



# CODE CORNER

## ABOUT CODE CORNER

CCFS would like to remind you to check with your local "Authority Having Jurisdiction (AHJ)" for questions and opinions concerning your local Fire and Building Codes. The information contained in this article is supplied as a courtesy by the International Code Council (ICC) and is based on the International Fire and Building Codes and their respective commentaries. Your local codes or ordinances may vary.

## Chapter 9 Fire Protection Systems

The requirements of Chapter 9 are just one aspect of the overall fire protection system of a building or structure. All fire protection requirements contained in the code must be considered as a package or overall system. Noncompliance with any part of the overall system may cause other parts of the system to fail, which may result in an increased loss of life and property from the reduced level of protection.

Every effort must be made to verify the proper design and installation of a given fire protection system, especially those that result in construction alternatives and other code trade-offs. The requirements in Chapter 9 are active fire safety provisions. They are directed at containing and extinguishing a fire once it has erupted. This chapter parallels and duplicates much of Chapter 9 in the International Building Code® (IBC®). The International Fire Code® (IFC®), however, contains additional specific provisions that are applicable only to existing buildings. The IFC also contains periodic testing criteria that are not duplicated in the IBC. Proper testing, inspection and maintenance of the various systems are critical to establish the reliability of the system. Additionally, Chapter 9 references and adopts numerous NFPA standards, including the acceptance testing criteria within the standard. The referenced standards will also contain more specific design and installation criteria than are found in this chapter. As noted in Section 102.6, where differences occur between code requirements and the referenced standard, the code provisions apply.

### Purpose

Fire protection systems may serve one or more purposes in providing adequate protection from fire. Chapter 9 prescribes the minimum requirements for an active system or systems of fire protection to perform the following functions: to detect a fire; to alert the occupants or fire department of a fire emergency; to control smoke and to control or extinguish the fire. Generally, the requirements are based on the occupancy, the height and the area of the building, because these are the factors that most affect fire-fighting capabilities and the relative hazard of a specific space or area.

901.2 Construction documents. The fire code official shall have the authority to require construction documents and calculations for all fire protection systems and to require permits be issued for the installation, rehabilitation or modification of any fire protection system. Construction documents for fire protection systems shall be submitted for review and approval prior to system installation.

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901.4.2 Nonrequired fire protection systems. Any fire protection system or portion thereof not required by this code or the International Building Code shall be allowed to be furnished for partial or complete protection provided such installed system meets the requirements of this code and the International Building Code.

- A building owner or designer may elect to install a fire protection system that is not required in the code. Even though such a system is not required, it must comply with the applicable requirements of Chapter 9. This requirement is based on the concept that any fire protection system not installed as required by the code is lacking because it could give a false impression of properly installed protection.

901.4.4 Appearance of equipment. Any device that has the physical appearance of life safety or fire protection equipment but that does not perform that life safety or fire protection function, shall be prohibited.

- All required or provided life safety or fire protection-related equipment must continue in use and be maintained to meet the requirements in effect at the time of the original installation. Nonrequired equipment that has been taken out of service or cannot function as intended must be dismantled and removed to prevent creating a false impression of protection.

901.5 Installation acceptance testing. Fire detection and alarm systems, fire-extinguishing systems, fire hydrant systems, fire standpipe systems, fire pump systems, private fire service mains and all other fire protection systems and appurtenances thereto shall be subject to acceptance tests as contained in the installation standards and as approved by the fire code official. The fire code official shall be notified before any required acceptance testing.

901.6.1 Standards. Fire protection systems shall be inspected, tested and maintained in accordance with the referenced standards listed in Table 901.6.1.

- Specific requirements related to inspection practices, testing schedules and maintenance procedures are dependent on the type of fire protection system and its corresponding referenced NFPA standard as indicated in Table 901.6.1.

TABLE 901.6.1

FIRE PROTECTION SYSTEM MAINTENANCE STANDARDS  
SYSTEM STANDARD

- Portable fire extinguishers NFPA 10
- Carbon dioxide fire-extinguishing system NFPA 12
- Halon 1301 fire-extinguishing systems NFPA 12A
- Dry-chemical extinguishing systems NFPA 17
- Wet-chemical extinguishing systems NFPA 17A
- Water-based fire protection systems NFPA 25
- Fire alarm systems NFPA 72
- Water-mist systems NFPA 750
- Clean-agent extinguishing systems NFPA 2001

- This table lists the NFPA referenced standards that should be used for the inspection, testing and maintenance criteria for various fire protection systems.

901.7 Systems out of service. Where a required fire protection system is out of service, the fire department and the fire code official shall be notified immediately and, where required by the fire code official, the building shall either be evacuated or an approved fire watch shall be provided for all occupants left unprotected by the shut down until the fire protection system has been returned to service. Where utilized, fire watches shall be provided with at least one approved means for notification of the fire department and their only duty shall be to perform constant patrols of the protected premises and keep watch for fires.

901.8 Removal of or tampering with equipment. It shall be unlawful for any person to remove, tamper with or otherwise disturb any fire hydrant, fire detection and alarm system, fire suppression system, or other fire appliance required by this code except for the purpose of extinguishing fire, training purposes, recharging or making necessary repairs, or when approved by the fire code official.

- Tampering or otherwise unauthorized altering of any fire protection system or component is illegal. A per-

son who unlawfully tampers with equipment could face potential criminal charges. Tampering could include intentionally pulling a manual fire alarm box when no emergency exists, playing with matches to set off a smoke detector or flowing a city fire hydrant. The use of fire protection systems, equipment and other fire appliances is limited to those people authorized to conduct repairs and maintenance unless approved by the fire code official.

## Chapter 27

### Hazardous Materials - General Provisions

2703.5 Hazard identification signs. Unless otherwise exempted by the fire code official, visible hazard identification signs as specified in NFPA 704 for the specific material contained shall be placed on stationary containers and above-ground tanks and at entrances to locations where hazardous materials are stored, dispensed, used or handled in quantities requiring a permit and at specific entrances and locations designated by the fire code official.

- This section contains requirements for identification signage and labeling of containers with hazardous materials. Signs are required to alert occupants who may unknowingly enter an area containing hazardous materials.

The hazard identification symbol (see Figure 2703.5) is a color-coded array of four numbers or letters arranged in a diamond shape. This symbol appears on the label of many chemicals acquired from commercial vendors.

The blue diamond, appearing on the left side of the label, conveys health hazard information. A number from 0 to 4 appears in the blue diamond indicating the degree of the hazard. The higher the number, the higher the hazard, as follows:

0—No hazard.

1—Can cause irritation if not treated.

2—Can cause injury. Requires prompt treatment.

3—Can cause serious injury despite medical treatment.

4—Can cause death or major injury despite medical treatment.

The red diamond, appearing at the top of the label, conveys flammability hazard information. Again, the numbers 0 to 4 are used to rate the flammability hazard as follows:

0—No hazard.

1—Ignites after considerable heating.

2—Ignites if moderately heated.

3—Can be ignited at all normal temperatures.

4—Very flammable gases or very volatile flammable liquid.

The yellow diamond, appearing on the right side of the label, conveys reactivity hazard information. The numbers 0 to 4 are used to rank reactivity hazards as follows:

0—Normally stable. Not reactive with water.

1—Normally stable. Unstable at high temperatures and pressure. Reacts with water.

2—Normally unstable but will not detonate.

3—Can detonate or explode but requires strong initiating force or heating under confinement.

4—Readily detonates or explodes.

The white diamond, appearing at the bottom of the label, conveys special hazard information. This information is conveyed by the use of symbols that represent

the special hazard. Two of the common symbols are:

W —Denotes the material is water reactive.

OX—Denotes an oxidizing agent.

Some labels use the white diamond to convey personal protective equipment or engineering controls required to work with the material safely. You may see a picture of gloves, safety glasses or a fume hood in the

Figure 2703.5 – NFPA 704 Label



white diamond.

NFPA hazard ratings can be found on the MSDS for a given chemical. Also, this symbol, or a form of this symbol, often appears on the label of commercial chemical products.

2703.6 Signs. Signs and markings required by Sections 2703.5 and 2703.5.1 shall not be obscured or removed, shall be in English as a primary language or in symbols allowed by this code, shall be durable, and the size, color and lettering shall be approved.

- Signs must be in English as the primary language, or in symbols allowed by the code, and be made of a durable material with the size, color and lettering approved by the fire code official or other sections of the International Codes.

**NFPA 704 Numbering system guidelines**

Health Hazard	Flammability	Reactivity	Special Concerns
<p><b>4</b> - Materials which on very short exposure could cause death or major residual injury even through prompt medical treatment were given.</p>	<p><b>4</b> - Materials which will rapidly or completely vaporize at atmospheric pressure and normal ambient temperature, and which will burn.</p> <p><b>FLASH POINT &lt; 73</b></p>	<p><b>4</b> - Materials which are readily capable of detonation or of explosive decomposition or reaction at normal temperatures and pressures.</p>	<p>Specific chemical hazards will be noted in this section. Specific hazards and their symbols are as follows:</p>
<p><b>3</b> - Materials which on short exposure could cause serious temporary or residual injury even though prompt medical treatment was given.</p>	<p><b>3</b> - Liquids and solids that can be ignited under almost all ambient temperature conditions.</p> <p><b>FLASH POINT &lt; 100</b></p>	<p><b>3</b> -Materials that can detonate or explode but require a strong initiating source, or must be heated under confinement before initiation, or react explosively with water.</p>	<p><b>OX- Oxidizer</b></p> <p><b>ACID - Acid</b></p> <p><b>ALK - Alkali</b></p> <p><b>COR- Corrosive</b></p> <p><b>-W- No Water</b></p> <p> <b>Radioactive</b></p>
<p><b>2</b> -Materials which on intense exposure could cause possible residual injury unless prompt medical treatment is given.</p>	<p><b>2</b> -Materials that must be moderately heated or exposed to relatively high ambient temperatures before igniting.</p> <p><b>FLASH &gt; 100 &lt; 200</b></p>	<p><b>2</b> -Materials that are normally unstable and readily undergo violent chemical changes but do not detonate; also materials that may react violently with water.</p>	
<p><b>1</b> -Materials which on exposure would cause irritation but only minor residual injury even if no treatment is given.</p>	<p><b>1</b> -Materials that must be preheated before ignition can occur.</p> <p><b>FLASH POINT &gt; 200</b></p>	<p><b>1</b> -Materials that are normally stable, but can become unstable at high temp. and pressures, or may react with water with some release of energy.</p>	
<p><b>0</b> -Materials which on exposure under fire conditions would offer no hazard beyond that of ordinary combustibles.</p>	<p><b>0</b> -Materials that will not burn.</p>	<p><b>0</b> -Materials that are normally stable even under fire explosive conditions and that are not reactive with water.</p>	