiliary, remote station, or proprietary sprinkler water flow alarms shall be provided based on manufacturer's instructions and/or other internationally accepted standards, subject to the evaluation and approval of the C/MFM having jurisdiction.

DIVISION 2. SMOKING

SECTION 10.5.2.1 DESIGNATED AND PROHIBITED SMOKING AREAS

A. In areas where flammable and combustible materials are stored or handled, "**NO SMOKING**" signages shall be posted in each building, structure, room or place in which smoking is prohibited. Such signs shall be conspicuously and suitably located. The C/MFM having jurisdiction shall designate specific safe locations, if necessary, in any building structure, or place in which smoking may be permitted.

B. It shall be unlawful for any person during that period of the year declared by the C/MFM having jurisdiction as the hazardous season, to light, ignite or smoke any tobacco, cigarette, pipe, or cigar in or upon any brush or forest covered land or land covered with flammable materials. However, nothing in this Section shall apply to the area within the boundaries of any established smoking areas as designated by the C/MFM having jurisdiction.

SECTION 10.5.2.2 NO SMOKING SIGNAGES

A. The letters "**NO SMOKING**" shall be made readable and recognizable within a minimum distance of fifteen and twenty-five hundredths meters (15.25 m) at any given time, at least one hundred millimeters (100 mm) high preferably with white-colored letters upon a red background. The posting location of such signs shall be in conspicuous places or as deemed required by the C/MFM having jurisdiction.

B. Likewise, the designated smoking areas shall be properly identified by the placement of a signage identifying such area on its entrance. Such area shall adopt precautionary measures relative to fire safety.

C. In no case shall a signage of "**SMOKING AREA**" be of different color from the "**NO SMOKING**" sign. The "**SMOKING AREA**" sign shall be posted on the entrance of the area designated as such.

DIVISION 3. MANUFACTURE AND SALE OF FIRE EXTINGUISHERS

SECTION 10.5.3.1 SCOPE

This Division prescribes the guidelines for the regulation of fire safety measures in the manufacture, sale, servicing and maintenance of fire extinguishers, including but not limited to prescribing standards and requirements thereof.

SECTION 10.5.3.2 MANUFACTURE AND SALE

No person shall engage in the manufacture, sale or servicing of fire extinguishers unless an FSIC is obtained from the C/MFM having jurisdiction, as a prerequisite for the grant of permit or license by the DTI.

An FSIC shall be issued only upon payment of two per centum (2%) of the manufacturer's/ dealer's/servicing firm's gross sales.

A. **Standards**

1. All locally manufactured fire extinguishers shall be classified, tested and rated in accordance with the PNS No. 27:1984, *Rules for Classification, Fire Testing and Rating of Portable Fire Extinguishers* or latest PNS**.** Provided that in the absence, non-coverage or limitation of existing PNS on other quality standard requirements, adoption of other internationally accepted standards and/or alignment to the International Organization for Standardization (ISO) norms shall be applicable for its manufacture, including but not limited to its containers (cylinders or tanks), types of chemical extinguishing agents used, accessories and ancillary devices.
2. All extinguishers that are made and imported from other countries shall be considered acceptable when manufactured in accordance with International Organization for Standardization (ISO) norms and/or internationally accepted standards and/or listings or certifications, such as but not limited to the following agencies:
   a. National Fire Protection Association (NFPA)
   b. Underwriter Laboratory, Incorporated (UL)
   c. Factory Manual, Incorporated (FM)
   d. American National Standards Institute (ANSI)

e. Loss Prevention Certification Board (LPC or LPCB)

f. European Committee for Standardization (CE or CEN)

g. Australia Standards Association (ASA)

h. Japan Industrial Standard Committee (JIS or JISC)

i. Korea Fire Industry Technology Institute (KFI)

3. Nothing in this Section shall be construed as to preclude the use of other standards, if and when, such standards are proven to be equal or more stringent that the above-listed standards, as evaluated and recommended by the Fire Code Technical Staff and approved by Chief, BFP.

B. **Fire Extinguishers Marks and Labels**

All fire extinguishers manufactured or sold in the Philippines shall be marked and labeled providing the following information:

1. Containers (tanks or cylinders) shall have permanent markings (stamped, pressed or embossed) that identify its manufacturer (e.g., logo or initials or abbreviation or symbols), date of manufacture/fabrication, lot number and applicable standards (e.g., ASME, ANSI, ASTM, etc.) or patent registration in case of original invention.
2. Basic product labels or marks presenting the following information, among others:
   a. Name, address, and contact details of the manufacturer and/or dealer
   b. Date of original filling of the container
   c. Chemical contents. The extinguishing agent shall be identified both under the common name and the chemical formula. Where the extinguishing agent is a formula, details on their proportions shall likewise be indicated.
   d. Type of extinguishers
      1) Whether or not useful for Class A, B, C, or D fires for locally manufactured types or appropriate classifications for imported types based on adopted standards; and
      2) Numerical rating of the extinguisher.
   e) Opening instructions
   f) Safety procedure in usage

C. **Tagging of Serviced Fire Extinguishers**

Whenever any person duly qualified by the DTI or its equivalent services a fire extinguisher, a tag shall at least indicate:

1. The month and year the services are performed;
2. The chemical name and formula of the contents;
3. The type of extinguisher serviced; and
4. The name, address, contact details and certificate of registration number of the servicing firm.

SECTION 10.5.3.3 PREVENTIVE MAINTENANCE

A. Preventive maintenance audit of fire extinguisher shall be conducted periodically by the building owners or persons responsible in accordance with the PNS No 27:1984, at least once (1) every twelve (12) months.

B. If after inspection it shows that servicing is necessary, it shall be performed by the legitimate supplier/manufacturer duly licensed by DTI.

SECTION 10.5.3.4 PROHIBITED TYPES OF EXTINGUISHERS

The following types of fire extinguishers and/or extinguishing agents are prohibited for manufacture or sale:

A. All inverting types which require inversion of the extinguisher before its operation;

B. Soda-acid extinguishers;

C. Stored pressure or cartridge-operated foam solution, water or loaded stream;

D. Vaporizing liquids (e.g., carbon tetrachloride);

E. Thermal special hazards single station extinguishers with extinguishing capability of less than four and a half cubic meters (4.5 m^3);

F. Fire extinguishers containing Ozone Depleting Substances (ODS) in accordance with the phase out schedule by DENR; and

G. Other types which may be prohibited and banned hereinafter by proper authorities.

SECTION 10.5.3.5 PROHIBITED ACTS

The following are declared prohibited acts with regard to fire extinguishers:

A. Removal of inspection tags attached to fire extinguishers.

B. Refilling a discharged extinguisher with an extinguishing agent other than what the unit was designed to contain.

C. Selling extinguishers not appropriate to the hazard.

D. Selling any extinguisher prohibited under Section 10.5.3.4 of this RIRR.

E. Selling defective or substandard extinguishers.

F. Using/installing two (2) or more thermal special hazard vaporizing liquid unit in rooms with volume greater than the nominal capability of one (1) unit.

G. Installing pressure gauges in fire extinguishers that do not indicate the actual pressure of the interior of the fire extinguisher, such as but not limited to, using defective or not calibrated gauges; not providing, or blocking the connection between the gauge and the interior; or fixing/tampering the indicator or needle to indicate a certain pressure.

DIVISION 4. OPEN BURNING

SECTION 10.5.4.1 WHEN ALLOWED

Open burning is allowed provided that an FSC shall first be obtained from the C/MFM having jurisdiction.

SECTION 10.5.4.2 EXCEPTIONS

An FSC shall not be required in the following:

A. Fires for outdoor food cooking/preparation, provided that such fire is built and maintained in a pit fully containing the fire, or a fire proof container made of brick, stone, metal or other fire proof material to prevent fire from spreading.

B. Fires that are used for recreation and ceremony such as symbolic torch, camp fires, and religious/cultural fires, provided that burning must be attended and supervised at all times.

SECTION 10.5.4.3 PROHIBITION ON OPEN BURNING

The following acts shall be prohibited:

A. When atmospheric conditions or circumstances make the fire hazardous or produce excessive or unnecessary smoke, soot, odors, visible emissions, heat, flame or radiation so as to cause nuisance, hazard or to violate other laws, rules and regulations, issuances and ordinances, specifically as provided under RIRR of RA 8749, such as:

   1. burning using any materials in any quantities which shall cause the emission of toxic and poisonous fumes. Such materials include but are not limited to plastic, polyvinyl chloride, polypropylene, paints, ink, wastes containing heavy metals, organic chemicals, petroleum related compound, industrial wastes, ozone depleting substances and other similar toxic and hazardous substances; and,

   2. burning or cause open burning of waste materials in the premises of any establishment, firm, company, government or private entity or organizations within the area of their jurisdiction, including recognized or unrecognized dumpsites in any quality or quantity.

B. Discarding burning objects or dropping any lighted match, cigar, cigarette or other burning substance, on or near combustible material or in places where fire is likely to occur.

C. Depositing hot ashes or cinders, or smoldering coals, or greasy or oily substances liable to spontaneous ignition, into any combustible receptacle.

D. Kindling of fire upon the land of another without permission of the owner thereof or his/her agent.

E. Use of sky lantern and the like.

SECTION 10.5.4.4 REQUIREMENTS

Outdoor burning, when authorized shall be subject to the following requirements:

A. The location thereof shall not be less than fifteen meters (15 m) from any structure and adequate provision is made to prevent fire from spreading to within fifteen meters (15 m) of any structure.

B. Burning is permitted only when wind direction and other meteorological conditions such as smoke and other pollutants will not present hazard to any public road, landing strip, navigable water, or have a negative effect on any building, structure or sensitive receptor/ electronic equipment.

C. Any residual fires and/or smoldering objects that continue to emit smoke shall be extinguished each day at the end of the burning activity.

D. Other fire safety measures necessary that may be imposed by the C/MFM having jurisdiction.

SECTION 10.5.4.5 PROCEDURES FOR OBTAINING FIRE SAFETY CLEARANCE

Application for FSC shall be filed in writing before the Office of the C/MFM having jurisdiction at least two (2) days prior to the date of burning.

SECTION 10.5.4.6 RESPONSIBLE PERSON FOR OUTDOOR BURNING

A. The applicant shall be the responsible person for outdoor burning who shall be present prior and during the burning activity. He shall be liable for the consequences, damages, or injuries resulting from the said burning.

B. The granting of the herein FSC does not exempt or excuse the applicant thereof from complying with all other applicable laws, ordinances, regulations and orders of governmental entities having jurisdiction.

DIVISION 5. INCINERATOR

Incinerators shall comply with the Implementing Rules and Regulations of Republic Act No. 8749, *Clean Air Act*.

DIVISION 6. USE OF EQUIPMENT, APPLIANCES, DEVICES AND VACANT BUILDINGS

SECTION 10.5.6.1 TOY BALLOONS

No person without any authority from the C/MFM having jurisdiction shall inflate any toy balloon or other similar device with any toxic, explosive or flammable gas, or sell, give away or furnish any such balloon/device when so inflated. Open flame shall be prohibited in the vicinity where toy balloons are inflated, or where inflated toy balloons are present.

SECTION 10.5.6.2 TRACER BULLETS AND SIMILAR DEVICES

No person shall possess or fire or discharge or cause to be fired any tracer bullet or tracer charge, or any type of projectile or device, such as fireworks, that discharges smoldering or flammable material, in any brush or grass-covered area, or any area where flammable materials are present.

SECTION 10.5.6.3 ASPHALT KETTLES

It shall be unlawful to transport over any highway, road or street any asphalt kettle beneath which is being heated by an open fire, coals or ashes. Heating of asphalt kettles inside or on the roof of any building shall be done only with an FSC issued by the C/MFM having jurisdiction. There shall be at least one (1) approved fire extinguisher of a minimum 12-B or C classification within nine meters (9 m) of each asphalt kettle being heated and one (1) additional fire extinguisher of 16-B or C classification in the area of work being covered.

SECTION 10.5.6.4 ELECTRICAL WIRING AND OTHER DEVICES

A. **Use and Installation**

It shall be unlawful to use and/or install any electrical wiring appliance, apparatus or device in violation of the latest edition of the PEC.

B. **Fire Hazard**

The C/MFM having jurisdiction shall notify the local Building Official of the existence of any hazardous electrical installation. He/She may order the use of such installation discontinued immediately until correction or the hazard be effected.

SECTION 10.5.6.5 TRAPDOORS TO BE CLOSED

All trapdoors and scuttle covers, except those that are automatic in their operations, in any building other than single-family dwelling, shall be kept closed at all times, in order to prevent the easy passage of smoke and heat in case of fire.

SECTION 10.5.6.6 SHAFTWAYS TO BE MARKED

To preclude accidents during fire operations, every outside window in a building used for manufacture purposes or for storage which opens directly on any hoist way or other vertical means of communication between two (2) or more floors in such buildings shall be plainly marked with the word **"SHAFTWAY"** in red letters, at least one hundred fifty millimeters (150 mm), on a white background. Such warning sign shall be placed as to be easily discernible from the outside of the building. Every door or window opening on such shaftway from the interior of the building shall be similarly marked with the warning word **"SHAFTWAY"** so placed as to be easily visible to anyone approaching the shaftway from the interior of the building.

SECTION 10.5.6.7 USE OF TORCHES OR FLAME-PRODUCING DEVICES FOR REMOVING PAINT

Any person using a torch or other flame-producing device for removing paint from any surface within a building or structure shall secure an FSC issued by the C/MFM having jurisdiction and provide one (1) approved fire extinguisher or water hose equipped with a suitable nozzle, sufficient in length to reach all portions of the building, and connected to the water supply on the premises where such operation is being done. In all cases, the person doing the removal of paint shall remain on the premises one (1) hour after the torch or flame-producing device has been used.

SECTION 10.5.6.8 HAZARDOUS WARNING LIGHTS

It shall be unlawful to maintain any torch or lantern utilizing an open flame along any excavation or road, or any place where the dislodgement of such torch or lantern might permit the same to roll, or slide on to any brush-covered land, or any land containing flammable material.

SECTION 10.5.6.9 OPEN FLAME DEVICES IN PORTS/WHARVES

A. No person shall use any open flame device for maintenance or repair on any boat, ship or wharf without a permit from the Philippine Coast Guard (PCG) and/or the Philippine Port Authority (PPA).

B. No person shall use any portable barbecue, brazier or cooking device on any boat, ship or wharf without a permit from the PCG and/or the PPA.

C. Any open flame device used for lighting or decoration on the exterior of any boat, ship or wharf must be approved by the PCG and/or the PPA.

SECTION 10.5.6.10 VACATING PREMISES

Upon vacating or abandoning any premise, the occupant thereof shall remove any and all noxious and hazardous material or waste matter which has been deposited, allowed to come to rest, or permitted to accumulate thereon, and such premises shall be left in clean and neat condition.

SECTION 10.5.6.11 VACANT BUILDINGS

Every person owning, or in charge or control of, any vacant building shall remove therefrom all accumulation of flammable or combustible waste or rubbish and shall securely lock, barricade, or otherwise secure all doors, windows and other openings thereof.

SECTION 10.5.7.1 HYDRANT

A. Project developers or owners of housing or condominium projects shall provide a hydrant system and develop the source of water used for the purpose of providing adequate water supply for fire suppression use on both economic and socialized housing in connection with RA 9514 and its RIRR. The maximum distance of fire hydrants shall not exceed two hundred fifty meters (250 m) and capable of delivering water of at least three thousand seven hundred eighty-five liters per minute (3,785 L/min) for one (1) hour.

B. Industrial/Storage Occupancy with a floor area of five thousand square meters (5,000 m^2) shall provide at least one (1) fire hydrant.

C. Local Government Units (LGUs) in coordination with the BFP shall provide each community with fire hydrants and cisterns or elevated tanks that will suffice the requirement pertaining to provision of water for firefighting operation.

D. All reservoir or water tanks must provide a twenty per centum (20%) fire reserve over and above the Average Daily Demand Supply (ADDS).

E. In communities where no public water supply is available, a water well or any other devices with water impounding capability shall be provided.

F. Posting of **"NO PARKING"** signage near fire hydrants.

SECTION 10.5.7.2 FIRE DEPARTMENT ACCESS ROADS

Fire department access roads shall be provided and maintained in accordance with the following:

A. Approved fire department access roads shall be provided for every facility, building, or portion of a building hereafter constructed or relocated, the height and width of which shall be able to accommodate the largest fire apparatus of the nearest fire station.

B. When fire department access roads cannot be provided due to location on property, topography, waterways, nonnegotiable grades, or other similar conditions, the C/MFM having jurisdiction shall be authorized to require additional fire protection features.

C. A fire department access road shall extend to within fifteen meters (15 m) of at least one (1) exterior door that can be opened from the outside and that provides access to the interior of the building.

D. Fire department access roads shall be provided such that any portion of the facility or any portion of an exterior wall of the first storey of the building is located not more than forty-six meters (46 m) from fire department access roads as measured by an approved route around the exterior of the building or facility.

E. When buildings are protected throughout with an approved automatic sprinkler system installed in accordance with Section 10.2.6.7 of this RIRR, the distance shall be permitted to be increased to one hundred thirty-seven meters (137 m).

F. Multiple access roads for the fire department shall be provided upon determination by the C/MFM having jurisdiction if a single road access is impaired by vehicle congestion, condition of terrain, climatic conditions, or other factors that limit the said access. The following might warrant multiple fire department access roads:

   1. Railroad tracks that cross a single fire department access road;
   2. Potential for mud slides along a single fire department access road;
   3. Single fire department access road that is below the one hundred-year (100-year) flood elevation; and
   4. Commercial or residential projects that generate large traffic counts on fire apparatus access roads.

G. Fire department access roads shall have an unobstructed width of not less than six and one tenth meters (6.1 m).

H. Fire department access roads shall have an unobstructed vertical clearance of not less than four and one tenth meters (4.1 m)

I. Vertical clearance shall be permitted to be reduced, provided such reduction does not impair access by fire apparatus, and approved signs are installed and maintained indicating the established vertical clearance when approved.

J. Vertical clearances or widths shall be increased when vertical clearances or widths are not adequate to accommodate fire apparatus.

K. Fire department access roads should be kept clear of obstructions such as parked vehicles, fences and other barriers, dumpsters, and excess vegetation.

L. Fire department access roads should be kept clear of obstructions such as parked vehicles, fences and other barriers, dumpsters, and excess vegetation.

SECTION 10.5.7.3 DESIGNATION OF FIRE LANE

The C/MFM having jurisdiction shall direct the installation of fire lanes, signages or other approved notices for emergency use in coordination with concerned government agencies.

A. Curb top and side shall be painted red and the words **"FIRE LANE"** shall be stenciled on the top and side of all red curbs at a maximum interval of fifteen and twenty-four hundredths meters (15.24 m). Letters shall be seventy-six millimeters (76 mm) in height with a minimum nineteen millimeters (19 mm) in stroke.

B. Outlining or painting the fire lane area in red with the words **"FIRE LANE NO PARKING"** in white, at intervals of not more than fifteen and twenty-four hundredths meters (15.24 m) or as otherwise directed by the BFP. Size of lettering shall be not less than six hundred ten millimeters (610 mm) in height and seventy-six millimeters (76 mm) in stroke.

C. Fire lane shall have an unobstructed width of not less than six and one tenth meters (6.1 m) and shall have an unobstructed vertical clearance of not less than four and one tenths (4.1 m).

D. Fire lane shall be provided such that any portion of the facility or any portion of an exterior wall of the first storey of the building is located not more than forty-six meters (46 m) from fire department access roads as measured by an approved route around the exterior of the building or facility.

E. The enforcement of fire lanes involving public roads shall be the responsibility of the BFP in coordination with the LGU and other concerned government agencies.

RULE 11. PROHIBITED ACTS

SECTION 11.0.0.1 PROHIBITED ACTS AND OMISSIONS

The following are declared as prohibited acts and omissions:

A. Obstructing or blocking the exit ways or across to buildings clearly marked for fire safety purposes, such as but not limited to aisles in interior rooms, any part of stairways, hallways, corridors, vestibules, balconies or bridges leading to a stairway or exit of any kind, or tolerating or allowing said violations;

B. Constructing gates, entrances and walkways to building components and yards, and temporary or permanent structures on public ways, which obstruct the orderly and easy passage of firefighting vehicles and equipment;

C. Prevention, interference or obstruction of any operation of the Fire Service, or of duly organized and authorized fire brigades;

D. Obstructing designated fire lanes or access to fire hydrants;

E. Overcrowding or admission of persons beyond the authorized capacity in movie houses, theaters, coliseums, auditoriums or other public assembly buildings, except in other assembly areas on the ground floor with open sides or open doors sufficient to provide safe exits;

F. Locking fire exits during period when people are inside the building;

G. Prevention or obstruction of the automatic closure of fire doors or smoke partitions or dampers;

H. Use of fire protective of firefighting equipment of the Fire Service other than for firefighting except in other emergencies where their use are justified;

I. Giving false or malicious fire alarms;

J. Smoking in prohibited areas as may be determined by Fire Service, or throwing of cigars, cigarettes, burning objects in places which may start or cause fire;

K. Abandoning or leaving a building or structure by the occupant or owner without appropriate safety measures;

L. Removing, destroying, tampering or obliterating any authorized mark, seal, sign or tag posted or required by the Fire Service for fire safety in any building, structure or processing equipment; and

M. Use of jumpers or tampering with electrical wiring or overloading the electrical system beyond its designated capacity or such other practices that would tend to undermine the fire safety features of the electrical system.

RULE 12. FIRE CODE TAXES, FEES/CHARGES AND FINES

SECTION 12.0.0.1 SOURCES OF INCOME

Pursuant to Section 12, in relation to Section 13 of RA 9514, the following shall be the sources of income of the BFP:

A. Fees to be charged for the issuance of certificates, permits and licenses as provided for in Section 7 of RA 9514;

B. One-tenth of one per centum (0.10%) of the verified estimated value of buildings or structures to be erected, from the owner thereof, but not to exceed fifty thousand (PhP 50,000.00) pesos, at least fifty per centum (50%) to be paid prior to the issuance of the building permit, and the balance, after final inspection and prior to the issuance of Certificate of Occupancy;

C. One-hundredth of one per centum (0.01%) of the assessed value of buildings or structures annually payable upon payment of the real estate tax, except on structures used as single family dwellings;

D. Two per centum (2%) of all premiums, excluding re-insurance premiums for the sale of fire, earthquake and explosion hazard insurance collected by companies, persons or agents licensed to sell such insurances in the Philippines;

E. Two per centum (2%) of gross sales of companies, persons or agents selling firefighting equipment, appliances or devices, including hazard detection and warning systems; and

F. Two per centum (2%) of the service fees received from fire, earthquake, and explosion hazard reinsurance surveys and post loss service of insurance adjustment companies doing business in the Philippines directly through agents.

SECTION 12.0.0.2 FIRE CODE REVENUES

A. The classification of Fire Code revenues and rates are prescribed in the following schedule:

1. Fire Code Construction Tax. Tax prescribed in Section 12.0.0.1 (B) of this RIRR.
2. Fire Code Realty Tax. Tax prescribed in Section 12.0.0.1 (C) of this RIRR.
3. Fire Code Premium Tax. Tax prescribed in Section 12.0.0.1 (D) of this RIRR.
4. Fire Code Sales Tax. Tax prescribed in Section 12.0.0.1 (E) of this RIRR.
5. Fire Code Proceeds Tax. Tax prescribed in Section 12.0.0.1 (F) of this RIRR.
6. Fire Safety Inspection Fee. Fee charged for the conduct of Fire Safety Inspection equivalent to fifteen percent (15%) of all fees charged by the Local Government Unit or Philippine Economic Zone Authority (PEZA), but in no case shall be lower than Five Hundred Pesos (PhP500.00).
7. Storage Clearance Fee. Fee derived from storage of flammable and combustible materials.
8. Conveyance Clearance Fee. Fee derived from transporting flammable and combustible materials.
9. Installation Clearance Fee. Fee derived from installation of tanks, pipes of flammable and combustible substances, building installations, and other fire protection system and warning system.
10. Fire Code Fines. Fees derived from imposition of administrative fines and penalties.
11. Other Fees. Fees derived from fireworks display, fumigation/fogging, fire drill, hotworks, filing fees for FSEC, protest and appeal fee, and other clearances as provided under this RIRR.

B. The account codes of the above classified taxes, fees/charges and fines shall be prescribed by the Commission on Audit (COA).

SECTION 12.0.0.3 ASSESSMENT

A. The assessment of Fire Code taxes, fees/charges and fines as revenue is vested upon the BFP. However, the BFP may enter into agreement with the LGUs allowing the latter to be deputized as assessors. The Chief, BFP shall prescribe the procedural rules for such purpose, subject to the approval of the Secretary, DILG.

B. The Chief, BFP or the Regional Director having jurisdiction shall designate a Fire Code Fee Assessor in every City and Municipal BFP office upon recommendation of C/MFM having jurisdiction.

C. The Chief, BFP or his/her duly authorized representative shall exercise the general power to assess the prescribed Fire Code taxes, fees/charges and fines for installations, structures, facilities and operations not within the jurisdiction of any C/MFM or in any other conditions as the need thereto arises.

D. The result of the assessment shall be the basis for issuance of Order of Payment Slip (OPS) by the C/MFM having jurisdiction for purposes of collection and deposit.

E. In cases where there is apparent misdeclaration of any of the sources of income enumerated under Section 12.0.0.1 of this RIRR, nothing prohibits the BFP from reviewing the submitted documents.

SECTION 12.0.0.4 SCHEDULE OF FEES AND FINES

A. **Fees** – The following are the schedule of fees:

1. FSIC shall be issued upon payment of a fee as prescribed hereunder:

   a. FSIC for Certificate of Occupancy- Fifteen percent (15%) of all fees charged by the Office of the Building Official of the Local Government Unit (LGU) or Philippine Economic Zone Authority (PEZA), but in no case shall be lower than Five Hundred Pesos (PhP500.00).

   b. FSIC for Business Permit - Fifteen percent (15%) of all fees charged by the Local Government Unit, but in no case shall be lower than Five Hundred Pesos (PhP500.00).

   c. FSIC for annual inspection certificate - Fifteen percent (15%) of all fees charged by the PEZA, but in no case shall be lower than Five Hundred Pesos (PhP500.00).

2. **Storage Clearance Fee** - storage clearance shall be issued upon payment of a fee based on the storage capacity as indicated:

   a. Flammable/Combustible Solids

      1) Calcium carbide

STORAGE CAPACITY (in kilograms)	ANNUAL FEES (in PhP)
From 40 to 80	49.00
Over 80 to 200	63.00
Over 200 to 2,000	126.00
Over 2,000 to 4,000	189.00
Over 4,000 to 20,000	252.00
Over 20,000 to 40,000	315.00
Over 40,000 to 200,000	472.00
Over 200,000	630.00

      2) Pyroxylin

STORAGE CAPACITY (in kilograms)	ANNUAL FEES (in PhP)
From 40 to 200	42.00
Over 200 to 800	84.00
Over 800 to 2,000	168.00
Over 2,000 to 4,000	315.00
Over 4,000 to 12,000	630.00
Over 12,000 to 40,000	1049.00
Over 40,000	2097.00

3) Matches

STORAGE CAPACITY (in kilograms)	ANNUAL FEES (in PhP)
From 100 to 400	42.00
Over 400 to 2,000	210.00
Over 2,000 to 4,000	420.00
Over 4,000 to 20,000	839.00
Over 20,000	1,678.00

4) Nitrate, phosphorous, bromine, sodium, picric acid and other hazardous chemicals of similar flammable, explosive, oxidizing or lacrymatory properties:

STORAGE CAPACITY (in kilograms)	ANNUAL FEES (in PhP)
From 20 to 100	42.00
Over 100 to 400	63.00
Over 400 to 2,000	158.00
Over 2,000 to 4,000	315.00
Over 4,000 to 20,000	460.00
Over 20,000	630.00

5) Shredded combustible materials, such as wood shaving/excelsior (kusot), sawdust, kapok, straw and hay; combustible loose fibers: cotton waste (estopa), sisal, oakum; and other similar combustible shavings and fine materials:

STORAGE CAPACITY (in kilograms)	ANNUAL FEES (in PhP)
From 0.25 to 3	42.00
Over 3 to 14	112.00
Over 14 to 28	189.00
Over 28 to 70	315.00
Over 70	486.00

6) Tar, resin, waxes, copra, rubber, cork, bituminous coal and similar combustible materials:

STORAGE CAPACITY (in kilograms)	ANNUAL FEES (in PhP)
From 200 to 400	49.00
Over 400 to 4,000	98.00
Over 4,000 to 20,000	189.00
Over 20,000	315.00

b. Flammable/Combustible Liquids

1) For flammable liquids having flashpoint of -6.67°C or below, such as gasoline, ether, carbon bisolphide, naptha, benzol (benzene), collodion, aflodin and acetone.

STORAGE CAPACITY (in liters)	ANNUAL FEES (in PhP)
From 20 to 100	35.00
Over 100 to 200	42.00
Over 200 to 400	84.00
Over 400 to 2,000	168.00
Over 2,000 to 4,000	252.00
Over 4,000 to 6,000	350.00
Over 6,000 to 8,000	420.00

Over 8,000 to 10,000	504.00
Over 10,000 to 12,000	672.00
Over 12,000 to 14,000	839.00
Over 14,000 to 16,000	1,007.00
Over 16,000 to 32,000	1,259.00
Over 32,000 to 40,000	1,678.00
Over 40,000 to 200,000	2,517.00
Over 200,000 to 800,000	3,775.00
Over 800,000 to 2,000,000	5,033.00
Over 2,000,000 to 6,000,000	6,711.00
Over 6,000,000 to 8,000,000	8,388.00
In excess of 8,000,000	4.00/400 liters

2) For flammable liquids having flashpoint of above -6.67°C and below 22.8 °C such as alcohol, amyl, toluol, ethyl, acetate and like.

STORAGE CAPACITY (in liters)	**ANNUAL FEES (in PhP)**
From 20 to 100	32.00
Over 100 to 200	42.00
Over 200 to 400	63.00
Over 400 to 2,000	105.00
Over 2,000 to 4,000	168.00
Over 4,000 to 20,000	350.00
Over 20,000 to 100,000	839.00
Over 100,000 to 200,000	1,678.00
Over 200,000	2,097.00

3) For liquids having flashpoint of 22.8 °C to 93.3 °C, such as kerosene, turpentine, thinner, prepared paints, varnish, diesel oil, fuel oil, kerosene, cleansing solvent, polishing liquids and similar

STORAGE CAPACITY (in liters)	**ANNUAL FEES (in PhP)**
From 20 to 100	18.00
Over 100 to 200	28.00
Over 200 to 400	42.00
Over 400 to 4,000	105.00
Over 4,000 to 20,000	315.00
Over 20,000 to 40,000	420.00
Over 40,000 to 200,000	630.00
Over 200,000 to 400,000	1,049.00
Over 400,000 to 2,000,000	1,678.00
Over 2,000,000 to 3,600,000	1,748.00
Over 3,600,000	2,098.00

4) For combustible liquids having flash point greater than 93.3 °C that is subject to spontaneous ignition or is artificially heated to a temperature equal to or higher than its flash point, such as crude oil, petroleum oil and others.

STORAGE CAPACITY (in liters)	**ANNUAL FEES (in PhP)**
From 20 to 100	18.00
Over 100 to 200	28.00
Over 200 to 400	42.00

Over 400 to 2,000	84.00
Over 2,000 to 4,000	105.00
Over 4,000 to 80,000	315.00
Over 80,000	630.00

c. Flammable Gases

1) Liquefied Petroleum Gas (LPG) in liter water capacity

a) For bulk storage

STORAGE CAPACITY (in liters)	ANNUAL FEES (in PhP)
200 and below	70.00
Over 200 to 2,000	140.00
Over 2,000 to 8,000	280.00
Over 8,000 to 20,000	699.00
Over 20,000 to 200,000	1,398.00
Over 200,000 to 400,000	5,592.00
For every additional 4,000 liters or fraction thereof, in excess of 400,000	35.00

b) For other than bulk storage

STORAGE CAPACITY (in liters)	ANNUAL FEES (in PhP)
60 and below	6.00
Over 60 to 100	7.00
Over 100 to 200	11.00
Over 200 to 400	14.00
Over 400 to 800	28.00
Over 800 to 1,200	42.00
Over 1,200 to 2,000	56.00
For every additional 400 liters water capacity in excess of 2,000	4.00

2) Other flammable gases in liter water capacity

STORAGE CAPACITY (in liters)	ANNUAL FEES (in PhP)
From 20 to 100	21.00
Over 100 to 400	42.00
Over 400 to 2,000	126.00
Over 2,000 to 8,000	252.00
Over 8,000 to 40,000	630.00
Over 40,000 to 200,000	1,259.00
Over 200,000 to 400,000	1,888.00
Over 400,000	3,146.00

3. **Conveyance Clearance Fee** – Conveyance Clearance shall be issued to vehicles transporting any explosives, flammable liquids and combustible materials over streets, water, or through pipelines, to load and unload such explosives, flammable liquids or combustible materials in or from any vessel, boat, craft, or railway upon payment of fee based on their capacity by the owner of vehicles transporting flammable or combustible materials during his/her application for FSIC for business operation at his/her principal place of business, on the rate prescribed below:

a.	For each cargo truck, motor vehicle, tank truck, tank trailer, and tank semi-trailer carrying flammable or combustible liquids:	
	1) For first 2,000 liters	1,748.00
	2) For every additional 400 liters or fraction thereof	70.00

b.	For each cargo truck, or motor vehicle, tank truck, tank trailer, and tank semi-trailer carrying explosives and/or combustible materials, including hazardous chemicals and gases:	
	1) For the first 500 kilograms	1,049.00
	2) For every additional 100 kilograms or fraction thereof	70.00

c.	For loading and unloading to or from a boat, vessel, craft, or railway tank cars and the transfer of packages of containers of explosives, flammable liquids or combustible materials, including hazardous chemicals and gases at terminals or piers:	
	1) For the first 2,000 liters or kilograms	700.00
	2) For every additional 400 liters or 100 kilograms or fraction thereof not exceeding 40,000 liters or 10,000 kilograms	350.00
	3) For every additional 4,000 liters or 1,000 kilograms or fraction thereof in excess of 40,000 liters or 10,000 kilograms	35.00

d.	For transfer of flammable or combustible liquids to shore tanks at terminal, including the discharge of flammable or combustible cargo to bulk lighters undertaken at bay, and its subsequent transportation by water to petroleum wharves, or transfer by bulk lighters from said terminals to vessel at bay:	
	1) For the first 2,000 liters	700.00
	2) For every additional 400 liters or fraction thereof not exceeding 400,000 liters	175.00
	3) For every additional 4,000 liters or fraction thereof in excess of 400,000 liters	70.00

e.	For transfer or conveyance of flammable or combustible liquids or gas in bulk done by lighters or through pipelines:	
	1) For first 2,000 liters	700.00
	2) For every additional 400 liters or fraction thereof in excess of 2,000 liters	70.00

4. **Installation Clearance Fee** – For installation of gas and flammable and combustible liquid syste,k ms other than at bulk premises, installation of equipment, utilities, facilities mentioned in Section 10.2.7.1 to Section 10.2.7.5 of this RIRR, and installation of fire protection and warning systems, an Installation Clearance shall be issued upon payment of the amount prescribed below:

a.	Gases (LPG, CNG and other compressed gases exceeding 454 liters water capacity	280.00
	• For every additional 100 liters water capacity or fraction thereof in excess of 454 liters	70.00
b.	Flammable and combustible liquids in aboveground and underground tanks	1,049.00
c.	Equipment, utilities and facilities mentioned in Section 10.2.7.1 to Section 10.2.7.5 of this RIRR, and fire protection and warning system – One-tenth of one per centum (0.10%) of the verified estimated value of the equipment, utilities, facilities to be installed.	

5. **Other Fees** – for the issuance of clearances relative to the conduct of the following activities and/or authentication of documents:

a. Appeal Fee mentioned under Rule 14 of this RIRR	1,000.00
b. Certified true copy of Fire Safety Inspection Certificate, Building Fire Safety Clearance and Fire Clearance	350.00
c. Electrical Installation	
1) 5KVA or less	100.00
2) Over 5KVA to 50KVA	100.00 + 10.00/KVA
3) Over 50KVA to 300KVA	550.00 + 5.00/KVA
4) Over 300KVA to 1,500KVA	1,800.00 + 5.00/KVA
5) Over 1,500KVA to 6,000KVA	4,800.00 + 2.50/KVA
6) Over 6,000KVA	8,425.00 + 1.25/KVA
d. Filing Fee for Fire Safety Evaluation Clearance (FSEC)	200.00
e. Fire Drill	1,000.00
f. Fire Incident Clearance	350.00
g. Fire Prevention and Safety Seminar	2,000.00
h. Fireworks Display	1,049.00
i. Fumigation/Fogging	350.00
j. Open Flame	525.00
k. Protest Fee mentioned under Rule 14 of this RIRR	500.00
l. Soundstage and Approved Production Facilities and Locations (mentioned in para "B" of Section 10.2.19.6 and para "C" of Section 10.2.19.6 of this RIRR)	2,000.00
m. Welding, Cutting and Other Hotworks	
1) 1-5 welding/oxy-acytylene	500.00
2) 6-10 welding/cutting machine	1,000.00
3) more than 10 welding/cutting machine	1,500.00

B. **Administrative Fines –** The following is the schedule of Fire Code Administrative Fines:

1. Failure to provide safety measures for the manufacture, storage, handling, display and/or use of the following hazardous materials required in Section 7, paragraph (b) of Republic Act No. 9514.	
DESCRIPTION	**SCHEDULE OF FINES**
a. Cellulose nitrate plastic of any kind	PhP 2,843.20/kg or less, but not exceeding PhP 8,885.00
b. Combustible fibers	PhP 2,843.20/m^3 or less, but not exceeding PhP 28,432.00
c. Cellular materials such as foam rubber, sponge rubber and plastic foam	PhP 2,843.20/m^3 or less, but not exceeding PhP 28,432.00
d. Flammable and combustible liquids or gases of any classification	PhP 2,843.20/liter or less, but not exceeding PhP 50,000.00
e. Flammable paints, varnishes, stains and organic coatings	PhP 2,843.20/liter or less, but not exceeding PhP 17,770.00

f. High piled or widely spread combustible stock	PhP 568.64/m^3 or less, but not exceeding PhP 50,000.00
g. Metallic magnesium in any form	PhP 2,843.20/kilo or less, but not exceeding PhP 50,000.00
h. Corrosive liquids, oxidizing materials, organic peroxide, nitromethane, ammonium nitrate or any amount of highly toxic pyrophoric, hypergolic or cryogenic materials or poisonous gases as well as material compounds which when exposed to heat or flame become a fire conductor or generate excessive smoke or toxic gases	PhP 2,843.20 per kilogram/liter or less, but not exceeding PhP 50,000.00
i. Blasting agents, explosives and special industrial explosive materials, blasting caps, black powder, liquid nitro-glycerin, dynamite, nitro-cellulose, fulminates of any kind and plastic explosives containing ammonium salt or chlorate	PhP 14,216.00 per kilogram/liter or less, but not exceeding PhP 50,000.00
j. Liquid nitro-glycerine and liquid trinitrotoluene	PhP 28,432.00/liter or less, but not exceeding PhP 50,000.00
k. Firework materials of any kind or form	PhP 14,216.00 per kilogram or less, but not exceeding PhP 50,000.00
l. Matches in commercial quantities	PhP 2,843.20 per matchman gross, but not exceeding PhP 50,000.00
m. Hot ashes, live coals and embers	PhP 1,421.60/m^3, but not exceeding PhP 28,432.00
n. Mineral, vegetable or animal oils and other derivative/by-products	PhP 284.30 per liter in excess of twenty-five (25) liters, but not exceeding PhP 28,432.00
o. Recycling, reuse and resale of combustible and flammable liquids and other combustible waste materials for recycling or resale	PhP 284.30 /m^3, but not exceeding PhP 28,432.00
p. Explosive dusts and vapors	PhP 28,432.00 to PhP 50,000.00 per violation
q. Agriculture, forest, marine or mineral products which may undergo spontaneous combustion	PhP 2,843.20/m^3 or less, but not exceeding PhP 28,432.00
r. Any other substance with potential to cause harm to persons, property or environment because of one (1) or more of the following:	Similar nature shall be penalized accordingly
1) The chemical properties of the substance;	
2) The physical properties of the substance;	
3) The biological properties of the substance. Without limiting the definition of hazardous material, all dangerous goods, combustible liquids and chemicals are hazardous materials.	

2. Failure to provide safety measures for the following hazardous operations or processes as required in Section 7, para "C" of RA 9514.	
a. Welding, cutting and other hotworks	PhP 2,843.20 to PhP 28,432.00
b. Industrial baking and drying	PhP 28,432.00 to PhP 50,000.00
c. Waste Disposal	PhP 28,432.00 to PhP 50,000.00
d. Pressurized/forced-draft burning equipment	PhP 28,432.00 to PhP 50,000.00
e. Smelting and forging	PhP 37,500.00 to PhP 50,000.00
f. Motion picture projection using electrical arc lamp	PhP 2,843.20 to PhP28,432.00
g. Refining, distillation and solvent extraction	PhP 37,500.00 to PhP 50,000.00

3. Failure to provide safety measures for other hazardous operations or processes not included in the preceding enumeration but mentioned in Chapter 4 of Rule 10 of this RIRR	PhP 37,500.00 to PhP 50,000.00

4. Failure to provide the following safety construction, and protective and warning systems as required in Section 7, paragraph (d) of Republic Act No. 9514.	
a. Fire protection features such as sprinkler alarms, hose boxes, hose reels, standpipe alarms and other firefighting equipment	PhP 37,500.00 to PhP 50,000.00
b. Fire alarm systems	PhP 37,500.00 to PhP 50,000.00
c. Fire walls to separate adjoining property and storage areas from other occupancies in the same building	PhP 37,500.00 to PhP 50,000.00
d. Provisions for confining the fire at its source such as fire resistive floors and walls extending up to the next floor slab or roof, curtain boards and other fire containing or stopping components	PhP 37,500.00 to PhP 50,000.00
e. Termination of all exits in an area affording safe passage to a public way or safe dispersal area	PhP 37,500.00 to PhP 50,000.00
f. Stairways, vertical shafts, horizontal exits and other means of egress sealed from smoke and heat	PhP 37,500.00 to PhP 50,000.00
g. A fire exit plan for each floor of the building, showing the routes from each room to appropriate exits, displayed prominently on the door of each room	PhP 37,500.00 to PhP 50,000.00
h. Self-closing fire resistive doors leading to corridors	PhP 37,500.00 to PhP 50,000.00
i. Fire dampers in centralized air- conditioning ducts	PhP 37,500.00 to PhP 50,000.00
j. Roof vents for use of firefighters	PhP 37,500.00 to PhP 50,000.00
k. Properly marked and lighted exits with provision for emergency lights to adequately illuminate exit ways in case of power failure	PhP 37,500.00 to PhP 50,000.00

5. Failure to observe the following declared prohibited acts and omissions as required under Section 8 of Republic Act No. 9514.	
a. Obstructing or blocking the exit ways or across to buildings clearly marked for fire safety purposes, such as but not limited to aisles in interior rooms, any part of the stairways, corridors, vestibules, balconies or bridges leading to a stairway or exit of any kind or tolerating or allowing said violations	PhP 37,500.00 to PhP 50,000.00
b. Constructing gates, entrances and walkways to building components and yards, and temporary or permanent structures on public ways, which obstruct the orderly and easy passage of firefighting vehicles and equipment	PhP 37,500.00 to PhP 50,000.00
c. Prevention, interference and obstruction of any operation of the BFP or of duly organized and authorized fire brigades	PhP 37,500.00 to PhP 50,000.00
d. Obstructing designated fire lanes or access to fire hydrants	PhP 37,500.00 to PhP 50,000.00
e. Overcrowding or admission of alarms beyond the authorized capacity in movie houses, theaters, coliseum, auditorium or other public assembly buildings, except in other assembly areas on the ground floor with open sides or open doors sufficient to provide safe exits	PhP 37,500.00 to PhP 50,000.00
f. Locking fire exits during period when people are inside the building	PhP 37,500.00 to PhP 50,000.00
g. Prevention or obstruction of the automatic closure of fire doors or smoke partition or dampers	PhP 37,500.00 to PhP 50,000.00
h. Use of fire protective or firefighting equipment of the BFP other than for firefighting except in other emergencies where their use are justified	PhP 37,500.00 to PhP 50,000.00
i. Giving false or malicious fire alarms	PhP 37,500.00 to PhP 50,000.00
j. Smoking in prohibited areas as may be determined by the BFP, or throwing of cigars, cigarettes, burning objects in places which may start or cause fire	PhP 37,500.00 to PhP 50,000.00
k. Properly marked and lighted exits with provision for emergency lights to adequately illuminate exit ways in case of power failure	PhP 37,500.00 to PhP 50,000.00
l. Removing, destroying, tampering or obliterating any authorized mark, seal, sign or tag posted or required by the BFP for fire safety in any building, structure or processing equipment	PhP 37,500.00 to PhP 50,000.00
m. Use of jumpers or tampering with electrical wiring or overloading the electrical system beyond its designed capacity or such other practices that would tend to undermine the fire safety features of the electrical system	PhP 37,500.00 to PhP 50,000.00

6. Failure to post or inadequate posting of required signages	PhP 12,500.00 to PhP 27,500.00

7. Failure to provide or inadequate means of egress	Php 37,500.00 to PhP 50,000.00

8. Failure to secure and submit documentary requirements such as, but not limited to:	
a. A copy of fire insurance policy submitted within the prescribed time limit	PhP 12,500.00 to PhP 27,500.00
b. FSIC for the year of default;	
1. Failure to renew FSIC for less than a year	50% of the total amount to be paid by the applicant;
2. Failure to renew FSIC for a year or more	100% of the total amount to be paid by the applicant for each year of default;
c. FSEC not secured prior to the construction of the building	PhP 37,500.00 to PhP 50,000.00
d. Storage, Conveyance, Installation and other clearances (e.g., fireworks display, fumigation/ fogging, fire drill, welding, cutting and other hotworks)	PhP 37,500.00 to PhP 50,000.00

9. Failure to comply within the period specified in the affidavit of undertaking	PhP 37,500.00 to PhP 50,000.00

10. Use of open flame lighting devices in places of assembly except those enumerated as exceptions in para "B" of Section 10.2.21.2 of this RIRR	PhP 37,500.00 to PhP 50,000.00

11. Obstruction in the conduct of fire safety inspection, fire arson investigation and fire operations.	PhP 37,500.00 to PhP 50,000.00

12. Other violations similar to or of the same nature as any of the above, but not included in this listing, shall likewise be fined with the same amount.

SECTION 12.0.0.5 MANNER OF COLLECTION

The BFP shall collect the prescribed Fire Code revenues thru any of the following options:

A. Direct deposit with Authorized Government Depository Bank (AGDB);

B. Collection by BFP or deputized collecting officers;

C. Electronic mode of payment; and

D. Other options that the Chief, BFP may later prescribe, subject to the existing accounting and auditing rules and regulations.

SECTION 12.0.0.6 DESIGNATION OF COLLECTING OFFICER

The Chief, BFP or the Regional Director having jurisdiction shall designate a Collecting Officer in every City and Municipal BFP office upon recommendation of their respective C/MFM having jurisdiction.

SECTION 12.0.0.7 UTILIZATION

A. BFP shall prepare an annual program subject to the approval of the DILG Secretary. Based on the approved program, DBM shall release to the BFP the full amount remitted as certified by the BTr thru the issuance of Special Allotment Release Order (SARO) and Notice of Cash Allocation (NCA), or equivalent issuances.

B. The eighty percent (80%) of all revenues collected by the BFP shall be used for its modernization as herein prescribed. The Chief, BFP is authorized, subject to the approval of the Secretary of the Interior and Local Government, to use the income generated under RA 9514 and its RIRR for the procurement and improvement of fire protection, fire investigation, rescue, and paramedics equipment, facilities, supplies and materials; related technical services necessary for BFP; and abatement of fire hazards. The remaining twenty percent (20%) shall be allocated by the BFP to the Local Government Units (LGUs) in accordance with the guidelines as set forth in a Memorandum Circular issued by the DILG Secretary or a

Joint Circular with other concerned government agencies through the issuance of funding checks subject to existing accounting and auditing rules and regulations. The twenty percent (20%) Local Government Unit (LGU) share shall be appropriated exclusively for the use of the operation and maintenance of it's local fire station, including but not limited to the construction and repair of the fire station.

C. The BFP shall prepare progressive modernization plans for its capability building and resource allocation at the national, regional, provincial and city/municipal levels, as well as determine among others the optimal number of equipment, including, but not limited to firetrucks and fire hydrants, received by every local government unit for the proper delivery of fire protection services in its jurisdiction.

D. Standards shall be established and regularly updated to serve as guide in the procurement of the firefighting and investigation supplies and materials. The Bureau of Product Standards (BPS) of the Department of Trade and Industry (DTI) shall evaluate, determine and certify if the supply so procured conforms to the product standards fixed by the BFP. For this purpose, the BFP shall submit to the BPS a detailed set of product standards that must be complied with in the procurement of firefighting and investigation supplies and materials.

SECTION 12.0.0.8 MONITORING

The Chief, BFP shall, within six (6) months from the effectivity of this RIRR, submit to the Secretary of the Interior and Local Government for his/her approval, a management tool or mechanism that would ensure effective monitoring of the enforcement of the Fire Code to include the amount of Fire Code fees collected.

A. Every Fire Marshal shall keep a secured permanent recording system for efficient and effective accounting and monitoring of all collected taxes, Fire Code fees, fines and other charges.

B. Detailed procedures in assessment, collection, monitoring/reporting shall be embodied in a manual of procedures to be approved by the Secretary, DILG.

RULE 13. ADMINISTRATIVE COURSES OF ACTION

SECTION 13.0.0.1 GENERAL GUIDELINES

A. **Fines**

Before a fine is imposed, the violator shall first be informed of his/her violation/s and ordered to correct the same immediately, if feasible, or within a reasonable period of time as prescribed in Section 13.0.0.6 of this RIRR. At the expiration of the period to comply the deficiency/deficiencies, a reinspection shall be conducted to determine compliance. If compliance is not effected or if compliance does not conform to the required standards, the first violation is committed and the violator shall be fined and further ordered to effect the correction. Repeated failure on the part of the violator to effect corrections will constitute subsequent violations. Administrative fines shall be imposed for every violation.

B. **Abatement**

1. All fire hazards shall be abated immediately. Abatement is any act that would remove or neutralize a fire hazard. Such acts are specified in the Notice to Comply.
2. Abatement includes, among others, any one (1) or combination or all of the following:
   a. Removal of the source of ignition;
   b. Rearranging or adjusting articles within the minimum clearances or dimensions;
   c. Reduction in the amount/quantity of flammable, combustible and/or hazardous materials;
   d. Changes in procedure in the conduct of hazardous operation;
   e. Constructions to limit and control the spread of fire and smoke;
   f. Installation of fire protective and/or warning systems; and
   g. Remodeling, repairing, strengthening, reconstructing, removal and demolition, either partial or total, of the building or structure.
   h. Where there is inaction on the part of the violator, abatement may be made summarily by the BFP if this is the only recourse to remove the imminent danger to life and property and achieve fire safety. In this case, the provisions of Sections 9, 10 and 11 of RA 9514 applies.

C. **Closure**

Closure of the building shall be resorted to by the BFP when the offender fails to comply with the abatement order or when the deficiency constitutes a clear and imminent danger to life and property.

SECTION 13.0.0.2 FIXING OF FINES

A. Administrative fines shall be determined as follows:

1. When the violation carries an administrative fine which has a rate per unit volume, weight or unit, the fine shall be computed by multiplying the weight/volume/unit by the rate.
2. Where the violation carries a fine within a certain range (for example, PhP25,000.00 – PhP37,500.00), the fine increases with the number of times a violation of the same provision is committed:
   a. First violation (Notice to Correct Violation) – the fine shall be the minimum amount in the range.
   b. Second violation (Abatement Order) – the fine shall be the maximum amount in the range.
3. When two (2) or more offenses are committed, the same procedures in para A.1 and A.2 above shall be followed, but the fine shall be sum of all administrative fines; Provided, that the total fines shall not exceed fifty thousand pesos (PhP50,000.00).

B. Failure to Pay Fine – Failure on the part of the violator to pay the administrative fine within the period fixed in the Notice shall constitute a ground for the issuance of Closure Order for the building or the portion thereof.

SECTION 13.0.0.3 JURISDICTION

Abatement, administrative fines, closure of the building, and assessment and declaration for public nuisance shall be imposed by the C/MFM having jurisdiction.

SECTION 13.0.0.4 GENERAL PROCEDURES

A. When the Inspection Report submitted by the Fire Safety Inspector (FSI) indicates violation of RA 9514 and its RIRR, the C/MFM having jurisdiction shall immediately issue Notice to Comply within which compliance shall be effected within the period provided for under Section 13.0.0.6 of this RIRR. Such Notice shall include, among others, a citation of the specific provision/s of RA 9514 and its RIRR violated and the specific actions/corrections that should be complied for period of not exceeding fifteen (15) days. The original copy of such Notice shall be served upon the person responsible not exceeding three (3) days from its issuance.

B. After the lapse of the prescribed period to comply, a re-inspection shall be conducted. When the after re-inspection report submitted by the FSI indicates non-compliance of the Notice, the C/MFM having jurisdiction shall impose the following:

1. Put up a sign in front of the building or structure that it is a fire hazard. Specifically, the notice shall bear the words **"WARNING: THIS BUILDING/STRUCTURE IS A FIRE HAZARD"**, which shall remain posted until such time that the owner, administrator, occupant or other persons responsible for the condition of the building, structure and their premises or facilities correct the same, but such period shall not exceed fifteen (15) days from the lapse of the initial period given in the notice/order to comply;
2. Impose the corresponding administrative fines; and
3. Issue the Notice to Correct Violation. The said notice shall include, among others, a citation of the specific provision/s of RA 9514 and its RIRR violated and the specific actions/corrections that should be complied for a period not exceeding fifteen (15) days

C. After the lapse of the prescribed period to comply provided for under the Notice to Correct Violations, a re-inspection shall be conducted. When the reinspection report submitted by the FSI indicates non-compliance of the order contained in the Notice to Correct Violations, the C/MFM having jurisdiction shall:

1. Effect the continuous posting of the sign in front of the building or structure that it is a fire hazard. Specifically, the notice shall bear the words **"WARNING: THIS BUILDING/ STRUCTURE IS A FIRE HAZARD"**, which shall remain posted until such time that the owner,

administrator, occupant or other persons responsible for the condition of the building, structure and their premises or facilities correct the same, but such period shall not exceed fifteen (15) days from the lapse of the period given in the Notice to Correct Violations.

2. Impose the administrative fine for the violation; and
3. Issue abatement order to the owner, administrator or occupant of the building, structure and their premises or facilities for a period not exceeding fifteen (15) days.

D. After the lapse of the prescribed period to comply provided for under the Abatement Order, a re-inspection shall be conducted. When the re-inspection report submitted by the FSI indicates non-compliance of the Abatement Order, the C/MFM having jurisdiction shall:

1. Effect the continuous posting of the sign in front of the building or structure that it is a fire hazard. Specifically, the notice shall bear the words **"WARNING: THIS BUILDING/ STRUCTURE IS A FIRE HAZARD"**, which shall remain posted until such time that the owner, administrator, occupant or other persons responsible for the condition of the building, structure and their premises or facilities abate the same.
2. Implement Closure Order after its service to the owner/responsible person in the building/establishment. Copy of the order shall also be sent to the Office of the Mayor and Business Permit and Licensing Office (BPLO) for the revocation of the business permit. Any existing FSIC shall be revoked.

E. During re-inspection under para "B" and "C" of this Section, if initial compliance is effected by the owner, the NTCV or Abatement Order may not be issued. In lieu thereof, the owner may be allowed to execute an Affidavit of Undertaking, specifically containing, among others, the period of completion of work, which shall not exceed up to a period of six (6) months. However, after determination of C/MFM concerned, if a longer period is required for its completion, it may be extended for another duration not exceeding six (6) months. For this purpose, the owner shall attach in his/her affidavit the following, if applicable:

1. Duly executed and notarized contract of works, entered into by the building establishment and the contractor;
2. Duly signed and sealed proposed plans, specifications, and bill of materials and labor; and
3. Authority to execute Affidavit of Undertaking, in case of corporation, partnership or association.

The C/MFM having jurisdiction may approve or disapprove the Affidavit of Undertaking through the issuance of Notice of Approval or Notice of Disapproval, respectively. Failure to comply within the period specified in the Affidavit of Undertaking shall be a ground for the issuance of closure order and imposition of administrative fine.

F. In cases where the building owner/administrator refuses or disallows the conduct of fire safety inspection, the FSI shall indicate in the AIR the fact that he/she is not allowed to inspect and submit the same to the Chief, FSES/U. The C/MFM having jurisdiction shall notify the owner/administrator through a letter, sent through registered mail, stating therein that ten (10) days after receipt thereof an actual inspection shall be conducted under a new Inspection Order (IO). Refusal of the building owner/administrator to be inspected under the new Inspection Order (IO) shall cause the C/MFM having jurisdiction to send a letter to the Business Processing and Licensing Office (BPLO) recommending the immediate revocation of the business permit issued.

SECTION 13.0.0.5 PUBLIC NUISANCE

A. Any building or structure assessed as a fire trap on account of the gravity or palpability of the violation, or is causing clear and present imminent danger to adjoining establishments and habitations shall be declared as public nuisance by the C/MFM having jurisdiction. Clear and present imminent danger shall mean absence of secondary exit or if at least five (5) of the following fire safety violations are committed:

1. Insufficient exit width;
2. Absence of fire-resistive enclosure for main and secondary exits;
3. Swing of exit door against the flow of travel;
4. Obstructed/padlocked fire exit;
5. Absence of fire wall;

6. Absence/defective fire alarm and smoke detection system;
7. Absence/inadequate automatic battery-operated emergency light or illuminated exit signs.
8. Absence of standpipe system;
9. Absence of automatic fire suppression system;
10. Absence or defective smoke management system;
11. Absence of fire safety measures in the manufacture, storage, handling, display, and/or use of hazardous material/s, as required in Section 7, para "B" of RA 9514;
12. Absence of fire safety measures for hazardous operations or processes as required in Section 7, para "C" of RA 9514;

B. Procedures

1. A notice of declaration as a public nuisance shall be issued by the C/MFM having jurisdiction within twenty-four (24) hours upon assessment to the owner, administrator, occupant or other person responsible for the condition of the building, structure and their premises or facilities. The notice shall contain the grounds relied upon in declaring the same as public nuisance.
2. Upon receipt of the notice, the owner, administrator, occupant or other person responsible for the condition of the building, structure and their premises or facilities shall cause the immediate abatement of the hazard therein specified within the following periods:
   a. If the assessed value of the nuisance or the amount to be spent in abating the same is not more than one hundred thousand pesos (PhP100,000.00), the owner, administrator or occupant thereof shall abate the hazard within fifteen (15) days from receipt of the order declaring said building or structure a public nuisance; or
   b. If the assessed value is more than one hundred thousand pesos (PhP100,000.00), the owner, administrator or occupant thereof shall abate the hazard within thirty (30) days from receipt of the order declaring said building or structure a public nuisance;
3. Failure to comply within five (5) days from the receipt of the notice shall cause the C/MFM to put up a sign in front of the building or structure, at or near the entrance of such premises, notifying the public that such building or structure is a **"FIRETRAP"**, which shall remain posted until the owner, administrator, occupant or other person responsible for the condition of the building, structure, facilities and their premises abate the same within the specified period. After the lapse of the said period, without the hazard being abated, Closure Order shall be issued.
4. Failure of the owner, administrator, occupant or other person responsible for the condition of the building, structure, facilities and their premises, which are vital to the public to abate the same, shall constrain the BFP to employ all corrective measures to abate hazards, which shall include but not be limited to remodeling, repairing, strengthening, reconstructing, removal and demolition, either partial or total, of the building or structure, subject to the availability of funds appropriated for this purpose.

SECTION 13.0.0.6 PERIOD FOR CORRECTING VIOLATIONS

A. **Immediately or within twenty-four (24) hours**

1. Obstructing or blocking the exit ways or access to building clearly marked for fire safety purposes, such as but not limited to aisles in interior rooms, any part of stairways, hallways, corridors, vestibules, balconies or bridges leading to a stairway or exit of any kind, or tolerating or allowing said violations;
2. Prevention, interference or obstruction of any operation of the BFP, or of duly organized and authorized fire brigades;
3. Obstructing designated fire lanes or access to fire hydrant;
4. Overcrowding or admission of person beyond the authorized capacity in movie houses, theatres, coliseums, auditorium or other public assembly buildings except in other assembly areas on the ground floor with open sides or open doors sufficient to provide exits;
5. Locking fire exits during periods when people are inside the building;
6. Prevention or obstruction of the automatic closure of fire doors or smoke partitions or dampers;

7. Use of fire protective or firefighting equipment of the Fire Service other than for firefighting except in other emergencies where their use are justified;
8. Giving false or malicious fire alarms;
9. Smoking in prohibited areas as may be determined by the Fire Service, or throwing cigars, cigarettes, or burning objects in places which may start or cause fires;
10. Removing, destroying, tampering or obliterating any authorized mark, seal sign, or tag posted or required by the Fire Service for fire safety in any building, structure or processing equipment;
11. Use of jumpers or tampering with electrical wiring or overloading the electrical system beyond its designed capacity or such other practices that tend to undermine the fire safety features of the electrical system;
12. Failure to observe fire safety precaution for the following:
    a. Hot ashes, live coals and embers;
    b. Flammable paints, varnishes, stains and organic coatings;
    c. Flammable and combustible liquids or gases of any classification;
    d. Metallic magnesium in any form;
    e. Blasting agents, explosives and special industrial, explosive materials, blasting caps, black powder, dynamic, nitrocellulose, fulminates of any kind, and plastic explosives containing ammonium salt or chlorate;
    f. Liquid nitroglycerine and liquid trinitrotoluoene;
    g. Firework materials of any kind or form;
    h. Explosive dusts and vapors;
    i. Welding, cutting and other hotwork;
    j. Industrial/commercial baking and drying;
    k. Smelting and forging; or
    l. Refilling, distillation and solvent extraction of flammable/combustible liquids; and
13. Other violations similar to or of the same nature as any of the above, but not included in this listing, shall likewise be allocated the same period.

B. **Within three (3) days**

1. Constructing gates, entrances and walkways to building components and yards, which obstruct the orderly and easy passage of firefighting vehicles and equipment;
2. Abandonment or leaving a building or structure by the occupant or owner without appropriate safety measures;
3. Failure to submit copy of fire insurance policy within the prescribed time limit;
4. Failure to observe fire safety precaution for the following:
    a. High piled or widely spread combustible stock;
    b. Corrosive liquids, oxidizing materials, organic peroxide, nitromethane, ammonium nitrate or any amount of highly toxic pyrophoric, hypergolic or cryogenic materials or poisonous gases, as well as materials compounds which when exposed to heat or flame become a fire conductor or generate excessive smoke or toxic gases;
    c. Matches in commercial quantities (more than sixty (60) watchman's gross);
    d. Combustible waste materials for recycling or resale;
    e. Agricultural, forest, marine or mineral products which may undergo spontaneous combustion;
    f. Waste disposal of combustible materials;
    g. Pressurized/forced-draft burning equipment; or
    h. Motion picture projection using electrical lamp; and
5. Other violations similar to or the same nature as any of the above, but not included in this listing, shall likewise be allocated the same period.

C. **Within seven (7) days**

1. Failure to provide the fire safety precautions for the following:
   a. Combustible fibers;
   b. Cellular materials such as foam rubber, sponge rubber and plastic foam;
   c. Mineral, vegetable or animal oils and other derivative by-products.
2. Other violations similar to or of the same nature as any of the above, but not included in this listing, shall likewise be allocated the same period.

D. **Within ten (10) days**

1. Failure to provide fire walls to separate adjoining building or warehouse and storage areas from other occupancies in the same building; and
2. Other violations similar to or of the same nature as any of the above, but not included in this listing, shall likewise be allocated the same period.

E. **Within fifteen (15) days**

1. Failure to provide, install and maintain the following:
   a. Fire alarm system;
   b. Provision for confining the fire at its source such as fire resistive floor slab or roof, curtain boards and other fire containing or stopping components;
   c. An emergency evacuation plan for each floor of the building showing the routes from each room to appropriate exits, displayed prominently on the door of each room;
   d. Properly marked and lighted exits with provisions for emergency lights to adequately exit ways in case of power failure;
2. Failure to develop and implement fire safety and education programs.
3. Failure to provide or effect the following:
   a. Fire protection features such as sprinkler systems, hose boxes, hose reels or standpipe system and other firefighting equipment;
   b. Termination of all exits in area affording safe passage to a public way or safe dispersal area;
   c. Stairways, vertical shafts, horizontal exits and other means of egress sealed from smoke and heat;
   d. Self-closing fire resistive door leading to corridors;
   e. Fire dampers in centralized air-conditioning ducts; or
   f. Roof vents for use by fire fighters; and
4. Other violations similar to or of the same nature as any of the above, but not included in this listing, shall likewise be allocated the same period.

SECTION 13.0.0.7 PENALTIES FOR SPECIFIC INDIVIDUALS

A. **Against Private Person**

1. Administrative Penalties
   a. The owner, administrator, occupant or other person responsible for the condition of the building, structure, facilities and their premises who violates any provision of RA 9514 and its RIRR shall be penalized by:
      1) Administrative fine of not exceeding Fifty thousand pesos (PhP50,000.00); or
      2) Closure of such buildings, structures, facilities and their premises which do not comply with the requirements; or
      3) Both such administrative fine and closure to be imposed by the proper authorities, provided that payment of the fine and closure of such buildings, structures, facilities and their premises shall not absolve the violator from correcting the deficiency or abating the fire hazard.
   b. Fire safety practitioner who violated any provisions of RA 9514 and its RIRR through his/her failure to perform duties and responsibilities; or who performed any willful

act of impropriety or dishonesty in the preparation of FSCR, FSCCR, or FSMR shall be penalized by:

1) Administrative fine of not exceeding Fifty thousand pesos (PhP50,000.00); and
2) Revocation of his/her Certificate of Competency as Fire Safety Practitioner.

2. Punitive Penalties

a. In case of willful failure to correct the deficiency or abate the fire hazard as provided in the preceding Subsection, the violator shall, upon conviction, be punished by:

1) Imprisonment of not less than six (6) months nor more than six (6) years, or
2) By a fine of not more than one hundred thousand pesos (PhP100,000.00) or
3) Both such fine and imprisonment. Provided, however, that in the case of a corporation, firm, partnership or association, the fine and/or imprisonment shall be imposed upon its officials responsible for such violation, and in case the guilty party is an alien, in addition to the penalties herein prescribed, he/she shall immediately be deported: Provided, finally, that where the violation is attended by injury, loss of life and/or damage to property, the violator shall be proceeded against under the applicable provisions of the Revised Penal Code.

b. Any person who, without authority, maliciously removes the sign that a building or structure is a fire hazard/firetrap placed by the authorized person in RA 9514 and its RIRR shall be liable for imprisonment for thirty (30) days or a fine not exceeding one hundred thousand pesos (PhP100,000.00) or both in the discretion of the court.

c. Any person, who disobeys the lawful order of the fire ground commander during a firefighting operation, shall be penalized with imprisonment of one (1) day to thirty (30) days and a fine of five thousand pesos (PhP5,000.00).

3. In all cases mentioned above, regardless of whether the violation is categorized as administrative or punitive, the C/MFM shall have the authority to determine whether a criminal charge is going to be instituted and shall initiate the filing thereof.

B. **Against Public Officer**

1. Administrative

The following acts or omissions shall render the public officer/employee in charge of the enforcement of RA 9514 and its RIRR, and other pertinent laws, administratively liable and shall be punished by reprimand, suspension or removal at the discretion of the disciplining authority, depending on the gravity of the offense:

a. Unjustified failure of the public officer/employee to conduct inspection of buildings or structures at least once a year;

b. Deliberate failure to put up a sign in front of the building or structure within his/her area of responsibility found to be violating RA 9514 and its RIRR, and other pertinent laws, that the same is a **"FIRE HAZARD"** or a **"FIRETRAP"**;

c. Endorsing to the Chief, BFP or his/her duly authorized representative the certification, or submitting a report that the building or structure complies with the standards set by RA 9514 and its RIRR or other pertinent laws when the same is contrary to fact;

d. Issuance or renewal of Certificate of Occupancy or Business Permit without the FSIC issued by the Chief, BFP or his/her duly authorized representative;

e. Failure to cancel the Certificate of Occupancy or Business Permit after the owner, administrator, occupant or other person responsible for the condition of the building, structure and other premises fails to comply with the notice/order for compliance with the standards set by RA 9514 and its RIRR and other pertinent laws, within the specified period;

f. Failure to abate a public nuisance within fifteen (15) days after the owner, administrator, occupant or other responsible person fails to abate the same within the period contained in the notice to abate;

g. Abusing his/her authority in the performance of his/her duty through acts of corruption and other unethical practices; or

h. Engaging in the preparation and/or signed the FSCR, FSCCR, or FSMR, or perform any act of impropriety or corruption in relation thereto; or

i. Other willful impropriety or gross negligence in the performance of his/her duty as provided in RA 9514 and its RIRR.

2. **Punitive**

In case of willful violation involving the above-mentioned acts or omissions enumerated under Section 11 subpara 2.A of RA 9514, the public official shall, upon conviction, be punished by imprisonment of not less than six (6) months nor more than six (6) years, or by a fine of not more than one hundred thousand pesos (PhP100,000.00) or both such fine and imprisonment: Provided, That where the violation is attended by injury, loss of life and/or property, the violator shall be proceeded against under the applicable provisions of the Revised Penal Code.

SECTION 13.0.0.8 CONDUCT OF HIGHWAY MONITORING

The BFP, in coordination with the Land Transportation Office (LTO), Highway Patrol Group (HPG) or, in their absence, the Local PNP, shall conduct highway monitoring to ensure that the handling and transport of hazardous materials and chemicals is in accordance with the provisions of RA 9514 and its RIRR. Should violations be found during the conducted monitoring, the erring person or entity shall be proceeded under the applicable provisions of RA 9514 and its RIRR and the guidelines that hereinafter be issued.

SECTION 13.0.0.9 REMOVAL OF HAZARD

Where hazardous materials and chemicals found during the conduct of highway monitoring, regular inspection or upon report of any concerned citizen pose an imminent threat or danger to the residents of the building, adjoining property, or the public in general, the BFP if found practicable, shall take immediate custody of the same and turn it over to the concerned government agency. If the hazardous materials and chemicals found are flammable though minimal in quantity or volume, they shall be deposited to the fire station concerned and shall be released only to the owner upon compliance of the applicable provisions of RA 9514 and its RIRR. This is without prejudice to the institution of legal action against the owners for violating the provisions of RA 9514 and its RIRR.

RULE 14. MISCELLANEOUS PROVISIONS

SECTION 14.0.0.1 PROTEST

A. Any party aggrieved by the action(s) or findings of the C/MFM may challenge the same by filing a VERIFIED PROTEST to the Office of the Provincial Fire Marshal or District Fire Marshal, as the case may be, within five (5) days from receipt of a notice or order. In case the action to be protested is rendered by a Provincial Fire Marshal or District Fire Marshal, the same shall be filed before the Office of the Regional Director.

B. Any request for reconsideration, request for extension of time to comply, and such other matters pertaining to the issued notice or order shall be treated as a protest, hence shall conform to the requirement as to form herein prescribed and pay the corresponding protest fee.

C. No protest shall be given due course without the payment of a non-refundable protest fee as indicated in the schedule of fees, the Official Receipt of which shall be attached to the protest. Payment shall be made at the fire station whose findings is the subject of the protest.

D. The verified protest shall contain the following information:

1. the name and address of the protestant;
2. the notice or order being protested;
3. the name and office address of the fire marshal who issued the notice or order; and/or
4. such other matters and information pertinent and relevant to the proper resolution of the protest.

E. The protest must be supported by attaching therewith certified true copy of the notice or order subject of the protest.

F. The protest is verified by an affidavit that the affiant has read and understood the contents thereof and that the allegations therein are true and correct of his personal knowledge or based on authentic records. An unverified protest shall be considered unsigned, produces no legal effect, and results to the outright dismissal of the protest.

G. In addition, the protestant shall likewise certify under oath that: (1) protestant has not theretofore commenced any action or filed any claim involving the same issues in any

court, tribunal or quasi-judicial agency and to the best of his knowledge, no such other action or claim is pending therein; (2) if there is such other pending action or claim, a complete statement of the present status thereof; (3) and if he should thereafter learn that the same or similar action or claim has been filed or is pending, he shall report such fact within five (5) days to the office where the protest is filed.

H. Failure to comply with the foregoing requirements shall be a ground for the outright dismissal of the protest.

I. Upon receipt of the protest, the concerned District/Provincial Fire Marshal or Regional Director may require the concerned fire marshal to forward all the necessary records which shall include the Inspection Order (IO), After Inspection Report (AIR) and such other documents that may aid the prompt disposition of the case.

J. The protest shall be resolved within a period of fifteen (15) days from receipt of the complete records of the case.

SECTION 14.0.0.2 APPEAL

A. Resolutions by the Provincial Fire Marshal, District Fire Marshal or the Regional Director over a protest may be challenged by filing a verified appeal to the next higher authority within five (5) days from the receipt of the decision or resolution appealed from. The decision of the Regional Director in the exercise of its appellate jurisdiction shall be final and executory, except decision on closure order in which case said decision may be appealed to the Chief, BFP then to the Secretary of the DILG.

B. No appeal shall be given due course without the payment of a non-refundable appeal fee as indicated in the schedule of fees, the Official Receipt of which shall be attached to the appeal. Payment shall be made at the fire station whose findings is the subject of the appeal.

C. Upon receipt of the appeal, the appellate authority may require the lower unit concerned to submit its comment on the appeal and the submission of the entire records of the case.

D. The appeal shall be resolved within a period of thirty (30) days from receipt of the complete records of the case, except when appeal is taken to the DILG.

SECTION 14.0.0.3 EFFECT OF FILING A PROTEST OR APPEAL

The filing of a protest or an appeal shall in no way stay the running of the period of correction indicated in the Notice to Comply/Correct Violation or Abatement/Closure Order, unless otherwise ordered by the higher authorities to where the protest or appeal is filed.

SECTION14.0.0.4 CITIZEN PARTICIPATION

A. **Cooperation with BFP**

RA 9514 and its RIRR are designed to achieve fire safety in the community. To this end, inspections are to be conducted by BFP. Inspection of buildings, structures, facilities and their premises shall be done by duly designated Fire Safety Inspectors (FSI) in distinctive uniform, with proper identification cards and Inspection Orders (IO). Citizens can assist in achieving the goals of public fire safety by cooperating with the FSI.

B. **Individual and Group Initiative**

All persons are encouraged to inspect their own premises and to abate any fire hazard therein, as well as take the necessary fire safety precautions. They shall strive to organize themselves into effective fire safety and fire prevention organizations in their community and places of work to avoid unnecessary loss of life and property.

SECTION 14.0.0.5 IMPLEMENTING DETAILS

The Chief, BFP shall have the authority to issue such further implementing details as may be necessary to carry out the provisions of RA 9514 and its RIRR, with the approval of the Secretary, DILG.

SECTION 14.0.0.6 ALTERNATIVE AND/OR REMEDIAL FIRE SAFETY MEASURES

A. In cases of existing buildings which when forced to comply will compromise its structural stability and/or integrity, the Chief, BFP may accept adequate alternative and/or remedial fire safety measures in lieu of the fire safety requirements of this RIRR upon application by the owner/occupant/building administrator of the building or structure.

B. For this purpose, a Fire Safety Technical Committee shall be created to assist the Chief, BFP in determining the adequacy of the said alternative measures.

C. The basis for the evaluation of the Fire Safety Technical Committee shall be in accordance with the implementing guidelines approved by the Chief, BFP.

SECTION 14.0.0.7 SEPARABILITY CLAUSE

If any provision of this RIRR is declared invalid & unconstitutional, the other provisions not affected thereby shall remain valid and subsisting.

SECTION 14.0.0.8 REPEALING AND AMENDING CLAUSE

All administrative orders, rules and regulations, memoranda, circulars and other issuances inconsistent herewith or contrary to the provisions of these rules and regulations are hereby repealed and/or modified accordingly.

SECTION 14.0.0.9 EFFECTIVITY

These Implementing Rules and Regulations shall take effect thirty (30) days after publication of the last installment in the Official Gazette or in a newspaper of general circulation.

Recommend Approval:

LEONARD R BANAGO, PME
FIRE DIRECTOR (DSC)
Chief, BFP

Approved by:

EDUARDO M AÑO
SECRETARY, DILG

DILG-OSEC 11052018-08140

Date: AUG 07 2019

ANNEX A: TABLES

TABLE 12: MAXIMUM ALLOWABLE QUANTITY (MAQ) OF HAZARDOUS MATERIALS PER CONTROL AREA

Material	Class	High Hazard Protection Level	Storage			Use — Closed Systems			Use — Open Systems	
			Solid Kilograms	Liquid Gallons (kg)	Gas[b] scf (kg)	Solid Kilograms	Liquid Gallons (kg)	Gas[b] scf (kg)	Solid kilograms	Liquid Gallons (kg)
Physical Hazard Materials										
Combustible liquid[o]	II III-A III-B	3 3 N/A	N/A N/A N/A	54.4[c,d] 149.7[c,d] 5,987.4[c,m]	N/A N/A N/A	N/A N/A N/A	See note See note See note	N/A N/A N/A	N/A N/A N/A	See note See note See note
Combustible metals	See note	See note	See note	See note	See note	See note	See note	See note	See note	See note
Cryogenic fluid [55: Table 6.3.1.1]	Flammable Oxidizing Inert	2 3 N/A	N/A N/A N/A	20.4[j,k] 20.4[c,d] NL	N/A N/A N/A	N/A N/A N/A	20.4[j,k] 20.4[c,d] NL	N/A N/A N/A	N/A N/A N/A	20.4[j,k] 20.4[c,d] NL
Explosives	See note	See note	See note	See note	See note	See note	See note	See note	See note	See note
Flammable gas[l] [55: Table 6.3.1.1]	Gaseous, Liquefied, Liquefied Petroleum (LP)	2 2 2	N/A N/A N/A	N/A N/A N/A	453.6[c,d] (68.0)[c,d] (136.1)[p,q,r]	N/A N/A N/A	N/A N/A N/A	453.6[c,d] (68.0)[c,d] (136.1)[q]	N/A N/A N/A	N/A N/A N/A
Flammable liquid[o]	I-A IB and IC Combination (IA, IB, IC)	3 3 3	N/A N/A N/A	13.6 [c,d] 54.4 [c,d] 54.4[c,d,n]	N/A N/A N/A	N/A N/A N/A	See note See note See note	N/A N/A N/A	N/A N/A N/A	See note See note See note
Flammable solid	N/A	3	56.7[c,d]	N/A	N/A	56.7[c, d]	N/A	N/A	11.3[c,d]	N/A
Inert Gas	Gaseous	N/A	N/A	N/A	NL	N/A	N/A	NL	N/A	N/A
	Liquefied	N/A	N/A	N/A	NL	N/A	N/A	NL	N/A	N/A
Organic peroxide	UD	1	0.5[c,i]	(0.5)[c,i]	N/A	0.1[i]	(0.1)[i]	N/A	0.1[i]	(0.1)[i]
	I	1	2.3[c,d]	(2.3)[c,d]	N/A	0.5[c,d]	(0.5)[c,d]	N/A	0.5[c,d]	(0.5)[c,d]
	II	2	22.7[c,d]	(22.7)[c,d]	N/A	22.7[d]	(22.7)[d]	N/A	4.5[c,d]	(4.5)[c,d]
	III	3	56.7[c,d]	(56.7)[c,d]	N/A	56.7[d]	(56.7)[d]	N/A	11.3[c,d]	(11.3)[c,d]
	IV	N/A	NL	NL	N/A	NL	NL	N/A	NL	NL
	V	N/A	NL	NL	N/A	NL	NL	N/A	NL	NL
Oxidizer	4	1	0.5[c,i]	(0.5)[c,i]	N/A	0.1[i]	(0.1)[i]	N/A	0.1[i]	(0.1)[i]
	3[f]	2 or 3	4.5[c,d]	(4.5)[c,d]	N/A	0.9[d]	(0.9)[d]	N/A	0.9[d]	(0.9)[d]
	2	3	113.4[c,d]	(113.4)[c,d]	N/A	113.4[d]	(113.4)[d]	N/A	22.7[d]	(22.7)[d]
	1	N/A	1,814.4[c,e]	(1,814.4)[c,e]	N/A	1,814.4[e]	(1,814.4)[e]	N/A	453.6[e]	(453.6)[e]
Oxidizing gas [55: Table 6.3.1.1]	Gaseous	3	N/A	N/A	680.4[c,d]	N/A	N/A	680.4[c,d]	N/A	N/A
	Liquefied	3	N/A	N/A	(68.0)[c,d]	N/A	N/A	(68.0)[c,d]	N/A	N/A
Pyrophoric	N/A	2	1.8[c,i]	(1.8)[c,i]	N/A	0.5[i]	(0.5)[i]	N/A	NP	NP
Pyrophoric Gas [55: Table 6.3.1.1]	Gaseous	2	N/A	N/A	22.7[c,i]	N/A	N/A	22.7[c,i]	N/A	N/A
	Liquefied	2	N/A	N/A	(1.8)[c,i]	N/A	N/A	(1.8)[c,i]	N/A	N/A
Unstable (reactive)	4	1	0.5[c,i]	(0.5)[c,i]	N/A	0.1[i]	(0.1)[i]	N/A	0.1[i]	(0.1)[i]
	3	1or 2	2.3[c,d]	(2.3)[c,d]	N/A	0.5[d]	(0.5)[d]	N/A	0.5[d]	(0.5)[d]
	2	2	22.7[c,d]	(22.7)[c,d]	N/A	22.7[d]	(22.7)[d]	N/A	4.5[d]	(4.5)[d]
	1	N/A	NL	NL	N/A	NL	NL	N/A	NL	NL
Unstable (reactive) Gas [55: Table 6.3.1.1]	Gaseous									
	4 or 3	1	N/A	N/A	4.5[c,i]	N/A	N/A	4.5[c,i]	N/A	N/A
	detonable 3	2	N/A	N/A	22.7[c,d]	N/A	N/A	22.7[c,d]	N/A	N/A
	non detonable 2									
		3	N/A	N/A	340.2[c,d]	N/A	N/A	340.2[c,d]	N/A	N/A
	1	N/A	N/A	N/A	NL	N/A	N/A	NL	N/A	N/A

Unstable (reactive) Gas [55: Table 6.3.1.1]	Liquefied									
	4 or 3	1	N/A	N/A	(0.5)[c,j]	N/A	N/A	(0.5)[c,j]	N/A	N/A
	detonable 3	2	N/A	N/A	(0.9)[c,d]	N/A	N/A	(0.9)[c,d]	N/A	N/A
	non-detonable 2									
		3	N/A	N/A	(68.0)[c,d]	N/A	N/A	(68.0)[c,d]	N/A	N/A
	1	N/A	N/A	N/A	NL	N/A	N/A	NL	N/A	N/A
Water reactive	3	2	2.3[c,d]	(2.3)[c,d]	N/A	2.3[d]	(2.3)[d]	N/A	0.5[d]	(0.5)[d]
	2	3	22.7[c,d]	(22.7)[c,d]	N/A	22.7[d]	(22.7)[d]	N/A	4.5[d]	(4.5)[d]
	1	N/A	NL	NL	N/A	NL	NL	N/A	NL	NL
Health Hazard Materials										
Corrosive	N/A	4	2,268.0[cd]	226.8[cd]	N/A	2,268.0[d]	226.8[d]	N/A	453.6[d]	45.36[d]
Corrosive Gas [55: Table 6.3.1.1]	Gaseous	4	N/A	N/A	367.4[c,d,g]	N/A	N/A	367.4[c,d,g]	N/A	N/A
	Liquefied	4	N/A	N/A	(68.0)[c,d]	N/A	N/A	(68.0)[c,d]	N/A	N/A
Highly toxic	N/A	4	4.5[cd]	(4.5)[c,d]	N/A	(4.5)[d]	(4.5)[d]	N/A	1.4[d]	(1.4)[d]
Highly toxic gas [55: Table 6.3.1.1]	Gaseous	4	N/A	N/A	9.1[d,g]	N/A	N/A	9.1[d,g]	N/A	N/A
	Liquefied	4	N/A	N/A	(1.8)[d,g]	N/A	N/A	(1.8)[d,g]	N/A	N/A
Toxic	N/A	4	226.8[c,d]	(226.8)[c,d]	N/A	226.8[c,d]	(226.8)[c,d]	N/A	56.7[d]	(56.7)[d]
Toxic gas	Gaseous	4	N/A	N/A	367.4[c,d]	N/A	N/A	367.4[c,d]	N/A	N/A
	Liquefied	4	N/A	N/A	(68.0)[c,d]	N/A	N/A	(68.0)[c,d]	N/A	N/A

For SI units, 1 lb = 0.4536 kg; 1 gal = 3.785 L; 1 ft3 = 0.0283 m3.
NTP: Normal temperature and pressure [measured at 70°F (21°C) and 14.7 psi (101 kPa)].
N/A: Not applicable. NP: Not permitted. NL: Not limited.
Note: The hazardous material categories and MAQs that are shaded in this table are not regulated by NFPA 400 but are provided here for informational purposes.
See Chapter 2 for the reference code or standard governing these materials and establishing the MAQs. In accordance with 1.1.1.2, materials having multiple hazards that fall within the scope of NFPA 400 shall comply with NFPA 400.

a. Unlimited amounts of gas are permitted to be used for personal medical or emergency medical use.
b. Storage in excess of 10 gal (38 L) of Class I and Class II liquids combined or 60 gal (227 L) of Class IIIA liquids is permitted where stored in safety cabinets with an aggregate quantity not to exceed 180 gal (681 L).
c. Fuel in the tank of operating mobile equipment is permitted to exceed the specified quantity where the equipment is operated in accordance with this code.
d. The use of explosive materials required by federal, state, or municipal agencies while engaged in normal or emergency performance of duties is not required to be limited. The storage of explosive materials is required to be in accordance with the requirements of NFPA 495.
e. The storage and use of explosive materials in medicines and medicinal agents in the forms prescribed by the official United States Pharmacopeia or the National Formulary are not required to be limited.
f. The storage and use of propellant-actuated devices or propellant-actuated industrial tools manufactured, imported, or distributed for their intended purposes are required to be limited to 50 lb (23 kg) net explosive weight.
g. The storage and use of small arms ammunition, and components thereof, are permitted where in accordance with NFPA 495.
h. Containers, cylinders, or tanks not exceeding 250 scf (7.1 m3) content measured at 70°F (21°C) and 14.7 psi (101 kPa) and used for maintenance purposes, patient care, or operation of equipment shall be permitted.
i. A maximum quantity of 220 lb (99 kg) of solid or 22 gal (83 L) of liquid Class 3 oxidizer is permitted where such materials are necessary for maintenance purposes, operation, or sanitation of equipment. Storage containers and the manner of storage are required to be approved.
j. Gas cylinders not exceeding 20 scf (0.57 m3) measured at 70°F (21°C) and 14.7 psi (101 kPa) are permitted in gas cabinets or fume hoods. [5000: Table 34.1.3.2(a)]
k. Conversion. Where quantities are indicated in pounds and when the weight per gallon of the liquid is not provided to the AHJ, a conversion factor of 10 lb/gal (1.2 kg/L) shall be used.
l. Medicines, foodstuffs, cosmetics, and other consumer products that contain not more than 50% by volume water-miscible flammable or combustible liquids, with the remainder of the product consisting of components that do not burn, shall not be limited, where packaged in individual containers that do not exceed a 1.3-gallon capacity. [30:9.1.4(4)]

TABLE 13: MAXIMUM ALLOWABLE QUANTITY (MAQ) OF HAZARDOUS MATERIALS PER CONTROL AREA IN ASSEMBLY OCCUPANCIES

Material	Class	Solid kilograms	Liquid Gallons[k] (kg)	Gas[a] (at NTP) scf (kg)
Flammable and combustible liquid[b,c,l]	I and II III-A III-B	N/A N/A N/A	4.5 27.2 54.4	N/A N/A N/A
Cryogenic fluid	Flammable Oxidizing	N/A N/A	4.5 4.5	N/A N/A
Explosives[d,e,f,g]	see note	see note	see note	see note
Flammable gas[c,h]	Gaseous Liquefied Liquefied Petroleum	N/A N/A N/A	N/A N/A N/A	NP (9.1) (9.1)
Flammable solid	N/A	2.3	N/A	N/A
Oxidizers	4 3 2 1	NP 4.5[i] 113.4 1,814.4	NP 3.8 liters[i] 11.3 181.4	N/A N/A N/A N/A
Oxidizing gas[h]	Gaseous Liquefied	N/A N/A	N/A N/A	NP[h] NP[h]
Organic peroxides	I II III IV V	NP NP (11.3) NL NL	NP NP (11.3) NL NL	N/A N/A N/A N/A N/A
Pyrophoric materials	N/A	0.5	(0.5)	NP
Unstable Reactive	4 3 2 1	0.1 0.5 4.5 NL	(0.1) (0.5) (4.5) (NL)	NP NP NP[h] NP
Water-reactive	3 2 1	0.5 4.5 NL	(0.5) (4.5) (NL)	N/A N/A N/A
Corrosives	N/A	453.6	(45.36)	NP
Highly toxic	N/A	1.4	(1.4)	NP[j]
Toxic	N/A	56.7	(56.7)	NP[j]

For SI units, 1 lb = 0.4536 kg; 1 gal = 3.7854 L; 1 ft3 = 0.0283 m3.
NTP: Normal temperature and pressure [measured at 70°F (21°C) and 14.7 psi (101 kPa)].
N/A: Not applicable. NP: Not permitted. NL: Not limited.
Note: The hazardous material categories and MAQs that are shaded in this table are not regulated by NFPA 400 but are provided here for informational purposes.
See Chapter 2 for the reference code or standard governing these materials and establishing the MAQs. In accordance with 1.1.1.2, materials having multiple hazards that fall within the scope of NFPA 400 shall comply with NFPA 400.

a. Unlimited amounts of gas are permitted to be used for personal medical or emergency medical use.
b. Storage in excess of 10 gal (38 L) of Class I and Class II liquids combined or 60 gal (227 L) of Class IIIA liquids is permitted where stored in safety cabinets with an aggregate quantity not to exceed 180 gal (681 L).
c. Fuel in the tank of operating mobile equipment is permitted to exceed the specified quantity where the equipment is operated in accordance with this code.
d. The use of explosive materials required by federal, state, or municipal agencies while engaged in normal or emergency performance of duties is not required to be limited. The storage of explosive materials is required to be in accordance with the requirements of NFPA 495.
e. The storage and use of explosive materials in medicines and medicinal agents in the forms prescribed by the official United States Pharmacopeia or the National Formulary are not required to be limited.
f. The storage and use of propellant-actuated devices or propellant-actuated industrial tools manufactured, imported, or distributed for their intended purposes are required to be limited to 50 lb (23 kg) net explosive weight.
g. The storage and use of small arms ammunition, and components thereof, are permitted where in accordance with NFPA 495.
h. Containers, cylinders, or tanks not exceeding 250 scf (7.1 m3) content measured at 70°F (21°C) and 14.7 psi (101 kPa) and used for maintenance purposes, patient care, or operation of equipment shall be permitted.
i. A maximum quantity of 220 lb (99 kg) of solid or 22 gal (83 L) of liquid Class 3 oxidizer is permitted where such materials are necessary for maintenance purposes, operation, or sanitation of equipment. Storage containers and the manner of storage are required to be approved.
j. Gas cylinders not exceeding 20 scf (0.57 m3) measured at 70°F (21°C) and 14.7 psi (101 kPa) are permitted in gas cabinets or fume hoods. [5000: Table 34.1.3.2(a)]
k. Conversion. Where quantities are indicated in pounds and when the weight per gallon of the liquid is not provided to the AHJ, a conversion factor of 10 lb/gal (1.2 kg/L) shall be used.
l. Medicines, foodstuffs, cosmetics, and other consumer products that contain not more than 50% by volume water-miscible flammable or combustible liquids, with the remainder of the product consisting of components that do not burn, shall not be limited, where packaged in individual containers that do not exceed a 1.3-gallon capacity. [30:9.1.4(4)]

TABLE 14: MAXIMUM ALLOWABLE QUANTITY (MAQ) OF HAZARDOUS MATERIALS PER CONTROL AREA IN EDUCATIONAL OCCUPANCIES

Material	Class	Solid Kilograms	Liquid Gallons[m] (kg)	Gas[a] (at NTP) scf (kg)
Flammable and combustible liquid[b,c,l]	I and II III-A III-B	N/A N/A N/A	4.5 27.2 54.4[n]	N/A N/A N/A
Cryogenic fluid	Flammable Oxidizing	N/A N/A	4.5 4.5	N/A N/A
Explosives[d,e,f,g]	see note	see note	see note	see note
Flammable gas[c,h]	Gaseous Liquefied Liquefied Petroleum	N/A N/A N/A	N/A N/A N/A	NP (9.1) (9.1)
Flammable solid	N/A	2.3	N/A	N/A
Oxidizers	4 3 2 1	NP 4.5[i] 113.4 1,814.4[i]	NP 0.5[i] 11.3 181.4[j]	N/A N/A N/A N/A
Oxidizing gas[h]	Gaseous Liquefied	N/A N/A	N/A N/A	NP[h] NP[h]
Organic peroxides	I II III IV V	NP NP 11.3 NL NL	NP NP (11.3) NL NL	N/A N/A N/A N/A N/A
Pyrophoric materials	N/A	0.5	(0.5)	NP
Unstable Reactive	4 3 2 1	0.1 0.5 4.5 NL	(0.1) (0.5) (4.5) (NL)	NP NP NP[h] NP
Water-reactive	3 2 1	0.5 4.5 NL	(0.5) (4.5) NL	N/A N/A N/A
Corrosives	N/A	453.6	45.36	NP
Highly toxic	N/A	1.4	(1.4)	NP[j]
Toxic	N/A	56.7	(56.7)	NP[j]

For SI units, 1 lb = 0.4536 kg; 1 gal = 3.7854 L; 1 ft3 = 0.0283 m3.

NTP: Normal temperature and pressure [measured at 70°F (21°C) and 14.7 psi (101 kPa)]. N/A: Not applicable. NP: Not permitted. NL: Not limited.

Note: The hazardous material categories and MAQs that are shaded in this table are not regulated by NFPA 400 but are provided here for informational purposes. See Chapter 2 for the reference code or standard governing these materials and establishing the MAQs. In accordance with 1.1.1.2, materials having multiple hazards that fall within the scope of NFPA 400 shall comply with NFPA 400.

a. Unlimited amounts of gas are permitted to be used for personal medical or emergency medical use.

b. Storage in excess of 10 gal (38 L) of Class I and Class II liquids combined or 60 gal (227 L) of Class IIIA liquids is permitted where stored in safety cabinets with an aggregate quantity not to exceed 180 gal (681 L).

c. Fuel in the tank of operating mobile equipment is permitted to exceed the specified quantity where the equipment is operated in accordance with this code.

d. The use of explosive materials required by federal, state, or municipal agencies while engaged in normal or emergency performance of duties is not required to be limited. The storage of explosive materials is required to be in accordance with the requirements of NFPA 495.

e. The storage and use of explosive materials in medicines and medicinal agents in the forms prescribed by the official United States Pharmacopeia or the National Formulary are not required to be limited.

f. The storage and use of propellant-actuated devices or propellant-actuated industrial tools manufactured, imported, or distributed for their intended purposes are required to be limited to 50 lb (23 kg) net explosive weight.

g. The storage and use of small arms ammunition, and components thereof, are permitted where in accordance with NFPA 495

h. Containers, cylinders, or tanks not exceeding 250 scf (7.1 m3) content measured at 70°F (21°C) and 14.7 psi (101 kPa) and used for maintenance purposes, patient care, or operation of equipment shall be permitted.

i. A maximum quantity of 220 lb (99 kg) of solid or 22 gal (83 L) of liquid Class 3 oxidizer is permitted where such materials are necessary for maintenance purposes, operation, or sanitation of equipment. Storage containers and the manner of storage are required to be approved.

j. The permitted quantities are not limited in a building protected throughout by automatic sprinkler systems in accordance with NFPA 13.

k. Storage in laboratories only; additional 20 lb (9 kg) units are permitted where minimum 20 ft (6.1 m) separation is provided.

l. Gas cylinders not exceeding 20 scf (0.57 m3) measured at 70°F (21°C) and 14.7 psi (101 kPa) are permitted in gas cabinets or fume hoods.

m. Conversion. Where quantities are indicated in pounds and when the weight per gallon of the liquid is not provided to the AHJ, a conversion factor of 10 lb/gal (1.2 kg/L) shall be used.

n. Storage shall be permitted to be increased 100% if the building is protected throughout with an automatic sprinkler system installed in accordance with NFPA 13.

o. Medicines, foodstuffs, cosmetics, and other consumer products that contain not more than 50% by volume water-miscible flammable or combustible liquids, with the remainder of the product consisting of components that do not burn, shall not be limited, where packaged in individual containers that do not exceed a 1.3-gallon capacity. [30:9.1.4(4)]

TABLE 15: MAXIMUM ALLOWABLE QUANTITIES (MAQ) OF HAZARDOUS MATERIALS PER CONTROL AREA IN DAY-CARE OCCUPANCIES

Material	Class	Solid Kilograms	Liquid Gallons[k] kg	Gas[a] (at NTP) scf (kg)
Flammable and combustible liquid[b,c,l]	I and II III-A III-B	N/A N/A N/A	4.5 27.2 54.4[n]	N/A N/A N/A
Cryogenic fluid	Flammable Oxidizing	N/A N/A	4.5 4.5	N/A N/A
Explosives[d,e,f,g]	see note	see note	see note	see note
Flammable gas[c,g]	Gaseous Liquefied Liquefied Petroleum	N/A N/A N/A	N/A N/A N/A	NP (9.1) (9.1)
Flammable solid	N/A	2.3	N/A	N/A
Oxidizers	4 3 2 1	NP 4.5[i] 113.4 1,814.4[h]	NP 0.5[i] 11.3 181.4[h]	N/A N/A N/A N/A
Oxidizing gas[g]	Gaseous Liquefied	N/A N/A	N/A N/A	NP[h] NP[h]
Organic peroxides	I II III IV V	NP NP 11.3 NL NL	NP NP (11.3) NL NL	N/A N/A N/A N/A N/A
Pyrophoric materials	N/A	0.5	(0.5)	NP
Unstable Reactive	4 3 2 1	0.1 0.5 4.5 NL	(0.1) (0.5) (4.5) (NL)	NP NP NP[g] NP
Water-reactive	3 2 1	0.5 4.5 NL	(0.5) (4.5) NL	N/A N/A N/A
Corrosives	N/A	453.6	45.36	NP
Highly toxic	N/A	1.4	(1.4)	NP[j]
Toxic	N/A	56.7	(56.7)	NP[j]

For SI units, 1 lb = 0.4536 kg; 1 gal = 3.7854 L; 1 ft3 = 0.0283 m3.

NTP: Normal temperature and pressure [measured at 70°F (21°C) and 14.7 psi (101 kPa)]. N/A: Not applicable. NP: Not permitted. NL: Not limited.

Note: The hazardous material categories and MAQs that are shaded in this table are not regulated by NFPA 400 but are provided here for informational purposes. See Chapter 2 for the reference code or standard governing these materials and establishing the MAQs. In accordance with 1.1.1.2, materials having multiple hazards that fall within the scope of NFPA 400 shall comply with NFPA 400.

a. Unlimited amounts of gas are permitted to be used for personal medical or emergency medical use.

b. Storage in excess of 10 gal (38 L) of Class I and Class II liquids combined or 60 gal (227 L) of Class IIIA liquids is permitted where stored in safety cabinets with an aggregate quantity not to exceed 180 gal (681 L).

c. Fuel in the tank of operating mobile equipment is permitted to exceed the specified quantity where the equipment is operated in accordance with this code.

d. The use of explosive materials required by federal, state, or municipal agencies while engaged in normal or emergency performance of duties is not required to be limited. The storage of explosive materials is required to be in accordance with the requirements of NFPA 495.

e. The storage and use of explosive materials in medicines and medicinal agents in the forms prescribed by the official United States Pharmacopeia or the National Formulary are not required to be limited.

f. The storage and use of propellant-actuated devices or propellant-actuated industrial tools manufactured, imported, or distributed for their intended purposes are required to be limited to 50 lb (23 kg) net explosive weight.

g. Containers, cylinders, or tanks not exceeding 250 scf (7.1 m3) content measured at 70°F (21°C) and 14.7 psi (101 kPa) and used for maintenance purposes,patient care, or operation of equipment shall be permitted.

h. The permitted quantities are not limited in a building protected throughout by automatic sprinkler systems in accordance with NFPA 13.

i. A maximum quantity of 220 lb (99 kg) of solid or 22 gal (83 L) of liquid Class 3 oxidizer is permitted where such materials are necessary for maintenance purposes, operation, or sanitation of equipment. Storage containers and the manner of storage are required to be approved.

j. Gas cylinders not exceeding 20 scf (0.57 m3) measured at 70°F (21°C) and 14.7 psi (101 kPa) are permitted in gas cabinets or fume hoods.

k. Conversion. Where quantities are indicated in pounds and when the weight per gallon of the liquid is not provided to the AHJ, a conversion factor of 10 lb/gal (1.2 kg/L) shall be used.

l. Storage shall be permitted to be increased 100% if the building is protected throughout with an automatic sprinkler system installed in accordance with NFPA 13.

m. Medicines, foodstuffs, cosmetics, and other consumer products that contain not more than 50% by volume water-miscible flammable or combustible liquids, with the remainder of the product consisting of components that do not burn, shall not be limited, where packaged in individual containers that do not exceed a 1.3-gallon capacity. [30:9.1.4(4)]

TABLE 16: MAXIMUM ALLOWABLE QUANTITIES (MAQ) OF HAZARDOUS MATERIALS PER CONTROL AREA IN HEALTH CARE OCCUPANCIES

Material	Class	Solid Kilograms	Liquid Gallons[k] (kg)	Gas[a] (at NTP) scf (kg)
Flammable and combustible liquid[b,c,l]	I and II III-A III-B	N/A N/A N/A	4.5 27.2 54.4[n]	N/A N/A N/A
Cryogenic fluid	Flammable Oxidizing	N/A N/A	4.5 4.5	N/A N/A
Explosives[d,e,f,]	see note	see note	see note	see note
Flammable gas[c,g]	Gaseous Liquefied Liquefied Petroleum	N/A N/A N/A	N/A N/A N/A	NP (9.1) (9.1)
Flammable solid	N/A	2.3	N/A	N/A
Oxidizers	4 3 2 1	NP 4.5[h] 113.4 1,814.4[i]	NP 0.5[h] 11.3 181.4[i]	N/A N/A N/A N/A
Oxidizing gas[g]	Gaseous Liquefied	N/A N/A	N/A N/A	NP[g] NP[g]
Organic peroxides	I II III IV V	NP NP 11.3 NL NL	NP NP (11.3) NL NL	N/A N/A N/A N/A N/A
Pyrophoric materials	N/A	NP	NP	NP
Unstable Reactive	4 3 2 1	NP NP 4.5 NL	NP NP (4.5) (NL)	NP NP NP[g] NP
Water-reactive	3 2 1	0.5 4.5 NL	(0.5) (4.5) NL	N/A N/A N/A
Corrosives	N/A	453.6	45.36	NP
Highly toxic	N/A	1.4	1.4	NP[j]
Toxic	N/A	56.7	56.7	NP[j]

For SI units, 1 lb = 0.4536 kg; 1 gal = 3.7854 L; 1 ft3 = 0.0283 m3.
NTP: Normal temperature and pressure [measured at 70°F (21°C) and 14.7 psi (101 kPa)]. N/A: Not applicable. NP: Not permitted. NL: Not limited.
Note: The hazardous material categories and MAQs that are shaded in this table are not regulated by NFPA 400 but are provided here for informational purposes.
See Chapter 2 for the reference code or standard governing these materials and establishing the MAQs. In accordance with 1.1.1.2, materials having multiple hazards that fall within the scope of NFPA 400 shall comply with NFPA 400.

a. Unlimited amounts of gas are permitted to be used for personal medical or emergency medical use.
b. Storage in excess of 10 gal (38 L) of Class I and Class II liquids combined or 60 gal (227 L) of Class IIIA liquids is permitted where stored in safety cabinets with an aggregate quantity not to exceed 180 gal (681 L).
c. Fuel in the tank of operating mobile equipment is permitted to exceed the specified quantity where the equipment is operated in accordance with this code.
d. The use of explosive materials required by federal, state, or municipal agencies while engaged in normal or emergency performance of duties is not required to be limited. The storage of explosive materials is required to be in accordance with the requirements of NFPA 495.
e. The storage and use of explosive materials in medicines and medicinal agents in the forms prescribed by the official United States Pharmacopeia or the National Formulary are not required to be limited.
f. The storage and use of propellant-actuated devices or propellant-actuated industrial tools manufactured, imported, or distributed for their intended purposes are required to be limited to 50 lb (23 kg) net explosive weight.
g. Containers, cylinders, or tanks not exceeding 250 scf (7.1 m3) content measured at 70°F (21°C) and 14.7 psi (101 kPa) and used for maintenance purposes, patient care, or operation of equipment shall be permitted.
h. A maximum quantity of 220 lb (99 kg) of solid or 22 gal (83 L) of liquid Class 3 oxidizer is permitted where such materials are necessary for maintenance purposes, operation, or sanitation of equipment. Storage containers and the manner of storage are required to be approved.
i. The permitted quantities are not limited in a building protected throughout by automatic sprinkler systems in accordance with NFPA 13.
j. Gas cylinders not exceeding 20 scf (0.57 m3) measured at 70°F (21°C) and 14.7 psi (101 kPa) are permitted in gas cabinets or fume hoods.
k. Conversion. Where quantities are indicated in pounds and when the weight per gallon of the liquid is not provided to the AHJ, a conversion factor of 10 lb/gal (1.2 kg/L) shall be used.
l. Storage shall be permitted to be increased 100% if the building is protected throughout with an automatic sprinkler system installed in accordance with NFPA 13.
m. Medicines, foodstuffs, cosmetics, and other consumer products that contain not more than 50% by volume water-miscible flammable or combustible liquids, with the remainder of the product consisting of components that do not burn, shall not be limited, where packaged in individual containers that do not exceed a
1.3-gallon capacity. [30:9.1.4(4)]

TABLE 17: MAXIMUM ALLOWABLE QUANTITIES (MAQ) OF HAZARDOUS MATERIALS PER CONTROL AREA IN AMBULATORY HEALTH CARE OCCUPANCIES

Material	Class	Solid Kilograms	Liquid Gallons[k] (kg)	Gas[a] (at NTP) scf (kg)
Flammable and combustible liquid[b,c,l]	I and II III-A III-B	N/A N/A N/A	4.5 27.2 54.4[n]	N/A N/A N/A
Cryogenic fluid	Flammable Oxidizing	N/A N/A	4.5 4.5	N/A N/A
Explosives[d,e,f]	see note	see note	see note	see note
Flammable gas[c,g]	Gaseous Liquefied Liquefied Petroleum	N/A N/A N/A	N/A N/A N/A	NP (9.1) (9.1)
Flammable solid	N/A	2.3	N/A	N/A
Oxidizers	4 3 2 1	NP 4.5[h] 113.4 1,814.4[i]	NP 0.5[h] 11.3 181.4[i]	N/A N/A N/A N/A
Oxidizing gas[g]	Gaseous Liquefied	N/A N/A	N/A N/A	NP[g] NP[g]
Organic peroxides	I II III IV V	NP NP 11.3 NL NL	NP NP (11.3) NL NL	N/A N/A N/A N/A N/A
Pyrophoric materials	N/A	NP	NP	NP
Unstable Reactive	4 3 2 1	NP NP 4.5 NL	NP NP (4.5) (NL)	NP NP NP[g] NP
Water-reactive	3 2 1	0.5 4.5 NL	(0.5) (4.5) NL	N/A N/A N/A
Corrosives	N/A	453.6	45.36	NP
Highly toxic	N/A	1.4	(1.4)	NP[j]
Toxic	N/A	56.7	56.7	NP[j]

For SI units, 1 lb = 0.4536 kg; 1 gal = 3.7854 L; 1 ft3 = 0.0283 m3.

NTP: Normal temperature and pressure [70°F (21°C) and 14.7 psi (101 kPa)]. N/A: Not applicable. NP: Not permitted. NL: Not limited.

Note: The hazardous material categories and MAQs that are shaded in this table are not regulated by NFPA 400 but are provided here for informational purposes. See Chapter 2 for the reference code or standard governing these materials and establishing the MAQs. In accordance with 1.1.1.2, materials having multiple hazards that fall within the scope of NFPA 400 shall comply with NFPA 400.

a. Unlimited amounts of gas are permitted to be used for personal medical or emergency medical use.

b. Storage in excess of 10 gal (38 L) of Class I and Class II liquids combined or 60 gal (227 L) of Class IIIA liquids is permitted where stored in safety cabinets with an aggregate quantity not to exceed 180 gal (681 L).

c. Fuel in the tank of operating mobile equipment is permitted to exceed the specified quantity where the equipment is operated in accordance with this code.

d. The use of explosive materials required by federal, state, or municipal agencies while engaged in normal or emergency performance of duties is not required to be limited. The storage of explosive materials is required to be in accordance with the requirements of NFPA 495.

e. The storage and use of explosive materials in medicines and medicinal agents in the forms prescribed by the official United States Pharmacopeia or the National Formulary are not required to be limited.

f. The storage and use of propellant-actuated devices or propellant-actuated industrial tools manufactured, imported, or distributed for their intended purposes are required to be limited to 50 lb (23 kg) net explosive weight.

g. Containers, cylinders, or tanks not exceeding 250 scf (7.1 m3) content measured at 70°F (21°C) and 14.7 psi (101 kPa) and used for maintenance purposes, patient care, or operation of equipment shall be permitted.

h. A maximum quantity of 220 lb (99 kg) of solid or 22 gal (83 L) of liquid Class 3 oxidizer is permitted where such materials are necessary for maintenance purposes, operation, or sanitation of equipment. Storage containers and the manner of storage are required to be approved.

i. The permitted quantities are not limited in a building protected throughout by automatic sprinkler systems in accordance with NFPA 13.

j. Gas cylinders not exceeding 20 scf (0.57 m3) measured at 70°F (21°C) and 14.7 psi (101 kPa) are permitted in gas cabinets or fume hoods.

k. Conversion. Where quantities are indicated in pounds and when the weight per gallon of the liquid is not provided to the AHJ, a conversion factor of 10 lb/gal (1.2 kg/L) shall be used.

l. Storage shall be permitted to be increased 100% if the building is protected throughout with an automatic sprinkler system installed in accordance with NFPA 13.

m. Medicines, foodstuffs, cosmetics, and other consumer products that contain not more than 50% by volume water-miscible flammable or combustible liquids, with the remainder of the product consisting of components that do not burn, shall not be limited, where packaged in individual containers that do not exceed a 1.3-gallon capacity. [30:9.1.4(4)]

TABLE 18: MAXIMUM ALLOWABLE QUANTITIES (MAQ) OF HAZARDOUS MATERIALS PER CONTROL AREA IN DETECTION AND CORRECTIONAL OCCUPANCIES

Material	Class	Solid Kilograms	Liquid Gallons[k] (kg)	Gas[a] (at NTP) scf (kg)
Flammable and combustible liquid[b,c,l]	I and II III-A III-B	N/A N/A N/A	4.5 27.2 54.4[n]	N/A N/A N/A
Cryogenic fluid	Flammable Oxidizing	N/A N/A	4.5 4.5	N/A N/A
Explosives[d,e,f]	see note	see note	see note	see note
Flammable gas[c,g]	Gaseous Liquefied Liquefied Petroleum	N/A N/A N/A	N/A N/A N/A	NP (9.1) (9.1)
Flammable solid	N/A	2.3	N/A	N/A
Oxidizers	4 3 2 1	NP 4.5[h] 113.4 1,814.4[i]	NP 0.5[h] 11.3 181.4[i]	N/A N/A N/A N/A
Oxidizing gas[g]	Gaseous Liquefied	N/A N/A	N/A N/A	NP[g] NP[g]
Organic peroxides	I II III IV V	NP NP 11.3 NL NL	NP NP (11.3) NL NL	N/A N/A N/A N/A N/A
Pyrophoric materials	N/A	NP	NP	NP
Unstable Reactive	4 3 2 1	NP NP 4.5 NL	NP NP (4.5) (NL)	NP NP NP[g] NP
Water-reactive	3 2 1	0.5 4.5 NL	(0.5) (4.5) NL	N/A N/A N/A
Corrosives	N/A	453.6	45.36	NP
Highly toxic	N/A	1.4	(1.4)	NP[j]
Toxic	N/A	56.7	56.7	NP[j]

For SI units, 1 lb = 0.4536 kg; 1 gal = 3.7854 L; 1 ft3 = 0.0283 m3.

NTP: Normal temperature and pressure [measured at 70°F (21°C) and 14.7 psi (101 kPa)]. N/A: Not applicable. NP: Not permitted. NL: Not limited.

Note: The hazardous material categories and MAQs that are shaded in this table are not regulated by NFPA 400 but are provided here for informational purposes. See Chapter 2 for the reference code or standard governing these materials and establishing the MAQs. In accordance with 1.1.1.2, materials having multiple hazards that fall within the scope of NFPA 400 shall comply with NFPA 400.

a. Unlimited amounts of gas are permitted to be used for personal medical or emergency medical use.

b. Storage in excess of 10 gal (38 L) of Class I and Class II liquids combined or 60 gal (227 L) of Class IIIA liquids is permitted where stored in safety cabinets with an aggregate quantity not to exceed 180 gal (681 L).

c. Fuel in the tank of operating mobile equipment is permitted to exceed the specified quantity where the equipment is operated in accordance with this code.

d. The use of explosive materials required by federal, state, or municipal agencies while engaged in normal or emergency performance of duties is not required to be limited. The storage of explosive materials is required to be in accordance with the requirements of NFPA 495.

e. The storage and use of explosive materials in medicines and medicinal agents in the forms prescribed by the official United States Pharmacopeia or the National Formulary are not required to be limited.

f. The storage and use of propellant-actuated devices or propellant-actuated industrial tools manufactured, imported, or distributed for their intended purposes are required to be limited to 50 lb (23 kg) net explosive weight.

g. The storage and use of small arms ammunition, and components thereof, are permitted where in accordance with NFPA 495.

h. Containers, cylinders, or tanks not exceeding 250 scf (7.1 m3) content measured at 70°F (21°C) and 14.7 psi (101 kPa) and used for maintenance purposes, patient care, or operation of equipment shall be permitted.

i. A maximum quantity of 220 lb (99 kg) of solid or 22 gal (83 L) of liquid Class 3 oxidizer is permitted where such materials are necessary for maintenance purposes, operation, or sanitation of equipment. Storage containers and the manner of storage are required to be approved.

j. Gas cylinders not exceeding 20 scf (0.57 m3) measured at 70°F (21°C) and 14.7 psi (101 kPa) are permitted in gas cabinets or fume hoods.

k. Conversion. Where quantities are indicated in pounds and when the weight per gallon of the liquid is not provided to the AHJ, a conversion factor of 10 lb/gal (1.2 kg/L) shall be used.

l. Medicines, foodstuffs, cosmetics, and other consumer products that contain not more than 50% by volume water-miscible flammable or combustible liquids, with the remainder of the product consisting of components that do not burn, shall not be limited, where packaged in individual containers that do not exceed a 1.3-gallon capacity. [30:9.1.4(4)]

TABLE 19: MAXIMUM ALLOWABLE QUANTITIES OF HAZARDOUS MATERIALS PER CONTROL AREA IN RESIDENTIAL OCCUPANCIES CONSISTING OF LODGING AND ROOMING HOUSES, HOTELS, DORMITORIES, APARTMENTS, AND RESIDENTIAL BOARD AND CARE FACILITIES

Material	Class	Solid Kilograms	Liquid Gallons[k] (kg)	Gas[a] (at NTP) scf (kg)
Flammable and combustible liquid[b,c,m]	I and II III-A III-B	N/A N/A N/A	4.5 27.2 54.4	N/A N/A N/A
Cryogenic fluid	Flammable Oxidizing	N/A N/A	4.5 4.5	N/A N/A
Explosives[d,e,f,g]	see note	see note	see note	see note
Flammable gas[c,h]	Gaseous Liquefied[j] Liquefied Petroleum	N/A N/A N/A	N/A N/A N/A	NP (9.1) (9.1)
Flammable solid	N/A	2.3	N/A	N/A
Oxidizers	4 3 2 1	NP 4.5[i] 113.4 1,814.4	NP 0.5[i] 11.3 181.4	N/A N/A N/A N/A
Oxidizing gas[h]	Gaseous Liquefied	N/A N/A	N/A N/A	NP[h] N/A
Organic peroxides	I II III IV V	NP NP 11.3 NL NL	NP NP (11.3) NL NL	N/A N/A N/A N/A N/A
Pyrophoric materials	N/A	0.5	(0.5)	NP
Unstable Reactive	4 3 2 1	0.1 0.5 4.5 NL	(0.1) (0.5) (4.5) NL	NP NP NP[h] NP
Water-reactive	3 2 1	0.5 4.5 NL	(0.5) (4.5) NL	N/A N/A N/A
Corrosives	N/A	453.6	45.36	NP
Highly toxic	N/A	1.4	(1.4)	NP[k]
Toxic	N/A	56.7	(56.7)	NP[k]

For SI units, 1 lb = 0.4536 kg; 1 gal = 3.7854 L; 1 ft3 = 0.0283 m3.

NTP: Normal temperature and pressure [measured at 70°F (21°C) and 14.7 psi (101 kPa)]. N/A: Not applicable. NP: Not permitted. NL: Not limited. Note: The hazardous material categories and MAQs that are shaded in this table are not regulated by NFPA 400 but are provided here for informational purposes. See Chapter 2 for the reference code or standard governing these materials and establishing the MAQs. In accordance with 1.1.1.2, materials having multiple hazards that fall within the scope of NFPA 400 shall comply with NFPA 400.

a. Unlimited amounts of gas are permitted to be used for personal medical or emergency medical use.

b. Storage in excess of 10 gal (38 L) of Class I and Class II liquids combined or 60 gal (227 L) of Class IIIA liquids are permitted where stored in safety cabinets with an aggregate quantity not to exceed 180 gal (681 L).

c. Fuel in the tank of operating mobile equipment is permitted to exceed the specified quantity where the equipment is operated in accordance with this code.

d. The use of explosive materials required by federal, state, or municipal agencies while engaged in normal or emergency performance of duties is not required to be limited. The storage of explosive materials is required to be in accordance with the requirements of NFPA 495.

e. The storage and use of explosive materials in medicines and medicinal agents in the forms prescribed by the official United States Pharmacopeia or the National Formulary are not required to be limited.

f. The storage and use of propellant-actuated devices or propellant-actuated industrial tools manufactured, imported, or distributed for their intended purposes are required to be limited to 50 lb (23 kg) net explosive weight.

g. The storage and use of small arms ammunition, and components thereof, are permitted where in accordance with NFPA 495.

h. Containers, cylinders, or tanks not exceeding 250 scf (7.1 m3) content measured at 70°F (21°C) and 14.7 psi (101 kPa) and used for maintenance purposes, patient care, or operation of equipment shall be permitted.

i. A maximum quantity of 220 lb (99 kg) of solid or 22 gal (83 L) of liquid Class 3 oxidizer is permitted where such materials are necessary for maintenance purposes, operation, or sanitation of equipment. Storage containers and the manner of storage are required to beapproved.

j. Storage containers are not permitted to exceed 0.325 ft3 (0.0092 m3) capacity.

k. Gas cylinders not exceeding 20 scf (0.57 m3) measured at 70°F (21°C) and 14.7 psi (101 kPa) are permitted in gas cabinets or fume hoods.

l. Conversion. Where quantities are indicated in pounds and when the weight per gallon of the liquid is not provided to the AHJ, a conversion factor of 10 lb/gal (1.2 kg/L) shall be used.

m. Medicines, foodstuffs, cosmetics, and other consumer products that contain not more than 50% by volume water-miscible flammable or combustible liquids, with the remainder of the product consisting of components that do not burn, shall not be limited, where packaged in individual containers that do not exceed a 1.3-gallon capacity. [30:9.1.4(4)]

TABLE 20: MAXIMUM ALLOWABLE QUANTITIES OF HAZARDOUS MATERIALS PER CONTROL AREA IN BUSINESS OCCUPANCIES

Material	Class	Solid Kilograms	Liquid Gallons[k] (kg)	Gas[a] (at NTP) scf (kg)
Flammable and combustible liquid[b,c,k]	I and II III-A III-B	N/A N/A N/A	4.5 27.2 54.4	N/A N/A N/A
Cryogenic fluid	Flammable Oxidizing	N/A N/A	4.5 4.5	N/A N/A
Explosives[d,e,f,g]	see note	see note	see note	see note
Flammable gas[c]	Gaseous Liquefied[j] Liquefied Petroleum	N/A N/A N/A	N/A N/A N/A	453.6 (9.1) (9.1)
Flammable solid	N/A	2.3	N/A	N/A
Oxidizers	4 3 2 1	NP 4.5[h] 113.4 1,814.4	NP 0.5[h] 11.3 181.4	NP NP NP NP
Oxidizing gas[h]	Gaseous Liquefied	N/A N/A	N/A 6.8	680.4 N/A
Organic peroxides	I II III IV V	NP NP 680.4 45,359.2 NL	NP NP (680.4) (45,359.2) NL	N/A N/A N/A N/A N/A
Pyrophoric materials	N/A	0.5	(0.5)	4.5
Unstable Reactive	4 3 2 1	0.1 0.5 4.5 NL	(0.1) 0.5 (4.5) (NL)	0.9 4.5 340.2 NL
Water-reactive	3 2 1	0.5 4.5 NL	(0.5) (4.5) NL	N/A N/A N/A
Corrosives	N/A	453.6	(45.36)	367.4
Highly toxic[i]	N/A	1.4	(1.4)	9.1
Toxic[i]	N/A	56.7	(56.7)	367.4

For SI units, 1 lb = 0.4536 kg; 1 gal = 3.7854 L; 1 ft3 = 0.0283 m3.

NTP: Normal temperature and pressure [measured at 70°F (21°C) and 14.7 psi (101 kPa)]. N/A: Not applicable. NP: Not permitted. NL: Not limited. Note: The hazardous material categories and MAQs that are shaded in this table are not regulated by NFPA 400 but are provided here for informational purposes. See Chapter 2 for the reference code or standard governing these materials and establishing the MAQs. In accordance with 1.1.1.2, materials having multiple hazards that fall within the scope of NFPA 400 shall comply with NFPA 400.

a. Unlimited amounts of gas are permitted to be used for personal medical or emergency medical use.

b. Storage in excess of 10 gal (38 L) of Class I and Class II liquids combined or 60 gal (227 L) of Class IIIA liquids is permitted where stored in safety cabinets with an aggregate quantity not to exceed 180 gal (681 L).

c. Fuel in the tank of operating mobile equipment is permitted to exceed the specified quantity where the equipment is operated in accordance with this code.

d. The use of explosive materials required by federal, state, or municipal agencies while engaged in normal or emergency performance of duties is not required to be limited. The storage of explosive materials is required to be in accordance with the requirements of NFPA 495.

e. The storage and use of explosive materials in medicines and medicinal agents in the forms prescribed by the official United States Pharmacopeia or the National Formulary are not required to be limited.

f. The storage and use of propellant-actuated devices or propellant-actuated industrial tools manufactured, imported, or distributed for their intended purposes are required to be limited to 50 lb (23 kg) net explosive weight.

g. The storage and use of small arms ammunition, and components thereof, are permitted where in accordance with NFPA 495.

h. A maximum quantity of 220 lb (99 kg) of solid or 22 gal (83 L) of liquid Class 3 oxidizer is permitted where such materials are necessary for maintenance purposes, operation, or sanitation of equipment. Storage containers and the manner of storage are required to be approved.

i. Gas cylinders not exceeding 20 scf (0.57 m3) measured at 70°F (21°C) and 14.7 psi (101 kPa) are permitted in gas cabinets or fume hoods.

j. Conversion. Where quantities are indicated in pounds and when the weight per gallon of the liquid is not provided to the AHJ, a conversion factor of 10 lb/gal (1.2 kg/L) shall be used.

k. Medicines, foodstuffs, cosmetics, and other consumer products that contain not more than 50% by volume water-miscible flammable or combustible liquids, with the remainder of the product consisting of components that do not burn, shall not be limited, where packaged in individual containers that do not exceed a 1.3-gallon capacity. [30:9.1.4(4)]

TABLE 21: MAXIMUM ALLOWABLE QUANTITY (MAQ) PER INDOOR AND OUTDOOR CONTROL AREA FOR SELECTED HAZARD CATEGORIES IN MERCANTILE, STORAGE, AND INDUSTRIAL OCCUPANCIES

HAZARD CATEGORY	MAXIMUM ALLOWABLE QUANTITY[ab]	
	Solids	Liquids
	kilogram	liters
Physical Hazards Materials: Nonflammable and Noncombustible Solids and Liquids		
Oxidizers		
Class 3	616	511
Class 2	1,021	852
Class 1	8,165[c]	6,814[c]

Note: Maximum quantities for hazard categories not shown are required to be in accordance with Table 5.2.1.1.3.
a. Maximum quantities are permitted to be increased 100 percent in buildings that are sprinklered in accordance with NFPA 13. Where footnote b also applies, the increase for both footnotes is permitted to be applied.
b. Maximum quantities are permitted to be increased 100 percent where stored in approved storage cabinets in accordance with NFPA1. Where footnote a also applies, the increase for both footnotes is permitted to be applied.
c. Quantities are not limited in buildings protected by an automatic sprinkler system complying with NFPA 13. [5000: Table 34.1.3.3.1(a)]

TABLE 22: MAXIMUM ALLOWABLE QUANTITY (MAQ) PER INDOOR AND OUTDOOR CONTROL AREA FOR SELECTED HAZARD CATEGORIES IN MERCANTILE AND STORAGE OCCUPANCIES

HAZARD CATEGORY	MAXIMUM ALLOWABLE QUANTITY[ab]	
	Solids	Liquids
	kilogram	liters
Physical Hazards Materials: Nonflammable and Noncombustible Solids and Liquids		
Unstable (reactive)		
Class 3	250	208
Class 2	522	435
Water-reactive		
Class 3	250	208
Class 2	522	435
Health Hazards Materials: Nonflammable and Noncombustible Solids and Liquids		
Corrosive	4,536	3,785
Highly Toxic[d]	9	8
Toxic[d]	454	378

a. Maximum quantities for hazard categories not shown are required to be in accordance with Table 5.2.1.1.3.
b. Maximum quantities are permitted to be increased 100 percent in buildings that are sprinklered in accordance with NFPA 13. Where footnote b also applies, the increase for both footnotes can be applied.
c. Maximum quantities are permitted to be increased 100 percent where stored in approved storage cabinets in accordance with NFPA1. Where footnote (a) also applies, the increase for both footnotes is permitted to be applied. [5000:Table 34.1.3.3.1(b)]
d. Toxic or highly toxic solids or liquids displayed in original packaging in mercantile or storage occupancies and intended for maintenance, operation of equipment, or sanitation when contained in individual packaging not exceeding 100 lb (45.4 kg) shall be limited to an aggregate of 1200 lb (544.3 kg) or 120 gal (454.2 L). The increases allowed by footnotes a, b, and c shall not apply to highly toxic solids and liquids.

TABLE 23: DESIGN AND NUMBER OF CONTROL AREAS

Floor Level	Maximum Allowable Quantity per Control Area (%)*	Number of Control Areas per Floor	Fire Resistance Rating for Fire Barriers† (hr)
Above grade			
>9	5.0	1	2
7–9	5.0	2	2
4–6	12.5	2	2
3	50.0	2	1
2	75.0	3	1
1	100.0	4	1
Below grade			
1	75.0	2	1
2	50.0	32	1
Lower than 2	NP	NP	N/A

NP: Not permitted. N/A: Not applicable.
*Percentages represent the MAQ per control area shown in Table 5.2.1.1.3, with all the increases permitted in the footnotes of that table.
†Fire barriers are required to include floors and walls, as necessary, to provide a complete separation from other control areas.

TABLE 24: DETACHED BUILDINGS REQUIRED WHERE QUANTITY OF MATERIAL EXCEEDS AMOUNT SHOWN

Gas Hazard		Quantity of Material	
	Class	scf	Nm^3*
Individual bulk hydrogen compressed gas systems	N/A	N/A	15,000 (425)
Oxidizers	3 2	1,200 2,000	N/A N/A
Organic peroxides	I II	25 50	N/A N/A
Unstable (Reactive) materials	3, undetonable 2	1 25	2,000 (57) 10,000 (283)
Water-reactive materials	3 2, deflagrating	1 25	N/A N/A
Pyrophoric gases		N/A	2,000 (57)

For SI units, 1 ton = 0.9 met ton.
N/A: Not applicable.
*See Table 21.2.5.
[55: Table 6.5]

TABLE 25: MAXIMUM ALLOWABLE QUANTITIES OF HAZARDOUS MATERIALS PER OUTDOOR CONTROL AREA

Material	Class	Storage			Use — Closed Systems			Use — Open Systems	
		Solid Kilograms	Liquid Gallons (kg)	Gas scf (kg)	Solid Kilograms	Liquid Gallons (kg)	Gas scf (kg)	Solid Kilograms	Liquid Gallons (kg)
Physical Hazard Materials									
Flammable gas									
Gaseous		N/A	N/A	1,360.8	N/A	N/A	680.4	N/A	N/A
Liquefied		N/A	N/A	(136.1)	N/A	N/A	(68.0)	N/A	N/A
Flammable solid		226.8	N/A	N/A	113.4	N/A	N/A	22.7	N/A
Organic peroxide	Detonable	0.5	(0.5)	N/A	0.1	(0.1)	N/A	0.1	(0.1)
Organic peroxide	I	9.1	9.1	N/A	4.5	(4.5)	N/A	0.9	0.9
	II	90.7	90.7	N/A	45.4	(45.4)	N/A	9.1	9.1
	III	226.8	226.8	N/A	113.4	(113.4)	N/A	22.7	22.7
	IV	NL	NL	N/A	NL	NL	N/A	NL	NL
	V	NL	NL	N/A	NL	NL	N/A	NL	NL
Oxidizer	4	0.9	(0.9)	N/A	0.5	(0.1)	N/A	0.1	(0.1)
	3	18.1	(18.1)	N/A	9.1	(0.9)	N/A	0.9	(0.9)
	2	453.6	(453.6)	N/A	226.8	(113.4)	N/A	22.7	(22.7)
	1	NL	NL	N/A	NL	NL	N/A	NL	NL
Oxidizing gas									
Gaseous		N/A	N/A	2,721.6	N/A	N/A	2,721.6	N/A	N/A
Liquefied		N/A	N/A	(272.2)	N/A	N/A	(136.1)	N/A	N/A
Pyrophoric		3.6	(3.6)	45.36	1.8	(1.8)	4.5	0	0
Unstable (Reactive)	4	0.9	(0.9)	9.1	0.5	(0.5)	0.9	0.1	(0.1)
	3	9.1	(9.1)	90.7	4.5	(4.5)	4.5	0.5	(0.5)
	2	90.7	(90.7)	453.6	45.4	(45.4)	113.4	4.5	(4.5)
	1	NL	NL	680.4	NL	NL	NL	NL	NL
Water-reactive	3	9.1	(9.1)	N/A	4.5	(4.5)	N/A	0.5	(0.5)
	2	90.7	(90.7)	N/A	45.4	(45.4)	N/A	4.5	(4.5)
	1	NL	NL	N/A	NL	NL	N/A	NL	NL
Health Hazard Materials									
Corrosive		9,071.9	907.2	N/A	4,535.9	453.6	N/A	453.6	45.4
Corrosive gas									
Gaseous		N/A	N/A	734.8	N/A	N/A	367.4	N/A	N/A
Liquefied		N/A	N/A	(136.1)	N/A	N/A	(68.0)	N/A	N/A
Highly toxic		9.1	(9.1)	N/A	4.5	(4.5)	N/A	1.4	(1.4)
Highly toxic gas									
Gaseous		N/A	N/A	18.1*	N/A	N/A	9.1*	N/A	N/A
Liquefied		N/A	N/A	(3.6)*	N/A	N/A	(1.8)*	N/A	N/A
Toxic		1,000	(1,000)	N/A	226.8	22.7	N/A	56.7	(56.7)
Toxic gas									
Gaseous		N/A	N/A	734.8	N/A	N/A	367.4	N/A	N/A
Liquefied		N/A	N/A	(136.1)	N/A	N/A	(68.0)	N/A	N/A

For SI units, 1 lb = 0.4535 kg; 1 gal = 3.785 L; 1 scf3 = 0.0283 Nm3.
N/A: Not applicable. NL: Not limited.
Notes:
(1) Table values in parentheses correspond to the unit name in parentheses at the top of the column.
(2) For gallons of liquids, divide the amount in pounds by 10.
(3) The aggregate quantities in storage and use cannot exceed the quantity listed for storage.
(4) The aggregate quantity of nonflammable solid and nonflammable or noncombustible liquid hazardous materials allowed in outdoor storage per single property under the same ownership or control used for retail or wholesale sales is permitted to exceed the MAQ where such storage is in accordance with 5.2.1.13.3.
*Permitted only where stored or used in approved exhausted gas cabinets, exhausted enclosures, or fume hoods.

TABLE 26: CLASSIFICATION OF HAZARDOUS MATERIALS

NFPA 400	ERG	GHS (Physical Hazards)	European and some South American Regulations
	Class 1 - Explosives	Explosives	
Flammable gases Inert gases	Class 2 - Gases	Flammable Gases Gases Under Pressure	2 - Emission of gas due to pressure or chemical reaction
		Flammable Aerosols	
Flammable cryogenic fluids Inert cryogenic fluids	Class 3 - Flammable Liquids (and Combustible Liquids [U.S.])	Flammable Liquids	3 - Flammability of liquids (vapors) and gases or self-heating liquid
Flammable solids	Class 4 - Flammable Solids; substances liable to spontaneous combustion; substances which, on contact with water, emit flammable gases	Flammable solids	4 - Flammability of solids or self-heating solid
Oxidizer solids or liquids Oxidizing cryogenic fluids Oxidizing gases	Class 5 - Oxidizing Substances and Organic Peroxides	Oxidizing Solids Oxidizing Liquids Oxidizing Gases	5 - Oxidizing (fire-intensifying) effect
Organic Peroxide Formulations		Organic Peroxide	
Toxic or highly toxic solids, liquids, or gases	Class 6 - Toxic Substances and Infectious Substances		6 - Toxicity or risk of infection
	Class 7 - Radioactive Materials		7 - Radioactivity
Corrosive solids, liquids, or gases	Class 8 - Corrosive Substances	Corrosive to Metal	8 - Corrosivity
Pyrophoric solids, liquids, or gases		Pyrophoric Solids Pyrophoric Liquids	
Unstable (reactive) solids, liquids, or gases	Class 9 - Miscellaneous Dangerous Goods/ Hazardous Materials and Articles	Self-Reactive Substances	9 - Risk of spontaneous violent reaction
		Self-Heating Substances	
			NOTE: The risk of spontaneous violent reaction within the meaning of digit 9 includes the possibility, due to the nature of a substance, of a risk of explosion, disintegration and polymerization reaction followed by the release of considerable heat or flammable and/or toxic gases . • Doubling of a digit indicates an intensification of that particular hazard (i .e ., 33, 66, 88) . • Where the hazard associated with a substance can be adequately indicated by a single digit, the digit is followed by a zero (i .e ., 30, 40, 50) . • A hazard identification number prefixed by the letter "X" indicates that the substance will react dangerously with water (i .e ., X88)

TABLE 27: STORAGE OF COMBUSTIBLE FIBERS

Volume of Material in cubic meters (m^3)	Method of Storage
0 – 3	Combustible Fiber Storage Bin* with self-closing cover
3.1 – 14	Combustible fiber storage room having 1-hr fire resistance barrier
14.1 – 28	Combustible fiber storage vault having 2-hr fire resistance barrier and approved opening
28 up (protected)	Combustible fiber storage vault with approved opening and protected by approved, supervised sprinkler system

TABLE 28: SPRINKLER DISCHARGE DENSITIES FOR COMBUSTIBLE COMMODITIES NOT EXCEEDING 640 CM IN HEIGHT, BY HAZARD CLASSIFICATION

HAZARD CLASSIFICATION	COMMODITY CLASS		
	I or II	II or III	III or IV
Low	8.2	8.2	10.2
Average	9.4	11.4	13.5
High	14.3	17.1	20.4
Very High			

TABLE 29: INDOOR PORTABLE CONTAINER STORAGE FOR FLAMMABLE LIQUIDS

CLASS LEVEL LIQUID	STORAGE LEVEL	LITERS	
		PROTECTED STORAGE MAXIMUM PER PILE	UNPROTECTED STORAGE MAXIMUM PER PILE
IA	Ground & Upper Floors	10,409	2,498
	Basement	NOT PERMITTED	NOT PERMITTED
IB	Ground & Upper Floors	20,818	5,204
	Basement	NOT PERMITTED	NOT PERMITTED
IC	Ground & Upper Floors	62,453	15,613
	Basement	NOT PERMITTED	NOT PERMITTED
II	Ground & Upper Floors	62,453	15,613
	Basement	20,818	NOT PERMITTED
III	Ground & Upper Floors	208,175	52,044
	Basement	31,226	NOT PERMITTED

TABLE 30: SPRINKLER SYSTEMS FOR INSIDE STORAGE AND HANDLING ROOMS OF FLAMMABLE LIQUIDS

SPRINKLER SYSTEM PROVIDED	FIRE RESISTANCE RATING	MAXIMUM SIZE (Floor Area)	TOTAL LITERS ALLOWED
Yes	2 hours	46.5 sq. m	18, 925
No	2 hours	46.5 sq. m	7, 570
Yes	1 hour	13.9 sq. m	3,785
No	1 hour	13.9 sq. m	1,893

TABLE 31: STORAGE OF FLAMMABLE OR COMBUSTIBLE LIQUIDS IN CLOSED CONTAINERS OUTSIDE OF BUILDINGS

QUANTITY IN LITERS	DISTANCE FROM BUILDING OR LINE OF ADJOINING PROPERTY WHICH MAY BE BUILT UPON IN METERS
CLASS I	
1 to 568 (3 drums)	4.5
568 to 1,892 (3 to 10 drums)	7.5
1,893 to 18,925 (10 to 100 drums)	15.0
CLASS II or III	
1 to 568 (3 drums)	1.5
568 to 1,892 (3 to 10 drums)	3.0
1,893 to 18,925 (10 to 100 drums)	9.0

TABLE 32: OUTDOOR PORTABLE TANK STORAGE

CLASS	MAXIMUM PER PILE (Liter)	DISTANCE BETWEEN PILES (meter)	DISTANCE TO PROPERTY LINES CAN BE BUILT UPON (meter)	DISTANCE TO STREET ALLEY PUBLIC WAY (meter)
IA	8,327	1.5	6.0	3.0
IB	16,654	1.5	6.0	3.0
IC	33,308	1.5	6.0	3.0
II	66,616	1.5	3.0	1.5
Combustible	66,540	1.5	3.0	1.5

TABLE 33: ELECTRICAL EQUIPMENT HAZARDOUS AREA SERVICE STATIONS

LOCATION	NEC CLASS I, GROUP D DIVISION	EXTENT OF CLASSIFIED AREA
Underground Tank-fill Opening	1	Any pit, box or space below grade level, any part at which is within the Division 1 to 2 of classified area
	2	Up to forty-six centimeters (46 cm) level within a horizontal radius of three meters (3 m) from a loosen fill connection and within the horizontal radius of one and a half meters (1.5 m) from a tight fill connection
Underground Tank-Vent Discharging Upward	1	Within ninety-one centimeters (91 cm) of open and off vent, extending in all directions
	2	Area between ninety-one centimeters (91 cm) and one and a half meters (1.5 m) of open and off vent, extending in all directions
Dispenser-Pits	1	Any pit, box or space below grade level, any part of which is within the Division 1 or 2 classified area
Dispenser-Enclosure	1	The area one and two tenths meters (1.2 m) vertically above grade within the enclosure of forty-six centimeters (46 cm) in all direction
Dispenser-Outdoor		Up to forty-six centimeters (46 cm) above grade level within six meters (6 m) horizontally of any edge of enclosure
Dispenser-Indoor with Mechanical Ventilation	2	Up to forty-six centimeters (46 cm) above grade or floor level within seven and six tenths meters (7.6 m) horizontally of any edge of enclosure
Remote Pump Outdoor	1	Any pit, box or space below grade level if any part is within a horizontal distant of three meters (3 m) from any edge of pump
	2	Within ninety-one centimeters (91 cm) of any edge of pump, extending in all directions. Also up to forty six centimeters (46 cm) above grade level within three meters (3 m) horizontally from any edge of pump

Remote Pump Indoor	1	Entire area within any pit
	2	Within one and a half meters (1.5 m) of any edge of pump, extending, in all directions. Also up to ninety-one centimeters (91 cm) above floor or grade level within seven and six tenths meters (7.6 m) horizontally from any edge of pump.
Lubrication Room	1	Entire area within any pit
	2	Area up to forty-six centimeters (46 cm) above floor or grade level within entire lubrication room
Lubrication Room Dispenser for Class I Liquids	2	Within ninety-one centimeters (91 cm), of any fill or dispensing point, extending in all directions
Special Enclosure Inside Building per Sec.23.703 (b)	1	Entire enclosure
Sales Storage and Rest Rooms	Ordinary	If there is any opening of these rooms within the extent of an outdoor classified area, the entire room shall be the same as the area classification at the point of the opening. If there is any opening of these rooms within the extent of an indoor classified area, the room shall be classified the same as if the wall, curb or partition did not exit.

TABLE 34: FIRE EXTINGUISHER SIZE AND PLACEMENT FOR CLASS B HAZARDS

Type of Hazard	Basic Minimum Extinguisher Rating	Maximum Travel Distance to Extinguishers (m)
Light (low)	5-B	9.15
	10-B	15.25
Ordinary (moderate)	10-B	9.15
	20-B	15.25
Extra (high)	40-B	9.15
	80-B	15.25

TABLE 35: MINIMUM DISTANCE FROM THE EDGE OF BELOWGROUND AND INGROUND CRYOGENIC CONTAINERS BASED ON CONTAINER CAPACITY

CONTAINER CAPACITY	MINIMUM DISTANCE
Less than one thousand nine hundred liters (1,900 L)	One hundred fifty-five centimeters (155 cm)
One thousand nine hundred liters (1,900 L) to three thousand eight hundred liters (3,800 L)	Seven and seventy-five hundredths meters (7.75 m)
Over three thousand eight hundred liters (3,800 L)	Fifteen and a half meters (15.5 m)

TABLE 36: MINIMUM DISTANCES OF LPG CONTAINERS OUTSIDE BUILDINGS, BY WATER CAPACITY

WATER CAPACITY PER CONTAINER (in liters)	MINIMUM DISTANCES (in meters)		
	Mounded or Underground Containers	Aboveground Containers	Between Containers
Less than 500	3.0	0	0
500 to 1,000	3.0	3.0	0
Above 1,000 to 1,900	3.0	3.0	1.0
Above 1,900 to 7,600	3.0	7.6	1.0
Above 7,600 to 114,000	15.0	15.0	1.5
Above 114,000 to 265,000	15.0	23.0	1/4 of sum of diameters of adjacent containers
Above 265,000 to 341,000	15.0	30.0	
Above 341,000 to 454,000	15.0	38.0	
Above 454,000 to 757,000	15.0	61.0	
Above 757,000 to 3,785,000	15.0	91.0	
Above 3,785,000	15.0	122.0	

TABLE 37: ELECTRICAL INSTALLATIONS IN CNG SERVICE STATIONS

Location	Division or Zone	Extent of Classified Area
Containers (other than mounted fuel supply containers)	2	within 3 m of container
Area containing compression and ancillary equipment		
Outdoors	2	up to 4.6 m from equipment
Indoors	2	up to 4.6 m from equipment
Dispensing Equipment		
Outdoors	1	Inside the dispenser enclosure
Outdoors	2	from 0 – 1.5 m from the dispenser
Indoors	1	Inside the dispenser enclosure
Indoors	2	entire room, with adequate ventilation
Outdoors		
Discharge from relief valves or vents	1	1.5 m in all directions from the point source
	2	beyond 1.5 m but within 4.6 m in all directions from point of discharge
valves, flanges of screwed fittings	none	unclassified
Discharge from relief valves within 15 degrees of the line of discharge	1	4.6 m

TABLE 38: MINIMUM DISTANCE OF NITROMETHANE FROM INHABITED BUILDINGS

WEIGHT	APPROXIMATE NUMBER OF DRUMS	DISTANCE
Beginning of 908 kg	4	30 m
909 kg to 4,546 kg	20	60 m
4,547 kg to 9,091 kg	40	90 m
9,092 kg to 18,182 kg	80	120 m
18,183 kg to 36,364 kg	160	150 m

TABLE 39: REPRESENTATIVE MINIMUM EXPOSURE SEPARATION DISTANCES IN METER FOR TIRE STORAGE

Exposed Face Dimension	Pile Height						
meters	2.4 m	3.0 m	3.7 m	4.3 m	4.9 m	5.5 m	6.1 m
7.6	17	19	20	22	23	25	26
15.2	23	26	28	30	33	34	36
30.0	30	35	39	42	44	47	50
45.0	30	35	39	42	44	47	50
61.0	30	35	39	42	44	47	50
75.0	30	35	39	42	44	47	50

TABLE 40: MINIMUM THICKNESS OF SPRAY BOOTH EXHAUST DUCTS, BY DIAMETER

Diameter of Duct	Minimum Thickness
20 cm or less	0.60 mm
20 cm to 46 cm inclusive	0.75 mm
46 cm to 76 cm inclusive	0.90 mm
Over 76 cm	1.20 mm

TABLE 41: CLEARANCE REQUIRED FROM EXHAUST DUCTS AND UNPROTECTED COMBUSTIBLE CONSTRUCTION FOR SPRAY BOOTHS, BY TYPE OF PROTECTION USED

Protection Used	Clearance required
Gauge 28 sheet metal on 1/4-inch asbestos millboard.	30.48 cm
Gauge 28 sheet metal on 1/8-inch asbestos millboard space out 1 inch (2.54 cm) on noncombustible spacers.	22.86 cm
Gauge 22 sheet metal on 1-inch (2.54 cm) coated batts reinforced with wire mesh or the equivalent.	7.62 cm
Where ducts are protected with an approved automatic sprinkler system, the clearance required in section "V" of this section may be reduced.	15.24 cm

TABLE 42: MAXIMUM ALLOWABLE QUANTITY OF FLAMMABLE AND COMBUSTIBLE LIQUIDS PER CONTROL AREA

	LIQUID CLASS	QUANTITY
FLAMMABLE LIQUIDS	IA	115 L
	IB & IC	460 L
	IA, IB, IC COMBINED	460 L
COMBUSTIBLE LIQUIDS	II	460 L
	IIIA	1,265 L
	IIIB	50,600 L

TABLE 43: DIAMETER OF BOTTOM DRAINPIPES BY TANK CAPACITY

Tank capacity (liters)	Pipe diameter
1,900 L to 2,850 L	8 cm
2,851 L to 3,800 L	10 cm
3,801 L to 9,500 L	13 cm
9,501 L to 15,000 L	15 cm
Over 15,000 L	20 cm

TABLE 44: CLEARANCES TO COMBUSTIBLE MATERIAL

Clearance (centimeters)							
Classification as to Type of Appliance	**A Above[2]**	**Duct[3]**	**B Front**	**C Chimney[4] Connector**	**D Rear**	**Ec Casing Sides[5]**	**Ep Furnace Plenum Sides[6]**
Form I	5[9]	5	60	45	15	15	5 or 15[10]
Form IA	15	-	60	45	15	15	-
Form II[7]	15	5	60	45	15	15	5
Form III[8]	45	45	120	45	45	45	45
Form IV	120	-	240	90	90	90	-
Form V	15	-	60	45	45	45	-

For multiple-fueled appliances that can fire solid fuels, see NFPA 211, Standard for Chimneys, Fireplaces, Vents, and Solid Fuel-Burning Appliances, and NFPA 90B, Standard for the Installation of Warm Air Heating and Air-Conditioning Systems.

2. This column indicates clearances above the top of the appliance casing or above the top of the furnace bonnet or plenum.
3. This column indicates clearance from a horizontal run of warm-air duct within 3 ft (900 mm) of upflow, downflow, or horizontal type warm-air furnaces.
4. See Section 6.5 for installation of chimney connectors.
5. This column indicates clearances from the sides of the appliance casing.
6. This column is applicable only to a warm-air furnace provided with an external plenum for connection to duct systems and indicates clearances from all sides of the outlet air plenum.
7. The clearance from the bottom of a suspended (horizontal) furnace that is not otherwise classified as a low-heat industrial appliance shall not be less than 6 in. (150 mm).
8. The clearance to combustible material from the bottom of a suspended (horizontal) furnace that is not classified as a low-heat industrial appliance under Form III, from a suspended-type unit heater that is classified under Form V, or from a unit heater that is classified as a low-heat industrial appliance under Form III shall not be less than 18 in. (450 mm).
9. This clearance shall be permitted to be reduced to 1 in. (25 mm) for a listed, forced-air or gravity system equipped with a limit control that cannot be set higher than 200°F (93°C).
10. Clearance is 2 in. (50 mm) for upflow warm-air furnaces and 6 in. (150 mm) for downflow warm-air furnaces.

Description of Classifications for Use with Table 43.

Form I. Automatically fired upflow- or downflow-type warm-air furnaces, excluding horizontal types not larger than 100 ft3 (2.8 m3) in size (excluding blower compartments and burner equipment).

Form IA. Floor-mounted unit heaters, not larger than 100 ft3 (2.8 m3) in size, excluding blower or fan compartment and burner.

Form II. Horizontal-type warm-air furnaces; water wall-type boilers operating at not more than 250°F (121°C) for water boilers and at not more than 15 psig (gauge pressure of 103 kPa) pressure for steam boilers; water heaters not larger than 100 ft3 (2.8 m3) in size (excluding burner equipment and blower compartments of furnaces).

Form III. Low-heat industrial appliances; floor-mounted-type and suspended-type warm-air furnaces not classified under Forms I and II; steam boilers operating at not more than a gauge pressure of 50 psi (gauge pressure of 345 kPa) pressure and not classified under Form II; water boilers operating at a water temperature not more than the temperature of saturated steam at not more than a gauge pressure of 50 psi pressure and not classified under Form II; unit heaters not classified under Forms IA or V.

Form IV. Medium-heat industrial appliances; steam boilers operating at a gauge pressure of over 50 psi pressure.

Form V. Suspended-type unit heaters not more than 100 ft3 (2.8m3) in size (excluding fan compartment and burner equipment).

TABLE 45: REDUCTION OF CLEARANCES WITH SPECIFIED FORMS OF PROTECTION

Type of Protection[1]	Allowable Clearance with Specified Protection (centimeters)									
	Where the required clearance with no protection from the appliance or chimney connector is:									
	90 cm		45 cm		30 cm		22.5 cm		15 cm	
	Above	Sides And Rear	Above	Sides And Rear	Above	Sides And Rear	Above	Sides And Rear	Above	Sides And Rear
(a) 8.75 cm thick masonry wall without ventilated air space	-	60	-	30	-	22.5	-	15	-	12.5
(b) 1.25 cm insulation board over 2.5 cm glass fiber or mineral wool batts	60	45	30	22.5	22.5	15	15	12.5	10	7.5
(c) 0.05 cm (24-gauge) sheet metal over 1 in. glass fiber or mineral wool batts reinforced with wire on rear face with ventilated air space	15	30	22.5	15	15	10	12.5	7.5	7.5	7.5
(d) 8.75 cm thick masonry wall with ventilated air space	-	30	-	15	-	15	-	15	-	15
(e) 0.05 cm (24-gauge) sheet metal with ventilated air space	45	30	22.5	15	15	10	12.5	7.5	7.5	5
(f) 1.25 cm thick insulation board with ventilated air space	45	30	22.5	15	15	10	12.5	7.5	7.5	7.5
(g) 0.05 cm (24-gauge) sheet metal with ventilated air space over 0.05 cm (24-gauge) sheet metal with ventilated air space	45	30	22.5	15	15	10	12.5	7.5	7.5	7.5
(h) 2.5 cm glass fiber or mineral wool batts sandwiched between 2 sheets 0.05 cm (24-gauge) sheet metal with ventilated air space	45	30	22.5	15	15	10	12.5	7.5	7.5	7.5

(1) The type of protection specified is applied to and covers all surfaces of combustible material within the distance specified as the required clearance with no protection.
(2) Reduction of clearances from combustible materials cannot interfere with combustion air, draft regulators, or accessibility for servicing.
(3) All clearances are measured from the outer surface of the combustible material to the nearest point on the surface of the appliance or connector, disregarding any intervening protection applied to the combustible material.
(4) Spacers and ties are of noncombustible material. No spacer or tie can be used directly opposite an appliance or connector.
(5) With all clearance reduction systems using ventilated air space, adequate provision for air circulation is to be provided as described.
(6) Provide at least 1 in. (25 mm) clearance between the reduction system and combustible walls and ceilings for reduction systems using ventilated air space.
(7) If a wall protector is mounted on a single flat wall away from corners, adequate air circulation can be provided by leaving only the bottom and top edges, or only the side and top edges open, with at least a 1 in. (25 mm) air gap.
(8) Mineral wool batts (blanket or board) are to have a minimum density of 8 lb/ft3 (128 kg/m3) and a minimum melting point of 1500°F (816°C).
(9) Insulation material used as part of a clearance reduction system is to have a thermal conductivity of 1 (Btu/in.)/(ft2/hr·°F) or less.
(10) Provide at least 1 in. (25 mm) between the appliance or connector and the protector. In no case is the clearance between the appliance or connector and the combustible material to be reduced below that allowed in the table.
(11) All clearances and thicknesses are minimum. Larger clearances and thicknesses are acceptable.

TABLE 46: MINIMUM THICKNESS FOR STEEL PIPE CONNECTORS

Thickness	
Pipe Diameter (centimeters)	**Sheet Metal Gauge**
Up to 22.5	26
>22.5 up to 25	24
>25 up to 40	22
>40	16

TABLE 47: LOCATION OF PROCESS VESSELS

Process Vessels Having Emergency Relief Venting to Permit Pressure (kPa)	Stable Liquids	Unstable Liquids
≤17.2	Distance in Table 48 (table below)	2.5 times distance in Table 48 (table below)
>17.2	1.5 times distance in Table 48 (table below)	4 times distance in Table 48 (table below)

TABLE 48. REFERENCE FOR TABLE 47, LOCATION OF PROCESS VESSELS

Capacity of Vessel (gal)	Minimum Distance	
	From Property Line That Is or Can Be Built upon, Including the Opposite Side of a Public Way	From Nearest Side of Any Public Way or from Nearest Important Building on Same Property
≤275	1.5 m	1.5 m
276–750	3.0 m	1.5 m
751–12,000	4.5 m	1.5 m
12,001–30,000	6.1 m	1.5 m
30,001–50,000	9.1 m	3.0 m

TABLE 49: ELECTRICAL AREA CLASSIFICATION SPECIFIC TO ORGANIC COATINGS MANUFACTURE

Location	NEC Class I		Extent of Classified Area
	Division	Zone	
Indoor open head mills installed in areas provided with ventilation in accordance with para "D" of Section 10.4.15.3 where flammable vapor–air mixtures can exist under normal operation	1	0	The entire area associated with such equipment where flammable gases or vapors are present continuously or for long periods of time
	1	1	Area within 1.5 m of any edge of such equipment, extending in all directions
	2	2	Area between 1.5 m and 2.4 m of any edge of such equipment, extending in all directions; also, space up to 0.9 m above floor or grade level within 1.5 m to 7.6 m horizontally from any edge of such equipment
Indoor closed head mills installed in areas with ventilation in accordance with para "D" Section 10.4.15.3 where flammable vapor–air mixtures are contained within the mill and within connected tanks, resulting in small vapor loss	1	0	The immediate area of the mill and the supporting tanks where flammable gases or vapors are present continuously or for long periods of time
	1	1	Area within 1.5 m of any edge of such equipment, extending in all directions
	2	2	Area between 1.5 m and 2.4 m of any edge of such equipment, extending in all directions; also, space up to 0.9 m above floor or grade level within 1.5 m to 4.6 m horizontally from any edge of such equipment
Indoor open mixing equipment installed in areas provided with ventilation in accordance with para "D" Section 10.4.15.3 where flammable vapor–air mixtures can exist under normal operation	1	0	The entire area associated with such equipment where flammable gases or vapors are present continuously or for long periods of time
	1	1	Area within 1.5 m of any edge of such equipment, extending in all directions
	2	2	Area between 1.5 m and 2.4 m of any edge of such equipment, extending in all directions; also, space up to 0.9 m above floor or grade level within 1.5 m to 7.5 m horizontally from any edge of such equipment
Indoor closed mixing equipment installed areas provided with ventilation in accordance with para "D" Section 10.4.15.3 where flammable vapor–air mixtures can exist inside the mixing tank under normal operation	1	0	The entire area associated with such equipment where flammable gases or vapors are present continuously or for long periods of time mixtures can exist inside the mixing tank under normal operation
	1	1	Area within 1.5 m of any edge of such equipment, extending in all directions
	2	2	Area between 1.5 m and 2.4 m of any edge of such equipment, extending in all directions; also, space up to 0.9 m above floor or grade level within 1.5 m to 4.5 m horizontally from any edge of such equipment
Indoor sealed mixing equipment installed in areas provided with ventilation in accordance with para "D" Section 10.4.15.3 where flammable vapor–air mixtures can exist inside the mixing tank under normal operation	1	0	The interior of the mining tank where flammable gases or vapors are present continuously or for long periods of time mixtures can exist inside the mixing tank under normal operation and the only
	1	1	Area within 0.9 m of any edge of such equipment, extending in all directions emissions are through the vents opening to the outside of the building
	2	2	Area between 1.5 m and 2.4 m of any edge of such equipment, extending in all directions

Indoor resin plate and frame filter press equipment installed with no local ventilation where flammable vapor–air mixtures can exist under normal operation	1	0	The entire area associated with such equipment where flammable gases or vapors are present continuously or for long periods of time
	1	1	Area within 1.5 m of any edge of such equipment, extending in all directions
	2	2	Area between 1.5 m and 2.4 m of any edge of such equipment, extending in all directions; also, space up to 0.9 m above floor or grade level within 1.5 m to 7.5 m horizontally from any edge of such equipment
Indoor resin plate and frame filter press equipment installed with surrounding local ventilation where flammable vapor–air mixtures can exist under normal operation only within the ventilation enclosure	1	0	The entire area associated with such equipment where flammable gases or vapors are present continuously or for long periods of time
	1	1	Area within 1.5 m of any edge of such equipment, extending in all directions
	2	2	Area between 1.5 m and 2.4 m of any edge of such equipment, extending in all directions; also, space up to 0.9 m above floor or grade level within 1.5 m to 4.5 m horizontally from any edge of such equipment

TABLE 50: SEPARATION DISTANCES FOR NITROCELLULOSE STORAGE

Wet Nitrocellulose (Dry Weight) (lb)	Distance to Property Line or Nearest Important Building (meters)
≤1,000	15.0
1,000–5,000	22.5
5,000–10,000	30.0
10,000–25,000	37.5
25,000–50,000	45.0
>50,000	As approved by authority having jurisdiction

TABLE 51: MINIMUM VENTILATION RATES IN WATER AND WASTE WATER TREATMENT PLANTS

Description	Ventilation Rates
Wet wells, screen rooms, and other enclosed spaces with used water or waste water exposed to atmosphere(1)	15 air changes per hour
Rooms or spaces intended for storage or conveyance of used water or waste water solids, (e.g., grits, sludge, hardened or cakes of fats and grease, etc.)	12 air changes per hour
Equipment rooms, tunnels, and other below grade spaces. • With gas piping and/or gas handling equipment(1) • With diesel fuel or other volatile combustible liquid tanks, pumps and supply piping(1)	12 air changes per hour or 40 km/min velocity in tunnels or galleries
Without gas piping	10 air changes per hour or 27 km/min velocity in tunnels or galleries

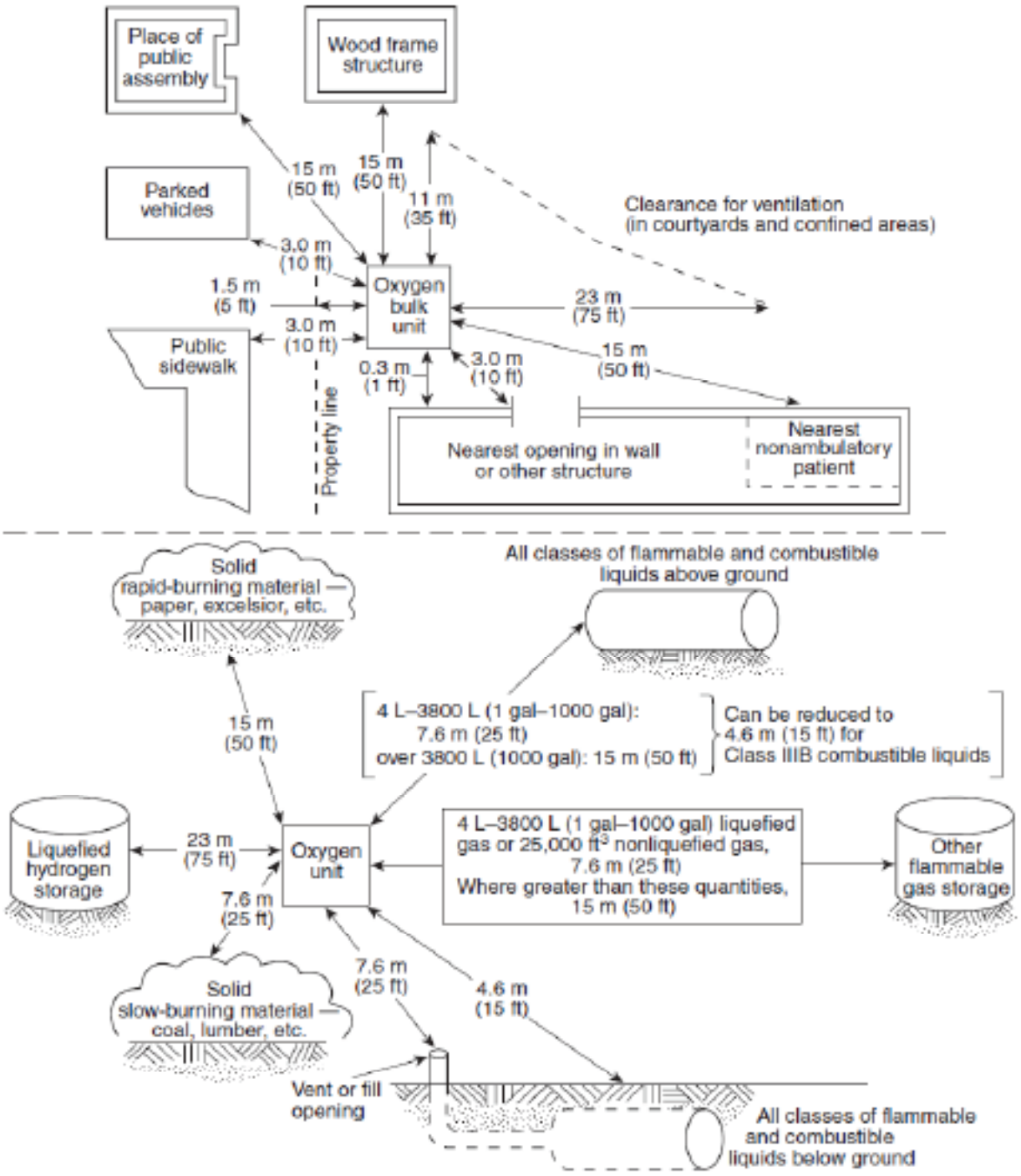
(1)The superscript (1) - prescribed the installation of combustible gas detector and alarm system to monitor and provide warnings for the explosive level of the confined combustible vapors.

(2)The ventilation rates prescribed above are considered to be the minimum necessary for protection against combustible vapors.
(3)Ventilation rates shall be increased above those recommended if unusual accumulations of volatile combustible liquid or combustible vapors are expected or if toxic gases may be present.

TABLE 52: FIRE RESISTIVE STANDARDS

Type of Assembly and Material	Minimum Thickness (in mm) for the given Fire Resistance			
	4 HRS	3 HRS	2 HRS	1 HR
FLOOR CONSTRUCTION				
Solid RC Slab				
- Average cover to reinforcement	25	25	20	15
- Overall Depth	150	150	125	100
SOLID PRE-STRESSED				
Concrete Slab				
- Average cover to reinforcement	65	50	40	25
- Overall Depth	150	150	125	100
PARTITIONS				
- Solid Concrete	175	175	150	125
- Solid Masonry	200	175	150	125
- Hallow Unit Masonry	300	250	200	150
PROTECTION FOR METAL STRUCTURAL MEMBERS				
- Concrete	75	50	38	25
- Solid Masonry	100	75	55	38
- Metal lath with vermiculite or perlite gypsum plaster	50	38	20	12
EXTERIOR WALL				
- Solid Concrete	180	150	125	75
- Solid Masonry	200	175	150	100
- Hallow Unit Masonry	300	250	200	150
COLUMN				
- Reinforced Concrete	450	400	300	200

ANNEX B: ILLUSTRATION OF THE STORAGE OF COMPRESSED GASES



These distances do not apply where protective structures having fire resistance rating of two (2) hours interrupt the line-of-sight between un-insulated portions of the bulk oxygen storage installation and the exposure. The protective structures protect un-insulated oxygen storage containers or supports, control equipment, and system piping (or parts thereof) from external fire exposure. Liquid oxygen storage containers are insulated. Such containers may provide line-of-sight protection for un-insulated system components. Interruption of the line-of-sight means that an "eye" on any part of the un-insulated portion of the bulk oxygen storage installation cannot "see" any part of the exposure.

BFP VISION

A modern fire service fully capable of ensuring a fire–safe nation by 2034.

BFP MISSION

We commit to prevent and suppress destructive fires; investigate its causes; enforce fire code and other related laws; respond to man-made and natural disasters, and other emergencies.

Our Pledge

This is our **AGENCY** ..... **Bureau of Fire Protection**

Focused of this **VISION** ..... A modern fire service fully capable of ensuring a fire–safe nation by 2034.

and fulfilling this **MISSION**..... We commit to prevent and suppress destructive fires; investigate its causes; enforce fire code and other related laws; respond to man-made and natural disasters, and other emergencies.

And we, the life blood of this agency, and guardians of your life and the countrys gains,
COMMIT ourselves to ..... Seek and provide fire safety and other emergency needs; Expand our services' reach by making ourselves available beyond office hours when needed or by engaging in projects and activities that will make services easily available; Return value of your money and paid taxes, by raising the quality of our services through continuous development of our people and other resources; value your views, suggestions and contributions and embody all these in our day-to-day affairs and interactions with...

for one **REASON**, that is..... **YOU.**

Our Core Values

R **RELIABILITY** — *We serve 24/7.*

E **EFFICIENCY** — *We find ways.*

S **SELFLESSNESS** — *We risk our lives so that others may live.*

P **ROFESSIONALISM** — *We conduct ourselves in the professional manner.*

O **ONENESS** — *We work as a team.*

N **NATIONALISM** — *We contribute in the in the preservation of our country's gains.*

S **SERVICE** — *We continually improve our services.*

I **INTEGRITY** — *We uphold ehtical norms and moral standards.*

V **VIBRANCY** — *We adapt to positive change.*

E **EFFECTIVENESS** — *We do the right things at the right time.*

About the Cover...

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Head Secretariat, Fire Code Technical Staff, February – April 2018

Member, Fire Code Technical Staff, 2017 – Present

Narrative:

The cover dubbed ***"The Fire Code Into Modernity"*** depicts the vision of the new Implementing Rules and Regulations to be more responsive and adoptive to current trends in fire safety and building design as it to usher in a new era for the BFP. It contains in the design, icons representing the significant new provisions of the RIRR such as that for fixed guideways/railways, airports, solar power installations, conveyance, wind turbines and historical structures among others.

The map of the globe with the Philippines at the center depicts the vision for the Fire Code to be an internationally recognized safety standard at par with its referral codes such as the NFPA. The bands of red and orange ribbon symbolizes the stringent enforcement policies of the BFP as the sole law enforcing agency of the *RA 9514* or the *Fire Code of the Philippines*.

DIRECTORY

NAME	ADDRESS	CONTACT NOS.

DIRECTORY

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DEPARTMENT OF THE INTERIOR AND LOCAL GOVERNMENT

BUREAU OF FIRE PROTECTION

"We Save Lives and Protect Properties"