STORAGE OCCUPANCIES

STORAGE OCCUPANCIES												
1.0	**GENERAL REQUIREMENTS**			**The fire and life safety requirements in this chapter shall apply to buildings or portions thereof used as storage occupancies.**								
	Buildings or structures used primarily for the storage or sheltering of goods, merchandise, products, or vehicles.											
	Warehouses Hangars (for Aircraft Storage only) Freight Terminals			Barns Bulk Oil Storage Truck and Marine Terminals				Parking Garages Cold Storage Grain Elevators				
1.1	GENERAL CONDITIONS AND BUILDING LIMITS											
	Sub-Classification (Hazards)			Building Height (m)				Floor Area (m^2)			Basement Levels	
1.1.1	LOW HAZARD Storage Occupancy			Height Limit based on Type of Construction and Fire Resistance of Building Elements in NFPA 5000 Table 7.4.1				Area Limit based on Type of Construction and Fire Resistance of Building Elements in NFPA 5000 Table 7.4.1			No Limit in Floor/Fire Area, Depth or Number of Levels	
1.1.2	ORDINARY HAZARD Storage Occupancy											
1.1.3	HIGH HAZARD Storage Occupancy											

FIRE AND LIFE SAFETY REQUIREMENTS					
Item	Fire Safety Provisions	Minimum Requirements	Low Hazard	Ordinary	High Hazard
1.2	CLASSIFICATION OF OCCUPANCIES	Storage occupancies shall include all buildings and structures or parts thereof with occupancy as described in item 1.0.			
1.2.1	STORAGE OCCUPANCY	Storage occupancy classification shall comply with 1.2.1.1 and 1.2.1.2	Required	Required	Required
1.2.1.1	Applications	Storage occupancies shall include all buildings and structures or parts thereof, used to shelter a wide variety of commodities having a wide range of hazards.	Required	Required	Required
1.2.1.2	Incidental Storage	Incidental storage in another occupancy shall not be the basis for overall occupancy classification.	Required	Required	Required

Item	Fire Safety Provisions	Minimum Requirements	Low Hazard	Ordinary	High Hazard
1.2.2	INDUSTRIAL TYPE OPERATION	Storage occupancies or areas of storage occupancies that are used for the purpose of packaging, labeling, sorting, special handling, or other operations requiring an occupant load greater than that normally contemplated for storage shall be classified as industrial occupancies.	Required	Required	Required
1.2.3	MULTIPLE OCCUPANCIES	Multiple occupancies shall comply with either 1.2.3.1 or 1.2.3.2.	Required	Required	Required
1.2.3.1	Mixed Occupancies	Each portion of the building shall be classified as to its use and shall comply with the most restrictive requirements of the occupancies involved, unless separate safeguards are approved.	Permitted	Permitted	Permitted
1.2.3.2	Separated occupancies	Each part of the building comprising a distinct occupancy, shall be completely separated from other occupancies by the required separation, as specified in NFPA 101 Table 6.1.14.4.1(a) and Table 6.1.14.4.1(b).	Permitted	Permitted	Permitted
1.3	OCCUPANT LOAD (OL)	The occupant load, shall be determined on the basis of the maximum probable population of the space under consideration.	Required	Required	Required
1.3.1	OCCUPANT LOAD FACTOR (OLF)	No occupant load factor (OLF) specified; the occupant load shall be determined on the basis of the maximum number of persons expected to occupy the storage occupancy under any anticipated facility operation.	Required	Required	Required
1.4	CLASSIFICATION OF HAZARD OF CONTENTS.	Hazard of contents shall be classified in accordance with NFPA 101 6.2.	Required	Required	Required
1.4.1	CONTENTS OF STORAGE OCCUPANCIES	Contents of storage occupancies shall be classified as low hazard, ordinary hazard, or high hazard depending on the quantity and character of the materials stored, their packaging, and other factors.	Required	Required	Required
1.4.1.1	High Hazard Contents	Storage buildings with hazardous materials shall be classified as storage occupancies with high-hazard contents.	Required	Required	Required

Item	Fire Safety Provisions	Minimum Requirements	Low Hazard	Ordinary	High Hazard
1.4.1.2	High Hazard Storage Occupancies	Buildings or areas in which high-hazard contents are stored, used, or handled shall comply with NFPA 5000 chapter 34 High Hazard Contents.	Required	Required	Required
1.4.2	LOW HAZARD STORAGE OCCPANCIES	Storage uses that can be considered as LOW hazard storage occupancies include the following:			
1.4.2.1	Asbestos / Beer or wine up to 12 percent alcohol in metal, glass, or ceramic containers / Cement in bags / Chalk and crayons / Dairy products in nonwax-coated paper containers / Dry cell batteries / Electrical coils / Electrical motors / Empty cans / Food products / Foods in noncombustible containers / Fresh fruits and vegetables in nonplastic trays or containers / Frozen foods / Glass / Glass bottles, empty or filled with noncombustible liquids / Gypsum board / Inert pigments / Ivory / Meats / Metal cabinets / Metal desks with plastic tops and trim / Metal parts / Metals / Mirrors / Oil-filled and other types of distribution transformers / Porcelain and pottery / Sheds / Stoves / Talc and soapstones / Tanks / Towers / Washers and dryers.				
1.4.3	OTHER THAN LOW HAZARD STORAGE OCCPANCIES	Storage uses that can be considered as ORDINARY or HIGH hazard storage occupancies, include the following:			
1.4.3.1	Aerosols Level 2 and Level 3 / Aircraft hangars / Automobiles and Transport Vehicles /Parking Garages or Parking Structures, Open or Enclosed / Bags, cloth, burlap, & paper / Bamboo and rattan / Baskets / Belting, canvas and leather / Books and paper in rolls or packs / Boots and shoes / Buttons, includes cloth covered, pearl, or bone / Cardboard & cardboard boxes / Clothing, woolen wearing apparel / Cordage / Furniture / Furs / Glues, mucilage, pastes, and size / Grains / Horns and combs, other than celluloid / Leather / Linoleum / Lumber / Petroleum warehouses for storage of lubricating oils with flash point of 200°F (93°C) or higher / Photo engravings / Resilient flooring / Silks / Soaps / Sugar / Tires, bulk storage / Tobacco, cigars, cigarettes, and snuff / Upholstery and mattresses / Wax candles.				
1.5	MINIMUM CONSTRUCTION REQUIREMENTS	Construction shall be in accordance with NFPA 500 Chapters 7–8, 13–14, 31, and 35–40.	Required	Required	Required
1.6	ACCESSIBILITY.	Accessibility shall be in accordance with NFPA 5000 Chapter 12.	Required	Required	Required

Item	Fire Safety Provisions	Minimum Requirements	Low Hazard	Ordinary	High Hazard
1.7	(Reserved).				
2.0	**MEANS OF EGRESS REQUIREMENTS**	**Means of egress shall comply with NFPA 101 Chapter 7, and as modified in item 2.0 of this FLS Occupancy Chapter.**			
2.1	MEANS OF EGRESS COMPONENTS	Components of means of egress shall be limited to the types describe in this occupancy guideline	Required	Required	Required
2.1.1	DOORS	Doors shall be in accordance with NFPA 101 section 7.2.1, and to the special requirements of 2.1.1.	Required	Required	Required
2.1.1.1	Side-hinged, swinging type Door Assemblies	Approved, side-hinged, swinging type door assemblies shall be provided as primary means of egress in storage occupancies.	Required	Required	Required
2.1.1.2	Delayed-Egress Electrical Locking Systems	Approved, delayed-egress electrical locking systems is perrmitted on any door in storage occupancies with security needs.	Permitted	Permitted	Permitted
2.1.1..3	Sensor-Release of Electrical Locking Systems	Sensor-release electrical locking system installed on egress doors as a security measure that does not compromise the use of the means of egress.	Permitted	Permitted	Permitted
2.1.2	STAIRS	Stairs shall comply with NFPA 101 section 7.2.2 and shall be permitted to be modified by any of the conditions in 2.1.2 (1) and 2.1.2 (2).	Permitted	Permitted	Permitted
2.1.2 (1)	Stair Treads and Landings	Noncombustible grated or expanded metal stair treads and landing floors.	Permitted	Permitted	Permitted
2.1.2. (2)	Industrial Equipment Access Stairs	Industrial equipment access stairs in accordance with NFPA 101 40.2.5.3.	Permitted	Permitted	Permitted
2.1.2.1	Spiral Stairs	Spiral stairs complying with NFPA 101 section 7.2.2.2.3 .	Permitted	Permitted	Permitted
2.1.3	SMOKEPROOF ENCLOSURES	Smokeproof enclosures complying with NFPA 101 section 7.2.3.	Permitted	Permitted	Permitted
2.1.4	HORIZONTAL EXITS	Horizontal exits complying with NFPA 101 section 7.2.4.	Permitted	Permitted	Permitted

Item	Fire Safety Provisions	Minimum Requirements	Low Hazard	Ordinary	High Hazard
2.1.4.1		In horizontal exits where the opening is protected by a fire door assembly on each side of the wall in which it is located, one fire door shall be of the swinging type, and the other shall be permitted to be an automatic-sliding fire door that shall be kept open whenever the building is occupied.	Required	Required	Required
2.1.5	RAMPS	Ramps complying with NFPA 101 section 7.2.5.	Permitted	Permitted	Permitted
2.1.5.1	Industrial Equipment Access Ramps	Industrial equipment access ramps used as a component in a means of egress in accordance with NFPA 101 section 40.2.5.2.	Permitted	Permitted	Permitted
2.1.6	EXIT PASSAGEWAY	Exit passageways complying with NFPA 101 section 7.2.6.	Permitted	Permitted	Permitted
2.1.7	FIRE ESCAPE STAIRS	Existing fire escape stairs complying with NFPA 101 section 7.2.8.	Permitted	Permitted	Permitted
2.1.8	FIRE ESCAPE LADDERS	Fire escape ladders complying with NFPA 101 section 7.2.9.	Permitted	Permitted	Permitted
2.1.8.1	Fixed Industrial Stairs	Fixed industrial stairs in accordance with the minimum requirements for fixed stairs in ANSI A1264.1, Safety Requirements for Workplace Walking /Working Surfaces and Their Access; Workplace Floor, Wall and Roof Openings; Stairs and Guardrail Systems.	Permitted	Permitted	Permitted
2.1.9	AREA OF REFUGE	Areas of refuge complying with NFPA 101 7.2.12	Permitted	Permitted	Permitted
2.2	CAPACITY OF MEANS OF EGRESS	The capacity of means of egress shall be in accordance with NFPA 101 Section 7.3 and the requirements in item 2.2	Required	Required	Required
2.2.1	CORRIDOR OR PASSAGEWAY	The minimum width of any corridor, passageway or any exit access serving not more than 180 persons within storage occupancies, shall not be less than 915 mm.	Required	Required	Required
2.3	NUMBER OF MEANS OF EGRESS	The number of means of egres shall comply with 2.3.1 and 2.3.2.	Required	Required	Required
2.3.1	MINUMUM REQUIRED	All buildings or structures used for storage, and every section thereof considered separately, shall have not less than two separate means of egress as remotely located from each other as practicable.	Required	Required	Required

Item	Fire Safety Provisions	Minimum Requirements	Low Hazard	Ordinary	High Hazard
2.3.1.1		Not less than 2 exits shall be provided in any floor level, including mezzanine with an occupant load exceeding 50.	NR-Not Required	Required	Required
2.3.1.2		Floors or portions thereof with an occupant load of more than 500 - <1000, shall have the minimum 3 number of separate and remote means of egress.	Required	Required	Required
2.3.2	HIGH HAZARD CONTENT AREAS	Not less than two means of egress shall be provided, unless all of the following criteria in 2.3.2.1 through 2.3.2.3 are met:	NA-Not Applicable	NA	Required
2.3.2.1		Rooms or spaces do not exceed 18.6 m^2.	NA	NA	Permitted
2.3.2.2		Rooms or spaces have an occupant load not exceeding three persons.	NA	NA	Permitted
2.3.2.3		Rooms or spaces have a travel distance to the room door not exceeding 7620 mm.	NA	NA	Permitted
2.3.3	Low Hazard Occupancy	In low hazard storage occupancies, a single means of egress shall be permitted from any story or section.	Permitted	NA	NA
2.3.4	Ordinary Hazard Occupancy	In ordinary hazard storage occupancies, a single means of egress shall be permitted from any story or section, provided that the exit can be reached within the distance permitted as a common path of travel.	NA-Not Applicable	Permitted	NA
2.4	ARRANGEMENT OF MEANS OF EGRESS	Means of egress, arranged in accordance with NFPA 101 Section 7.5, shall not exceed that provided by 2.4.	Required	Required	Required
2.4.1	TRAVEL DISTANCE (TD)	Travel distance, measured in accordance with NFPA 101 section 7.6, shall not exceed that provided in 2.4.1.1 through 2.4.1.3.	NA	Required	Required
2.4.1.1	Low Hazard Storage Occupancy	Travel distance to exits in low hazard storage occupancies shall not be limited.	NR-Not Required	NA	NA
2.4.1.2	Ordinary Hazard Storage Occupancy	Travel distance in ordinary hazard storage occupancy shall not exceed 61 m.	NA	Required	NA
2.4.1.2.1	Protected with an approved automatic spinkler system	Travel distance in ordinary hazard storage occupancy shall not exceed 122 m.	NA	Required	NA

Item	Fire Safety Provisions	Minimum Requirements	Low Hazard	Ordinary	High Hazard
2.4.1.3	High Hazard Storage Occupancy	Travel distance in high hazard storage occupancy, including storage buildings with flammable and combustible liquid products stored and protected in accordance with NFPA 30, Flammable and Combustible Liquids Code, shall not exceed 30 m.	NA	NA	Required
2.4.2	COMMON PATH (CP) OF TRAVEL	Common path of travel shall comply with 2.4.2.1 thru 2.4.2.3.	NA	Required	NA
2.4.2.1	Low Hazard Storage Occupancy	Common path of travel in low hazard storage occupancies shall not be limited.	NR	NA	NA
2.4.2.2	Ordinary Hazard Storage Occupancy	Common path of travel in ordinary hazard storage occupancy shall not exceed 15 m.	NA	Required	NA
2.4.2.2.1	Protected with an approved automatic spinkler system	Common path of travel in ordinary hazard storage occupancy shall not exceed 30 m.	NA	Required	NA
2.4.2.3	High Hazard Storage Occupancy	Common path of travel in high hazard storage occupancy is prohibited.	NA	NA	NP
2.4.3	DEAD-END (DE) CORRIDOR	Dead-end corridors shall comply with 2.4.3.1 thruough 2.4.3.3.	NA	Required	NA
2.4.3.1	Low Hazard Storage Occupancy	Dead-end corridor in low hazard storage occupancies shall not be limited.	NR	NA	NA
2.4.3.2	Ordinary Hazard Storage Occupancy	Dead-end corridor in ordinary hazard occupancy shall not exceed 15 m.	NA	Required	NA
2.4.3.2.1	Protected with an approved automatic spinkler system	Dead-end corridor in ordinary hazard storage occupancy shall not exceed 30 m.	NA-Not Applicable	Required	NA
2.4.3.3	High Hazard Storage Occupancy	Dead-end corridor in high hazard storage occupancy is prohibited.	NA	NA	NA
2.5	DISCHARGE FROM EXITS	Discharge from exits shall be in accordance with NFPA 101 section 7.7.	Required	Required	Required
2.5.1	EXIT TERMINATION	Exits shall terminate directly, at a public way or at an exterior exit discharge.	Required	Required	Required
2.6	ILLUMINATION OF MEANS OF EGRESS	Means of egress shall be illuminated in accordance with NFPA 101 section 7.8 and as specified in 2.6.1.	Required	Required	Required

Item	Fire Safety Provisions	Minimum Requirements	Low Hazard	Ordinary	High Hazard
2.6.1	ILLUMINATION BY NATURAL SOURCES	In structures occupied only during daylight hours, means of egress shall be permitted to be illuminated with windows, skylights, open wall sections, and similar means of illumination by natural sources arranged to provide the required level of illumination on all portions of the means of egress during such hours.	Permitted	Permitted	Permitted
2.7	EMERGENCY LIGHTING	Emergency lighting shall be provided in normally occupied storage occupancies in accordance with NFPA 101 section 7.9, except for spaces occupied only during daylight hours with natural illumination in accordance with 2.6.1	Required	Required	Required
2.7.1		Emergency lighting shall be provided in covered car parks along the normal pedestrian routes	Required	Required	Required
2.8	MARKINGS OF MEANS OF EGRESS	Means of egress shall have signs in accordance with NFPA 101 section 7.10.	Required	Required	Required
2.9	SPECIAL MEANS OF EGRESS FEATURES				
2.9.1	HAZARDOUS MATERIALS	Where hazardous materials are stored, used, or handled, the provisions of 2.9.1.1 and 2.9.1.2 shall apply.	Required	Required	Required
2.9.1.1	Hazardous materials classified as high-hazard contents	Hazardous materials that are stored, used, or handled, and that are also classified as high-hazard contents shall comply with the Special Provisions for Occupancies with High Hazard Contents in NFPA 101 Section 7.11.	Required	Required	Required
2.9.1.2	Hazardous Materials	Hazardous materials shall comply with both 2.9.1.2(1) and 2.9.1.2(2)	Required	Required	Required
2.9.1.2(1)		Means of egress requirements in NFPA 101 chapter 7 and item 2.0 of this Fire and Life Safety (FLS) Requirements.	Required	Required	Required

Item	Fire Safety Provisions	Minimum Requirements	Low Hazard	Ordinary	High Hazard
2.9.1.2(2)		Applicable means of egress requirements of NFPA 30, NFPA 45, NFPA 55, NFPA 58, NFPA 400, and NFPA 495 that are stricter than the general requirements for means of egress and this storage occupancy chapter.	Required	Required	Required
2.10	(Reserved)				
3.0	**PROTECTION.**	**Protection shall comply with the applicable NFPA codes and standards, QCD FLS Annex and as modified in item 3.0 of this FLS Occupancy Chapter.**			
3.1	PROTECTION OF VERTICAL OPENINGS	Any vertical opening shall be protected in accordance with NFPA 101 section 8.6, unless otherwise permitted by 3.1.1 and 3.1.2.	Required	Required	Required
3.1.1	CONVENIENCE OPENINGS	Unenclosed vertical openings created by convenience openings complying with with NFPA 101 section 8.6.9.1.	Permitted	Permitted	Permitted
3.1.2	CONVENIENCE STAIRWAYS	Unenclosed vertical openings created by convenience stairways complying with with NFPA 101 section 8.6.9.2.	Permitted	Permitted	Permitted
3.2	PROTECTION FROM HAZARDS	Where hazardous materials are stored, used, or handled, the provisions of NFPA 101 section 8.7.3.1 and 3.2 of this occupancy chapter shall apply.	Required	Required	Required
3.2.1	HAZARDOUS MATERIALS	Storage occupancies with the storage, use, and handling of hazardous materials shall comply with the applicable NFPA hazardous materials document.: NFPA 30, NFPA 54, NFPA 55, NFPA 58, NFPA 400, NFPA 495.	Required	Required	Required
3.2.1.1		No storage, use, or handling of hazardous materials shall be permitted in any location where such storage, use, or handling would jeopardize egress from the structure, unless otherwise permitted by a document listed in 3.2.1.	Required	Required	Required
3.2.2	MSDS-Material Safety Data Sheets	Provide MSDS and chemical information documents for the hazardous storage chemical warehouse and facility that shall be properly placed/ situated at the warehouse and chemical store entrance.	Required	Required	Required

Item	Fire Safety Provisions	Minimum Requirements	Low Hazard	Ordinary	High Hazard
3.2.2.1	Warehouse and Chemical Stores - Laboratory Scale Chemical Reagents.	Implement strict chemical compatibility storage arrangement as per approved Chemical Compatibility Matrix for Laboratories. See Matrix in Table 3.2.2.1.	Required	Required	Required
3.2.2.2		Storage of Class 5.1, 5.2 chemicals and Class 4.3 chemicals shall be separated or placed in approved hazardous material storage cabinets. See 3.2.2.2(1)	Required	Required	Required
3.2.2.2(1)	Chemicals Class	Class 4.3 - Water Reactive Materials			
		Class 5.1 - Oxidizers Materials			
		Class 5.2- Organic Peroxides Materials			
3.2.2.3		Individual containers less than 5gal (19L) or less than 25lb (11kg) shall be stored or displayed on pallets, racks, or shelves. Containers shall be listed or approved for the intended use.	Required	Required	Required
3.2.3	(Reserved)				

Item	Fire Safety Provisions	Minimum Requirements	Low Hazard	Ordinary	High Hazard

Table 3.2.2.1

CHEMICAL COMPATIBILITY MATRIX FOR LABORATORIES

	CATEGORY	1 FLAMMABLE LIQUIDS	2a ACIDS, INORGANIC	2b ACIDS, ORGANIC	3 ALKALIS (BASES)	4 OXIDIZERS	5 ORGANIC PEROXIDES	6a POISONS, INORGANIC	6b POISONS, ORGANIC	7 AIR / WATER REACTIVES
1	FLAMMABLE LIQUIDS	✓	✗	✓	✗	✗	✗	✗	✓	✗
2a	ACIDS, INORGANIC	✗	✓	✗	✗	✓	✗	✗	✗	✗
2b	ACIDS, ORGANIC	✓	✗	✓	✗	✗	✗	✗	✗	✗
3	ALKALIS (BASES)	✗	✗	✗	✓	✓	✗	✓	✗	✗
4	OXIDIZERS	✗	✓	✗	✓	✓	✗	✓	✗	✗
5	ORGANIC PEROXIDES	✗	✗	✗	✗	✗	✓	✗	✗	✗
6a	POISONS, INORGANIC	✗	✗	✗	✓	✓	✗	✓	✗	✗
6b	POISONS, ORGANIC	✓	✗	✗	✗	✗	✗	✗	✓	✗
7	AIR / WATER REACTIVES	✗	✗	✗	✗	✗	✗	✗	✗	✓

NOTES AND GUIDANCE:

A. KEY:

✓	MAYBE Compatible (Consult Material Safety Data Sheets-MSDS / Safety Data Sheets-SDS)
✗	NOT Compatible (do NOT store TOGETHER in the same cabinet)

B. QUANTITY LIMITATIONS:

Storage in Laboratory work areas / per room SHALL not exceed 50liters (13.2gallons) for flammable liquids.

C. INSTRUCTIONS FOR STORAGE AND HANDLING:

The air extraction outlet shall be at least 3m away from any building opening
The minimum Ventilation of a laboratory containig chemicals shall be 5 air changes per hour
All chemical Bottles and containers shall be sealed and airtight and placed inside the designated cabinet.
All chemical bottles and containers/cabinets shall be properly labeled addressing the hazard group/severity
Drip pans/trays shall be used for liquid chemicals.
Drip pans/trays material shall not react with the contained chemical.
Storage cabinets in laboratory work areas / per room shall be at least 30minutes (0.5-hr) fire resistive construction material and shall be manifuctured as per BS 476.

Item	Fire Safety Provisions	Minimum Requirements	Low Hazard	Ordinary	High Hazard
3.3	INTERIOR FINISH	Interior finish shall be in accordance with NFPA 101 Section 10.2 and as specified in 3.3.1 and 3.3.2.	Required	Required	Required
3.3.1	INTERIOR WALL AND CEILING FINISH	Interior wall and ceiling finish materials shall be Class A, Class B, or Class C in accordance with Section NFPA 101 10.2 in storage areas and shall be as required by NFPA 101 7.1.4 in exit enclosures.	Required	Required	Required
3.3.1.1		Interior wall and ceiling finishes shall be Class A, Class B, or Class C in areas other than those specified in 3.3.1	Required	Required	Required
3.3.2	INTERIOR FLOOR FINISH	Interior floor finish in exit enclosures shall be Class I or Class II.	Required	Required	Required
3.4	DETECTION, ALARM AND COMMUNICATIONS				
3.4.1	GENERAL	Complete coverage of Fire Detection and Alarm System.	Required	Required	Required
3.4.2	INITIATION	Complete coverage of an Automatic Detection and Manual Initiating Devices.	Required	Required	Required
3.4.3	OCCUPANT NOTIFICATION	Complete Coverage of an Occupant Notification (audible & visible).	Required	Required	Required
3.4.3.1	Emergency Voice Evacuation System	Mass Notification System	NR	NR	Required
3.4.4	SUPPLEMENTARY		Required	Required	Required
3.4.4.1	Fire Telephone / 2-way Communication	In every required provisions of a fire command center (FCC) or emergency control center(ECC).	Required	Required	Required
3.4.4.2	Graphic Annunciator (PC Panel) or Mimic Panel	In every required provisions of a fire command center (FCC) or emergency control center(ECC).	Required	Required	Required
3.5	EXTINGUISHMENT REQUIREMENTS				
3.5.1	AUTOMATIC FIRE SPRINKLER (AFS) SYSTEM	Storage occupancies, other than low hazard storage occupancies, shall be protected by an approved, supervised automatic sprinkler system, in any of the following locations and conditions in 3.5.1.1 through 3.5.1.6.	NR-Not Required	Required	Required

Item	Fire Safety Provisions	Minimum Requirements	Low Hazard	Ordinary	High Hazard
3.5.1.1	G+2 Floors and Above (Ordinary Hazard)	An automatic sprinkler system shall be provided throughout all storage occupancies three or more stories in height.	NR	Required	NA
3.5.1.2	Fire Area Exceeds 1115 m^2 (Ordinary Hazard)	An automatic sprinkler system shall be provided throughout all storage occupancies exceeding 1115 m^2 in fire area or fire compartment.	NR	Required	NA
3.5.1.3	Total Area of All Floors Exceeds 2230 m^2 (Ordinary Hazard)	An automatic sprinkler system shall be provided throughout storage occupancies, where the total area of all floor levels, including mezzanines (when provided) exceeds 2230 m^2.	NR	Required	NA
3.5.1.4	High Hazard Storage Occupancy	High hazard storage occupancy shall be proteced throughout with an approved automatic sprinkler system.	NA	NA	Required
3.5.1.5	Bulk Storage of Tires	Buildings and structures where the volume for the storage of tires exceeds 566 m^3 shall be equipped throughout with an approved automatic fire sprinkler system.	NA-Not Applicable	Required	NA
3.5.1.6	Mini-Storage Building	An automatic sprinkler system shall be installed throughout all mini-storage buildings greater than 232 m^2 and where any of the individual storage units are separated by a 1-hour fire resistance–rated barrier.	NA	Required	NA
3.5.1.7	Exemption to Automatic Fire Sprinkler System Requirements	Exemption to the automatic fire sprinkler system required in 3.5.1.1 through 3.5.1.3 shall be permitted with the following conditions:	NA-Not Applicable	Permitted	NP-Not Permitted
3.5.1.7(1)	Create Separate Buildings	Create separate buildings via 2-hour or greater vertically aligned fire barrier, for purposes of limiting the fire area to not more than 1115 m^2, and complying with conditions in 3.5.1.7(1)(a) through 3.5.1.7(2)(b)	NA	Permitted	NP
3.5.1.7 (1)(a)	Vertical Continuity	The 2-hour or greater vertically aligned fire barrier wall shall be extended 760mm above roof surface.	NA	Required	NP

Item	Fire Safety Provisions	Minimum Requirements	Low Hazard	Ordinary	High Hazard
3.5.1.7 (1)(b)	Horizontal Continuity	Connections between the 2-hour or greater fire barrier wall and the exterior walls shall form an end wall exposure protection (T-shaped).	NA	Required	NP
3.5.1.7 (1)(c)		Length of the end wall protection shall be not less than 1830 mm, where the height of the exposing area is equal or less than 12 m or not less than 3050 mm if the height of the exposing area is more than 12 m.	NA	Required	NP-Not Permitted
3.5.1.7(2)	Doorways and Openings	Doorways and openings in fire walls and fire barriers shall be protected with the following:	NA	Required	NP
3.5.1.7 (2)(a)		Doors shall be normally closed and shall be automatic-closing or self-closing fire doors.	NA	Required	NP
3.5.1.7 (2)(b)		The aggregate width of all openings at any level shall not exceed 25 percent of the length of the wall.	NA	Required	NP
3.5.2	OTHER AUTOMATIC SUPPRESSION SYSTEM	Where an automatic sprinkler system is required in Section 3.5.1, the appropriate type of automatic suppression system shall be permitted in areas where likely water damage may occur, or the sprinkler system may damage the contents or equipment.	Permitted	Permitted	Permitted
3.5.3	Fire Hose Reel	Fire hose reels are required in buildings protected by an approved supervised automatic sprinkler system.	Required	Required	Required
3.5.4	Portable Fire Extinguisher	Applicable Portable Fire Extinguishers required in all buildings.	Required	Required	Required
3.5.5	Rising Main (Dry or Wet Standpipe)	Refer to Annex Fire Fighting System Annex_FFS_G1 Revisions 2021	Required	Required	Required

Item	Fire Safety Provisions	Minimum Requirements	Low Hazard	Ordinary	High Hazard
3.6	SMOKE CONTROL/VENTILATION REQUIREMENTS	Design conditions per Annex ACMV_N1 Revisions 2021. (AS-Sprinklered / NS-Not Sprinklered)			
3.6.1	STORAGE OCCUPANCY BUILDING				
3.6.1.1	Aboveground Storage Occupancy	Fire area or fire compartment exceeds 100 m^2.	Required	Required	Required
3.6.1.1(1)	≤ 100 m^2 (AS or NS)		NR	NR	NR
3.6.1.1(2)	100 m^2 ≤ 500 m^2 (AS)		NR	NR	NR
3.6.1.1(3)	100 m^2 ≤ 500 m^2 (NS)	Smoke Vent of minimum % Openings according to Annex ACMV_N1 Revisions 2021.	NR	NR	Required
3.6.1.1(4)	500 to ≤ 1115 m^2 (NS)	Smoke Vent of minimum % Openings according to Annex ACMV_N1 Revisions 2021.	NR	Required	Required
3.6.1.1(5)	500 to ≤ 1115 m^2 (AS)	Smoke Vent of minimum % Openings according to Annex ACMV_N1 Revisions 2021.	NR	NR	NR
3.6.1.1(6)	1115 m^2 ≤ 2500 m^2 (AS)	Smoke Vent of minimum % Openings according to Annex ACMV_N1 Revisions 2021.	Required	Required	NP
3.6.1.1(7)		Purging System	Permitted	Permitted	Required
3.6.1.1(8)	2500 m^2 ≤ 4000 m^2 (AS)	Purging System	Required	Required	Required
3.6.1.1(9)	4000 m^2 (AS)	Engineered Smoke Control System	Required	Required	Required
3.6.1.2	Belowground Storage Occupancy	Fire area or fire compartment exceeds 100 m^2.	Required	Required	Required
3.6.1.2(1)	100 m^2 ≤ 1115 m^2 (NS)	Smoke Vent of minimum % Openings according to Annex ACMV_N1 Revisions 2021.	Required	Required	NP-Not Permitted
3.6.1.2(2)		Purging System	Permitted	Permitted	Required
3.6.1.2(3)	≤ 1115 m^2 (AS)	Smoke Vent of minimum % Openings according to Annex ACMV_N1 Revisions 2021.	Permitted	Permitted	Required
3.6.1.2(4)		Purging System	Permitted	Permitted	Required
3.6.1.2(5)	1115 m^2 (AS)	Engineered Smoke Control System	Required	Required	Required
3.6.2	STAIRWELL/LOBBY	Design conditions per Annex ACMV_N1 Revisions 2021.	<15m	≥15m - <28m	≥28m

Item	Fire Safety Provisions	Minimum Requirements	Low Hazard	Ordinary	High Hazard
3.6.2.1	Less than 9 m habitable height		No Reqmt	No Reqmt	No Reqmt
3.6.2.2	9 m to 15 m habitable height	Vent at top of stairwell	Required	NA	NA
		Stair ventilation openings at every floor level (for stairs along external walls)	Permitted	NA	NA
		Stairwell Pressurization	NR	NA	NA
3.6.2.3	>15 m to < 28 m habitable height	Vent at top of stairwell	NA	NP	NA
		Stair ventilation openings at every floor level (stairs along external walls)	NA	Required	NA
		Stairwell Pressurization	NA	Permitted	NA
3.6.2.4	≥28 m habitable height	Vent at top of stairwell	NA	NA	NP
		Stair ventilation openings at every floor level (stairs along external walls)	NA	NA	NP
		Stairwell pressurization, smoke stop/fire fighting lobby pressurization	NA	NA	Required
	Connecting Basement Levels				
3.6.2.5	Two basement levels or ≤6 m deep, ≤2000 m² floor area	Vent at top of stairwell : * Permitted up to five (5) connecting above floors (2B+G+4 or less) or 12 m habitable height ; whichever is less; otherwise next below provisions shall apply.	*Required	NP	NP
		Stair ventilation openings at every floor level (stairs along external walls)	Permitted	Required	NP
		Stairwell pressurization, smoke stop/fire fighting lobby pressurization	Permitted	Permitted	Required
3.6.2	STAIRWELL/LOBBY	Design conditions per Annex ACMV_N1 Revisions 2021.	<15m	≥15m - <28m	≥28m

Item	Fire Safety Provisions	Minimum Requirements	Low Hazard	Ordinary	High Hazard
3.6.2.6	Three basement levels or ≤ 9.1m deep, ≤2000 m² floor area	Vent at top of stairwell : * Permitted up to three (3) connecting above floors only (3B+G+2 or less) or 6m habitable height, whichever is less; otherwise next below provisions shall apply	*Required	NP	NP
		Stair ventilation openings at every floor level (stairs along external walls)	NA	NA	NA
		Stairwell pressurization, smoke stop/fire fighting lobby pressurization	Permitted	Permitted	Permitted
3.6.2.7	Two basement levels or ≤6 m deep, >2000 m² floor area	Vent at top of stairwell: * Permitted up to four (4) connecting floors (2B+G+3 or less) or 9 m habitable height ; whichever is less; otherwise next below provisions shall apply.	*Required	NP	NP
		Stair ventilation openings at every floor level (stairs along external walls)	Required	NP	NP
		Stairwell pressurization, smoke stop/fire fighting lobby pressurization	Permitted	Required	Required
3.6.2.8	Three basement levels or ≤ 9.1m deep, >2000 m² floor area, connecting one floor above only	Vent at top of stairwell : * Permitted up to two connecting above floors or 3 m habitable height only (3B+G+1 or less); whichever is less, otherwise next below provisions shall apply	*Required	NP	NP
		Stair ventilation openings at every floor level (stairs along external walls)	NA	NA	NA
		Stairwell pressurization, smoke stop/fire fighting lobby pressurization.	Permitted	Required	Required
3.6.2.9	Lowest basement level >9.1 m below ground level, regarless of floor area	Vent at top of stairwell	NP	NP	NP
		Stair ventilation openings at every floor level (stairs along external walls)	NP	NP	NP
		Stairwell pressurization, smoke stop/fire fighting lobby pressurization	Required	Required	Required
3.6.3	ESCAPE CORRIDOR PROTECTION	Design conditions per Annex ACMV_N1 Revisions 2021.	Low Hazard	Ordinary	High Hazard

Item	Fire Safety Provisions	Minimum Requirements	Low Hazard	Ordinary	High Hazard
3.6.3.1	Interior Corridors	Vents (Fixed or Automatic Opening)	Required in specific type of Occupancy: Healthcare Occupancies and in Detention and Correctional Occupancies		
		Mechanical Ventilation of Corridor			
		Pressurization of Corridor			
3.6.3.2	Corridor with side/s located along exterior walls	Vents (Fixed or Automatic Opening)			
		Mechanical Ventilation of Corridor			
		Pressurization of Corridor			
3.6.4	ATRIUM and OTHER FLOOR OPENINGS PROTECTION	Design conditions per Annex ACMV_N1 Revisions 2021.	<15m	≥15m - <28m	≥28m
3.6.4.1	Malls (with floor openings connecting >2 floors	Smoke Vents (Fixed or Automatic Opening)	NA	NA	NA
		Mechanical Smoke Exhaust Ventilation System/Engineered	NA	NA	NA
3.6.4.2	Other Occupancies (connecting >3 floor levels)	Smoke Vents (Fixed or Automatic Opening)	Required	Permitted	NP
		Mechanical Smoke Exhaust Ventilation System/Engineered	Permitted	Permitted	Required
3.6.5	CAR PARKS/PARKING STRUCTURES PROTECTION	Design conditions per Annex ACMV_N1 Revisions 2021.	<15m	≥15m - <28m	≥28m
3.6.5.1	Open Parking Structures	The open parking structure shall justify that no smoke stagnation will occur such as from a fire located somewhere in the middle of the car park; otherwise mechanical equipment that will aid in effective dispersal of smoke shall be provided	Required	Required	Required
3.6.5.2	Aboveground Enclosed Car Parks				
3.6.5.2.1	Aggregate floor area of ≤2000 m²	Smoke Vents (Fixed or Automatic)	Required	Required	Permitted
		Mechanical Smoke Purging/Clearance	Permitted	Permitted	Required
		Engineered Smoke Control System	Permitted	Permitted	Permitted
3.6.5.2.2	Aggregate floor area of >2000 m²	Smoke Vents (Fixed or Automatic)	Required	NP	NP
		Mechanical Smoke Purging/Clearance	Permitted	Required	NP
		Engineered Smoke Control System	Required	Permitted	Required

Item	Fire Safety Provisions	Minimum Requirements	Low Hazard	Ordinary	High Hazard
3.6.5.3	Belowground Car Parks		≤6m Deep	>6m - ≤9.1 m Deep	>9.1 m Deep
3.6.5.3.1	Aggregate floor area of ≤2000 m²	Smoke Vents (Fixed or Automatic)	Required	NP	NP
		Mechanical Smoke Purging/Clearance	Permitted	Required	Required
		Engineered Smoke Control System	Permitted	Permitted	Permitted
3.6.5.3.2	Aggregate floor area of >2000 m²	Smoke Vents (Fixed or Automatic)	NP	NP	NP
		Mechanical Smoke Purging/Clearance	Required	NP	NP
		Engineered Smoke Control System	Permitted	Required	Required
3.7	CORRIDORS	Exit access corridors protection	NR	NR	Required
3.7.1	WALLS	Corridors shall be separated from use areas by fire barriers having a minimum 1-hour fire resistance rating.	NR-Not Required	NR	NR
3.8	SUBDIVISIONS OF BUILDING SPACES	Internal subdivisions.	NR	Required	Required
3.8.1	INCIDENTAL SPACES	Incidental spaces shall be permitted without fire rated separation from other areas, as long as the space function is in support of the predominant occupancy.	Permitted	NA-Not Applicable	NA
3.8.2	Salesrooms, Showrooms, Offices, or Similar Spaces	Any single area or spaces of equal or more than 140 m² in area, shall be separated from the main industrial occupancy by walls or partitions and floor or floor-ceiling assemblies of not less than 2-hrs fire resistance rating.	Required	Required	Required
3.8.2.1		The separation required in 3.8.2, shall be permitted to be reduced to not less than 1-hour fire resistance rating in buildings protected throughout by an approved, supervised automatic sprinkler system.	Permitted	Permitted	Not Permitted
3.9	(Reserved).				

Item	Fire Safety Provisions	Minimum Requirements	Low Hazard	Ordinary	High Hazard
4.0	**SPECIAL PROVISIONS.**	**Special Provisions for Firefighting and Rescue shall comply with QCD FLS Annex and as modified in item 4.0 of this FLS Occupancy Chapter.**			
4.1	FIRE (EMERGENCY) COMMAND CENTER (FCC)	QCD FLS Annex_A5 – Revisions_2021.	NR-Not Required	NR	Required
4.1.1		A fire command center shall be provided in any building that requires an Emergency Voice Communication System and/or Smoke Control System.	Required	Required	Required
4.2	FIREMAN›S ACCESS PANELS/ OPENINGS	QCD FLS Annex_A3 – Revisions_2021	Required	Required	Required
4.2.1		Fireman›s access panels shall be provided in storage occupancy buildings regardless of habitable height.	Required	Required	Required
4.3	EXTERNAL ACCESS TO SITE AND BUILDINGS	QCD FLS Annex_A3 – Revisions_2021	NR	NR	NR
4.3.1	SITE ACCESS	For gated facility development a 4.0 m wide and 4.5 m clear height vertical clearance entry gate or site access shall be provided.	NR	NR	NR
4.3.3	FIRE ENGINE HARDSTANDING	Storage occupancies shall be provided with fire engine hardstanding regardless of habitable height.	Required	Required	Required
4.4	(Reserved).				
5.0	**BUILDING SERVICES and FIRE PROTECTION EQUIPMENT**	**Building Services and Fire Protection Equipment shall comply with the applicable NFPA codes and standards and QCD FLS Annex.**			
5..1	ELECTRICAL SYSTEM	Electrical wiring and equipment shall be in accordance with NFPA 70.	Required	Required	Required
5.1.1	ELECTRICAL EQUIPMENT/PANEL ROOMS AND SIMILAR ROOMS/ SPACES	QCD FLS Annex _A7 – Revisions_2021	Required	Required	Required
5.1.2	EMERGENCY GENERATORS AND STANDBY POWER SYSTEMS.	Emergency generators and standby power systems shall be installed, tested, and maintained in accordance with NFPA 110.	Required	Required	Required

Item	Fire Safety Provisions	Minimum Requirements	Low Hazard	Ordinary	High Hazard
5.1.3	STORED ELECTRIAL ENERGY SYSTEMS	Stored electrical energy systems shall be installed, tested, and maintained in accordance with NFPA 111.	Required	Required	Required
5.2	COMMERCIAL COOKING OPERATIONS	Where permitted, commercial cooking operations shall be protected in accordance with NFPA 96.	Required	Required	Required
5.3	ELEVATORS, ESCALATORS, and CONVEYORS	An elevator, shall not be considered a component in a required means of egress and shall be in accordance with NFPA 101 section 9.4.	Required	Required	Required
5.3.1	NUMBER OF CARS	The number of elevator cars permitted in a hoistway shall be not more than three (3).	Required	Required	Required
5.3.2	OPENINGS TO EXIT ENCLOSURES	Conveyors, elevators, dumbwaiters, and pneumatic conveyors serving various stories of a building shall not open to an exit enclosure.	Required	Required	Required
5.4	FIRE PUMPS				
5.5.1	FIRE PUMPS ROOM	QCD FLS Annex _A6 – Revisions_2021	Required	Required	Required
5.5	SUBSTATION and SWITCHGEARS	QCD FLS Annex _A8 – Revisions_2021	Required	Required	Required
5.6	(Reserved).				
6.0	**SPECIAL PROVISIONS for OPEN-SIDES STORAGE BUILDINGS**	**Open-sides Storage Buildings shall comply with the applicable NFPA codes and standards and this FLS Occupancy Chapter.**			
6.1	APPLICATIONS	The requirements of Storage Occupancies sections 1.0 through 4.0 shall be met, except as modified by 6.1.1 through 6.1.4.	Required	Required	NA
6.1.1	OPENINGS REQUIREMENT	All sides of the storage building shall be open and without walls to be considered as an open-side or sheds storage building.	Required	Required	NA

Item	Fire Safety Provisions	Minimum Requirements	Low Hazard	Ordinary	High Hazard
6.1.1.1	External Walls	External walls along the perimeter of the building shall be permitted, provided the wall does not exceed 1 m. height from the finished floor line.	Permitted	Permitted	NA
6.1.2	HAZARD CLASSIFICATION	Provisions in 6.1 through 6.1.9 shall only be limited to storage contents classified as low and ordinary hazards.	Required	Required	NA
6.1.3	BUILDING AREA	Gross area of one compartment or fire area shall not exceed 4000 m^2.	Required	Required	NA
6.1.4	BUILDING HEIGHT	Building height from the finished floor level up to the level of the junction between the supporting column and the beam or roof assembly, shall be not less than 4 m.	Required	Required	NA
6.1.4.1	Contents Storage Height	Storage of commodities shall be arranged so as not to exceed a maximum height of 3 m., when stored in racks, piled or stacked atop each other.	Required	Required	NA
6.1.4.2	Spacing between Storage Racks/ Shelves	When aisles are created within a storage piles or areas, aisle shall have a minimum clear width of 1.2 m.	Required	Required	NA
6.1.5	EXPOSURE PROTECTION	Open-sides or shed storage building shall be separated from the property line and other buildings located on the same lot.	Required	Required	NA
6.1.5.1	Horizontal Separation	A minimum horizontal separation of 6 m. shall be provided between the open-side/shed storage building and the property line or other buildings located on the same lot.	Required	Required	NA
6.1.5.2		The horizontal separation shall be measured at a 90-degree angle to the exterior surface of the building.	Required	Required	NA
6.1.6	AUTOMATIC SPRINKLER SYSTEM	An automatic sprinkler system shall not be required in open-side or shed storage building complying with the conditions in 6.1.1 through 6.1.5.2.	NR-Not Required	NR	NA
6.1.7	FIRE DETECTION	A fire detection system shall not be required in open-sides storage buildings complying with the conditions in 6.1.1 through 6.1.5.2.	NR	NR	NA

Item	Fire Safety Provisions	Minimum Requirements	Low Hazard	Ordinary	High Hazard
6.1.8.1	Initiation	Initiation of the fire alarm system shall be in accordance with the requirements for storage occupancies in 3.4.	Required	Required	NA
6.1.8.2	Notification	Notification of the fire alarm system shall be in accordance with the requirements for storage occupancies in 3.4.	Required	Required	NA
6.1.9	SMOKE CONTROL SYSTEM	Smoke control system shall not be required in open-wall storage buildings complying with the conditions in 6.1.1 through 6.1.5.2.	NR	NR	NA
6.2	(Reserved).				
7.0	**SPECIAL PROVISIONS for AIRCRAFT STORAGE HANGARS.**	**Aircraft Storage Hangars shall comply with the applicable NFPA codes and standards and this FLS Occupancy Chapter.**			
7.1	GENERAL	For further information on, and provisions for aircraft hangars, see NFPA 409 Standard on Aircraft Hangars.			
7.1.1	APPLICATIONS	The requirements of Storage Occupancy sections 1.0 through 4.0 shall be met, except as modified by 7.1.1.1 through 7.1.3	NA-Not Applicable	Required	NA
7.1.1.1	Number of Exits	There shall be not less than two (2) means of egress from each aircraft storage area.	NA	Required	NA
7.1.1.2		Exits from aircraft storage areas shall be provided at intervals not exceeding 46 m on all exterior walls.	NA	Required	NA
7.1.1.3	Egress Components	Where horizontal exits are provided, doors shall be provided in the horizontal exit fire barrier at intervals not exceeding 30 m.	NA	Required	NA
7.1.1.4		Where dwarf or "smash" doors are provided in doors that accommodate aircraft, such doors shall be permitted for compliance with 7.1.1.1 through 7.1.1.3.	NA	Required	NA
7.1.2	ARRANGEMENT OF MEANS OF EGRESS AND DISCHARGE FROM EXITS	Means of egress from mezzanine floors in aircraft storage areas shall be arranged so that the travel distance to the nearest exit from any point on the mezzanine does not exceed 23 m.	NA	Required	NA
7.1.2.1		The means of egress required in 7.1.2, shall lead directly to a properly enclosed stair discharging directly to the exterior, to a suitable cutoff area, or to outside stairs.	NA	Required	NA

Item	Fire Safety Provisions	Minimum Requirements	Low Hazard	Ordinary	High Hazard
7.1.3	DEAD-ENDS	Dead ends shall not exceed 15 m. for other than high hazard contents areas and shall not be permitted for high hazard contents areas.	NA	Required	NA
8.0	**GRAIN HANDLING. PROCESSING, MILLING, or OTHER BULK STORAGE FACILITIES.**	**Bulk Storage Facilities shall comply with the applicable NFPA codes and standards and this FLS Occupancy Chapter.**			
8.1	GENERAL	For further information, see NFPA 61 Standard for the Prevention of Fires and Dust Explosions in Agricultural and Food Processing Facilities.			
8.1.1	APPLICATIONS	The requirements of Storage Occupancy sections 1.0 through 4.0 shall be met, except as modified by 8.1.2 through 8.1.5.2	Required	Required	Required
8.1.2	NUMBER OF MEANS OF EGRESS	There shall be not less than two means of egress from all working levels of the head house, as modified by 8.1.2.1, 8.1.2.2, and 8.1.2.3.	Required	Required	Required
8.1.2.1	Egress Components	One of the two 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, 1-hour fire resistance–rated enclosure.	Required	Required	Required
8.1.2.1(1)		Exterior exit stair shall be protected from the structure by a 1-hour fire resistance–rated wall that extends at least 3050 mm beyond the stair.	Required	Required	Required
8.1.2.2	Second Means of Egress	The second means of egress shall be one of the following:	Required	Required	Required
8.1.2.2(1)	Exterior Stair or Basket Ladder–Type Fire Escape	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.	Required	Required	Required

Item	Fire Safety Provisions	Minimum Requirements	Low Hazard	Ordinary	High Hazard
8.1.2.2(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 8.1.3.	Required	Required	Required
8.1.2.3	Stair Enclosures	Stair enclosures in existing structures shall be permitted to have non-fire-rated dust-resistant enclosures.	Required	Required	Required
8.1.3	MEANS OF EGRESS TO FINISHED GROUND LEVEL	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.	Required	Required	Required
8.1.4	UNDERGROUND SPACES				
8.1.4.1	Number of Means of Egress	Underground spaces shall have not less than two means of egress, except as permitted in 8.1.4.2	Required	Required	Required
8.1.4.2		Where the horizontal travel distance to the means of egress is less than 15 m in normally unoccupied spaces, a single means of egress shall be permitted.	Required	Permitted	NP-Not Permitted
8.1.5	TRAVEL DISTANCE (TD) TO EXITS	Travel distance shall not exceed that provided by 8.1.5.1 and 8.1.5.2.	Required	Required	NA
8.1.5.1		Travel distance in bulk storage facilities shall not exceed 61 m.	Required	Required	NA
8.1.5.2		Travel distance in bulk storage facilities protected throughout by an approved, supervised automatic sprinkler system, shall not exceed 122 m.	Required	Required	NA
8.2	(Reserved).				
9.0	**SPECIAL PROVISIONS for PARKING STRUCTURES.**	**Parking Structures shall comply with the applicable NFPA codes and standards and this FLS Occupancy Chapter.**			
9.1	APPLICATIONS	The provisions of item 9.0 shall apply to parking structures of the closed or open type, above or below grade plane.			

Item	Fire Safety Provisions	Minimum Requirements	Low Hazard	Ordinary	High Hazard
9.1.1		The provisions of item 9.0 shall not apply to assisted mechanical-type or automated-type parking facilities that are not occupied by customers.	NA-Not Applicable	Required	NA
9.1.2		For further information and other provisions on parking structures, see the latest NFPA 88A Standard for Parking Structures.	NA	Required	NA
9.2	MULTIPLE OCCUPANCIES				
9.2.1		Where both parking and repair operations are conducted in the same building, the entire building shall comply with the provisions for Industrial Occupancies except as modified by item 9.2.1.1.	NA	Required	NA
9.2.2	SEPARATED OCCUPANCIES	Where the parking and repair sections are separated by not less than 1-hour fire-rated construction, the parking and repair sections shall be treated separately.	NA	Required	NA
9.2.3		In areas where repair operations are conducted, the means of egress shall comply with the means of egress provisions of industrial occupancies.	NA	Required	NA
9.3	OPEN PARKING STRUCTURES				
9.3.1	AREA OF WALL OPENING	For natural ventilation purposes, the exterior sides of the structure shall have uniformly distributed openings on two or more sides.	NA	Required	NA
9.3.2		The area of such openings in exterior walls on a level shall be not less than 20 percent of the total perimeter wall area of each level.	NA	Required	NA
9.3.3		The aggregate length of the openings considered to be providing natural ventilation shall be not less than 40 percent of the perimeter of the level.	NA	Required	NA

Item	Fire Safety Provisions	Minimum Requirements	Low Hazard	Ordinary	High Hazard
9.3.4		Where the required openings are uniformly distributed over two opposing sides of the building, item 9.3.3 shall not apply.	NA	Required	NA
9.3.5		Interior wall lines and column lines shall be at least 20 percent open, with openings uniformly distributed to provide ventilation.	NA-Not Applicable	Required	NA
9.4	CLASSIFICATION OF OCCUPANCIES				
9.4.1		Incidental vehicle parking in another occupancy shall not be the basis for overall occupancy classification.	NA	Required	NA
9.5	CLASSIFICATION OF HAZARD OF CONTENTS				
9.5.1		Parking structures used only for the storage of vehicles shall be classified as ordinary hazard in accordance with item 1.4	NA	Required	NA
9.5.2		The presence of gasoline, diesel fuel, and alternative fuels such as compressed natural gas in closed automobile fuel tanks or gas cylinders does not warrant a high hazard classification.	NA	Permitted	NA
9.6	MINIMUM CONSTRUCTION REQUIREMENTS				
9.6.1		Those parts of parking structures located within, immediately below, attached to, or less than 3000 mm from a building used for any other purpose shall be separated by walls, partitions, floors, or floor–ceiling assemblies having fire resistance ratings of not less than 2 hours.	NA	Required	NA
9.6.2		No fire-rated separation shall be required when parts of a parking structure and a building used for any other purpose are separated by 3000 mm or more, and are attached only via open pedestrian balconies or bridges or open vehicle bridges.	NA	Permitted	NA

Item	Fire Safety Provisions	Minimum Requirements	Low Hazard	Ordinary	High Hazard
9.6.3		Those portions of an open parking structure located within or immediately below a building used for another purpose shall have the principal supporting members and bearing walls in all levels of the parking structure protected to provide a fire-resistive rating equivalent to that required for the other occupancy.	NA	Required	NA
9.6.4		Offices or other similar spaces that are related to the operation of the parking structure and are less than 300 m^2 in area, other than cashier or attendant booths, shall be separated from parking areas by walls or partitions that resist the passage of smoke.	NA	Required	NA
9.6.5		Floor surfaces shall be of noncombustible material.	NA	Required	NA
9.6.6		Combustible construction is not permitted.	NA	NP	NA
9.6.7		Asphalt shall be permitted on grade.	NA	Permitted	NA
9.6.8	ENCLOSED PARKING STRUCTURES	The maximum building height, number of stories, and area limitations for enclosed parking structures shall be in accordance with NFPA 5000 chap. 7.	NA	Required	NA
9.6.9	OPEN PARKING STRUCTURES	Open parking structures shall be of Type I or Type II construction in accordance with NFPA 5000 chapter 7 and as defined in NFPA 220.	NA	Required	NA
9.6.9.1		Heights and floor areas of open parking structures of Type I, Type II (222), or Type II (111) construction shall be permitted to be unlimited.	NA	Required	NA
9.6.9.2		Open parking structures of Type II (000) construction shall be permitted to be of unlimited area where both of the following conditions are met:	NA	Required	NA
9.6.9.2(2)		The height does not exceed 25 m.	NA	Required	NA
9.6.9.2(2)		The horizontal distance from any point on any parking level to an exterior wall opening on a street, an alley, a courtyard, or other similar permanent open space does not exceed 60 m.	NA	Required	NA

Item	Fire Safety Provisions	Minimum Requirements	Low Hazard	Ordinary	High Hazard
9.7	MEANS OF EGRESS REQUIREMENTS				
9.7.1	MEANS OF EGRESS COMPONENTS	Components of means of egress shall be limited to the types described in items 9.7.1.1 through 9.7.1.2	NA	Required	NA
9.7.1.1	Doors	Doors in accordance with item 2.1.1.	NA	Permitted	NA
9.7.1.1(1)		Special locking arrangements complying with NFPA 101 section 7.2.1.6.	NA	Permitted	NA
9.7.1.1(2)		An opening for the passage of automobiles shall be permitted to serve as an exit from a street floor, provided that no door or shutter is installed therein.	NA	Permitted	NA
9.7.1.2	Stairs	Stairs in accordance with 2.1.2 shall be permitted, unless otherwise permitted by item 9.7.1.2.1.	NA	Required	NA
9.7.1.2(1)	Stair Enclosures	In open parking structures, stairs are not required to be enclosed.	NA	Permitted	NA
9.7.1.2(2)	Winders	Winders shall be not be permitted.	NA	NP	NA
9.7.1.3	Smokeproof Enclosures	Smokeproof enclosures complying with item 2.1.3.	NA	Permitted	NA
9.7.1.4	Horizontal Exits	Horizontal exits complying with item 2.1.4.	NA	Permitted	NA
9.7.1.5	Ramps	Ramps shall be permitted in accordance with any of the following conditions:	NA	Permitted	NA
9.7.1.5(1)	Ramps Usage	Ramps complying with item 2.1.5 shall be permitted and shall not be subject to normal vehicular traffic where used as an exit.	NA	Permitted	NA
9.7.1.5(2)	Ramps as Second Means of Egress	In a ramp-type open parking structure with open vehicle ramps not subject to closure, the ramp shall be permitted to serve in lieu of the second means of egress from floors above the level of exit discharge, provided that the ramp discharges directly outside at the street level.	NA-Not Applicable	Permitted	NA
9.7.1.5(3)		For parking structures extending only one floor level below the level of exit discharge, a vehicle ramp leading directly to the outside shall be permitted to serve in lieu of the second means of egress, provided that no door or shutter is installed therein.	NA	Permitted	NA

Item	Fire Safety Provisions	Minimum Requirements	Low Hazard	Ordinary	High Hazard
9.7.1.6	Exit Passageways	Exit passageways complying with item 2.1.6.	NA	Permitted	NA
9.7.1.7	Fire Escape Stairs	Fire escape stairs complying with item 2.1.7.	NA	Permitted	NA
9.7.1.8	Areas of Refuge	Areas of refuge complying with item 2.1.9.	NA	Permitted	NA
9.7.1.8(1)		In open-air parking structures, the area of refuge requirements shall not apply.	NA	Permitted	NA
9.7.2	NUMBER OF MEANS OF EGRESS	The number of means of egress shall comply with items 9.7.2.1 and 9.7.2.2.	NA	Required	NA
9.7.2.1		Not less than two means of egress shall be provided from every floor or section of every parking structure.	NA	Required	NA
9.7.2.2		Floors or portions thereof with an occupant load of more than 500 - <1000 shall have the minimum 3 number of separate and remote means of egress.	NA	Required	NA
9.7.3	ARRANGEMENT OF MEANS OF EGRESS				
9.7.3.1	Common Path of Travel	A common path of travel shall be permitted for the first 15 m from any point in the parking structure.	NA	Required	NA
9.7.3.2	Dead-Ends	Dead ends shall not exceed 15 m.	NA	Required	NA
9.7.3.3	Fuel Dispensing Devices within Parking Structures	Where fuel-dispensing devices are located within a parking structure, items 9.7.3.3(1) and 9.7.3.3(2) shall apply.	NA	Required	NA
9.7.3.3(1)		Travel away from the fuel-dispensing device in any direction shall lead to an exit with no dead end in which occupants might be trapped by fire.	NA	Required	NA
9.7.3.3(2)		Within closed parking structures containing fuel-dispensing devices, exits shall be arranged and located to meet all of the following additional requirements:	NA	Required	NA
9.7.3.3(2)(a)		Exits shall lead to the outside of the building on the same level or to stairs, with no upward travel permitted, unless direct outside exits are available from that floor.	NA-Not Applicable	Required	NA

Item	Fire Safety Provisions	Minimum Requirements	Low Hazard	Ordinary	High Hazard
9.7.3.3(2)(b)		Any story below the story at which fuel is being dispensed shall have exits leading directly to the outside via outside stairs or doors at the finished ground level.	NA	Required	NA
9.7.4	TRAVEL DISTANCE (TD) TO EXITS	Travel distance shall not exceed that provided by items 9.7.4.1 and 9.7.4.2, except as otherwise permitted in item 9.7.4.5.	NA	Required	NA
9.7.4.1	Enclosed Parking Structures	Travel distance in enclosed parking structures shall not exceed 46 m.	NA	Required	NA
9.7.4.2		Travel distance in enclosed parking structures protected with an approved automatic spinkler system shall not exceed 61 m.	NA	Required	NA
9.7.4.3	Open Parking Structures	Travel distance in open parking structures shall not exceed 91 m.	NA	Required	NA
9.7.4.4		Travel distance in open parking structures protected with an approved automatic spinkler system shall not exceed 122 m.	NA	Required	NA
9.7.4.5	Parking Structure Open Not Less than 50% on All Sides	Travel distance in parking structure open not less than 50% on all sides shall not exceed 122 m.	NA	Required	NA
9.7.4.6	Open Parking Structures	In open parking structures, travel distance shall comply with one of the following:	NA	Required	NA
9.7.4.6(1)		The travel distance to an exit shall not exceed the travel distance specified in items 9.7.4.1 through 9.7.4.2.	NA	Required	NA
9.7.4.6(2)		The travel distance to a stair that does not meet the provisions for an exit enclosure shall not exceed the travel distance specified in items 9.7.4.1 and 9.7.4.2, and travel along the stair shall not be limited.	NA	Required	NA
9.7.5	DISCHARGE FROM EXITS	Exit discharge shall comply with item 2.5.	NA	Required	NA
9.7.6	ILLUMINATION OF MEANS OF EGRESS	Means of egress shall be illuminated in accordance with item 2.6 or with natural lighting that provides the required level of illumination in structures occupied only during daylight hours.	NA	Required	NA
9.7.7	EMERGENCY LIGHTING	Parking structures shall be provided with emergency lighting in accordance item 2.7, except for structures occupied only during daylight hours and arranged to provide the required level of illumination of all portions of the means of egress by natural means.	NA-Not Applicable	Required	NA

Item	Fire Safety Provisions	Minimum Requirements	Low Hazard	Ordinary	High Hazard
9.7.8	MARKINGS OF MEANS OF EGRESS	Means of egress shall have signs in accordance with item 2.8.	NA	Required	NA
9.8	PROTECTION				
9.8.1	PROTECTION OF VERTICAL OPENINGS				
9.8.1.1	Vertical Openings in Enclosed Parking Structures	Vertical openings through floors in enclosed parking structures four stories or more in height shall be enclosed with walls or partitions having a fire resistance rating of not less than 2 hours.	NA	Required	NA
9.8.1.2		Vertical openings through floors in enclosed parking structures less than four stories in height shall be enclosed with walls or partitions having a fire resistance rating of not less than 1 hour.	NA	Required	NA
9.8.1.3	Ramps	Ramps in enclosed parking structures shall not be required to be enclosed where the parking structure is protected throughout by an approved, automatic sprinkler system.	NA	Permitted	NA
9.8.1.4		Ramps in enclosed parking structures shall not be required to be enclosed where the parking structure is protected throughout by an approved, supervised, automatic fire detection system and a mechanical ventilation system in accordance with item 9.8.5.	NA	Permitted	NA
9.8.1.5	Openings in Floor Assembly between Enclosed Parking Structure and Open Parking Structure	Openings in the floor assembly between an enclosed parking structure and an open parking structure, except exit openings, shall not be required to be enclosed where the enclosed parking structure is protected in accordance with item 9.8.1.3 or 9.8.1.4.	NA	Permitted	NA
9.8.1.6	Vertical Openings in Open Parking Structures	Unprotected vertical openings through floors in open parking structures shall be permitted.	NA	Permitted	NA
9.8.2	INTERIOR FINISH				
9.8.2.1	Interior Wall and Ceiling Finish	Interior wall and ceiling finish materials shall be Class A, Class B, or Class C in parking structures and shall be as required by item 3.3.1 in exit enclosures.	NA	Required	NA
9.8.2.2	Interior Floor Finish	Interior floor finish in exit enclosures and exit access corridors shall be Class I or Class II.	NA-Not Applicable	Required	NA

9.8.3	DETECTION, ALARM AND COMMUNICATIONS	A fire alarm system shall be required for parking structures, except as modified by 9.8.3.1 and 9.8.3.2.	NA	Required	NA
9.8.3.1		Open parking structures shall not be required to have a fire detection system.	NA	NR	NA
9.8.3.2		Parking structures protected throughout by an approved automatic sprinkler system shall not be required to have a fire detection system.	NA	Required	NA
9.8.3.3	Initiation	Initiation of the fire alarm system required in item 9.8.3, shall be in accordance with the requirements for storage occupancies in item 3.4.	NA	Required	NA
9.8.3.4	Notification (Sounder and Flasher)	The required fire alarm system in item 9.8.3 shall activate an audible and visible alarm in a continuously attended location for purposes of initiating emergency action.	NA	Required	NA
9.8.4	AUTOMATIC SPRINKLER SYSTEM				
9.8.4.1	Enclosed Parking Structures	Enclosed parking structures located at or above grade plane, within or immediately below a building used for another occupancy, shall have an automatic sprinkler system throughout the parking structure.	NA	Required	NA
9.8.4.1(1)	Open Parking Structures	Automatic sprinkler system shall not be required in open parking structures.	NA	NR	NA
9.8.4.1.2	High-rise, Open Parking Structures	Open parking structures located under other occupancies within a high-rise building, shall be protected throughout by an approved, supervised automatic sprinkler system.	NA	Required	NA
9.8.5	SMOKE CONTROL SYSTEM	See 3.6.5 for requirements.			
9.9	(Reserved).				

General Directorate of Civil Defence (QCD) – Fire and Life Safety Requirement (ANNEX)

This document provides the minimum fire and life safety requirements for buildings and structures of various occupancies prescribed by the General Directorate of Civil Defence (GDCD). It establishes the guidelines in determining the minimum design and construction requirements, firefighting, fire alarm and detection, smoke control provisions, as well as other valuable life safety concerns necessary in the protection of precious lives and properties.

This document also adopts the National Fire Protection Association (NFPA) codes and standards as principal reference for provisions or requirements not specifically addressed in this document. In the event of any conflict concerning requirements under this document and requirements under NFPA, the requirements under this document shall be uphold.

Adoption of requirements from other fire and engineering codes and standards should have the prior concurrence of GDCD before its application.

This document is an updated version of the Fire Safety Guidelines and Annex published in 2015 (FSG_2015), and further supersedes and replaces that previous FSG_2015 documents.