

INDUSTRIAL OCCUPANCIES



INDUSTRIAL OCCUPANCIES						
1.0	GENERAL REQUIREMENTS.	The fire and life safety requirements in this chapter shall apply to buildings or portions thereof used as industrial occupancies.				
	An occupancy in which products are manufactured or in which processing, assembling, mixing, packaging, finishing, decorating, or repair operations are conducted.					
	Factories of All Kinds Pumping Stations / Telephone Exchanges GasPlants / Laundries	Auto-body and Repair Shops / Laboratories Recycling plants / Refineries Food processing plants / Drycleaning plants	Hangars (for Servicing Aircraft) Post Office Central Sorting/Maintenance Facilities / Power Plants / Sawmills			
1.1	GENERAL CONDITIONS AND BUILDING LIMITS					
	Sub-Classification (Hazards)	Building Height (m)	Floor Area (m²)	Basement Levels		
1.1.1	LOW HAZARD Industrial 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 Industrial Occupancy					
1.1.3	HIGH HAZARD Industrial Occupancy					
FIRE AND LIFE SAFETY REQUIREMENTS						
Item	Fire Safety Provisions	Minimum Requirements		Low Hazard	Ordinary	High Hazard
1.2	CLASSIFICATION OF OCCUPANCIES	Industrial occupancies shall include all buildings and structures or parts thereof with occupancy as described in item 1.0.				
1.2.1	INDUSTRIAL OCCUPANCY	Industrial occupancy classification shall comply with 1.2.1.1 and 1.2.1.2		Required	Required	Required
1.2.1.1	Applications	Industrial occupancies shall include factories making products of all kinds and properties used for operations such as processing, assembling, mixing, packaging, finishing or decorating, repairing, and similar operations.		Required	Required	Required



Item	Fire Safety Provisions	Minimum Requirements	Low Hazard	Ordinary	High Hazard
1.2.1.2	Incidental High Hazard Operations	Incidental high hazard operations protected in accordance with special hazard protection in NFPA 101 section 8.7 and in 3.2 of this occupancy guideline, in industrial occupancies containing low or ordinary hazard contents shall not be the basis for high hazard industrial occupancy classification.	Permitted	Permitted	Permitted
1.2.2	SUBCLASSIFICATION OF OCCUPANCY	Each industrial occupancy shall be subclassified according to its use as described in 1.2.2.1, 1.2.2.2, and 1.2.2.3.	Required	Required	Required
1.2.2.1	General Industrial Occupancy	General industrial occupancies shall include all of the following:	Required	Required	Required
1.2.2.1(1)	Ordinary / Low Hazard Industrial Operations for Various Types of Industrial Processes.	Industrial occupancies that conduct ordinary and low hazard industrial operations in buildings of conventional design that are usable for various types of industrial processes.	Required	Required	Required
1.2.2.1(2)	Multistory and Multi Tenant Buildings / High Density of Employee Population	Industrial occupancies that include multistory buildings where floors are occupied by different tenants, or buildings that are usable for such occupancy and, therefore, are subject to possible use for types of industrial processes with a high density of employee population.	Required	Required	Required
1.2.2.2	Special-Purpose Industrial Occupancy	Special-purpose industrial occupancies shall include all of the following:	Required	Required	Required
1.2.2.2(1)	Ordinary / Low Hazard Industrial Operations for Specific Type of Operations	Industrial occupancies that conduct ordinary and low hazard industrial operations in buildings designed for, and that are usable only for, particular types of operations.	Required	Required	Required
1.2.2.2(2)	Area Occupied by Machinery or Equipment / Low Density of Employee Population	Industrial occupancies that are characterized by a relatively low density of employee population, with much of the area occupied by machinery or equipment	Required	Required	Required
1.2.2.2(3)	Application of Special-Purpose Industrial Occupancy	The special-purpose industrial occupancy classification shall not be applied to a building to reduce the life safety features; the full number and arrangement of exits required for a general industrial occupancy shall be provided.	Required	Required	Required
1.2.2.3	High-Hazard Industrial Occupancy	High-hazard industrial occupancies shall include all of the following:	Required	Required	Required



Item	Fire Safety Provisions	Minimum Requirements	Low Hazard	Ordinary	High Hazard
1.2.2.3(1)	High-Hazard Industrial Operations	Industrial occupancies in which industrial operations that include high hazard materials, processes, or contents are conducted.	Required	Required	Required
1.2.2.3 (1) (a)		Where gasoline and other flammable liquids are handled, used, or stored under such conditions that involve possible release of flammable vapors;	Required	Required	Required
1.2.2.3 (1) (b)		Where grain dust, wood flour or plastic dust, aluminum or magnesium dust, or other explosive dusts are produced;	Required	Required	Required
1.2.2.3 (1) (c)		Where hazardous chemicals or explosives are manufactured, stored, or handled;	Required	Required	Required
1.2.2.3 (1) (d)		Where materials are processed or handled under conditions that might produce flammable flyings; and where other situations of similar hazard exist.	Required	Required	Required
1.2.3	CHANGE OF INDUSTRIAL OCCUPANCY SUBCLASSIFICATION	A change from one subclassification of industrial occupancy to another are permitted only where the building complied with requirements for the new subclassification.	Required	Required	Required
1.2.4	MULTIPLE OCCUPANCIES	Multiple occupancies shall comply with the requirements of either 1.2.4.1 or 1.2.4.2.	Required	Required	Required
1.2.4.1	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
1.2.4.2	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)	Occupant load in industrial occupancies shall be determined on the basis of the occupant load factor in 1.3.1 or in 1.3.2.	Required	Required	Required



Item	Fire Safety Provisions	Minimum Requirements	Low Hazard	Ordinary	High Hazard
1.3.1	GENERAL and HIGH-HAZARD Industrial Occupancy	The occupant load in general and high-hazard industrial occupancies shall be based on an average of 9.3 m ² of gross floor area per occupant.	Required	Required	Required
1.3.2	SPECIAL-PURPOSE Industrial Occupancy	The occupant load in a special-purpose industrial occupancy shall be determined as the maximum probable population of the space under consideration.	Required	Required	Required
1.4	CLASSIFICATION OF HAZARD OF CONTENTS	Classification of hazard of contents shall be in accordance with NFPA 101 section 6.2.	Required	Required	Required
1.4.1		Industrial occupancies shall be classified as low hazard, ordinary hazard, or high hazard depending on the nature of industrial operation, manufacturing processes, equipment, and hazard of materials, processes, or contents.	Required	Required	Required
1.4.1	LOW HAZARD INDUSTRIAL OCCUPANCIES	Industrial uses that can be considered as LOW Hazard Industrial Occupancies include the following:			
1.4.1.1	Beverages (Non-alcoholic) / Brick and Masonry / Ceramic / Foundries / Glass products / Gypsum / Ice / Metal Products (Fabrication and Assembly) / Telecommunications Signal Processing / Telephone Exchanges				
1.4.2	OTHER THAN LOW HAZARD INDUSTRIAL OCCUPANCIES	Industrial uses that can be considered as ORDINARY or HIGH Hazard Industrial Occupancies, include the following:			



Item	Fire Safety Provisions	Minimum Requirements	Low Hazard	Ordinary	High Hazard
1.4.2.1	Aircraft / Appliances / Athletic equipment / Automobiles and other motor vehicles / Bakeries / Beverages (alcoholic) / Bicycles / Boat building / Brooms or Brushes / Business Machines / Cameras and Photo Equipment / Canvas or similar Fabric / Clothing / Construction / Carpets and Rugs (includes cleaning) / Disinfectants / Drycleaning and Dyeing / Electric Light Plants and Power Houses / Electronics / Engines (including rebuilding) / Food Processing / Furniture / Hemp Products / Jute Products / Laundries / Leather Products / Machinery / Metals / Millwork (sash and door) / Motion Pictures and Television Filming / Motor Vehicle Repair Garages / Musical Instruments / Optical Goods / Paper Mills or Products / Photographic Film / Plastic Products / Printing or Publishing / Recreational Vehicles / Refuse Incineration / Shoes / Soaps and Detergents / Textiles / Tobacco / Trailers / Upholstering / Wood (Distillation) / Woodworking (Cabinet Making) or Carpentry				
1.5	MINIMUM CONSTRUCTION REQUIREMENTS.	Construction shall be in accordance with NFPA 5000 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
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	Door assembly in a means of egress in industrial occupancy 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 industrial occupancies.	Required	Required	Required
2.1.1.2	Delayed-Egress Electrical Locking Systems	Approved, delayed-egress electrical locking systems complying with NFPA 101 section 7.2.1.6.1, on any door in industrial occupancies with security needs.	Permitted	Permitted	Permitted
2.1.1.3	Sensor-Release of Electrical Locking Systems	Sensor-release electrical locking system complying with NFPA 101 section 7.2.1.6.2. and installed on egress doors as a security measure that does not compromise the use of the means of egress.	Permitted	Permitted	Permitted



Item	Fire Safety Provisions	Minimum Requirements	Low Hazard	Ordinary	High Hazard
2.1.2	STAIRS	Stairs complying with NFPA 101 section 7.2.2, 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 as a component in a means of egress complying with NFPA 101 section 7.2.2.2.3.	Permitted	Permitted	Permitted
2.1.3	SMOKEPROOF ENCLOSURES	Smokeproof enclosures complying with with NFPA 101 section 7.2.3.	Permitted	Permitted	Permitted
2.1.4	HORIZONTAL EXITS	Horizontal exit used as substitute for other exits shall comply with all the criteria for horizontal exits in NFPA 101 section 7.2.4.	Permitted	Permitted	Permitted
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.	Permitted	Permitted	Permitted
2.1.5	RAMPS	Every ramp used as a component in a means of egress shall be in accordance 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 used as a component in a means of egress complying with NFPA 101 section 7.2.6.	Permitted	Permitted	Permitted
2.1.7	FIRE ESCAPE STAIRS	Fire escape stairs used as a component in a means of egress complying with NFPA 101 section 7.2.8.	Permitted	Permitted	Permitted
2.1.8	FIRE ESCAPE LADDERS	Fire escape ladders used as a component in a means of egress complying with NFPA 101 section 7.2.9.	Permitted	Permitted	Permitted



Item	Fire Safety Provisions	Minimum Requirements	Low Hazard	Ordinary	High Hazard
2.1.8.1	Fixed Industrial Stairs	Fixed industrial stairs in accordance with the minimum requirements for fixed stairs and stair railing systems 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 section 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.	Required	Required	Required
2.2.1	CORRIDOR OR PASSAGEWAY	In industrial occupancies, means of egress shall be sized to accommodate the occupant load as determined in accordance with item 1.3.	Required	Required	Required
2.2.1.1		Spaces not subject to human occupancy because of the presence of machinery or equipment shall not be included in the computation.	Permitted	Permitted	Permitted
2.3	NUMBER OF MEANS OF EGRESS	The number of means of egress shall comply with NFPA 101 section 7.4 and as modified in 2.3.1 and 2.3.2.	Required	Required	Required
2.3.1	MINIMUM REQUIRED	Not less than two means of egress shall be provided from every story or section, and not less than one exit shall be reached without traversing another story.	Required	Required	Required
2.3.1.1		Not less than 2 exits shall be provided in any floor level, including mezzanine with an occupant load exceeding 50.	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



Item	Fire Safety Provisions	Minimum Requirements	Low Hazard	Ordinary	High Hazard
2.3.2.3		Rooms or spaces have a travel distance to the room door not exceeding 7620 mm	NA	NA	Permitted
2.3.1.3	Low Hazard Occupancy	In low hazard industrial occupancies, a single means of egress shall be permitted from any story or section.	Permitted	NA	NA
2.3.1.4	Ordinary Hazard Occupancy	In ordinary hazard industrial 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	Permitted	NA
2.4	ARRANGEMENT OF MEANS OF EGRESS	Access to all required exits shall be in accordance with NFPA 101 section 7.5, and as modified 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 2.4.1.5.	Required	Required	Required
2.4.1.1	General Industrial Occupancy	Travel distance in general industrial occupancies with low or ordinary hazards, shall not exceed 61 m.	Required	Required	NA
2.4.1.1(1)	Protected with an approved automatic sprinkler system	Travel distance in general industrial occupancies with low or ordinary hazards, shall not exceed 76 m.	Required	Required	NA
2.4.1.2	Special-Purpose Industrial Occupancy	Travel distance in special-purpose industrial occupancies with low or ordinary hazards, shall not exceed 91 m.	Required	Required	NA
2.4.1.2(1)	Protected with an approved automatic sprinkler system	Travel distance in special-purpose industrial occupancies with low or ordinary hazards, shall not exceed 122 m.	Required	Required	NA
2.4.1.3	High Hazard Industrial Occupancy	Travel distance in high hazard industrial occupancies and high-hazard contents areas shall not exceed 23 m.	NA-Not Applicable	NA	Required
2.4.2	COMMON PATH (CP) OF TRAVEL	Common path of travel shall comply with 2.4.2.1 through 2.4.2.3.	Required	Required	NA
2.4.2.1	General Industrial and Special-Purpose Industrial Occupancy	Common path of travel in general industrial and in special-purpose industrial occupancies with low or ordinary hazards, shall not exceed 15 m.	Required	Required	NA



Item	Fire Safety Provisions	Minimum Requirements		Low Hazard	Ordinary	High Hazard
2.4.2.1(1)	Protected with an approved automatic sprinkler system	Common path of travel in general industrial and in special-purpose industrial occupancies with low or ordinary hazards, shall not exceed 30 m.		Required	Required	NA
2.4.2.2	High Hazard Industrial Occupancy	Common path of travel in high hazard storage occupancy is prohibited, unless permitted in item 2.3.2		NA	NA	NP-Not Permitted
2.4.3	DEAD-END (DE) CORRIDOR	Dead-end corridors shall comply with 2.4.3.1 through 2.4.3.3.		NA	Required	NA
2.4.3.1	General Industrial and Special-Purpose Industrial Occupancy	Dead-end corridors in general industrial and in special-purpose industrial occupancies with low or ordinary hazards, shall not exceed 15 m.		Required	Required	NA
2.4.3.3	High Hazard Industrial Occupancy	Dead-end corridors in high hazard storage occupancy is prohibited, unless permitted in 2.3.2		NA	NA	NP
2.4.4	Ancillary Facilities	Ancillary facilities located within industrial occupancies include administrative office, laboratory, control, and employee service facilities incidental to the predominant industrial function.		Permitted	Permitted	Permitted
2.4.4.1		Ancillary facilities shall be arranged to allow travel in independent directions after leaving the ancillary facility so that both means of egress paths do not become compromised by the same fire or similar emergency.		Required	Required	Required
2.4.4.2	Ancillary Facilities in Special-Purpose Industrial Occupancy	Ancillary facilities in special-purpose industrial occupancies shall have not less than a 2-hour fire resistance-rated separation from the predominant industrial occupancy, and shall have one means of egress that is separated from the predominant industrial occupancy by 2-hour fire resistance - rated construction.		Required	Required	Required
2.4.5	Industrial Equipment Access	Industrial equipment access doors, walkways, platforms, ramps, and stairs that serve as a component of the means of egress from the involved equipment.		Permitted	Permitted	Permitted
2.4.5.1	Industrial Equipment Access Dimensional Criteria	Minimum horizontal dimension of any walkway, landing, or platform (clear).	560 mm	Required	Required	Required



Item	Fire Safety Provisions	Minimum Requirements		Low Hazard	Ordinary	High Hazard
		Minimum stair or ramp width (clear between landings)	560 mm	Required	Required	Required
		Minimum tread width (clear)	560 mm	Required	Required	Required
		Minimum tread depth	255 mm	Required	Required	Required
		Maximum riser height	230 mm	Required	Required	Required
		Handrails are permitted to terminate, at the required height, at a point directly above the top and bottom risers.		Permitted	Permitted	Permitted
		Maximum height between landings	3660 mm	Required	Required	Required
		Minimum headroom	2030 mm	Required	Required	Required
		Minimum width of door openings (clear)	560 mm	Required	Required	Required
2.4.5.2		Any means of egress component permitted by 2.4.5, shall serve not more than 20 people.		Required	Required	Required
2.5	DISCHARGE FROM EXITS	Exit discharge 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		Required	Required	Required
2.6.1	ILLUMINATION BY NATURAL SOURCES	Means of egress shall be illuminated with natural lighting that provides the required level of illumination in structures occupied only during daylight hours.		Permitted	Permitted	Permitted
2.7	EMERGENCY LIGHTING	Emergency lighting shall be provided in accordance with NFPA 101 section 7.9. and in 2.7.1 through 2.7.3 unless permitted in 2.7.4 and 2.7.5.		Required	Required	Required



Item	Fire Safety Provisions	Minimum Requirements	Low Hazard	Ordinary	High Hazard
2.7.1		Emergency lighting shall be provided in stairs, major aisles, corridors, ramps, and passageways leading to large locker rooms or laboratories using hazardous chemicals.	Required	Required	Required
2.7.2	High Risk Task Areas	Emergency lighting shall be provided in high risk task areas as described in 2.7.2.1 and 2.7.2.2	Required	Required	Required
2.7.2.1		High risk task areas such as in local risk and control rooms for dangerous industrial buildings.	Required	Required	Required
2.7.2.2		High risk task area such as in motor generator, control or industrial rooms.	Required	Required	Required
2.7.3		Emergency lighting shall be considered where operations require lighting to perform orderly manual emergency operation or shutdown, maintain critical services, or provide safe start-up after a power failure.	Required	Required	Required
2.7.4	Exemptions	Special-purpose industrial occupancies without routine human habitation.	Permitted	Permitted	NA
2.7.5		Structures occupied only during daylight hours, with skylights or windows arranged to provide the required level of illumination on all portions of the means of egress during such hours.	Permitted	Permitted	Permitted
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 the provisions of NFPA 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



Item	Fire Safety Provisions	Minimum Requirements	Low Hazard	Ordinary	High Hazard
2.9.1.2(1)		Means of egress requirements of this Fire and Life Safety Requirements.	Required	Required	Required
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 industrial 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 one of the following in 3.1.1 through 3.1.4.	Required	Required	Required
3.1.1	SPECIAL-PURPOSE and HIGH-HAZARD Industrial Occupancy	Where unprotected vertical openings exist and are necessary to manufacturing operations, such openings shall be permitted beyond the specified limits provided the condition in 3.1.1.1 is met.	Permitted	Permitted	Permitted
3.1.1.1	Conditions	Every floor level shall have direct access to one or more enclosed stairs or other exits protected against obstruction by any fire or smoke in the open areas connected by the unprotected vertical openings.	Required	Required	Required
3.1.2	OPEN STAIRS, Open Ramps and Escalators	Open stairs, open ramps, and escalators shall be permitted where connecting only two adjacent stories (one floor pierced only).	Permitted	Permitted	Permitted
3.1.3	CONVENIENCE OPENINGS	Unenclosed vertical openings in accordance with NFPA 101 section 8.6.9.1.	Permitted	Permitted	Permitted
3.1.4	CONVENIENCE STAIRWAYS	Unenclosed vertical openings created by convenience stairways in accordance with NFPA 101 section 8.6.9.2.	Permitted	Permitted	Permitted
3.2	PROTECTION FROM HAZARDS				



Item	Fire Safety Provisions	Minimum Requirements	Low Hazard	Ordinary	High Hazard
3.2.1	HIGH-HAZARD INDUSTRIAL OCCUPANCIES	All high hazard industrial occupancies, operations, or processes shall have an automatic extinguishing systems or other protection appropriate to the particular hazard, such as explosion venting or suppression.	NA-Not Applicable	NA	Required
3.2.1.1	Areas Subject to Explosion Hazard	Protection required in 3.2.1 shall be provided for any area subject to an explosion hazard in order to minimize danger to occupants in case of fire or other emergency before they have time to use exits to escape.	Required	Required	Required
3.2.1.2		Hazardous areas in industrial occupancies protected by automatic extinguishing systems shall be exempt from the smoke-resisting enclosure requirement of NFPA 101 section 8.7.1.2.	Permitted	Permitted	Permitted
3.2.2	COMMERCIAL COOKING FACILITIES	Commercial cooking equipment shall be protected in accordance with NFPA 96 .	Required	Required	Required
3.2.3	HAZARDOUS MATERIALS	Industrial occupancies 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, and NFPA 495.	Required	Required	Required
3.3	INTERIOR FINISH	Interior finish shall be in accordance with NFPA 101 section 10.2.	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 operating areas.	Required	Required	Required
3.3.1.1		In exit enclosures, interior wall and ceiling finish materials shall be Class A or Class B.	Required	Required	Required
3.3.2	INTERIOR FLOOR FINISH	Interior floor finish in exit enclosures and in exit access corridors 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 shall be provided.	Required	Required	Required



Item	Fire Safety Provisions	Minimum Requirements	Low Hazard	Ordinary	High Hazard
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	Industrial 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
3.5.1.1	G+2 Floors and Above (Ordinary Hazard)	An automatic sprinkler system shall be provided throughout all industrial occupancies three or more stories in height.	NR	Required	NA-Not Applicable
3.5.1.2	Fire Area Exceeds 1115 m ² (Ordinary Hazard)	An automatic sprinkler system shall be provided throughout all industrial 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 industrial occupancies, where the total area of all floors, including mezzanines (when provided), exceeds 2230 m ² .	NR	Required	NA
3.5.1.4	High Hazard Industrial Occupancy	High hazard industrial occupancy shall be protected throughout with an approved automatic sprinkler system.	NA	NA	Required



Item	Fire Safety Provisions	Minimum Requirements	Low Hazard	Ordinary	High Hazard
3.5.1.5	Woodworking Operations	Buildings containing woodworking operations exceeding 232 m ² that use equipment, machinery, or appliances; that generate finely divided, combustible waste; or that use finely divided combustible materials, shall be installed with an approved automatic fire sprinkler system.	NA	Required	Required
3.5.1.5(1)		Areas within building involved in woodworking operations in accordance with 3.5.1.5, shall be clearly identified and area marked on the floor surface.	NA	Required	Required
3.5.1.6	Power-Generation Buildings.	Buildings of Type I or Type II construction used exclusively for the enclosure of steam generators, steam turbines, gas turbines, heat recovery generators, and flue gas treatment equipment shall not be required to be sprinklered throughout, provided that the special hazards are protected by approved automatic suppression systems in accordance with NFPA 11, NFPA 12, NFPA 13, NFPA 15, NFPA 16, NFPA 17, NFPA 750, or NFPA 2001.	NA	Required	Required
3.5.1.7	Spray Areas (Rooms/Booths) in Repair Garage and Other Industrial Occupancies	Spray application operations shall be located only in buildings that are completely protected by an approved system of automatic sprinklers.	NA	Required	Required
3.5.1.7(1)	Spray Areas and Mixing Rooms	Spray areas (both manual and automated spray application processes) used for liquid spray operations and mixing rooms shall be protected with an approved automatic fire protection system in accordance with 3.5.1 or 3.5.2.	NA	Required	Required
3.5.1.7(2)		In unsprinklered buildings, an automatic fire protection system complying with 3.5.1 or 3.5.2 shall be installed to protect spray application processes.	NA	Required	Required
3.5.1.8	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



Item	Fire Safety Provisions	Minimum Requirements	Low Hazard	Ordinary	High Hazard
3.5.1.8(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 3.5.1.8(1)(a) through 3.5.1.8(2)(b).	NA	Permitted	NP
3.5.1.8 (1) (a)	Vertical Continuity	The 2-hour or greater vertically aligned fire barrier wall shall be extended 760mm above roof surface.	NA	Required	NP
3.5.1.8 (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
3.5.1.8 (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
3.5.1.8(2)	Doorways and Openings	Openings in fire barriers shall be protected with the following:	NA	Required	NP
3.5.1.8 (2) (a)		Doors shall be normally closed and shall be automatic-closing or self-closing fire doors.	NA	Required	NP
3.5.1.8 (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	INDUSTRIAL OCCUPANCY BUILDING				
3.6.1.1	Aboveground Industrial 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 Industrial 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
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 (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 m ² 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
	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 ≤ 9.1 m deep, ≤ 2000 m ² 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 m ² 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 ≤ 9.1 m deep, >2000 m ² 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, regardless 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



Item	Fire Safety Provisions	Minimum Requirements	Low Hazard	Ordinary	High Hazard
3.6.3	ESCAPE CORRIDOR PROTECTION	Design conditions per Annex ACMV_N1 Revisions 2021.	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 m ²	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 m ²	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 m ²	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 m ²	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	NR
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 m ² 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.	NR	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
3.8.3	Parts Storage and Other Storage Areas	Parts storage and other storage areas of equal or more than 140 m ² in area, shall 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 2 hours.	NR	Required	Required



Item	Fire Safety Provisions	Minimum Requirements	Low Hazard	Ordinary	High Hazard
3.8.4	Repair Garage	Garage occupancies shall be separated from other portions of a multi-tenanted building by walls or partitions and floor or floor-ceiling assemblies of not less than 2-hrs fire resistance rating.	NR	Required	Required
3.8.4.1	Spray Areas and Spray Booths in Repair Garage	Wall, floors and assemblies that intersect or enclose a spray area shall be constructed of non-combustible or limited combustible materials or assemblies and shall be rigidly mounted or fastened.	NR	Required	Required
3.8.4.1.1		Spray booths shall be separated from other operations by a minimum distance of 900 mm or by a partition, wall, or floor/ceiling assembly having a minimum fire resistance rating of 1-hour.	NR	Required	Required
3.8.4.1.2		A clear space of not less than 900 mm shall be maintained on all sides and above the spray booth. This clear space shall be kept free of any storage or combustible construction.	NR	Required	Required
3.8.4.2	Spray Rooms in Repair Garage	In addition to 3.8.4.1 requirements, spray rooms shall be constructed of, and separated vertically and horizontally from all surrounding areas by construction assemblies of not less than 2-hrs fire resistance ratings.	NR	Required	Required
3.8.5	Fire and Smoke Barrier Walls/Partitions, Floor or Floor Ceiling Assemblies	The 2-hrs fire barrier walls or partitions and floor or floor-ceiling assemblies required in 3.8.2 thru 3.8.4 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 (in case of repair garages) to these spaces.	NR	Required	Required
3.90	(Reserved).				
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.			



Item	Fire Safety Provisions	Minimum Requirements	Low Hazard	Ordinary	High Hazard
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 industrial 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	Industrial 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

