Second Revision No. 9-NFPA 120-2014 [ Global Comment ]

Change title of 5.3.7 to Self-Propelled Equipment

Submitter Information Verification

Submitter Full Name: [ Not Specified ]
Organization: [ Not Specified ]
Street Address:
City:
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Zip:
Submittal Date: Tue Jan 07 16:58:40 EST 2014

Committee Statement

Committee Statement: Product of task group work on self-propelled and mobile equipment to clarify and distinguish between the types of equipment.
Response Message:
3.3.21 Fixed Fire Suppression System.  
A *engineered* or *pre-engineered* total flooding or local application system consisting of a fixed supply of extinguishing agent permanently connected for fixed agent distribution to fixed nozzles that are arranged to discharge an extinguishing agent into an enclosure (total flooding), directly onto a hazard (local application), or a combination of both; or an automatic sprinkler system. [122, 2015]

3.3.21.1 Engineered Systems.  
Engineered systems are those systems requiring individual calculation and design to determine the flow rates, nozzle pressures, pipe size, area, or volume protected by each nozzle, quantity of suppression agent, number and types of nozzles and their placement in a specific system.

3.3.21.2 Pre-Engineered Systems.  
Those systems having predetermined flow rates, nozzle pressures, and quantities of extinguishing agent and having specific pipe size, maximum and minimum pipe lengths, flexible hose specifications, number or type of fittings, and number and types of nozzles. [17, 2013]

Submitter Information Verification

Submitter Full Name: [Not Specified]  
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Submittal Date: Tue Jan 07 11:06:25 EST 2014

Committee Statement

Committee Statement: The technical committee added the definitions of engineered and pre-engineered systems to the definition of fixed fire suppression systems. This will also address public comments no. 3 and 4 and committee comments on FR-67. The committee feels that both definitions should be part of Chapter 3. Pre-engineered Systems is being moved from existing 3.3.42.
3.3.33 Mobile Equipment.
Wheeled, skid-mounted, track-mounted, or rail-mounted equipment capable of moving or being moved.

Submitter Information Verification

Submitter Full Name: [Not Specified]
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State:  
Zip:  
Submittal Date: Tue Jan 07 16:49:26 EST 2014

Committee Statement

Committee Statement: Product of task group - mobile equipment definition is now consistent between the 120 and 122
### 3.3.44 Safety Can.
A listed container, of not more than 19 L (5.3 gal) capacity, having a screen or strainer in each fill and pour opening and having a spring-closing lid and spout cover and so designed that it will safely relieve internal pressure when subjected to fire exposure. [30, 2015]

### Submitter Information Verification

- **Submitter Full Name:** [Not Specified]
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- **City:**
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- **Zip:**
- **Submittal Date:** Mon Jan 27 16:11:40 EST 2014

### Committee Statement

- **Committee Statement:** Update of extracted material from NFPA 30.
- **Response Message:**

3.3.46 Self-Propelled Equipment.
Any unit that contains a motive power train as an integral part of the unit and is not rail mounted.

Submitter Information Verification

Submitter Full Name: [Not Specified]
Organization: [Not Specified]
Street Address:
City:
State:
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Submittal Date: Tue Jan 07 17:20:49 EST 2014

Committee Statement

Committee Statement: Product of task group work - clarified that rail mounted equipment can be self-propelled.
Response Message:
4.2.5.1* Underground maintenance shops that are intended for use longer than 6 months shall be enclosed structures of fire-resistant construction, including floor, roof, roof supports, doors, and door frames, or shall be protected with an automatic sprinkler fire suppression system. (See 5.3.7.3 for information on fixed fire suppression systems.) in accordance with 4.3.3.3.

Submitter Information Verification

Submitter Full Name: Susan Bershad
Organization: National Fire Protection Assoc
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Submittal Date: Mon Mar 31 12:05:25 EDT 2014

Committee Statement

Committee Statement: This corrects an error in the current edition. Product of sprinkler task group.
Response Message:
Second Revision No. 19-NFPA 120-2014 [ Section No. 4.3.3.1 ]

4.3.3.1 General Requirements.

4.3.3.1.1 Mining equipment requiring a fixed fire protection system shall be protected by a system with the capacity to suppress the largest anticipated fires in the protected areas and shall meet the following criteria:

1. They shall be listed or approved for the purpose.
2. They shall be located or guarded so as to be protected against physical damage.
3. They shall be actuated either automatically, manually, or both.
4. They shall be provided with an agent distribution hose or pipe secured and protected against damage, including abrasion and corrosion, and shall be flame resistant.
5. They shall be provided with discharge nozzle blowoff caps or other devices or materials to prevent the entrance of moisture, dirt, or other material into the piping. The discharge nozzle protective device shall blow off, blow out, or open upon agent discharge.
6. Water-based systems shall not be required to have nozzle blowoff caps as long as the nozzles are kept free of blockage at all times.
7. The fire protection system shall be installed so that system actuation causes shutdown of the protected equipment.
8. Discharge nozzles or sprinklers shall not be covered with any material that will reduce the effectiveness of the system.

4.3.3.1.2 Automatically actuated systems other than water-based sprinkler systems shall have a manual actuator capable of being activated from the operator's compartment or other accessible location.

4.3.3.1.3 Fire Unless otherwise noted in this standard, fire protection systems other than automatic sprinkler systems shall be installed and operate in accordance with the applicable NFPA standards.

4.3.3.1.3.1 Pre-engineered dry chemical or wet chemical systems shall be designed, installed, and tested in accordance with the fire suppression system manufacturer's listed installation and maintenance manual.

4.3.3.1.4 Where the nature of a coal mine does not allow the NFPA standards to be followed, systems that provide equivalent protection shall be approved by the authority having jurisdiction.

Supplemental Information

<table>
<thead>
<tr>
<th>File Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>NFPA_120_4.3.3.1.1_SR_19_reviewed_SB_comments_final.docx</td>
<td>Annex material</td>
</tr>
</tbody>
</table>

Submitter Information Verification

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Submittal Date: Mon Mar 31 12:24:12 EDT 2014
Annex Material for SR-19

A.4.3.3.1.1(6)

Open-head deluge and water spray systems can be kept free of blockage by regular flow of water through the system. For example, fire suppression on continuous miners can be flowed once per shift to keep the nozzles clean. Deluge water spray systems at belt drives can be flowed weekly to keep the nozzles clean.
Committee Statement

Committee Statement: Product of sprinkler system task group. Adds additional annex material.
Response Message:
Second Revision No. 20-NFPA 120-2014 [ Section No. 4.3.3.2 ]

4.3.3.2 Applications.

4.3.3.2.1* The following equipment and facilities shall be protected by approved automatic fire protection systems. Where sprinkler systems are used, they shall satisfy the requirements of 4.3.3.3 through 4.3.3.5.5. Where dry chemical systems are used, they shall satisfy the requirements for self-propelled equipment in 4.3.3.6.1.

(1)* Drive areas of belt conveyors shall be protected in accordance with 9.4.6.

(2) Flammable and combustible liquid storage areas shall be protected by either one of the following:

(a) Automatic water-based fixed fire protection systems installed for the protection of Class I or Class II liquid storage areas shall be of the Class B foam–water type.

(b) Fixed diesel or other Class II combustible liquid storage areas shall be protected with a dry chemical system or a system that provides equivalent protection according to the authority having jurisdiction.

Maintenance shops shall be protected by an approved automatic fire protection system.

(3) Unattended hydraulic equipment shall use fire-resistant hydraulic fluid.

(4) Unattended electrical equipment such as enclosed electric motors, controls, transformers, rectifiers, battery chargers, and other equipment that does not have a hydraulic system shall be protected by an approved automatic fire protection system.

(5) Unattended electrical equipment located on noncombustible material and spaced at least 0.61 m (2 ft) from coal or other combustible material shall not be required to be protected with an automatic fire suppression system.

(6) Unattended electrical equipment located on noncombustible material and separated from coal or other combustible material by a fire-resistive layer or wall shall not be required to be protected with an automatic fire suppression system.

4.3.3.2.2* Air Compressors.

Air compressors with motors that exceed 5 horsepower shall be protected by an approved automatic fire protection system interlocked to shut down the power to the compressor and by one of the following:

(1) A person in constant attendance, within the line of sight of the compressor, and equipped with a portable fire extinguisher

(2) Containment within an enclosure that is constructed of noncombustible materials, ventilated to prevent overheating of the compressor, and designed to provide containment of any possible fire involving the compressor

Submitter Information Verification

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Submittal Date: Mon Mar 31 13:04:14 EDT 2014

Committee Statement
<table>
<thead>
<tr>
<th>Committee Statement:</th>
<th>Requirement for maintenance shops is already covered in 4.2.5. Adds battery charges to the list of electrical equipment.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Response Message:</td>
<td></td>
</tr>
</tbody>
</table>
Second Revision No. 24-NFPA 120-2014 [Sections 4.3.3.3, 4.3.3.4, 4.3.3.5]

4.3.3.3 Sprinkler System Requirements.

4.3.3.3.1 Automatic water-based fixed fire protection systems installed for the protection of Class I or Class II liquid storage areas shall be of the foam-water type.

4.3.3.3.1 Water Supply.
The water supply shall have enough pressure and flow to provide sprinkler coverage as the sprinkler design is intended.

4.3.3.3.1.1 An approved strainer with a flush-out connection and a manual shutoff valve shall be provided at the point of the sprinkler system connection to the main water line.

4.3.3.3.1.2 An indicating, full-flow, slow-opening water control valve shall be located at the tap of the water line supplying the sprinkler system.

4.3.3.3.1.3 When the sprinkler system is put into operation, the slow-opening valve specified in 4.3.3.3.1.2 shall be sealed or locked in the open position, or be provided with a supervisory alarm.

4.3.3.3.1.4 A pressure gauge shall be provided at the point of connection.

4.3.3.3.1.5 The water line from the water main to the sprinkler system shall be metallic.

4.3.3.3.1.6 The water line from the water main to the sprinkler system of a belt drive shall be flexible metal or reinforced nonmetal if excessive vibration could reduce the reliability of the sprinkler system.

4.3.3.3.1.7 Fittings and piping shall have a rated pressure higher than the anticipated maximum pressure on the system.

4.3.3.3.2 General Installation Requirements.

4.3.3.3.2.1 Piping in sprinkler systems shall comply with NFPA 13, Standard for the Installation of Sprinkler Systems.

4.3.3.3.2.2 Nonmetallic pipe shall not be used downstream of the sprinkler control valve unless investigated and approved for this purpose.

4.3.3.3.2.3 Hangers supporting sprinkler piping shall be metallic.

4.3.3.3.2.4 At least one hanger shall be attached to each length of pipe.

4.3.3.3.2.5 Sprinklers shall be standard orifice pendent, upright, or sidewall-type automatic sprinklers.

4.3.3.3.2.6 For sprinkler systems installed to protect the equipment and facilities indicated in 4.3.3.2.1(2) through 4.3.3.2.1(6), sprinklers shall be spaced no more than 3.66 m (12 ft) apart, and the protection of any one sprinkler shall not exceed 9.3 m² (100 ft²).

4.3.3.3.2.7 Sprinklers shall be located so that the discharge will not be obstructed.

4.3.3.3.2.8 Sprinkler deflectors shall be located at a distance below the roof of not less than 25.4 mm (1 in.) nor greater than 508 mm (20 in.).
4.3.3.3.2.9
Roof cavities containing combustible material such as wood or coal in the area to be protected shall be protected by installation of upright sprinklers within the cavity at the top of riser pipes so that the deflectors are within 508 mm (20 in.) of the roof.

4.3.3.3.2.10
Wet-pipe sprinkler systems shall not be used where chance of freezing exists.

4.3.3.3.2.11
Provisions shall be made to drain all parts of the system.

4.3.3.3.2.12
Drain connections shall be sized as shown in Table 4.3.3.3.2.12. Table 4.3.3.3.2.12 Sizes of Drain Connections

<table>
<thead>
<tr>
<th>Riser or Main Size</th>
<th>Size of Drain Connection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 2 in.</td>
<td>¼ in. or larger</td>
</tr>
<tr>
<td>2½ in. to 3½ in.</td>
<td>1¼ in. or larger</td>
</tr>
<tr>
<td>4 in. and larger</td>
<td>2 in. only</td>
</tr>
</tbody>
</table>

For SI units, 1 in. = 25.4 mm.

4.3.3.3.2.13
Trapped piping sections shall be equipped with auxiliary drains or otherwise arranged to facilitate draining.

4.3.3.3.3 General Alarm Requirements for Sprinkler Systems.

4.3.3.3.3.1
A waterflow switch or alarm valve, with associated inspector's test connection, capable of detecting the flow through one opened sprinkler shall be installed in the piping feeding the sprinklers.

(A)
An inspector's test connection shall be provided at the end of the most remote line of the sprinkler system.

(B)
The inspector's test connection shall simulate one sprinkler head in operation for sprinkler systems other than belt drive systems.

(C)
In addition to 4.3.3.3.3.1(B), the inspector's test connection for belt drive systems shall simulate a minimum of eight sprinkler heads activating at the same time.

4.3.3.3.3.2
The alarm device shall be connected to an alarm system that will alarm at a constantly attended location. The alarm device shall provide a local audible and visual alarm.

4.3.3.3.3.3
The alarm system shall identify the sprinkler system involved.

4.3.3.3.3.4
In dry-pipe automatic sprinkler systems, the alarm system shall be actuated by flow through a dry-pipe valve a pressure switch associated with the trim on the dry-pipe device.

4.3.3.3.3.5
A paddle-type water flow switch shall not be used be installed in wet systems only.

4.3.3.3.4* Where the requirements of Section 8.2 are satisfied by installing automatic sprinkler systems, such systems shall comply with the requirements of 4.3.3.3.2.1 and 4.3.3.3.2.2.

4.3.3.3.2.1
An indicating, full-flow, slow-opening water control valve shall be located at the tap of the water line supplying the sprinkler system.

4.3.3.3.2.2
When the sprinkler system is put into operation, the slow-opening valve specified in 4.3.3.3.2.1 shall be sealed in the open position.

4.3.3.3.4.4
A waterflow switch or alarm valve, with associated inspector's test connection, capable of detecting the flow through one opened sprinkler shall be installed in the piping feeding the sprinklers.
4.3.3.3.4.2
The alarm device shall be connected to an alarm system that will alarm at a constantly attended location.

4.3.3.3.4.3
The alarm system shall identify the sprinkler system involved.

4.3.3.3.4.4
In dry-pipe automatic sprinkler systems, the alarm system shall be actuated by flow through a dry-pipe valve.

4.3.3.3.4.5
A paddle-type water flow switch shall not be used.

4.3.3.3.4.1*
Sprinklers shall be standard orifice pendent, upright, or sidewall-type automatic sprinklers.

4.3.3.3.4.1
Sprinklers shall be installed in the upright position on a dry-pipe system.

4.3.3.3.4.4*
Sprinklers shall be located so that the discharge will not be obstructed.

4.3.3.3.4.10
For belt conveyors, the entire top belt surface shall be wetted.

4.3.3.3.4.5
Sprinkler deflector shall be located at a distance below the roof of not less than 25.4 mm (1 in.) nor greater than 508 mm (20 in.).

4.3.3.3.4.6
Roof cavities containing combustible material such as wood or coal in the area to be protected shall be protected by installation of upright sprinklers within the cavity at the top of riser pipes so that the deflectors are within 508 mm (20 in.) of the roof.

4.3.3.3.4.7*
Piping in sprinkler systems shall comply with NFPA 13, "Standard for the Installation of Sprinkler Systems".

4.3.3.3.4.7
Nonmetallic pipe shall not be used downstream of the sprinkler control valve unless investigated and approved for this purpose.

4.3.3.3.4.8
Hangers supporting sprinkler piping shall be metallic.

4.3.3.3.4.9
At least one hanger shall be attached to each length of pipe.

4.3.3.3.4.7
Provision shall be made to drain all parts of the system.

4.3.3.3.4.8
Drain connections shall be sized as shown in Table 4.3.3.3.4.8 Sizes of Drain Connections.

Table 4.3.3.3.4.8 Sizes of Drain Connections

<table>
<thead>
<tr>
<th>Riser or Main Size</th>
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<tr>
<td>Up to 2 in.</td>
<td>3/4 in. or larger</td>
</tr>
<tr>
<td>2 1/2 in. to 3 1/2 in.</td>
<td>1 1/4 in. or larger</td>
</tr>
<tr>
<td>4 in. and larger</td>
<td>2 in. only</td>
</tr>
</tbody>
</table>

For SI units, 1 in. = 25.4 mm.

4.3.3.3.4.9
Trapped piping sections shall be equipped with auxiliary drains or otherwise arranged to facilitate draining.

4.3.3.3.5
Wet-pipe sprinkler systems shall not be used where chance of freezing exists.

4.3.3.3.4 Antifreeze System.
Where danger of freezing exists, sprinkler systems filled with antifreeze solution shall be permitted and shall meet the requirements of 4.3.3.3.4.1 through 4.3.3.3.4.21, 7.6.2 and 7.6.3 of NFPA 13.

4.3.3.3.5.1*
If automatic sprinkler systems are connected to public water supplies or to piping supplying water for drinking, antifreeze solutions other than water solutions of pure glycerine [chemically pure (CP) or U.S. Pharmacopeia (USP) 96.5 percent grade] or propylene glycol shall not be used.

4.3.3.3.5.2
The glycerine–water and propylene glycol–water mixtures provided in Table 4.3.3.3.5.2 shall be permitted to be used.

Table 4.3.3.3.5.2 Properties of Water-Based Solutions

<table>
<thead>
<tr>
<th>Material</th>
<th>Solution (by volume)</th>
<th>Specific Gravity at 15.6°C (60°F)</th>
<th>Freezing Point</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glycerine (CP or USP grade)</td>
<td>50% water</td>
<td>1.133</td>
<td>-26.1, -15</td>
</tr>
<tr>
<td></td>
<td>40% water</td>
<td>1.151</td>
<td>-30.0, -22</td>
</tr>
<tr>
<td></td>
<td>30% water</td>
<td>1.165</td>
<td>-40.0, -40</td>
</tr>
<tr>
<td>Propylene glycol</td>
<td>70% water</td>
<td>1.027</td>
<td>-12.8, 9</td>
</tr>
<tr>
<td></td>
<td>60% water</td>
<td>1.034</td>
<td>-21.1, 6</td>
</tr>
<tr>
<td></td>
<td>50% water</td>
<td>1.041</td>
<td>-32.2, 26</td>
</tr>
<tr>
<td></td>
<td>40% water</td>
<td>1.045</td>
<td>-51.1, 60</td>
</tr>
</tbody>
</table>

CP: chemically pure; USP: U.S. Pharmacopeia 96.5%.

Note: Based on a hydrometer scale 1.000 to 1.200 (subdivisions 0.002).
4.3.3.5.3
If automatic sprinkler systems are not connected to public water systems or to piping that supplies water for drinking, the commercially available materials shown in Table 4.3.3.3.4.3 shall be permitted to be used in antifreeze solutions.

**Table 4.3.3.5.3 Antifreeze Solutions to Be Used If Public Water Is Not Connected to Sprinklers**

<table>
<thead>
<tr>
<th>Material</th>
<th>Solution (by volume)</th>
<th>Specific Gravity at 15.6°C (60°F)</th>
<th>Freezing Point °C</th>
<th>°F</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Glycerine</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diethylene-glycol</td>
<td>50% water</td>
<td>1.078</td>
<td>-25.0</td>
<td>-13</td>
</tr>
<tr>
<td></td>
<td>45% water</td>
<td>1.081</td>
<td>-32.8</td>
<td>-27</td>
</tr>
<tr>
<td></td>
<td>40% water</td>
<td>1.086</td>
<td>-41.1</td>
<td>-42</td>
</tr>
<tr>
<td>Ethylene-glycol</td>
<td>61% water</td>
<td>1.056</td>
<td>-23.3</td>
<td>-10</td>
</tr>
<tr>
<td></td>
<td>56% water</td>
<td>1.063</td>
<td>-28.9</td>
<td>-20</td>
</tr>
<tr>
<td></td>
<td>51% water</td>
<td>1.069</td>
<td>-34.4</td>
<td>-30</td>
</tr>
<tr>
<td></td>
<td>47% water</td>
<td>1.073</td>
<td>-40.0</td>
<td>-40</td>
</tr>
<tr>
<td><strong>Propylene-glycol</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Calcium-chloride</td>
<td>2.83 lb CaCl₂ /gal water</td>
<td>1.183</td>
<td>-17.8</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>3.38 lb CaCl₂ /gal water</td>
<td>1.212</td>
<td>-23.3</td>
<td>-10</td>
</tr>
<tr>
<td></td>
<td>3.89 lb CaCl₂ /gal water</td>
<td>1.237</td>
<td>-28.9</td>
<td>-20</td>
</tr>
<tr>
<td>---Add corrosion inhibitor of sodium bichromate, ¹⁄₄ oz/gal-water</td>
<td>4.37 lb CaCl₂ /gal water</td>
<td>1.258</td>
<td>-34.4</td>
<td>-30</td>
</tr>
<tr>
<td></td>
<td>4.73 lb CaCl₂ /gal water</td>
<td>1.274</td>
<td>-40.0</td>
<td>-40</td>
</tr>
<tr>
<td></td>
<td>4.93 lb CaCl₂ /gal water</td>
<td>1.283</td>
<td>-45.6</td>
<td>-40</td>
</tr>
</tbody>
</table>

For SI units, 1 lb/gal = 0.119 kg/L.

**Note:** Based on a hydrometer scale 1.000 to 1.200 (subdivisions 0.002).

*See Table 4.3.3.3.4.2.

† Free from magnesium chloride and other impurities.

4.3.3.5.4*
A soft-seat check valve shall be connected to the tee in the water line feeding the automatic sprinkler system.

4.3.3.5.5
The water control valve shall be connected close to the discharge side of the check valve.

4.3.3.5.6
A 6.35 mm (¹⁄₄ in.) soft-seat relief valve made of corrosion-resistant bronze or stainless steel shall be connected to the sprinkler piping near the shutoff valve.

4.3.3.5.7
The relief valve shall be set to open at a pressure of 1380 kPa (200 psi) above the maximum water-line pressure (i.e., the maximum system pressure).

4.3.3.5.8*
A suitable air chamber shall be connected to the piping.
4.3.3.5.9
The connection port to the chamber shall be fitted with a small, high-pressure, corrosion-resistant ball valve.

4.3.3.5.10
The connection from the ball valve to the sprinkler piping shall be permitted to use a small-diameter hydraulic hose having a working pressure of at least the maximum system pressure.

4.3.3.5.11
The air chamber shall be filled with compressed air at a pressure equal to the maximum water-line pressure.

4.3.3.5.12
Where connected to the system piping, the air chamber shall be oriented so that the connection port is located at the bottom of the chamber.

4.3.3.5.13
With the shutoff valve still closed, the sprinkler piping shall be filled with the antifreeze solution, and the following procedures shall be performed:

- High points of the piping shall be vented to obtain reasonably complete filling.
- The valve on the air chamber shall be opened and sealed.
- If possible, the pressure of the antifreeze solution shall be raised to the line pressure before the shutoff valve is opened and sealed.
- Finally, the system shall be checked carefully for leaks.

4.3.3.5.14*
With all other fill, drain, and vent valves closed, a high-pressure air compressor shall be connected to a valve opening, and pressure in the piping shall be raised at least to the water-line pressure.

4.3.3.5.15
The valve at the opening shall be closed, and the valve shall be plugged.

4.3.3.5.16
The system shall be checked for leaks, especially in the area of the piping where the air is believed to exist.

4.3.3.5.17
If the pressure gauge shows that the system is still tight after 24 hours, the shutoff valve shall be opened, making the system operational.

4.3.3.5.18
The shutoff valve shall be sealed in the open position.

4.3.3.5.19
Sprinkler systems filled with antifreeze solution shall employ antifreeze solution mixtures that are rated for the lowest temperature to which the sprinkler system could be exposed.

4.3.3.5.20*
The antifreeze solution shall be mixed and tested before being pumped into the sprinkler system piping.

4.3.3.5.21
A pressure gauge shall be provided in a protected location on the downstream side of the shutoff valve.

4.3.3.5.* Dry-Pipe System.
Where danger of freezing exists, a dry-pipe sprinkler system shall be permitted and shall meet the requirements of 4.3.3.5.1 through 4.3.3.5.7.

4.3.3.5.1
The dry-pipe valve and its accessories shall be installed in a separate area and shall be protected against freezing and mechanical injury.

4.3.3.5.2
If the separate area described in 4.3.3.5.1 is ventilated with return air, all electrical components shall be permissible or intrinsically safe.

4.3.3.5.3
Water pressure shall be regulated not to exceed the maximum pressure specified by the manufacturer of the dry-pipe valve.
4.3.3.5.4
The dry-pipe valve shall be installed in accordance with the manufacturer's instructions.

4.3.3.5.5
Mechanical grooved couplings, including gaskets used on dry-pipe systems, shall be listed for dry-pipe service.

4.3.3.5.6
Operation of the dry-pipe system and supervision of the system, including pressure of the air supply, shall be signaled to an attended location. Signaling to an attended location shall be permitted to utilize alarm systems serving fire detection equipment.

4.3.3.5.7
The system air supply shall be provided from a reliable source such as a dedicated compressor and shall be equipped with an air maintenance device.

4.3.3.5.8
Sprinklers shall be installed in the upright position on a dry-pipe system or be listed dry type or horizontal sidewall sprinklers installed according to the listing for dry-pipe systems.

4.3.3.6 Protection of Specific Hazards.
4.3.3.6.1*
Automatic water-based fixed fire protection systems installed for the protection of Class I or Class II liquid storage areas shall be of the foam–water type.

4.3.3.6.2*
Where the requirements of Section 8.2 dealing with underground belt drives are satisfied by installing automatic sprinkler systems, such systems shall comply with the requirements of 4.3.3.3.2.1 and 4.3.3.3.2.2 and 4.3.3.3.1.2 and 4.3.3.3.1.3.

4.3.3.4 Automatic Sprinkler System Acceptance Testing.
4.3.3.4.1 Flushing of Water-Line Connections.
4.3.3.4.1.1
Water-line connections and lead-in connections shall be flushed at the maximum flow rate available before connection is made to the sprinkler piping in order to remove foreign material.

4.3.3.4.1.2
Flushing shall be continued until the water is clear.

4.3.3.4.2 Flow Testing of Sprinkler Systems.
4.3.3.4.2.1
Wet-pipe closed automatic sprinkler systems shall be flow-tested by operating flow through the maximum number of sprinklers expected to open, but not through fewer than eight open sprinklers at least one sprinkler head for non–belt drive areas and at least eight sprinkler heads for belt drive areas.

4.3.3.4.2.2
If the system contains fewer than eight sprinklers, all sprinklers or an inspector's test simulating all sprinklers shall be flow-tested as specified in 4.3.3.4.2.1.

4.3.3.4.2.3
If with a water flow and pressure that is present under normal mine operating conditions, if the residual pressure measured downstream of the opened sprinklers is 70 kPa (10 psi) or greater for belt drive systems and 140 kPa (20 psi) for all other systems, the system shall be considered acceptable.

4.3.3.4.2.4
Closed sprinkler systems installed to protect areas where the water discharge could damage the area or its contents shall not be required to be tested by operating flow through opened sprinklers.

4.3.3.4.2.5
Where the condition(s) in 4.3.3.4.2.4 exist, the alternative test of operating flow through a 51 mm (2 in.) valve test connection shall be permitted to be used.

4.3.3.4.2.6
Portable sprinkler systems that are dismantled and reinstalled in new areas shall be flow-tested following the initial installation.

4.3.3.4.3 Tests of Dry-Pipe Sprinkler Systems.
4.3.3.4.3.1
Where there is no risk of freezing, new dry-pipe systems shall be flow-tested and hydrostatically tested in accordance with NFPA 13, Standard for the Installation of Sprinkler Systems.
4.3.3.4.2  
A dry-pipe valve shall be tested according to the manufacturer's recommendations.

4.3.3.4.3*  
Where there is risk of freezing in dry-pipe systems, an air pressure of 276 kPa (40 psi) shall be pumped up and allowed to stand 24 hours, and all leaks that allow a loss of pressure over 10.3 kPa (1 1/2 psi) during the 24 hours shall be stopped.

4.3.3.4.4 Sprinkler System Maintenance.

4.3.3.4.4.1  
All sprinkler systems shall be maintained in accordance with the manufacturer's requirements or in accordance with NFPA 25, Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems.

4.3.3.4.4.2  
As a minimum, all closed sprinkler systems, except antifreeze systems, shall be retested annually by operating flow through the end fitting in all lines to remove any silt buildup.

4.3.3.4.4.3  
If pendent sprinklers are used on wet-type sprinkler systems, the end sprinkler on each line shall be removed and examined annually to check for silt buildup.

4.3.3.4.4.4  
If silt buildup is found, all sprinklers on the line shall be removed, the line flushed, and new sprinklers installed.

4.3.3.4.4.5 Antifreeze Systems.

(A) Each year at the onset of freezing weather, a small amount of antifreeze shall be drawn from the drain valve and the test valve(s) and tested with a hydrometer to ensure that the solution is suitable for the lowest temperature expected.

(B) If the test described in 4.3.3.4.4.5(A) shows that the solution is not suitable, the solution shall be replaced.

4.3.3.5 Inspection, Maintenance, and Testing.

4.3.3.5.1  
All fire suppression systems shall be tested after installation in accordance with the appropriate NFPA standard.

4.3.3.5.2  
If an applicable NFPA standard does not exist, then a fire suppression system shall be tested in accordance with the manufacturer's or designer's instruction manual.

4.3.3.5.3  
Testing shall not require the discharge of suppressant unless there is no other satisfactory manner in which the reliability and integrity of the system can be verified.

4.3.3.5.4*  
All persons who inspect, test, operate, or maintain fire suppression systems shall be trained.

4.3.3.5.5 Sprinkler System Maintenance.

4.3.3.5.5.1  
All sprinkler systems shall be maintained in accordance with the manufacturer's requirements or in accordance with NFPA 25, Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems.

4.3.3.5.5.2*  
As a minimum, all closed-head sprinkler systems, except antifreeze systems, shall be retested annually by operating flow through the end fitting in all lines of the line drain(s) for the system to remove any silt buildup.

(A) If pendent sprinklers are used on wet-type sprinkler systems, the end sprinkler on each line shall be removed and examined annually to check for silt buildup.

(B) If silt buildup is found, all sprinklers on the line shall be removed, the line flushed, and new sprinklers installed.
4.3.3.5.3*  
As a minimum, deluge sprinklers and deluge water-spray systems shall be flow-tested on a monthly basis.

4.3.3.5.4  
The strainer shall be flushed on a weekly basis, at a minimum.

4.3.3.5.6  
Antifreeze Systems.

(A)  
Each year at the onset of freezing weather, a small amount of antifreeze shall be drawn from the drain valve and the test valve(s) and tested with a hydrometer to ensure that the solution is suitable for the lowest temperature expected.

(B)  
If the test described in 4.3.3.5.6(A) shows that the solution is not suitable, the solution shall be replaced.

4.3.3.5.7*  
All persons who inspect, test, operate, or maintain fire suppression systems shall be trained.

Supplemental Information

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<th>File Name</th>
<th>Description</th>
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<td>NFPA_120_4_3_3_3_SR-24_clean_reviewed_SB_comments.docx</td>
<td>Annex material</td>
</tr>
</tbody>
</table>

Submitter Information Verification

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Submittal Date: Wed Apr 02 10:53:46 EDT 2014

Committee Statement

Committee Statement: The sprinkler task group has revised and reorganized this section. Most of the following section is just reorganized in a more logical manner for ease of readership. The section on water supply is added as the current edition does not have specifics on the requirements for water supply systems. Note that the entire section on antifreeze systems has been deleted and now just refers to the requirements in NFPA 13. Flow testing of sprinkler system was originally written only for belt drive areas. It is now expanded to include all areas with sprinklers. The non-belt drive areas need different requirements.

Response Message:
4.3.3.3 Sprinkler System Requirements.

4.3.3.3.1* Water Supply.
The water supply shall have enough pressure and flow to provide sprinkler coverage as the sprinkler design is intended.

4.3.3.3.1.1 An approved strainer with a flush-out connection and a manual shutoff valve shall be provided at the point of the sprinkler system connection to the main water line.

4.3.3.3.1.2 An indicating, full-flow, slow-opening water control valve shall be located at the tap of the water line supplying the sprinkler system.

4.3.3.3.1.3 When the sprinkler system is put into operation, the slow-opening valve specified in 4.3.3.3.1.2 shall be sealed or locked in the open position, or be provided with a supervisory alarm.

4.3.3.3.1.4 A pressure gauge shall be provided at the point of connection.

4.3.3.3.1.5 The water line from the water main to the sprinkler system shall be metallic.

4.3.3.3.1.6 The water line from the water main to the sprinkler system of a belt drive shall be flexible metal or reinforced nonmetal if excessive vibration could reduce the reliability of the sprinkler system.

4.3.3.3.1.7 Fittings and piping shall have a rated pressure higher than the anticipated maximum pressure on the system.

4.3.3.3.2 General Installation Requirements.

4.3.3.3.2.1* Piping in sprinkler systems shall comply with NFPA 13.

4.3.3.3.2.2 Nonmetallic pipe shall not be used downstream of the sprinkler control valve unless investigated and approved for this purpose.

4.3.3.3.2.3 Hangers supporting sprinkler piping shall be metallic.
4.3.3.3.2.4
At least one hanger shall be attached to each length of pipe.

4.3.3.3.2.5*
Sprinklers shall be standard orifice pendent, upright, or sidewall-type automatic sprinklers.

4.3.3.3.2.6*
For sprinkler systems installed to protect the equipment and facilities indicated in 4.3.3.2.1(2) through 4.3.3.2.1(7), sprinklers shall be spaced no more than 3.66 m (12 ft) apart, and the protection of any one sprinkler shall not exceed 9.3 m² (100 ft²).

4.3.3.3.2.7*
Sprinklers shall be located so that the discharge will not be obstructed.

4.3.3.3.2.8
Sprinkler deflectors shall be located at a distance below the roof of not less than 25.4 mm (1 in.) nor greater than 508 mm (20 in.).

4.3.3.3.2.9
Roof cavities containing combustible material such as wood or coal in the area to be protected shall be protected by installation of upright sprinklers within the cavity at the top of riser pipes so that the deflectors are within 508 mm (20 in.) of the roof.

4.3.3.3.2.10
Wet-pipe sprinkler systems shall not be used where chance of freezing exists.

4.3.3.3.2.11
Provisions shall be made to drain all parts of the system.

4.3.3.3.2.12
Drain connections shall be sized as shown in Table 4.3.3.3.2.12.

Table 4.3.3.3.2.12 Sizes of Drain Connections

<table>
<thead>
<tr>
<th>Riser or Main Size</th>
<th>Size of Drain Connection</th>
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<tbody>
<tr>
<td>Up to 2 in.</td>
<td>⅛ in. or larger</td>
</tr>
<tr>
<td>2½ in. to 3½ in.</td>
<td>1¼ in. or larger</td>
</tr>
<tr>
<td>4 in. and larger</td>
<td>2 in. only</td>
</tr>
</tbody>
</table>

For SI units, 1 in. = 25.4 mm.

4.3.3.3.2.13
Trapped piping sections shall be equipped with auxiliary drains or otherwise arranged to facilitate draining.

4.3.3.3.3 General Alarm Requirements for Sprinkler Systems.
4.3.3.3.1
A waterflow switch or alarm valve capable of detecting the flow through one opened sprinkler shall be installed in the piping feeding the sprinklers.

(A)
An inspector’s test connection shall be provided at the end of the most remote line of the sprinkler system.

(B)
The inspector’s test connection shall simulate one sprinkler head in operation for sprinkler systems other than belt drive systems.

(C)
In addition to 4.3.3.3.1(B), the inspector’s test connection for belt drive systems shall simulate a minimum of eight sprinkler heads activating at the same time.

4.3.3.3.2
The alarm device shall be connected to an alarm system that will alarm at a constantly attended location. The alarm device shall provide a local audible and visual alarm.

4.3.3.3.3
The alarm system shall identify the sprinkler system involved.

4.3.3.3.4
In dry-pipe automatic sprinkler systems, the alarm system shall be actuated by a pressure switch associated with the trim on the dry-pipe device.

4.3.3.3.5
A paddle-type water flow switch shall be installed in wet systems only.

4.3.3.4 Antifreeze System.
Where danger of freezing exists, sprinkler systems filled with antifreeze solution shall be permitted and shall meet the requirements of 7.6.2 and 7.6.3 of NFPA 13.

4.3.3.5 Dry-Pipe System.
Where danger of freezing exists, a dry-pipe sprinkler system shall be permitted and shall meet the requirements of 4.3.3.5.1 through 4.3.3.5.7.

4.3.3.5.1
The dry-pipe valve and its accessories shall be installed in a separate area and shall be protected against freezing and mechanical injury.

4.3.3.5.2
If the separate area described in 4.3.3.5.1 is ventilated with return air, all electrical components shall be permissible or intrinsically safe.

4.3.3.5.3
Water pressure shall be regulated not to exceed the maximum pressure specified by the manufacturer of the dry-pipe valve.

4.3.3.5.4
The dry-pipe valve shall be installed in accordance with the manufacturer's instructions.

4.3.3.5.5
Mechanical grooved couplings, including gaskets used on dry-pipe systems, shall be listed for dry-pipe service.

4.3.3.5.6
Operation of the dry-pipe system and supervision of the system, including pressure of the air supply, shall be signaled to an attended location. Signaling to an attended location shall be permitted to utilize alarm systems serving fire detection equipment.

4.3.3.5.7
The system air supply shall be provided from a reliable source such as a dedicated compressor and shall be equipped with an air maintenance device.

4.3.3.5.8
Sprinklers shall be installed in the upright position on a dry-pipe system or be listed dry type or horizontal sidewall sprinklers installed according to the listing for dry-pipe systems.

4.3.3.6 Protection of Specific Hazards.

4.3.3.6.1*
Automatic water-based fixed fire protection systems installed for the protection of Class I or Class II liquid storage areas shall be of the foam–water type.

4.3.3.6.2*
Where the requirements of 9.4.6 dealing with underground belt drives are satisfied by installing automatic sprinkler systems, such systems shall comply with the requirements of 4.3.3.1.2 and 4.3.3.1.3.

4.3.3.4 Automatic Sprinkler System Acceptance Testing.

4.3.3.4.1 Flushing of Water-Line Connections.

4.3.3.4.1.1
Water-line connections and lead-in connections shall be flushed at the maximum flow rate available before connection is made to the sprinkler piping in order to remove foreign material.
4.3.3.4.1.2
Flushing shall be continued until the water is clear.

4.3.3.4.2 Flow-Testing of Sprinkler Systems.

4.3.3.4.2.1
Wet-pipe closed automatic sprinkler systems shall be flow-tested by operating flow through at least one sprinkler head for non–belt drive areas and at least eight sprinkler heads for belt drive areas.

4.3.3.4.2.2
If the system contains fewer than eight sprinklers, all sprinklers or an inspector’s test simulating all sprinklers shall be flow-tested as specified in 4.3.3.4.2.1.

4.3.3.4.2.3
With a water flow and pressure that is present under normal mine operating conditions, if the residual pressure measured downstream of the opened sprinklers is 70 kPa (10 psi) or greater for belt drive systems and 140 kPa (20 psi) for all other systems, the system shall be considered acceptable.

4.3.3.4.2.4
Closed sprinkler systems installed to protect areas where the water discharge could damage the area or its contents shall not be required to be tested by operating flow through opened sprinklers.

4.3.3.4.2.5
Where the condition(s) in 4.3.3.4.2.4 exist, the alternative test of operating flow through a 51 mm (2 in.) valve test connection shall be permitted to be used.

4.3.3.4.2.6
Portable sprinkler systems that are dismantled and reinstalled in new areas shall be flow-tested following the initial installation.

4.3.3.4.3 Tests of Dry-Pipe Sprinkler Systems.

4.3.3.4.3.1
Where there is no risk of freezing, new dry-pipe systems shall be flow-tested and hydrostatically tested in accordance with NFPA 13.

4.3.3.4.3.2
A dry-pipe valve shall be tested according to the manufacturer's recommendations.

4.3.3.4.3.3*
Where there is risk of freezing in dry-pipe systems, an air pressure of 276 kPa (40 psi) shall be pumped up and allowed to stand 24 hours, and all leaks that allow a loss of pressure over 10.3 kPa (1½ psi) during the 24 hours shall be stopped.
4.3.3.5 Inspection, Maintenance, and Testing.

4.3.3.5.1
All fire suppression systems shall be tested after installation in accordance with the appropriate NFPA standard.

4.3.3.5.2
If an applicable NFPA standard does not exist, then a fire suppression system shall be tested in accordance with the manufacturer's or designer's instruction manual.

4.3.3.5.3
Testing shall not require the discharge of suppressant unless there is no other satisfactory manner in which the reliability and integrity of the system can be verified.

4.3.3.5.4*
All persons who inspect, test, operate, or maintain fire suppression systems shall be trained.

4.3.3.5.5 Sprinkler System Maintenance.

4.3.3.5.5.1
All sprinkler systems shall be maintained in accordance with the manufacturer's requirements or in accordance with NFPA 25.

4.3.3.5.5.2*
As a minimum, all closed-head sprinkler systems, except antifreeze systems, shall be flushed annually by operating flow through the end of the line drain(s) for the system to remove any silt buildup.

(A)
If pendent sprinklers are used on wet-type sprinkler systems, the end sprinkler on each line shall be removed and examined annually to check for silt buildup.

(B)
If silt buildup is found, all sprinklers on the line shall be removed, the line flushed, and new sprinklers installed.

4.3.3.5.5.3*
As a minimum, deluge sprinklers and deluge water-spray systems shall be flow-tested on a monthly basis.

4.3.3.5.5.4
The strainer shall be flushed on a weekly basis, at a minimum.

4.3.3.5.6 Antifreeze Systems.
(A) Each year at the onset of freezing weather, a small amount of antifreeze shall be drawn from the drain valve and the test valve(s) and tested with a hydrometer to ensure that the solution is suitable for the lowest temperature expected.

(B) If the test described in 4.3.3.5.6(A) shows that the solution is not suitable, the solution shall be replaced.
SR-24 Annex material

A.4.3.3.3.1
NFPA 13 requires a minimum 140 kPa (20 psi) residual pressure for ordinary hazard pipe schedule sprinkler systems.

A.4.3.3.3.2.1
Pipe and fittings that permit limited motion of the pipe are recommended as they allow the pipe to be held closer to the roof. If threaded fittings are used, steel pipe with extra-strength threaded fittings is recommended. Copper, aluminum, or other approved materials could be permitted if they are adequate for the pressure.

A number of mines use aluminum pipe or tubing with groove-type couplings and fittings. Where water pressure does not exceed 3448 kPa (500 psi), grooved couplings that have a 12.7 mm (½ in.) female national pipe thread (FNPT) outlet are used to provide connections for sprinklers. Piping put together in this manner can be located closer to an undulating roof, especially if the pipe lengths are short enough to put the couplings (and the automatic sprinklers) on 3 m (10 ft) centers. ‘Mines that use groove-type couplings can have most of the piping precut and grooved ‘in the shop, which simplifies installation underground. Rolled grooves are recommended because they do not reduce the strength of the pipe as much as the cut grooves do. If cut grooves are used, Schedule 40 or heavier pipe should be used.

A.4.3.3.3.2.5
Some automatic sprinklers might not withstand the water pressure that can be encountered in deep mines. Information on the effect of high water pressure on automatic sprinklers can be found in U.S. Bureau of Mines Report of Investigation 9451, “Effect of Pressure on Leakage of Automatic Sprinklers.”

Under U.S. Bureau of Mines Report of Investigation 9538, “Performance of Automatic Sprinkler Systems for Extinguishing Incipient and Propagating Conveyor Belt Fires Under Ventilated Conditions,” NIOSH conducted a series of full-scale fire tests under ventilated conditions of 1.1 and 4.0 m/s (225 and 800 ft/min) for fires up to 10.8 MW. The tests demonstrated that pendent and horizontal sidewall types were both able to extinguish incipient belt fires. Directional sprinklers showed a slightly improved performance in terms of maximum heat release rate at the lower airflow. Both pendent and horizontal sidewall sprinkler types were able to extinguish propagating fires. Horizontal sidewall sprinklers showed an increased effectiveness compared to the pendent sprinklers because of the increased upstream coverage area of the water discharge in terms of maximum heat release rate.

A.4.3.3.3.2.6
The restrictions on sprinkler spacing apply to sprinklers on the same line and those located between sprinklers on adjacent lines.

A.4.3.3.3.2.7
Where sprinkler positioning is such that full coverage can be impaired, such as where a single line of sprinklers protects a belt conveyor with little clearance, a flow test should be conducted to determine if adequate wetting of surface areas is achieved. Additional sprinklers should be provided in the event that adequate coverage is not achieved, or alternative arrangements such as rotated lines or sidewall sprinklers should be considered. Consideration also should be given to the need for noncombustible baffles to protect sprinklers from the discharge of adjacent sprinklers located within 1.8 m (6 ft).

A.4.3.3.3.5

Dry-pipe automatic sprinkler systems are more complex and more difficult to design and install than wet-pipe systems. The committee recommends that all systems be designed and installed by skilled and experienced personnel.

A pressure relief valve, set to relieve at a pressure below the maximum pressure rating of the dry-pipe valve, should be installed between the pressure regulating valve and the dry-pipe valve. The reclosing pressure of the relief valve should be higher than the set pressure of the regulating valve.

A.4.3.3.6.1

Underground shaft mines that use diesel-powered equipment generally employ underground diesel fuel storage areas to facilitate equipment refueling. Adit-type mines in the western United States might initially locate diesel fuel storage and refueling facilities on the surface; however, as the active mine workings progress farther from the adit portal(s), these facilities will likely be moved underground.

A common means of fire protection in many underground diesel fuel storage areas is the use of fixed water sprinkler systems. However, this situation represents a significant safety hazard. According to the NFPA Fire Protection Handbook, water sprinklers can be permitted to be used on diesel fuel for control but not for extinguishment.

In “The Health and Safety Implications of the Use of Diesel-Powered Equipment in Underground Mines,” a report by an interagency task group prepared for MSHA in 1985, the simple conclusion was that “water spray or fog usually will not extinguish diesel fuel fires.”

In an underground coal mine, fire control is not sufficient; fire extinguishment is essential for the following reasons:

(1) Unlike an underground metal or nonmetal mine, the mineral in a coal mine is combustible. All fire prevention and protection provisions in an underground coal mine are aimed at preventing the ignition of the coal. In a metal or nonmetal mine, if fire control efforts are unsuccessful in extinguishing a fire on a piece of diesel equipment or a diesel fuel fire, personnel can be evacuated and the fire can be allowed to consume all available fuel materials, thereby self-extinguishing. In an underground coal mine, this practice would almost certainly result in the ignition of the coal and the consequent loss of part or all of the mine.

(2) Even if a fire does not grow in intensity or spread to the coal, toxic smoke and fire gases are produced as long as it burns, which can endanger persons within the mine.

(3) According to the NFPA Fire Protection Handbook, overpressure failure of containers exposed to fire is considered the principal hazard of closed-container flammable and combustible liquid storage.
(4) Even a “controlled” fire can cause such container failure, producing a fire so intense that the sprinkler system is unable to control it, much less extinguish it.

(5) Water sprays are not effective in extinguishing pressure fires, running fuel fires, and obstructed spill fires, all of which could occur in a diesel refueling area.

(6) Water supplies are limited in many underground mines. Fire “control” should be considered temporary because when the water supply is depleted, the fire will grow immediately to the maximum intensity.

(7) The vapor pressure of diesel fuel increases with elevation due to reduced barometric pressure. As a result, even fuels without flash point–reducing additives can become flammable, depending on the altitude at which they are used. This reduction in flash point can result in reclassification of the diesel fuel to a Class IC flammable liquid. There is no clear consensus in the literature and industry practice as to the effectiveness of fixed water sprays in controlling and extinguishing fires involving Class IC flammable liquids. Although industry practice strongly favors fixed water sprays for such applications, the literature and available research results clearly indicate the ineffectiveness of fixed sprays on Class IC liquids, especially in the case of pressure fires, running fuel fires, and obstructed spill fires.

Therefore, water sprinkler systems installed for the protection of diesel fuel storage areas are considered inadequate; foam–water systems should be utilized. See the applicable sections of NFPA 16.

A.4.3.3.6.2

The alarm system that serves sprinklers protecting the drive area of a belt conveyor also should be permitted to serve as the fire detection system installed over that portion of the belt conveyor.

A.4.3.3.4.3

The clapper of a differential-type dry-pipe valve should be held off its seat during any test in excess of 345 kPa (50 psi), to prevent damaging the valve.

A.4.3.3.5.4

The special suppression system manufacturer is a good source for training regarding their equipment. Other acceptable training resources can be available.

A.4.3.3.5.5.2

The system could have several end-of-line drains if parts of the system dead end.

A.4.3.3.5.5.4

Deluge sprinklers might need to be flowed more frequently than monthly to keep the sprinkler systems clean. If caps are not used on water spray systems, they also might need to be flowed more frequently than monthly to keep the nozzles clean.
4.3.3.6.4 *
Where a pre-engineered fire suppression system(s) is used to protect self-propelled equipment, it shall be tested and listed for such use, by a third-party testing laboratory acceptable to the authority having jurisdiction.

Submitter Information Verification

Submitter Full Name: [ Not Specified ]
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Submittal Date: Tue Jan 07 12:14:39 EST 2014

Committee Statement

Committee Statement: Technical Committee has decided to remove this section and associated annex as the requirement is redundant and is not consistently included in other sections of the document.
5.3.5.1.1
An automatic fire suppression system shall be installed in the center pin/collector ring area of the dragline. If there is no way for an electrical spark to communicate from the collector ring (e.g., a sealed ring) to the grease around the center pin, then a fire suppression system is not required.

Submitter Information Verification

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Submittal Date: Tue Jan 07 12:27:53 EST 2014

Committee Statement

Committee Statement: Technical Committee revised the language in this FR to clarify the requirement and to address committee comments on the ballot.
Response Message:
5.3.6.6*
Fire suppression system manual actuation lines shall not be routed near high heated surfaces or and shall not be routed within fire hazard areas unless fitted with fire-resistant sleeves.

Submitter Information Verification

Submitter Full Name: [Not Specified]
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Submittal Date: Tue Jan 07 12:55:40 EST 2014

Committee Statement

Committee Statement: Technical Committee clarified language to add back in the ability to use fire resistant sleeves for lines that are routed through fire hazard areas.

Response Message:
5.3.8.1 Portable Fire Extinguishers.

5.3.8.1.1* All self-propelled surface mining equipment, including but not limited to bulldozers, front-end loaders, haulage trucks, cranes, graders, scrapers, draglines, drills, shovels, and mobile diesel and electrical equipment, shall be equipped with at least one listed portable, multipurpose (ABC), dry-chemical extinguisher having a nominal capacity of 4.5 kg (10 lb) of agent or greater.

5.3.8.1.2 Portable extinguishers installed on small units of self-propelled and mobile mining equipment, including but not limited to miniature loaders, and individual personnel transports, and small mobile generators, shall have a minimum rating of 2-A:10-B:C and a nominal capacity of 2.3 kg (5 lb) of extinguishing agent.

Submitter Information Verification

Submitter Full Name: [Not Specified]
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Submittal Date: Tue Jan 07 17:34:17 EST 2014

Committee Statement

Committee Statement: Product of task group - clarifies requirements for self-propelled equipment.
Response Message:
### Second Revision No. 10-NFPA 120-2014 [ New Section after 5.3.7.3.12 ]

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<tr>
<td><strong>5.3.7</strong> Mobile Equipment.</td>
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<tr>
<td><strong>5.3.7.1</strong> Fire Protection.</td>
<td>Portable extinguishers installed on mobile mining equipment, including but not limited to mobile generators and compressors, shall have a minimum rating of 2-A:10-B:C and a nominal capacity of 2.3 kg (5 lb) of extinguishing agent.</td>
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### Committee Statement

| Committee Statement:       | Product of Task Group - Clarified requirements specific for mobile equipment. |
| Response Message:          |                            |
9.4.6 Automatic Fire Suppression Systems at the Belt Drive.

9.4.6.1 Deluge water spray systems, foam systems, closed-head sprinkler systems, or dry-chemical systems automatically actuated by rise in temperature shall be installed at main and secondary belt conveyor drives.

9.4.6.1.1 If sprinkler or water systems are installed, they shall comply with 4.3.3.3 and 9.4.6.3 of this standard.

9.4.6.1.2 If dry chemical systems are installed, they shall be installed and maintained in accordance with NFPA 17 and the manufacturer’s instructions.

9.4.6.2 Fire suppression systems shall extend to the drive areas of belt conveyors, including drive motor(s), reducer, head pulley, and belt storage unit (takeup), including any hydraulic power unit; its electrical controls; and the top and bottom of the first 15.2 m (50 ft) of belt from the drive on the downwind side.

9.4.6.2.1 Where a pre-engineered dry chemical fire suppression system is to be used, protection shall also be provided for the top surface of both the top and bottom belts, and the bottom surface of the top belt of the first 15.2 m (50 ft) of fire-resistant belt or 45.7 m (150 ft) of non-fire-resistant belt from the drive on the downwind side.

9.4.6.3 Water-Based Fire Suppression Systems.

9.4.6.3.1 Water Supply.

9.4.6.3.1.1 The water supply shall be free of excessive sediment and corrosives and provide the required flow for not less than 10 minutes. A approved strainer with a flush-out connection and manual shutoff valve shall be provided.

9.4.6.3.1.2 The water supply shall provide the required flow for not less than 60 minutes.

9.4.6.3.1.3 Reinforced approved or listed flexible hose connections shall be permitted to be used to connect the water supply pipe from the water main to the pressure reducing device or shutoff valve to the sprinkler system.

(A) The flexible connection shall be rated at a pressure that exceeds the maximum water pressure expected on the system.

(B) If a non-metallic connection is used, it shall not be within 3.0 m (10 ft) of the belt drive motors or primary roller drive.

9.4.6.3.1.4 If a pressure regulator is used, it shall be set below the maximum pressure allowed by the pressure rating of the piping and fittings.

9.4.6.3.1.5 If a pressure regulator is used, it shall be inspected and tested on a weekly basis to ensure that it is functioning properly and the sprinkler system has the right amount of pressure.
General Sprinkler Requirements.

Sprinkler systems shall meet the following requirements:

(1) The sprinklers shall be installed in accordance with NFPA 13, *Standard for the Installation of Sprinkler Systems*, as far as practical, and shall have components that have been listed. The water supply shall be capable of supplying a constant flow of water with all heads functioning for a period of 10 minutes.

(2) The sprinkler head activation temperature shall not be less than 65.6°C (150°F) or greater than 148.9°C (300°F).

(3) Sprinklers shall be kept free of excessive rock dust, muck, conveyor string, or any other material that can block the discharge or insulate the fusible link. Sprinklers shall not be covered with plastic bags or similar material that will reduce the response time index or interfere with the spray pattern of the sprinkler head.

(4) The application rate shall not be less than 10.2 L/min/m² (0.25 gpm/ft²) of the top surface of the top belt, bottom surface of the top belt, and the top surface of the lower belt.

(5) With a water flow and pressure than is present under normal mine operating conditions, the residual pressure measured downstream of the opened sprinklers or the 8-head inspector’s test connection of 70 kPa (10 psi) or greater for belt drive systems shall be maintained at all times.

(6) Maximum distance between nozzles on a branch line shall not exceed 2.4 m (8 ft).

(7) Piping for the deluge, foam, or closed-head sprinkler system shall be metal and listed for sprinkler applications.

(8) Sprinkler piping shall be supported by UL-listed pipe hangers or other substantial metal supports such as angle iron, U bolts, or heavy chain.

(9) The system shall be interlocked to shut down the conveyor and provide an audible and a visual alarm.

(10) The components of the system shall be located so as to minimize the possibility of damage by roof fall or by the moving belt and its load.

Deluge Water Systems.

Deluge water spray systems shall meet the requirements of 9.4.6.3.1 through 9.4.6.12.3.

The system shall be activated by heat detectors or no less effective means.

(A) Heat detectors shall be located at the belt drive, hydraulic takeup unit (unless fire-resistive fluid is used), discharge roller, and the roof above the conveyor.

(B) Heat detectors at the roof line should be spaced 2.4 m to 3.0 m (8 ft to 10 ft) apart along the entire length of the protected area of the belt.

The water spray nozzles shall be full cone, corrosion resistant [if less than 0.95 cm (3/8 in.) inside diameter or K-factor 4.2 or lower], and provided with blow-off dust covers.

If water spray sprinklers or open-head sprinklers are used, blow-off dust covers are not required to keep them clean as long as they are flow tested in accordance with 4.3.5.5.

A closed sprinkler head shall be used over the electrical controls.

Foam Systems.

Foam systems shall meet the requirements of 9.4.6.3.4 through 9.4.6.13.4.

The system shall be activated by heat detectors or no less effective means.
(A) Heat detectors shall be located at the belt drive, hydraulic takeup unit (unless fire-resistive fluid is used), discharge roller, and the roof above the conveyor.

(B) Heat detectors at the roof line should be spaced 2.4 m to 3.0 m (8 ft to 10 ft) apart along the entire length of the protected area of the belt.

9.4.6.3.4.3
The nozzles shall be full cone, corrosion resistant [if less than 0.95 cm (3/8 in.) inside diameter or K-factor 4.2 or lower], and provided with blow-off dust covers.

9.4.6.3.4.4
The system shall have a capacity to last 25 minutes.

9.4.6.3.5
A closed sprinkler head should be used over the electrical controls.

9.4.6.4
Piping for the deluge, foam, or closed-head sprinkler system shall be metal and listed for sprinkler applications.

9.4.6.4.1
Sprinkler piping shall be supported by UL-listed pipe hangers or other substantial metal supports such as angle iron, U bolts, or heavy chain.

9.4.6.5
The application rate shall not be less than 10.2 L/min/m² (0.25 gpm/ft²) of the top surface of the top belt.

9.4.6.6
The discharge shall be directed at both the upper and the bottom surface of the top belt and the upper surface of the bottom belt.

9.4.6.7
The water supply shall be free of excessive sediment and corrosives and provide the required flow for not less than 10 minutes. A strainer with a flush-out connection and manual shutoff valve shall be provided.

9.4.6.8
Maximum distance between nozzles on a branch line shall not exceed 2.4 m (8 ft).

9.4.6.9
The system shall be interlocked to shut down the conveyor and provide an audible and a visual alarm.

9.4.6.10
The components of the system shall be located so as to minimize the possibility of damage by roof fall or by the moving belt and its load.

9.4.6.11
Water sprinkler systems shall also comply with 4.3.3.3.

9.4.6.10.1
Deluge water spray systems shall meet the requirements of 9.4.6.12.1 through 9.4.6.12.3.

9.4.6.10.1.1
Heat detectors shall be located at the belt drive, hydraulic takeup unit (unless fire-resistive fluid is used), discharge roller, and the roof above the conveyor.

9.4.6.10.1.2
Heat detectors at the roof line should be spaced 2.4 m to 3.0 m (8 ft to 10 ft) apart along the entire length of the protected area of the belt.
9.4.6.10.2  
The nozzles shall be full cone, corrosion resistant, and provided with blow-off dust covers.

9.4.6.10.3  
A closed sprinkler head shall be used over the electrical controls.

9.4.6.10  
Foam systems shall meet the requirements of 9.4.6.13.1 through 9.4.6.13.4.

9.4.6.10.1  
The system shall be activated by heat detectors.

9.4.6.10.1.1  
Heat detectors shall be located at the belt drive, hydraulic takeup unit (unless fire-resistant fluid is used), discharge roller, and the roof above the conveyor.

9.4.6.10.1.2  
Heat detectors at the roof line should be spaced 2.4 m to 3.0 m (8 ft to 10 ft) apart along the entire length of the protected area of the belt.

9.4.6.10.2  
The nozzles shall be full cone, corrosion resistant, and provided with blow-off dust covers.

9.4.6.10.3  
The system shall have a capacity to last 25 minutes.

9.4.6.10.4  
A closed sprinkler head should be used over the electrical controls.

9.4.6.13  
Sprinkler systems shall meet the following requirements:

  - The sprinklers shall be installed in accordance with NFPA 13, Standard for the Installation of Sprinkler Systems, as far as practical, and shall have components that have been listed.
  - The water supply shall be capable of supplying a constant flow of water with all heads functioning for a period of 10 minutes.
  - The sprinkler head activation temperature shall not be less than 65.6°C (150°F) or greater than 149.9°C (300°F).
  - Sprinklers shall be kept free of excessive rock dust, muck, conveyor string, or any other material that can block the discharge or insulate the fusible link.
  - Sprinklers shall not be covered with plastic bags or similar material that will reduce the response time index or interfere with the spray pattern of the sprinkler head.

9.4.6.10  
Maintenance and Testing.

Fire suppression systems shall be maintained and tested in accordance with 4.3.3.4.

Supplemental Information

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Submitter Information Verification

Submitter Full Name: Susan Bershad  
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Submittal Date: Mon Mar 31 13:32:36 EDT 2014

Committee Statement
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<th>Work of sprinkler task group. Reorganizes and modifies section 9.4.6, Automatic Fire Suppression Systems at the Belt Drive for clarity. See word attachment for revised section.</th>
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</table>
9.4.6  Automatic Fire Suppression Systems at the Belt Drive.

9.4.6.1  Deluge water spray systems, foam systems, closed-head sprinkler systems, or dry-chemical systems automatically actuated by rise in temperature shall be installed at main and secondary belt conveyor drives.

9.4.6.1.1  If sprinkler or water systems are installed, they shall comply with 4.3.3.3 and 9.4.6.3 of this standard.

9.4.6.1.2  If dry chemical systems are installed, they shall be installed and maintained in accordance with NFPA 17 and the manufacturer’s instructions.

9.4.6.2  Fire suppression systems shall extend to the drive areas of belt conveyors, including drive motor(s), reducer, head pulley, and belt storage unit (takeup), including any hydraulic power unit; its electrical controls; and the top and bottom of the first 15.2 m (50 ft) of belt from the drive on the downwind side.

9.4.6.2.1  Where a pre-engineered dry chemical fire suppression system is to be used, protection shall also be provided for the top surface of both the top and bottom belts, and the bottom surface of the top belt of the first 15.2 m (50 ft) of fire-resistant belt or 45.7 m (150 ft) of non-fire-resistant belt from the drive on the downward side.

9.4.6.3  Water-Based Fire Suppression Systems.

9.4.6.3.1  Water Supply.

9.4.6.3.1.1  The water supply shall be free of excessive sediment and corrosives. An approved strainer with a flush-out connection and manual shutoff valve shall be provided.

9.4.6.3.1.2  The water supply shall provide the required flow for not less than 60 minutes.
Approved or listed flexible connections shall be permitted from the water main to the pressure reducing device or shutoff valve to the sprinkler system.

(A) The flexible connection shall be rated at a pressure that exceeds the maximum water pressure expected on the system.

(B) If a non-metallic connection is used, it shall not be within 3.0 m (10 ft) of the belt drive motors or primary roller drive.

9.4.6.3.1.4 If a pressure regulator is used, it shall be set below the maximum pressure allowed by the pressure rating of the piping and fittings.

9.4.6.3.1.5 If a pressure regulator is used, it shall be inspected and tested on a weekly basis to ensure that it is functioning properly and the sprinkler system has the right amount of pressure.

9.4.6.3.2 General Sprinkler Requirements.

Sprinkler systems shall meet the following requirements:

1. The sprinklers shall be installed in accordance with NFPA 13, as far as practical, and shall have components that have been listed.
2. The sprinkler head activation temperature shall not be less than 65.6°C (150°F) or greater than 148.9°C (300°F).
3. Sprinklers shall be kept free of excessive rock dust, muck, conveyor string, or any other material that can block the discharge or insulate the fusible link.

(4) The application rate shall not be less than 10.2 L/min/m² (0.25 gpm/ft²) of the top surface of the top belt, bottom surface of the top belt, and the top surface of the lower belt.
(5) With a water flow and pressure than is present under normal mine operating conditions, the residual pressure measured downstream of the opened sprinklers or the 8-head inspector’s test connection of 70 kPa (10 psi) or greater for belt drive systems shall be maintained at all times.
(6) Maximum distance between nozzles on a branch line shall not exceed 2.4 m (8 ft).
(7) Piping for the deluge, foam, or closed-head sprinkler system shall be metal and listed for sprinkler applications.
(8)* Sprinkler piping shall be supported by UL-listed pipe hangers or other substantial metal supports such as angle iron, U bolts, or heavy chain.
(9) The system shall be interlocked to shut down the conveyor and provide an audible and a visual alarm.
(10) The components of the system shall be located so as to minimize the possibility of damage by roof fall or by the moving belt and its load.

9.4.6.3.3 Deluge Water Systems.
Deluge water spray systems shall meet the requirements of 9.4.6.3.3.1 through 9.4.6.3.3.4.

9.4.6.3.3.1
The system shall be activated by heat detectors or no less effective means.

(A) Detectors shall be located at the belt drive, hydraulic takeup unit (unless fire-resistive fluid is used), discharge roller, and the roof above the conveyor.

(B) Detectors at the roof line should be spaced 2.4 m to 3.0 m (8 ft to 10 ft) apart along the entire length of the protected area of the belt.

9.4.6.3.3.2
The water spray nozzles shall be full cone, corrosion resistant [if less than 0.95 cm (⅜ in.) inside diameter or K-factor 4.2 or lower], and provided with blow-off dust covers.

9.4.6.3.3.3
If water spray sprinklers or open-head sprinklers are used, blow-off dust covers are not required to keep them clean as long as they are flow tested in accordance with 4.3.3.5.5.3.

9.4.6.3.3.4
A closed sprinkler head shall be used over the electrical controls.

9.4.6.3.4  Foam Systems.

9.4.6.3.4.1
Foam systems shall meet the requirements of 9.4.6.3.4.2 through 9.4.6.3.4.5.

9.4.6.3.4.2
The system shall be activated by heat detectors or no less effective means.

(A) Detectors shall be located at the belt drive, hydraulic takeup unit (unless fire-resistive fluid is used), discharge roller, and the roof above the conveyor.

(B) Detectors at the roof line should be spaced 2.4 m to 3.0 m (8 ft to 10 ft) apart along the entire length of the protected area of the belt.

9.4.6.3.4.4
The nozzles shall be full cone, corrosion resistant [if less than 0.95 cm (⅜ in.) inside diameter or K-factor 4.2 or lower], and provided with blow-off dust covers.
The system shall have a capacity to last 25 minutes.

9.4.6.3.4.5
A closed sprinkler head should be used over the electrical controls.

9.4.6.3.5 Maintenance and Testing.
Fire suppression systems shall be maintained and tested in accordance with 4.3.3.5.
A.4.3.3.2.1(1)

Under Report No. H0122086, “Suppression of Fires on Underground Coal Mine Conveyor Belts,” the Department of the Interior, U.S. Bureau of Mines (USBM), conducted a series of full-scale fire tests. The tests demonstrated that standard, 12.7 mm (½ in.) orifice, nominal 100°C (212°F) automatic sprinklers, located over the belt on 3 m (10 ft) centers, effectively controlled every test fire while opening only two sprinklers, with residual pressure held to a constant a gauge pressure of 69 kPa (10 psi).

From the time that the USBM tests were conducted, underground belts have tended to become wider to carry increased tonnage; therefore, belt fire suppression systems should be designed to supply more sprinklers than indicated by these tests. Because many conveyor belts stretch a long distance in a straight line, a fire scenario would involve only a portion of the belt, regardless of the overall length of the belt. Because the actual incidence of belt fires is low in underground coal mines, and most of those are in the area of the belt drive and the belt takeup, protection of only the area from the discharge pulley to the end of the takeup is needed. If the belt structure contains a deck between upper and lower strands of the belt, automatic sprinklers should be located beneath the deck, virtually doubling the size of the sprinkler system.

If the sprinkler system is extended to cover a distance greater than 30.5 m (100 ft) in one direction from the point where the pipe holding the automatic sprinklers along the roof is fed, then a hydraulic calculation of the system is recommended. Long runs of pipe should be flow tested as required by 4.3.3.5.5.1, with the eight open sprinklers installed at the distant end of the pipe run. Branch piping intended to protect limited areas should be piped with adequately sized pipe to carry the required water flow. Table A.4.3.3.2.1(1) should be used to determine the minimum size of pipe.

Table A.4.3.3.2.1(1) Minimum Pipe Sizes per Number of Sprinklers

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<thead>
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<tr>
<td>1 in.</td>
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</tr>
<tr>
<td>1¼ in.</td>
<td>3</td>
</tr>
<tr>
<td>1½ in.</td>
<td>5</td>
</tr>
<tr>
<td>2 in.</td>
<td>10</td>
</tr>
<tr>
<td>2½ in.</td>
<td>20</td>
</tr>
<tr>
<td>3 in.</td>
<td>40</td>
</tr>
<tr>
<td>3½ in.</td>
<td>65</td>
</tr>
<tr>
<td>4 in.</td>
<td>100</td>
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For SI units, 1 in. = 25.4 mm.
Larger systems should be separately flow tested as required by 4.3.3.5.5.1.

Supplemental Information

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Submitter Information Verification

Submitter Full Name: Susan Bershad
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Committee Statement

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<td>1 in.</td>
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<td>2 in.</td>
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<tr>
<td>2 ½ in.</td>
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<tr>
<td>3 in.</td>
<td>40</td>
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B.1.2 Other Publications.
B.1.2.1 API Publications.
American Petroleum Institute, 1220 L Street NW, Washington, DC 20005-4070.


B.1.2.2 ASME Publications.
American Society of Mechanical Engineers, Two Park Avenue, New York, NY 10016-5990.


B.1.2.3 AWS Publications.
American Welding Society, 550 NW LeJeune Road, Miami, FL 33126.


B.1.2.4 CGA Publications.
Compressed Gas Association, 14501 George Carter Way, Suite 103, Chantilly, VA 20151-2923.


B.1.2.5 MSHA Publications.
Mine Safety and Health Administration, National Mine Health and Safety Academy, 1301 Airport Road, Beaver, WV 25813-9426. (email: Library@MSHA.gov).

"Fire Accident Abstract."

"Fire Accident Report."


"Injury Experience in Coal Mining."

B.1.2.6 NIOSH Publications.
National Institute for Occupational Safety and Health, 1600 Clifton Road, Atlanta, GA 30333.


B.1.2.7 UL Publications.
Underwriters Laboratories Inc., 333 Pfingsten Road, Northbrook, IL 60062-2096.

UL 80, Standard for Steel Tanks for Oil Burner Fuels or Other Combustible Liquids, 2007, revised 2009.

B.1.2.8  USBM Publications.
U.S. Bureau of Mines, Publications, National Technical Information Service (NTIS), 5285 Port Royal Road, Springfield, VA 22161.


B.1.2.9  U.S. Government Publications.

Title 30, Code of Federal Regulations, Part 18, Chapter 1.

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Submittal Date: Tue Jan 28 11:26:23 EST 2014

Committee Statement

Committee Statement: Update of publication dates for reference material
Response Message:
B.2 Informational References.

The following documents or portions thereof are listed here as informational resources only. They are not a part of the requirements of this document.

B.2.1 NFPA Publications.
National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471.


B.2.2 Other Publications.

B.2.2.1 ACGIH Publications.
American Conference of Governmental Industrial Hygienists, 1330 Kemper Meadow Drive, Cincinnati, OH 45240-1634.


B.2.2.2 ANSI Publications.
American National Standards Institute, Inc., 25 West 43rd Street, 4th Floor, New York, NY 10036.


B.2.2.3 ASTM Publications.
ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959.

IEEE Publications.
Institute of Electrical and Electronics Engineers (IEEE), Inc., Three Park Avenue, 17th Floor, New York, NY 10016-5997.

SAE Publications.
Society of Automotive Engineers, 400 Commonwealth Drive, Warrendale, PA 15096.
B.2.2.6 Former U.S. Department of Interior Bureau of Mines Publications.

The following former Bureau of Mines reports and articles are available for Open File (OFR) inspection at the following locations: National Institute for Occupational Safety & Health (NIOSH) Facilities, P.O. Box 18070, Pittsburgh, PA 15232; U.S. Geological Survey, Reston, VA; and the National Mine Health and Safety Academy, Beaver, WV (email: Library@MSHA.gov). They also may be obtained directly from the National Technical Information Service (NTIS), 5285 Port Royal Road, Springfield, VA 22161.

Note: Publications marked with an asterisk provide information on fire risk assessment.

The following Bureau of Mines reports are available from the Section of Publications, Bureau of Mines, 4800 Forbes Avenue, Pittsburgh, PA 15213.
B.2.2.7 U.S. Government Publications.

B.2.2.8 Other Publications.

Submitter Information Verification

Submitter Full Name: [ Not Specified ]
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Submittal Date: Tue Jan 28 11:37:03 EST 2014

Committee Statement

Committee Statement: Update of referenced publications.
Response Message: