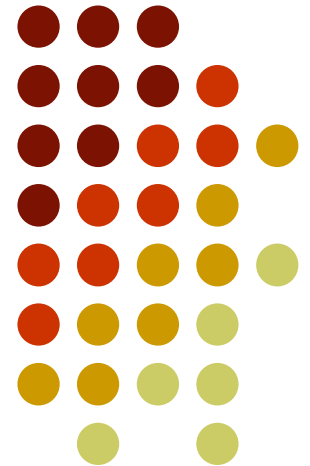


Inspecting High Hazard Occupancies

An overview of Fire Code Requirements For High Hazard Industrial Buildings (F1)



What is an F1 by Definition

Manitoba Fire Code

- ***High Hazard Industrial Occupancy (Group F, Division 1) means an industrial occupancy containing sufficient quantities of highly combustible and flammable or explosive materials which, because of their inherent characteristics, constitute a special fire hazard***



MBC Div B, A3.1.2.1- Grp F Div 1

- Bulk plants for flammable liquids
- Bulk storage warehouses for hazardous substances
- Cereal mills
- Chemical manufacturing or processing plants
- Distilleries
- Dry cleaning plants
- Feed mills
- Flour mills
- Grain elevators
- Lacquer factories
- Mattress factories
- Paint, varnish and pyroxylin product factories
- Rubber processing plants
- Spray painting operations
- Waste paper processing plants



Most Common Cause Of Industrial Fire or Explosion

- Combustible Dust
- Hot Work
- Flammable Liquids
- Electrical Installations
- Mechanical Failure



Fire Protection Options

- spatial separations
- travel distance to exits
- fire alarm system
- compartmentalisation
- fire fighting access
- housekeeping
- non combustibile construction
- sprinkler system
- fire stopping
- emergency lighting
- limiting concealed spaces
- adequate water supply
- exit width
- number of exits
- limiting ignition sources



Fire Hazard Definition



Any situation, process, material, or condition that, on the basis of applicable data, can cause a fire or explosion or provide a ready fuel supply to augment the spread or intensity of a fire or explosion, all of which pose a threat to life or property.



Fire Hazard

Fire Hazard = Fire Load + Source of Ignition

Fire Load = Quantity + Ignitability

Source of Ignition = Probability of Ignition



Fire Hazards – *Building Design/Use*

Is the building construction or design appropriate to this type of operation?

- Change of occupancy from original intent?
- Change of use from original intent?
- Change of process from original purpose?
- How does this impact Life Safety Systems?
- How does this impact on Active and Passive defence systems?



Fire Hazards - *Operational*

Are personnel following operational procedures?

- Is there a regular review of procedures?
- Are there special precautions that need to be added to hazardous materials use?
- Are there prescribed shut down periods to clean and maintain workplace and equipment?



Fire Hazards - *Equipment*

- Is there a preventative maintenance program in place for equipment?
- Are there noticeable signs of fatigue or wear on equipment?
- Is there open electrical equipment wiring?
- Is there build up of grease and lint?
- Is there poor housekeeping around equipment?



Fire Hazards - *Procedures*

- Are there safe work practices established for each part of a process?
- Are there appropriate warnings (signage) to ensure personnel are aware of hazards?
- Are personnel exposed to regular training sessions?
- Are personnel supervised to ensure safe work procedures are being followed?



Fire Hazards – *Environmental*

Spillage of waste material?

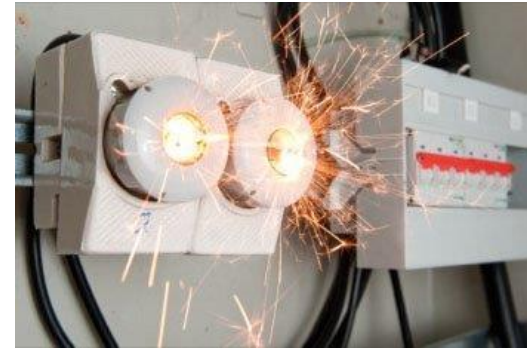
Venting of gases?

Spillage of flammable materials?



Fire Hazards – *Ignition Sources*

- Electrical equipment
- Static electricity
- Mechanical sparks and friction
- Open flame
- Design of heating systems & heated surfaces
- Use of tools and vehicles
- Maintenance



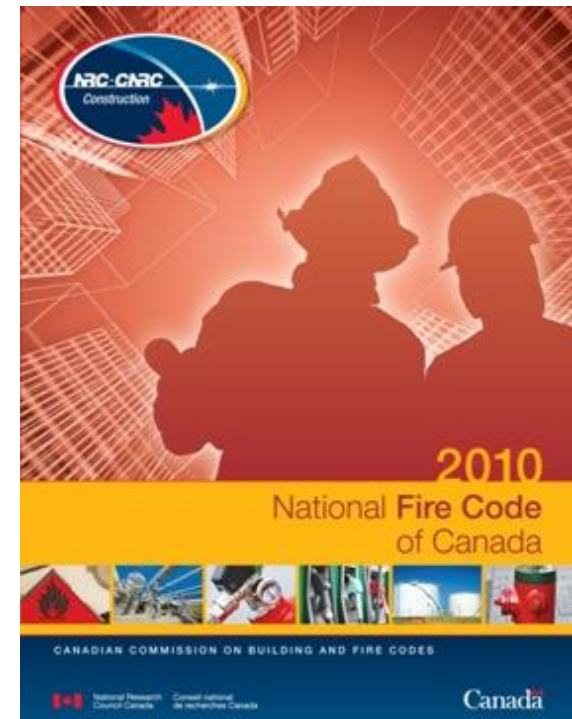
***'Special'* Industrial Hazards**

- Flammable and combustible liquids
- Compressed gases
- Hazardous goods
- Hot Work (welding/cutting)
- Dust producing operations
- Woodworking operations
- Conveyor systems
- High temperatures (ovens)
- Spraying and dipping operations
- Exposures to people from hazards



MFC Requirements for F1 Occupancies

MFC Division B (acceptable solutions)
Part 2 Building & Occupant Fire Safety
Part 3 Indoor & Outdoor Storage
Part 4 Flammable & Combustible Liquids
Part 5 Hazardous Processes & Operations



MFC Requirements for F1 Occupancies

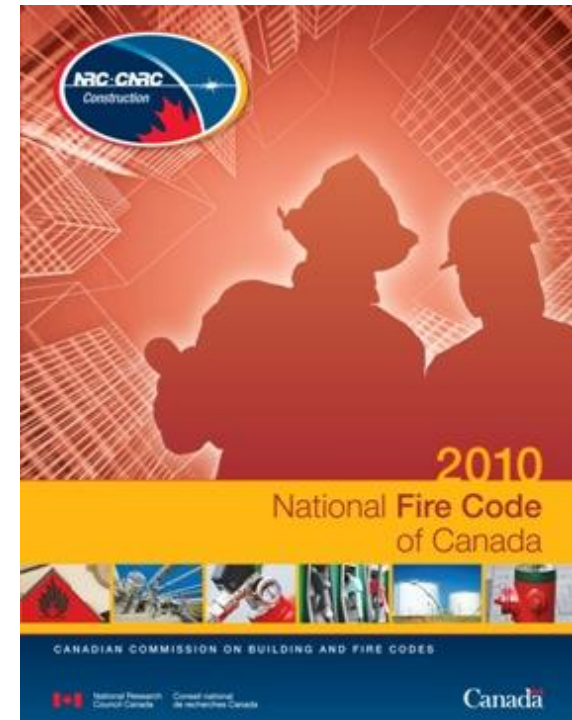
MFC Division B (acceptable solutions)

Part 2 Building & Occupant Fire Safety

Part 3 Indoor & Outdoor Storage

Part 4 Flammable & Combustible Liquids

Part 5 Hazardous Processes &
Operations



MFC Requirements for F1 Occupancies

Part 2 Building and Occupant Fire Safety

General Overview

- Buildings classification consistent with MBC
- General means reduce fire hazards
- Maintenance of
 - egress routes & exits
 - emergency lighting & exit signs
 - fire separations
 - fire department access
 - life safety systems
- Establishes Fire Safety Plans



Code Articles Relevant to F1 Occupancy

2.1.2.2. Hazardous Activities

- 1) Activities that create a hazard and that are not allowed for in the original design shall not be carried out in a *building* unless provisions are made to control the hazard in conformance with this Code.



Code Articles Relevant to F1 Occupancy

2.1.3.1. Fire Alarm, Standpipe and Sprinkler Systems

- 2) When changes in the use of *buildings* or *floor areas* create a hazard exceeding the criteria for which the fire protection systems were designed, such fire protection systems shall be upgraded to accommodate the increased hazard.



Part 3- Indoor and Outdoor Storage

General Overview of Part 3

- Applies to storage of combustible products and dangerous goods (inside and outside of building)
- Does not address classification of buildings except for storage of
 - Baled Combustible Fibres (F2 - MBC 3.1.2.6)
 - Ammonium Nitrate (F2 – MBC 3.3.6.6)
- Use of industrial trucks



Part 3- Indoor and Outdoor Storage

Part 3 requirements reduces the Fire Hazards by:

Limiting the fire initiation and fire growth

- 1(a) restriction ignition sources
- 1(b) limiting storage quantities
- 1(c) restricts incompatible products
- 1(d) restricts storage arrangements

Limiting consequences after fire initiation

- 2(a) providing firefighting access to stored items (aisle ways, clearance)
- 2(b) preventing fire spread (restricting room sizes, fire separations)
- 2(c) increasing building fire suppression systems requirements
- 2(d) increasing staff responses / awareness
- 2(e) limiting public access
- 2(f) specifying fire department access requirements



Part 3- Indoor and Outdoor Storage

Stored Materials Discussed

- solids
 - package goods (commodities)
 - tires
 - combustible fibres
 - ammonium nitrate (oxidant)
- gases
 - aerosols
 - compressed gases (flammable, toxic, corrosive)
- packaged dangerous goods (other than combustible or flammable liquids)



Part 3 - Code Articles Relevant to F1 Occupancy

- 3.1.2.2. Ambient Temperature
- 3.2.2.2. Access Aisles
- 3.2.2.3. Clearances (storage)
- 3.2.4.3. Sprinkler Protection (requirements)
- 3.2.7.2. Ignition Sources
- 3.2.7.1. Small Quantity Exemptions (dangerous goods)
- 3.2.7.5. Indoor Storage Arrangements
- 3.2.7.6 Separation of dangerous goods



Part 3 - Code Articles Relevant to F1 Occupancy

- 3.2.8. Compressed Gases
- 3.2.8.2. Flammable Gases
- 3.2.8.3. Storage of Poisonous, Corrosive or Oxidizing Gases
- 3.2.9. Indoor Storage of Ammonium Nitrate
- 3.3 Outdoor Storage
 - » Similar requirements to indoor storage with variations
 - » Adds fencing, power line considerations



Part 4 Flammable and Combustible Liquids

- applies to storage, handling, use and processing of F&CL
- does not distinguish industrial occupancies with an associated F&CL (except F1 for distilleries)

Just like Part 3, reduces the fire hazards by

Limiting the fire initiation and fire growth

- 1(a) restriction ignition sources
- 1(b) limiting storage quantities
- 1(c) restricts incompatible products
- 1(d) restricts storage arrangements

Limiting consequences after fire initiation

- 2(a) providing firefighting access to stored items (aisle ways, clearance)
- 2(b) preventing fire spread (restricting room sizes, fire separations)
- 2(c) increasing building fire suppression systems requirements
- 2(d) increasing staff responses / awareness
- 2(e) limiting public access
- 2(f) specifying fire department access requirements



Part 4 Flammable and Combustible Liquids

unlike Part 3

limit fire hazards by

1(e) limiting fire load exposure (by controlling piping, dispensing and transfer methods; and regulating fuel-dispensing stations, restricting basements and other low area such as pits)

1(f) limiting fire loads quantities by restricting tank trailer vehicles

1(g) limiting fire spread (by restricting handling, secondary containment, leak detection)

1(h) limiting ignition potential (by control of static electric charge with bonding & grounding)

limiting the fire consequences by

2 (g) allowing alternative fire suppressions systems to water



Part 4 Flammable and Combustible Liquids

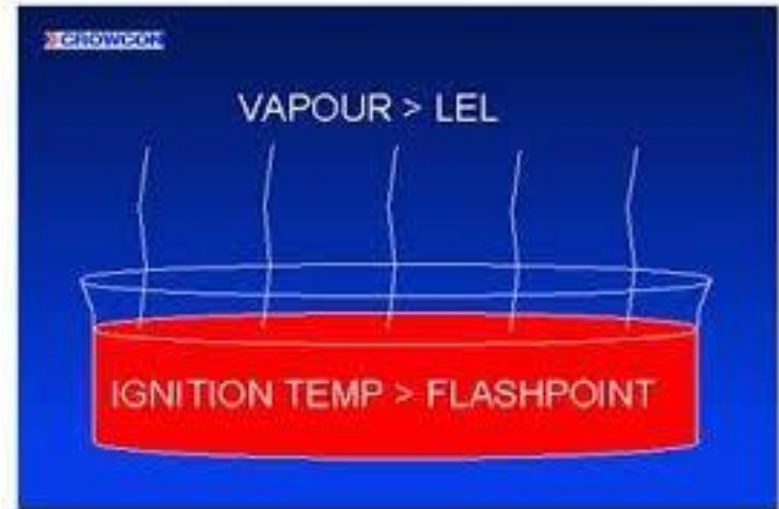
materials discussed

- flammable liquids
- combustible liquids
- class 2.1 gases at fuel dispensing stations (propane)
- distilled beverage alcohols



Part 4-General Articles Relevant to F1 Occupancy

4.1.2.2. Heated Liquids



- 1) When a liquid having a *flash point* at or above 37.8°C is being processed, stored, handled or used at a temperature at or above its *flash point*, it shall be treated as a **Class I** liquid.



Part 4- General Articles Relevant to F1 Occupancy

4.1.4. Electrical Installations

4.1.4.1. Hazardous Locations

- 1) Where *flammable liquids* or *combustible liquids* are present, electrical equipment shall conform to CSA C22.1, “Canadian Electrical Code, Part I,” for hazardous locations.



Part 4- General Articles Relevant to F1 Occupancy

4.1.5 Fire Prevention and Protection

4.1.5.1. Additional Fire Protection Equipment

- 1) Fire protection equipment shall be provided where there are special hazards of operation, dispensing or storage.

4.1.5.2. Ignition Sources

- 1) Unless controlled in a manner that will not create a fire or explosion hazard, a device, operation or activity that produces open flames, sparks or heat shall not be permitted in an area described in Article 4.1.1.1. (Application).

4.1.7 Ventilation

4.1.7.7. Exclusive Use of Ducts

- 1) Ducts used in a ventilation system conforming to Article 4.1.7.2. shall not be used for any other ventilation or exhaust system.



Part 4- General Articles Relevant to F1 Occupancy

4.1.8 Handling of Flammable and Combustible Liquids

4.1.8.2. Control of Static Electric Charge

- 1) When Class I liquids are dispensed from or into a container or a *storage tank*,
 - a) all metallic or electrically conducting material in the transfer system shall be electrically bonded and grounded, or
 - b) if the container or tank is made of non-electrically conducting material, measures shall be taken to minimize the potential for static electric charge to develop (see Note A-4.1.8.2.(1)(b)).
- 2) Except as provided in Sentence (3), when Class I liquids are transferred into a *storage tank* through the top of the tank, the fill pipe shall terminate within 150 mm of the bottom of the tank.
- 3) Sentence (2) shall not apply when
 - a) the *storage tank* vapour space cannot exceed 25% of the *lower explosive limit* or is filled with an inert gas that prevents the ignition of the vapour mixture, or
 - b) the liquid being transferred has a minimum conductivity that prevents the accumulation of static electricity (see Note A-4.1.8.2.(3)(b)).
- 4) Fill pipes referred to in Sentence (2) shall be installed in such a way as to minimize vibration of the pipe.



Part 4- General Articles Relevant to F1 Occupancy

4.2.2.1. Prohibited Locations

- 1) *Flammable liquids or combustible liquids* shall not be stored in or adjacent to *exits*, elevators or principle routes that provide *access to exits*.



Part 4- Code Articles Relevant to F1 Occupancy

4.2.7. Industrial Occupancies

4.2.7.1. Application

- 1) This Subsection applies to the storage of *flammable liquids* and *combustible liquids* in *closed containers* in *industrial occupancies*.

4.2.7.2. Storage Facilities

- 1) In *industrial occupancies*, *flammable liquids* and *combustible liquids* shall be stored
 - a) in conformance with Subsection 4.2.8., (incidental use)
 - b) in cabinets conforming to Subsection 4.2.10.,
 - c) in rooms conforming to Subsection 4.2.9., or
 - d) in storage areas conforming to Article 4.2.7.5. (max quantities)



Part 4- Code Articles Relevant to F1 Occupancy

4.2.7.3. Fire Compartments

- 1) *Fire compartments* regulated by this Subsection shall be separated from the remainder of the *building* by a *fire separation* having a *fire-resistance rating* of at least 2 h.



Part 4- Code Articles Relevant to F1 Occupancy

4.2.7.5. Maximum Quantities

- 1) Except as provided in Sentence (2), the storage of *flammable liquids* and *combustible liquids* in storage areas specified in Clause 4.2.7.2.(1)(d) shall
 - a) conform to Table 4.2.7.5.- A
 - i) where it consists of palletized or solid piled storage, or
 - ii) where stored in *racks* in *buildings* not protected in conformance with Article 4.2.7.6., or
 - b) conform to Table 4.2.7.5.-B where stored in *racks* in *buildings* protected in conformance with Article 4.2.7.6.

- 2) Where a *building* or part of *building* is designed for the storage of *flammable liquids* or *combustible liquids*, there is no limit on the total quantity of storage per *fire compartment* provided the *building* or part of *building* is separated from adjacent *buildings* or parts of *buildings* by
 - a) a *firewall* having a *fire-resistance rating* of at least 4 h, or
 - b) spatial separation in conformance with the MBC. (See Note A-4.2.7.5.(2).)



Part 4- Code Articles Relevant to F1 Occupancy

4.2.7.9 Separation from Other Dangerous Goods

- 1) *Flammable liquids and combustible liquids* shall not be stored with other *dangerous goods* unless in conformance with Article 4.2.2.3.

4.2.7.10 Separation from Combustible Products

- 1) Except for Class I commodities, *flammable liquids and combustible liquids* shall not be stored in the same *individual storage area* with other products listed in Sentence 3.2.1.1.(1).



Part 4- Code Articles Relevant to F1 Occupancy

4.2.8. Incidental Use

4.2.8.1. Application

- 1) Except as otherwise noted in this Part, this Subsection applies to *industrial occupancies* where the use, storage and handling of *flammable liquids* or *combustible liquids* is secondary to the principal activity. (See Note A-4.2.8.1.(1).)

4.2.8.2. Maximum Quantities

- 1) Except as provided in Sentences (2) and (3) and in Article 4.2.8.4., the quantity of *flammable liquids* and *combustible liquids* permitted to be located outside of storage rooms conforming to Subsections 4.2.7., 4.2.9. or 4.3.14., or storage cabinets conforming to Subsection 4.2.10., in any one *fire compartment* of a *building*, shall not be more than
 - a) 600 L of *flammable liquids* and *combustible liquids* in *closed containers*, of which not more than 100 L shall be Class IA liquids, and
 - b) 5000 L of Class IB, IC, II and IIIA liquids in *storage tanks* or portable tanks.
- 2) Where required for normal plant activity, quantities of *flammable liquids* and *combustible liquids* are permitted to exceed those specified in Sentence (1), but shall not be greater than the supply for one day of normal operation.
- 3) Where larger quantities than those permitted by Sentence (2) are required, such quantities shall be in *storage tanks* installed in conformance with Sentence 4.3.13.4.(2).



Part 4- Fire Hazard Related to Alcohol Production

- The fire load is the ethanol gas and the ethanol liquid that evaporates gas (especially if it is heated).
- The boiling point of [ethanol](#) or [grain alcohol](#) at atmospheric pressure (14.7 psia, 1 bar absolute) is 173.1°F (78.37°C).
- Distilled beverage alcohol = greater than 20%



Part 4- Fire Hazard Related to Alcohol Production (Distillery)

MFC 4.10

- Building (or parts of building) classification – high hazard (F1)
 - Involving distilling, processing, or stored in bulk
- Just storage of closed containers – F2



Part 5 Hazardous Processes and Operations

- applies to processes & operations that could cause a high fire hazard or explosive hazard

hazardous processes & operations

- hot works (welding)
- dust producing processes
 - woodworking (sawmills, furniture & cabinet manufacturing,
 - grain processing facilities (grain elevators, flour mills, feed mills)
- operations using flammable gases or dangerous goods
 - paint booths & spray operations
 - laboratories
 - welding
- operations using flammable or combustible liquids
 - paint booths & spray paint operations
 - dry-cleaning plants
 - hot dipping operations
 - Processing of flammable or combustible liquids



Part 5 - Articles Relevant to F1 Occupancy (General)

5.1.2. Electrical Installations

5.1.2.1. Hazardous Locations

- 1) Where wiring or electrical equipment is located in areas in which flammable gases or vapours, *combustible dusts* or *combustible fibres* are present in quantities sufficient to create a hazard, such wiring and electrical equipment shall conform to CSA C22.1, “Canadian Electrical Code, Part I,” for hazardous locations. (See Note A-5.1.2.1.(1).)



Part 5 - Articles Relevant to F1 Occupancy (General)

5.1.3.1. Ventilation

- 1) Ventilation shall be provided for hazardous locations and processes in conformance with the MBC and with this Part.



Part 5 - Articles Relevant to F1 Occupancy

Section 5.2. Hot Works

5.2.1.1. Application

- 1) This Section applies to hot works involving open flames or producing heat or sparks, including but not limited to, cutting, welding, soldering, brazing, grinding, adhesive bonding, roofing operations, thermal spraying and thawing pipes.

5.2.1.2. Training

- 1) Hot works shall be performed only by personnel trained in the safe use of equipment in conformance with this Section.

5.2.3.1. Location of Operations

- 1) Except as provided in Sentence (2), hot work shall be carried out in an area free of combustible and flammable contents, with walls, ceilings and floors of *noncombustible construction* or lined with noncombustible materials.

5.2.3.2. Protection of Combustible and Flammable Materials

- 1) Any combustible and flammable material, dust or residue shall be
 - a) removed from the area where hot work is carried out, or
 - b) protected against ignition by the use of noncombustible materials.

5.2.3.6. Fire Extinguishing Equipment

- 1) At least one portable fire extinguisher shall be provided in the hot work area.



Part 5 - Spray Coating Processes various sizes



Isolation of Spray Operations

MBC requires separation of spray operations (F1 major) from remainder of building

- 1 or 2 hour fire separation

Possible option is to treat spray booth as F1 ancillary occupancy to surrounding occupancy.



Major Components of Spray Booth

Enclosed/semi enclosed booth or room

- Includes enclosure, electrical and sprinklers/fire suppression.

Exhaust System

- Includes filtering system, fans, ducting, interlocks, and air monitoring systems.

Spray Coating Delivery System

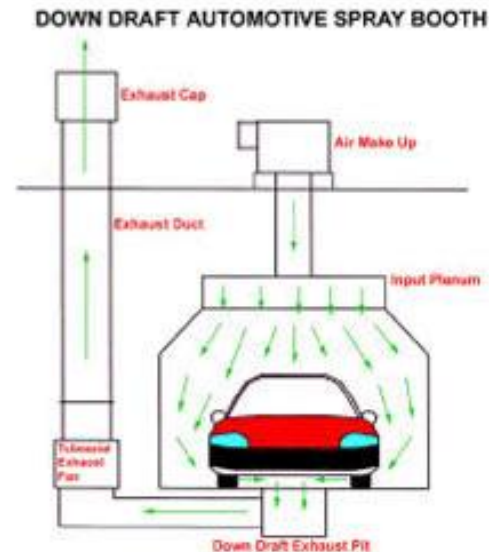
- Includes spray gun or applicator, air supply and pump.

*Design, Operation, and Maintenance Per NFPA 33
Spray Application Using Flammable or Combustible
Materials*



Ventilation/ Exhaust

- Mechanical ventilation is required and designed to NFPA 91 (Exhaust systems for conveying vapours)
- Types can be cross draft and down draft.



NFPA 33- Location

- Operations shall be confined to spray booths, spray rooms, or spray areas.
- Shall not be conducted in any building classified as assembly, educational, institutional, or residential.
 - Exception for rooms that are 2hr fire rated separation and sprinklered.



Electrical Equipment

Spray areas require adherence to the Canadian Electrical Code, Part 1, Sections 18 / 20.



NFPA 33 - Ventilation

Vent and exhaust systems shall conform to NFPA 91

Required to reduce concentration of

- Flammable vapours to $\leq 25\%$ l_{el}
- Combustible dust to $\leq 50\%$ of their minimum explosive content (MEC)

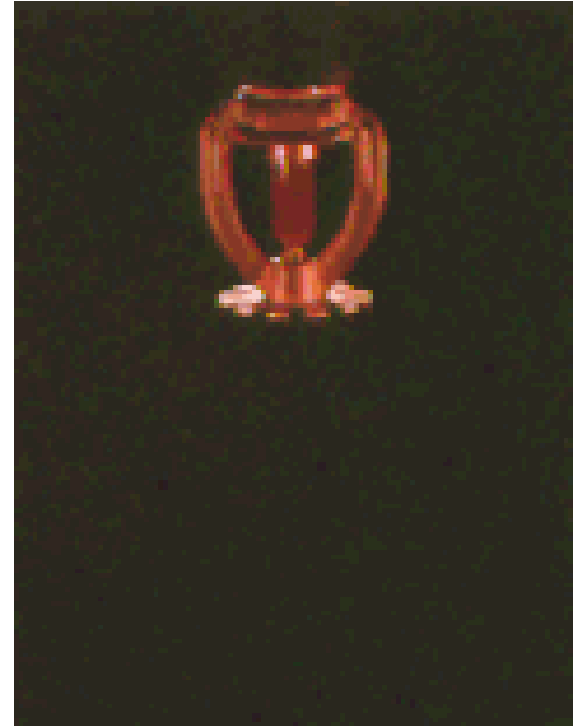
Liquid vapours shall be ducted directly to outside of building.



Fire Protection

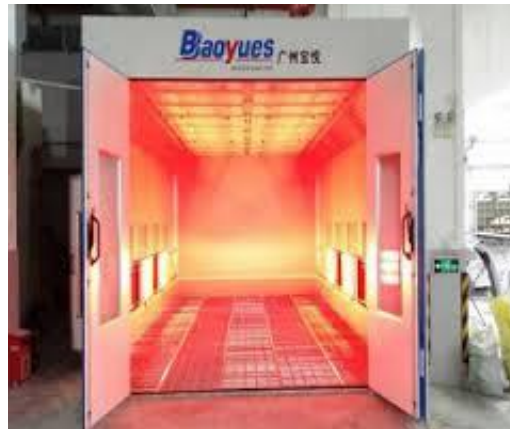
Spray areas, including associated exhaust plenums and exhaust ductwork, any particulate filters, any solvent concentrator units, any recirculation air supply units, and mixing rooms, shall be protected with an approved automatic fire protection system.

- NFPA 13 installed sprinklers.
- Pre-action, deluge, foam-water, or other special protection systems.



Combination Spray/Drying Booths

- Coating applied and cured in same booth.
- Interlocks to be provided to prevent spraying while curing and shut down heaters if person enters.
- Radiant heating permanently attached to walls shall be listed for exposure to flammable vapours.
- High temp interlock to shut down heaters when temp exceeds 93C.



Housekeeping Items

- No storage or combustible construction within 3ft around a spray booth and above.
- Establish maintenance procedures to replace filters before excessive accumulation of deposits restricts air flow.
- Clean combustible residue from inner booth and discard same day.
- Protect sprinkler heads from spray residue with coverings.



Housekeeping Items

- Powered vehicles prohibited in spray area unless all operations are stopped.
- Waste contaminated with flammable liquids to be disposed of in self closing, non combustible container.
- Waste containers containing flammable liquids shall be located in ventilated areas that meet the requirements of Chapter 7.



Dust - From Fire to Deflagration...



Dust - From Fire to Deflagration



How Much Dust is a Hazard?

“>1/8th inch, 5% area or 1000 ft²,
whichever is smaller”

NFPA 664



*Cleaning Rule of Thumb:
Obscures the colour of
the underlying surface.*



Part 5 - Articles Relevant to F1 Occupancy

Section 5.3. Dust-Producing Processes

5.3.1.2. Dust Removal

- 1) Building and machinery surfaces shall be kept clean of accumulations of combustible dusts using cleaning equipment that
 - a) is made of materials that will not create electrostatic charges or sparks,
 - b) is electrically conductive and bonded to ground, and
 - c) except as permitted in Sentence (3), removes the dust to a safe location by vacuum.
- 2) Cleaning equipment required in Sentence (1) that is used in an atmosphere containing combustible dusts shall conform to CSA C22.1, “Canadian Electrical Code, Part I.”



Part 5 - Articles Relevant to F1 Occupancy

5.3.1.3. Dust-Collecting Systems

- 1) Dust-collecting systems shall be provided to prevent the accumulation of dust and keep suspended dusts at a safe concentration inside a *building*.

- 2) A dust-collecting system required in Sentence (1) shall
 - a) be designed in conformance with good engineering practice,
 - b) be made of noncombustible materials, and
 - c) not create sparks upon physical contact in the fan assembly.
(See Note A-5.3.1.3.(2).)



Part 5 - Articles Relevant to F1

Occupancy

5.3.1.5. Bonding and Grounding

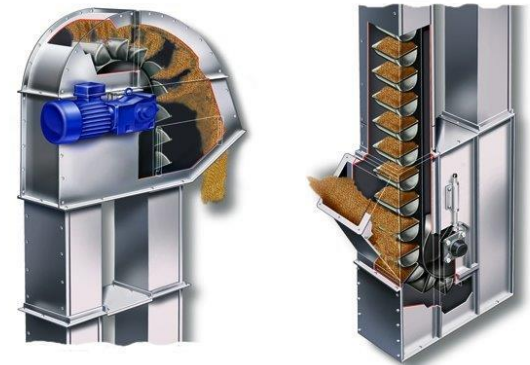
- 1) Electrically conducting parts of conveying systems, dust collectors, dust-producing machines and any equipment capable of accumulating static electricity located in an atmosphere containing *combustible dusts* shall be electrically bonded and grounded.
- 2) Static electricity shall be prevented from accumulating on machines or equipment subject to static electricity buildup by appropriate bonding, grounding and static eliminating devices.



Part 5 - Articles Relevant to F1 Occupancy

5.3.1.7. Explosion Prevention Systems

- 1) In processes where an explosion hazard is present and conditions exist that prevent adequate explosion venting as required in this section, an explosion prevention system shall be provided.



Part 5 - Articles Relevant to F1 Occupancy



5.3.1.8. Electrical Interlocks

- 1) Equipment required to have a dust-collecting system shall be interlocked to prevent it from operating if the dust-collecting system is not in operation.



Part 5 - Articles Relevant to F1 Occupancy



5.3.1.10. Ignition Sources

- 1) Unless controlled in a manner that will not create a fire or explosion hazard, a device, operation or activity that produces open flames, sparks or heat shall not be permitted. (See Note A-4.1.5.2.(1).)



Part 5 - Articles Relevant to F1 Occupancy

5.3.2. Woodworking Operations

5.3.2.2. Shavings and Sawdust Collection

- 1) Loose shavings and sawdust shall be collected at frequent intervals and deposited in receptacles described in Article 2.4.1.3.



Part 5 - Articles Relevant to F1 Occupancy

5.3.3. Grain Handling and Storage Facilities

5.3.3.2. Conveying Equipment

- 1) Belt conveyors and bucket elevator legs shall be equipped with safety devices to
 - a) detect excessive misalignment, blockage, slipping or slow-down of the conveying equipment, and
 - b) prevent conditions described in Clause (a) from creating a fire or explosion hazard by
 - i) alerting personnel trained in taking appropriate actions, or
 - ii) automatically stopping the conveying equipment



Part 5 - Articles Relevant to F1 Occupancy

Section 5.4. Special Processes Involving Flammable and Combustible Liquids and Materials

5.4.1. Baking and Drying Processes

5.4.1.2. Design, Operation and Maintenance

- 1) The design, operation and maintenance requirements relating to baking and drying processes shall conform to NFPA 86, "Ovens and Furnaces."

5.4.2. Dry Cleaning Plants

5.4.2.1. Dry Cleaning Plants

- 1) Dry cleaning plants shall conform to NFPA 32, "Dry cleaning Plants."



Part 5 - Articles Relevant to F1

Occupancy

5.4.4. Floor Finishing

5.4.4.4. Sources of Ignition

- 1) All mechanical systems, electric motors and other equipment that might be a source of ignition shall be shut down, and smoking and the use of open flames shall be prohibited during the application of Class I liquids and for at least 1 h after such application.

5.4.5. Spray Coating Processes

5.4.5.2. Design, Operation and Maintenance

- 1) The design, operation and maintenance requirements relating to spray coating processes shall conform to NFPA 33, "Spray Application Using Flammable or Combustible Materials."

5.4.6. Dipping and Coating Processes

5.4.6.2. Design, Operation and Maintenance

- 1) The design, operation and maintenance requirements relating to dipping and coating processes shall conform to NFPA 34, "Dipping, Coating, and Printing Processes Using Flammable or Combustible Liquids."

5.4.7. Production of Ethanol for Fuel (MFC 2015)

5.4.7.1. Application

- 2) For the purpose of applying this Subsection, ethanol concentrations greater than or equal to 20% by volume of ethanol in water shall be considered as a *flammable liquid*.



Safety Plans - Articles Relevant to F1 Occupancy

2.8.1.1. Application

- 1) Fire emergency procedures conforming to this Section shall be provided for
 - b) every *building required by the MBC to have a fire alarm system*,
 - c) storage areas required to have a fire safety plan in conformance with **Articles 3.2.2.5.** and **3.3.2.9.**,
 - d) areas where *flammable liquids or combustible liquids are stored or handled*, in conformance with Article **4.1.5.5.**, and
 - e) areas where hazardous processes or operations occur, in conformance with Article **5.1.5.1**



Safety Plans - Articles Relevant to F1 Occupancy

3.2.2.5. Fire Safety Plan

- 2) The fire safety plan shall identify
 - a) the product classifications, as described in Sentence 3.2.1.1.(1), for each part of the *building* where products of different classification are stored,
 - b) the method of storage, including aisle widths for *rack* storage,
 - c) the maximum permitted height of storage for the *building* or part of the *building*, if different,
 - d) the maximum permitted size of *individual storage areas*, and
 - e) in *sprinklered buildings*, the sprinkler system design criteria, inside and outside hose allowances, and results of the benchmark sprinkler system main drain and water flow tests.
- 3) The storage method and maximum height of storage as described in Clauses (2)(b) and (c) shall be posted in the storage area.
- 4) Signs required in Sentence (3) shall have
 - a) a minimum dimension of 200 mm, and
 - b) letters not less than 25 mm high.
- 5) When the products stored include Group A plastics, rubber products, Level 2 or 3 aerosols, or *dangerous goods*, the fire safety plan shall identify the location and maximum quantity of product that is being stored.



Safety Plans - Articles Relevant to F1 Occupancy

4.1.5.5. Emergency Planning

- 1) Except as provided in Sentence (2), emergency planning measures conforming to Section 2.8. shall be provided for all *buildings, parts of buildings and open areas* described in Article 4.1.1.1.
- 2) The fire safety plan required as part of the emergency planning measures in Sentence (1) shall be retained on site for reference by the *authority having jurisdiction* and personnel



Safety Plans - Articles Relevant to F1 Occupancy

5.1.5.1. Fire Safety Plan

- 2) In addition to the information required in Section 2.8., the fire safety plan shall include
- a) the location and identification of storage and use areas for specific products, in conformance with Article 3.2.2.5., and
 - b) the names, addresses and telephone numbers of persons to be contacted in case of fire during non-operating hours.



Fire Inspections of F1 Occupancies

Assessing The Fire Safety Plan

- Is the Fire Safety Plan still appropriate?
- Does the Fire Safety Plan need to be revised?
- The Fire Safety Plan should be reviewed at a minimum every 2 years at inspection time.
- If the fire hazardous conditions change does the Fire Safety Plan need to be reviewed?



Fire Inspections of F1 Occupancies

Assessing The Fire Safety Plan

- Do the staff have an awareness of the F1 hazards?
- Do ALL the occupants know what to do in an emergency?
- Are there any staff trained to respond to a hazardous situation?
- Is this noted in the Fire Safety Plan?
- Are the staff adequately trained as expected in the Fire Safety Plan?
- Is there new staff training and awareness provided?



Fire Inspections of F1 Occupancies

Legal Responsibility of Building Owners

To carry out the provisions of the MFC {MFC Div C
2.2.1.1(1)}

MFC Div C

2.2.1.1. Responsibility

- 1) Unless otherwise specified, the owner or the owner's authorized agent shall be responsible for carrying out the provisions of this Code.



Obligations of Building Owners

- To report any “Changes of Use” or “Modifications’ within building to the AHJ
- To report to any “Changes in Operations” (including any new materials or significant quantity changes) to the AHJ
- To properly maintain life safety systems such as exit, sprinklers and fire alarm systems



Fire Inspections of F1 Occupancies

Keys to a Successful Fire Inspection

- Being aware of and understanding the specific fire hazards at the building site.
- Maintaining open communication with the Supervisory Staff.
- Finding effective solutions for non-compliance matters (by reducing fire hazards and/or if necessary by increasing the life safety systems).
- Know your codes and do not guess - research



First Step for a F1 Occupancy Inspection

1. Pre-Inspection Steps

- a) Client Contact
- b) Pre-Inspection Review
- c) Fire Hazard Assessment
- d) Fire Code Review
- e) Cost associated for inspection



Second Step for a F1 Occupancy Inspection

2. Field Inspection

- a) Pre-Trip Checklist
- b) Preliminary Meeting with Supervisory Staff
- c) Walk Thru Visual Inspection with Supervisory Staff
- d) Review SDS documents
- e) Post-Walk Thru Meeting with Supervisory Staff and Client



Third Step for a F1 Occupancy Inspection

3. Post Inspection Steps

- a) Follow-Up Research
- b) Internal Staff / Peer Review of Inspection
- c) Inspection Report Preparation, Distribution and Filing
- d) Follow-Up for Compliance



MESC Support



Manitoba Emergency Services College courses:

- Fire Inspector Level I and Level II
- High Hazard Inspections

On Line Support:

- Inspection check sheets



Questions?



Neil Billedeau
Program Manager- Fire Safety Inspection
neil.billedeau@gov.mb.ca

