OSC | 11
Ohio Safety Congress & Expo

# #144 – Fire suppression requirements for flammable/combustible liquids

Nicholas Mariano, LPE, NFPA certified

Wednesday, March 30, 2011
1 to 2 p.m.

Ohio | Bureau of Workers' Compensation

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## Sebench Engineering Inc.
## NFPA 25

**Inspecting, Testing and Maintaining**
**Fire Sprinkler Systems:**
**An Overview of**
**NFPA 25 Requirements**

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## Today's Focus

You will learn:

- The responsibilities of building owners for maintaining their sprinkler systems.
- Definitions from the standard that outline the role of the building owner and the inspector.
- The basic requirements for properly inspecting and testing sprinkler systems and their components.
- The steps that should be taken when system deficiencies and impairments are found – and the additional tests required when they're corrected.
- The difference between an internal pipe inspection and an obstruction investigation.

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## Why Should I Care?

2007 Ohio Fire section 901.6.1 states: Fire Protection Systems shall be inspected, tested and maintained in accordance with:

NFPA 25: Water-Based Fire Protection Systems

It's The Law!

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## NFPA 25 –Maintaining Your Fire Sprinkler System

*"History has shown that the performance reliability of a water-based fire protection system under fire-related conditions increases where comprehensive inspection, testing, and maintenance procedures are enforced."*

Diligence during an inspection is important.

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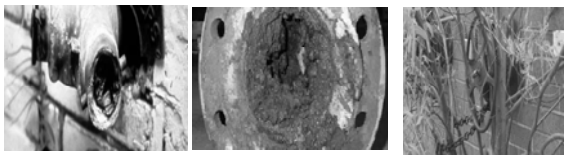
## Is this Why?



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**NFPA 25: Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems – 2008 Edition**

- Chapter 1: Scope, Purpose, and Application
- Chapter 3: Definition
- Chapter 4: General Requirements
- Chapter 5: Sprinkler Systems
- Chapter 13: Valves, Valve Components & Trim
- Chapter 14: Obstruction Investigation
- Chapter 15: Impairments

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## Chapter 1 - Administration

**1.2* Purpose.**

The purpose of this document is to provide requirements that ensure a reasonable degree of protection for life and property from fire through minimum inspection, testing, and maintenance methods for water-based fire protection systems. In those cases, history has shown that the performance reliability of a water based fire protection system under fire-related conditions increases where comprehensive inspection, testing, and maintenance procedures are enforced.

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## Chapter 3 - Definitions

**3.2.2*** Authority Having Jurisdiction (AHJ). An organization, office, or individual responsible for enforcing the requirements of a code or standard, or for approving equipment, materials, an installation, or a procedure.

**3.2.4** Shall indicate a mandatory requirement.

**3.2.5** Should indicate a recommendation or that which is advised but not required.

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## Chapter 3 - Definitions

**3.3.17.1 Emergency Impairment.** A condition where a water-based fire protection system or portion thereof is out of order due to an unexpected occurrence, such as a ruptured pipe, an operated sprinkler, or an interruption of the water supply to the system.

**3.3.17.2 Preplanned Impairment**. A condition where a water-based fire protection system or a portion thereof is out of service due to work that has been planned in advance, such as revisions to the water supply or sprinkler system piping.

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## Chapter 3 - Definitions

**3.3.18 Inspection.** A visual examination of a system or portion thereof to verify that it appears to be in operating condition and is free of physical damage.

**3.3.34 Testing.** A procedure used to determine the status of a system as intended by conducting periodic physical checks on waterbased fire protection systems such as waterflow tests, fire pump tests, alarm tests, and trip tests of dry pipe, deluge, or preaction valves. These tests follow up on the original acceptance test at intervals specified in the appropriate chapter of this standard.

**3.3.20 Maintenance.** In water-based fire protection systems, work performed to keep equipment operable or to make repairs.

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## Chapter 3 - Definitions

**3.3.19 Inspection, Testing, and Maintenance Service**. A service program provided by a qualified contractor or qualified property owner's representative in which all components unique to the property's systems are inspected and tested at the required times and necessary maintenance is provided. This program includes logging and retention of relevant records.

**3.3.28 Qualified.** A competent and capable person or company that has met the requirements and training for a given field acceptable to the AHJ.

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## Chapter 4 - General Requirements

**4.1.1* Responsibility for Inspection, Testing, and Maintenance.**

The responsibility for properly maintaining a water-based fire protection system shall be that of the owner of the property.

**A.4.1.1** Inspection, testing, and maintenance can be permitted to be contracted with an inspection, testing, and maintenance service.

**4.1.2.2** These tasks shall be performed by personnel who have developed competence through training and experience.

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## Chapter 4 - General Requirements

**4.1.4* Corrections and Repairs.** The property owner or occupant shall promptly correct or repair deficiencies, damaged parts, or impairments found while performing the inspection, test, and maintenance requirement of this standard.

**4.1.4.1*** Corrections and repairs shall be performed by qualified maintenance personnel or a qualified contractor.

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## Chapter 4 - General Requirements

**4.1.5.1** The evaluation shall consider factors that include, but are not limited to, the following:

1) Occupancy changes such as converting office or product space into warehousing.
2) Process or material changes such as metal stamping to molded plastics.
3) Building revisions such as relocated walls, added mezzanine and ceilings added below sprinklers.
4) Removal of heating systems in spaces with piping subject to freezing.

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## Chapter 4 - General Requirements

**4.1.6 Addressing Changes in Hazard**. Where changes in the occupancy, hazard, water supply, storage commodity, storage arrangement, building modification, or other condition that affects the installation criteria of the system are identified, the property owner or occupant shall promptly take steps, such as contacting a qualified contractor, consultant, or engineer, and the authority having jurisdiction, to evaluate the adequacy of the installed system in order to protect the building or hazard in question.

**4.1.6.1** Where the evaluation reveals a deficiency causing a threat to life or property, the property owner shall make appropriate corrections All requirements of the authority having jurisdiction shall be followed.

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## 2007 Ohio Fire Code 104.7.2 Technical Assistance

To determine the acceptability of technologies, processes, products, facilities, materials and uses attending the design, operation or use of a building or premises subject to inspection by the fire code official, the fire code official is authorized to require the owner or agent to provide, without charge to the jurisdiction, a technical opinion and report. The opinion and report shall be prepared by a qualified engineer, specialist, laboratory or fire safety specialty organization acceptable to the fire code official and shall analyze the fire safety properties of the design, operation or use of the building or premises and the facilities and appurtenances situated thereon, to recommend necessary changes. The fire code official is authorized to require design submittals to be prepared by, and bear the stamp of, a registered design professional.

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## Chapter 4 - General Requirements

**4.4 Records.**

**4.4.1*** Records shall be made for all inspections, tests, and maintenance of the system and its components and shall be made available to the authority having jurisdiction upon request.

**4.4.3*** Records shall be maintained by the property owner.

**4.4.4** As-built system installation drawings, hydraulic calculations, original acceptance test records, and device manufacturer's data sheets shall be retained for the life of the system.

**4.4.5** Subsequent records shall be retained for a period of 1 year after the next inspection, test, or maintenance of tha required by the standard.

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## Chapter 5 - Sprinkler Systems

**5.2* Inspection.**

**5.2.1 Sprinklers.**

**5.2.1.1*** Sprinklers shall be inspected from the floor level annually.

**5.2.1.1.1*** Sprinklers shall not show signs of leakage; shall be free of corrosion, foreign materials, paint, and physical damage; and shall be installed in the proper orientation (e.g., upright, pendent, or sidewall).

**5.2.1.1.2** Any sprinkler shall be replaced that has signs of leakage; is painted, other than by the sprinkler manufacturer, corroded, damaged, or loaded; or in the improper orientation.

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## Could this be why?

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## Well, do I need attention?

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## Is something wrong with these?

**5.2* Inspection.**

**5.2.1 Sprinklers.**

**5.2.1.1.3 Glass bulb sprinklers shall be replaced if the bulbs have emptied**.

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## Chapter 5 - Sprinkler Systems

**5.2* Inspection.**

**5.2.3* Hangers and Seismic Braces. Sprinkler pipe hangers and seismic braces** shall be inspected annually from the floor level.

**5.2.3.1 Hangers and seismic braces shall not be damaged or loose.**

**5.2.5 Buildings. Annually, prior to the onset of freezing weather,** buildings with wet pipe systems shall be inspected to verify that windows, skylights, doors, ventilators, other openings and closures, blind spaces, unused attics, stair towers, roof houses, and low spaces under buildings do not expose water-filled sprinkler piping to freezing and to verify that adequate heat [minimum 40°F (4.4°C)] is available.

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## Chapter 5 - Sprinkler Systems

**5.3 Testing.**

**5.3.1* Sprinklers.**

**5.3.1.1*** Where required by this section, sample sprinklers shall be submitted to a recognized testing laboratory acceptable to the authority having jurisdiction for field service testing.

**5.3.1.2*** A representative sample of sprinklers for testing per **5.3.1.1.1** shall consist of a minimum of not less than four sprinklers or 1 percent of the number of sprinklers per individual sprinkler sample, whichever is greater.

**5.3.1.3** Where one sprinkler within a representative sample fails to meet the test requirement, all sprinklers within the area represented by that sample shall be replaced.

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## Chapter 5 - Sprinkler Systems

**5.3 Testing.**

**5.3.1* Sprinklers.**

**5.3.1.1.1 Where sprinklers have been in service for 50 years,** they shall be replaced or representative samples from one or more sample areas shall be tested. Test procedures shall be repeated at 10-year intervals.

**5.3.1.1.1.1 Sprinklers manufactured prior to 1920 shall be replaced.**

**5.3.1.1.1.4 Where sprinklers have been in service for 75 years,** they shall be replaced or representative samples from one or more sample areas shall be submitted to a recognized testing laboratory acceptable to the authority having jurisdiction for field service testing. Test procedures shall be repeated at 5-year intervals.

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## Chapter 5 - Sprinkler Systems

**5.3 Testing.**

**5.3.1* Sprinklers.**

**5.3.1.1.1.2 Sprinklers** manufactured using fast response elements that have been in service for 20 years shall be replaced, or representative samples shall be tested. They shall be retested at 10-year intervals.

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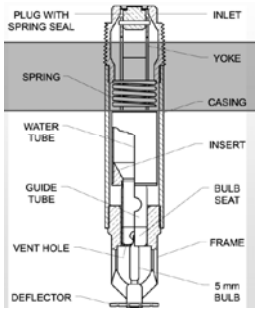
## Chapter 5 - Sprinkler Systems

**5.3 Testing.**

**5.3.1*** Sprinklers

**5.3.1.1.1.5*** Dry sprinklers that have been in service for 10 years shall be replaced, or representative samples shall be tested. They shall be retested at 10-year intervals.




## Chapter 5 - Sprinkler Systems

**5.3 Testing.**

**5.3.1* Sprinklers**

**5.3.1.1.1.3*** Representative samples of solder-type sprinklers with a temperature classification of extra high 325°F (163°C) or greater that are exposed to semi continuous to continuous maximum allowable ambient temperature conditions shall be tested at 5-year intervals.

**5.3.1.1.2*** Where sprinklers are subjected to harsh environments, including corrosive atmospheres and corrosive water supplies, on a 5-year basis, sprinklers shall either be replaced or representative sprinkler samples shall be tested.

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## Chapter 13 - Valves, Components & Trim

**13.2.5* Main Drain Test.** A main drain test shall be conducted annually at each water-based fire protection system riser to determine whether there has been a change in the condition of the water supply piping and control valves. (See also 13.3.3.4.)

**13.2.5.1** Systems where the sole water supply is through a backflow preventer and/or pressure reducing valves, the main drain test of at least one system downstream of the device shall be conducted on a quarterly basis.

**13.2.5.2** When there is a 10 percent reduction in full flow pressure when compared to the original acceptance test or previously performed tests, the cause of the reduction shall be identified and corrected if necessary.

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## Chapter 13 - Valves, Components & Trim

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## Chapter 13 - Valves, Components & Trim

**13.4.2 Check Valves**

**13.4.2.1** Inspection. Valves shall be inspected internally every 5 years to verify that all components operate correctly, move freely, and are in good condition.

**13.4.2.2** repaired, or replaced as necessary in accordance with the manufacturer's instructions.

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## Chapter 13 - Valves, Components & Trim

**13.4.4 Dry Pipe Valves/Quick-Opening Devices.**

**13.4.4.1 Inspection.**

**13.4.4.1.5** The interior of the dry pipe valve shall be inspected annually when the trip test is conducted.

**13.4.4.1.6** Strainers, filters, and restricted orifices shall be inspected internally every 5 years unless tests indicate a greater frequency is necessary.

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## Chapter 13 - Valves, Components & Trim

**13.4.4 Dry Pipe Valves/Quick-Opening Devices.**

**13.4.4.2 Testing.**

**13.4.4.2.9** Dry pipe systems shall be tested once every 3 years for air leakage, using one of the following test methods:

1) A pressure test at 40 psi for two hours. The system shall be permitted to lose up to 3 psi (0.2 bar) during the duration of the test. Air leaks shall be addressed if the system loses more than 3 psi (0.2 bar) during this test.
2) With the system at normal system pressure, shut off the air source (compressor or shop air) for 4 hours.

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## Chapter 13 -Valves, Components & Trim

**13.5 Pressure Reducing Valves and Relief Valves.**

**13.5.1 Inspection** Sprinkler pressure reducing valves shall be inspected and and Testing of Sprinkler Pressure Reducing Valves tested as described in 13.5.1.1 and 13.5.1.2.

**13.5.1.2*** A full flow test shall be conducted on each valve at 5-year intervals and shall be compared to previous test results.

**13.5.1.3** A partial flow test adequate to move the valve from its seat shall be conducted annually.

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## Chapter 13 - Valves, Components & Trim

**13.6 Backflow Prevention Assemblies.**

**13.6.2 Testing.**

**13.6.2.1*** All backflow preventers installed in fire protection system piping shall be tested annually in accordance with the following:

1) A forward flow test shall be conducted at the designed flow rate, including hose stream demand, of the system, where hydrants or inside hose stations are located downstream of the backflow preventer.
2) A backflow performance test, as required by the authority having jurisdiction, shall be conducted at the completion of the forward flow test.

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## Chapter 13 - Valves, Components & Trim

**13.7 Fire Department Connections.**

**13.7.1** Fire department connections shall be inspected quarterly. The inspection shall verify the following:

1) The fire department connections are visible and accessible.
2) Couplings or swivels are not damaged and rotate smoothly.
3) Plugs or caps are in place and undamaged.
4) Gaskets are in place and in good condition.
5) Identification signs are in place.

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## Chapter 14 -Obstruction Investigation

**14.1 General.**

This chapter shall provide the minimum requirements for conducting investigations of fire protection system piping for possible sources of materials that could cause pipe blockage.

**14.2* Obstruction Investigation and Prevention.**

14.2.1 An inspection of piping and branch line conditions shall be conducted every 5 years by opening a flushing connection at the end of one main and by removing a sprinkler toward the end of one branch line for the purpose of inspecting for the presence of foreign organic and inorganic material.

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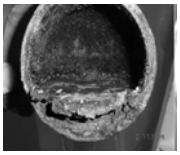
## Chapter 14 - Obstruction Investigation



*If a fire occurs, the system may be too plugged to control the fire.*

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## Chapter 14 - Obstruction Investigation

Pin Hole Leaks Caused By MIC

*Rust spots like these on pipe are good indicators that MIC can be present. Testing is very reasonable!*

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## Chapter 14 - Obstruction Investigation

**14.2.2*** An obstruction investigation shall be conducted for system or yard main piping wherever any of the following conditions exist:

1) Defective intake for fire pumps taking suction from open bodies of water.
2) The discharge of obstructive material during routine water tests.
3) Foreign materials in fire pumps, in dry pipe valves, or in check valves.
4) Foreign material in water during drain tests or plugging of inspector's test connection(s).
5) Plugged sprinklers.

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## Chapter 14 - Obstruction Investigation

6) Plugged piping in sprinkler systems dismantled during building alterations.
7) Failure to flush yard piping or surrounding public mains following new installations or repairs
8) A record of broken public mains in the vicinity.
9) Abnormally frequent false tripping of a dry pipe valve(s).
10) A system that is returned to service after an extended shutdown (greater than 1 year).
11) There is reason to believe that the sprinkler system contains sodium silicate or highly corrosive fluxes in copper systems

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## Chapter 14 - Obstruction Investigation

11) A system has been supplied with raw water via the fire department connection.
12) Pinhole leaks.
13) A 50 percent increase in the time it takes water to travel to the inspector's test connection from the time the valve trips during a full flow trip test of a dry pipe sprinkler system when compared to the original system acceptance test.

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## Chapter 15 - Impairments

**15.1 General.**

This chapter shall provide the minimum requirements for a waterbased fire protection system impairment program. Measures shall be taken during the impairment to ensure that increased risks are minimized and the duration of the impairment is limited.

**15.2 Impairment Coordinator.**

**15.2.1** The property owner shall assign an impairment coordinator to comply with the requirements of this chapter.

**15.2.2** In the absence of a specific designee, the property owner shall be considered the impairment coordinator.

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## 2007 Fire Code section 901.7.1:

The Building owner shall assign an impairment coordinator to comply with the requirements of this section. In the absence of a specific designee, the owner shall be considered the impairment coordinator.

- Tag Required
- Placement of Tag
- Preplanned Impairment Program
- Emergency Impairment
- Restoring system to service

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## Chapter - 15 Impairments

**15.3 Tag Impairment System.**

**15.3.1*** A tag shall be used to indicate that a system, or part thereof, has been removed from service.

**15.3.2*** The tag shall be posted at each fire department connection and system control valve, indicating which system, or part thereof, has been removed from service.

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## Chapter 15 - Impairments

**15.5* Preplanned Impairment Programs.**

**15.5.1** All preplanned impairments shall be authorized by the impairment coordinator.

**15.5.2** Before authorization is given, the impairment coordinator shall be responsible for verifying that the following procedures have been implemented:

1) The extent and expected duration of the impairment have been determined.
2) The areas or buildings involved have been inspected and the increased risks determined.

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## Chapter 15 - Impairments

**15.5* Preplanned Impairment Programs**.

3) Recommendations have been submitted to management or the property owner/manager. Where a required fire protection system is out of service for more than 10 hours in a 24-hour period, the impairment coordinator shall arrange for one of the following:

a) Evacuation of the building or portion of the building affected by the system out of service

b)* An approved fire watch

c) * Establishment of a temporary water supply

d)* Establishment and implementation of an approved program to eliminate potential ignition sources and limit the amount of fuel available to the fire

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## Chapter 15 - Impairments

**15.6 Emergency Impairments.**

**15.6.1** Emergency impairments include but are not limited to system leakage, interruption of water supply, frozen or ruptured piping, and equipment failure.

**15.6.2** When emergency impairments occur, emergency action shall be taken to minimize potential injury and damage.

**15.6.3** The coordinator shall implement the steps outlined in Section15.5.

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## How do You handle, store, or use Flammable and Combustible Liquids

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## What is a Flammable Liquid?

**FLAMMABLE LIQUID.** A liquid having a closed cup flash point below 100°F (38°C). Flammable liquids are further categorized into a group known as Class I liquids. The Class I category is subdivided as follows:

**Class IA.** Liquids having a flash point below 73°F (23°C) and having

**Class IB.** Liquids having a *flash point below 73°F (23°C)*and having a *boiling point at or above 100°F (38°C).*a *boiling point below 100°F (38°C).*

**Class IC.** Liquids having a *flash point at or above 73°F* (23°C) and below 100°F (38°C).

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## What is a Combustible Liquid?

**COMBUSTIBLE LIQUID.** A liquid having a closed cup flash point at or above 100°F (38°C). Combustible liquids shall be subdivided as follows:

**Class II.** *Liquids having a closed cup flash point at or above 100°F (38°C) and below 140°F (60°C).*

**Class IIIA.** *Liquids having a closed cup flash point at or above 140°F (60°C) and below 200°F (93°C).*

**Class IIIB.** *Liquids having closed cup flash points at or above 200°F (93°C).*

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**2009 INTERNATIONAL FIRE CODE®HAZARDOUS MATERIALS GENERAL PROVISIONS**
**TABLE 2703.1.1(1)**
**MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A PHYSICAL HAZARD a, j, m, n, p**

| MATERIAL | Class | GROUP WHEN THE MAXIMUM ALLOWABLE QUANTITY IS EXCEEDED | Storage b | USE-CLOSED SYSTEMS b | USE-OPEN SYSTEMS b |
|---|---|---|---|---|---|
| | | | Liquid gallons | Liquid gallons | Liquid gallons |
| Combustible Liquid c, i | II | H-2 or H-3 | 120 d, e | 120 d, e | 30 d |
| | IIIA | H-2 or H-3 | 330 d, e | 330 d, e | 80 d |
| | IIIB | Not Applicable | 13,200 c, f | 13,200 c, f | 3,330 f |
| Flammable Liquid c | IA | H-2 | 30 d, e | 30 d, e | 10 d |
| | IB or IC | H-3 | 120 d, e | 120 d, e | 30 d |
| Flammable liquid, combination (IA, IB, IC) | Not Applicable | H-2 | 120 d, e, h | 120 d, h | 30 d, h |
| | | H-3 | | | |

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## Foot Notes for Table 2703.1.1(1)

a. For use of control areas, see Section 2703.8.3.
b. The aggregate quantity in use and storage shall not exceed the quantity listed for storage.
c. The quantities of alcoholic beverages in retail and wholesale sales occupancies shall not be limited providing the liquids are packaged in individual containers not exceeding 1.3 gallons. In retail and wholesale sales occupancies, the quantities of medicines, foodstuffs, consumer or industrial products, and cosmetics containing not more than 50 percent by volume of water-miscible liquids with the remainder of the solutions not being flammable shall not be limited, provided that such materials are packaged in individual containers not exceeding 1.3 gallons.
d. Maximum allowable quantities shall be increased 100 percent in buildings equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1.
Where Note e also applies, the increase for both notes shall be applied accumulatively.. Maximum allowable quantities shall be increased 100 percent when stored in approved storage cabinets, day boxes, gas cabinets, exhausted enclosures, or listed safety cans. Listed safety cans shall be in accordance with Section 2703.9.10. Where Note d also applies, the increase for both notes shall be applied accumulatively.
f. Quantities shall not be limited in a building equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1.
g. Allowed only in buildings equipped throughout with an approved automatic sprinkler system.
h. Containing not more than the maximum allowable quantity per control area of Class IA, Class IB or Class IC flammable liquids.
i. The maximum allowable quantity shall not apply to fuel oil storage complying with Section 603.3.2.
j. Quantities in parenthesis indicate quantity units in parenthesis at the head of each column.
k. A maximum quantity of 200 pounds of solid or 20 gallons of liquid Class 3 oxidizers is allowed when such materials are necessary for maintenance purposes, operation or sanitation of equipment when the storage containers and the manner of storage are approved.
l. Net weight of pyrotechnic composition of the fireworks. Where the net weight of the pyrotechnic composition of the fireworks is not known, 25 percent of the gross weight of the fireworks including packaging shall be used.
m. For gallons of liquids, divide the amount in pounds by 10 in accordance with Section 2703.1.2.
n. For storage and display quantities in Group M and storage quantities in Group S occupancies complying with Section 2703.11, see Table 2703.11.1.
o. Densely-packed baled cotton that complies with the packing requirements of ISO 8115 shall not be included in this material class.
p. The following shall not be included in determining the maximum allowable quantities:
1. Liquid or gaseous fuel in fuel tanks on vehicles.
2. Liquid or gaseous fuel in fuel tanks on motorized equipment operated in accordance with this code.
3. Gaseous fuels in piping systems and fixed appliances regulated by the *International Fuel Gas Code*.
4. Liquid fuels in piping systems and fixed appliances, regulated by the *International Mechanical Code*

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**TABLE 2703.8.3.2**
**DESIGN AND NUMBER OF CONTROL AREAS**

| Floor Level | | Percentage of the Maximum Allowable Quantity per Control Area | Number of Control Areas per Floor | Fire-Resistance Rating for Fire Barriers in Hours b |
|---|---|---|---|---|
| Above grade plane | Higher than 9 | 5 | 1 | 2 |
| | 7-9 | 5 | 2 | 2 |
| | 4-6 | 12.5 | 2 | 2 |
| | 3 | 50 | 2 | 1 |
| | 2 | 75 | 3 | 1 |
| | 1 | 100 | 4 | 1 |
| Below grade plane | 1 | 75 | 3 | 1 |
| | 2 | 50 | 2 | 1 |
| | Lower than 2 | Not Allowed | Not Allowed | Not Allowed |

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## Footnotes to Table 2703.8.3.2

a. Percentages shall be of the maximum allowable quantity per control area shown in Tables 2703.1.1(1) and 2703.1.1(2), with all increases allowed in the footnotes to those tables.

b. Fire barriers shall include walls and floors as necessary to provide separation from other portions of the building.

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## Container Type

| Container Type | Flammable Liquids | | | Combustible Liquids | |
|---|---|---|---|---|---|
| | IA | IB | IC | II | III |
| Metal(other than DOT )or approved plastic | 1pt-1gal | 1 qt.-5 gal | 1 gal-5 gal | 1 gal | 5 gal |
| Safety Cans | 2 gal | 5 gal | 5 gal | 5 gal | 5 gal |
| Metal Drums (DOT Spec.) | 60 gal | 60 gal | 60 gal | 60 gal | 60 gal |
| Approved Portable tanks | 660 gal | 660 gal | 660 gal | 660 gal | 660 gal |

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## Flammable Liquid Cabinets

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## Flammable Liquid Storage Houses

- Factory Mutual Approval label
- Leak-Proof Secondary Containment
- Gravity air vents to allow 6 air changes per hour
- Chemical, Weather, and UV Resistant 2-Part Coating Inside and Out
- Removable Steel Floor Grating provides full access to Secondary Containment
- Static Grounding System
- Seismic Bolt-Down Plates
- Open Access for Forklift Offloading/Relocation
- DOT metal flip placard, NFPA 704 Hazard Rating Signs

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## Any Questions?

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