Technical Committee on NFPA 750 Water Mist Fire Protection Systems (WAM-AAA)

MEMORANDUM

TO: Principal and Alternate Members of the Technical Committee on NFPA 750 Water Mist Fire Protection Systems (WAM-AAA)

FROM: Sandra Stanek, NFPA Staff Liaison

DATE: January 11, 2013

SUBJECT: AMENDMENT TO AGENDA – NFPA 750 Second Draft Meeting (Fall 2013 revision cycle) for the 2014 edition

The attached agenda amendment is for the following Public Comments:

Public Comment #45
Public Comment #49
Public Comment #73
Public Comment #78

It was brought to our attention that the intent of the submitter for the above Public Comments was unclear in the file originally provided.

Please use these revised comments in your Agenda Package.

Thank you.
7.2 System Applications.
System applications shall consist of one of the following four categories:

1. Local-application systems
2. Total compartment application systems
3. Zoned application systems
4. Automatic sprinkler alternative water mist application systems

7.2.1 Local-Application Systems.
7.2.1.1 Local-application systems shall be designed and installed to provide complete distribution of mist on or around the hazard or object to be protected.
7.2.1.2 Local-application systems shall be designed to protect an object or a hazard in an enclosed, unenclosed, or open outdoor condition.
7.2.1.3 Local-application systems shall be actuated by automatic nozzles or by an independent detection system.

7.2.2 Total Compartment Application Systems.
7.2.2.1 Total compartment application systems shall be designed and installed to provide complete protection of an enclosure or space.
7.2.2.2 The complete protection of an enclosure or space shall be achieved by the simultaneous operation of all nozzles in the space by manual or automatic means.

7.2.3* Zoned Application Systems.
7.2.3.1 Zoned application systems shall be designed to protect a predetermined portion of the compartment by the activation of a selected group of nozzles.
7.2.3.2 Zoned application systems shall be designed and installed to provide complete mist distribution throughout a predetermined portion of an enclosure or space. This shall be achieved by simultaneous operation of a selected group of nozzles in a predetermined portion of the space by manual or automatic means.
7.2.3.3 Zoned application systems shall be actuated by automatic nozzles or by an independent detection system.

7.2.4 Automatic Sprinkler Alternative Water Mist Systems
Water Mist Systems Utilized to Provide Primary Fire Protection of Buildings or Occupancies.

7.2.4.1 Automatic sprinkler alternative water mist systems shall be designed and installed to provide automatic fire protection throughout a building or area occupancy.

7.2.4.2 Automatic sprinkler alternative water mist system devices shall be listed for the intended occupancy classification as described in Chapter 5 unless otherwise permitted in this standard.

7.2.4.3 Automatic sprinkler alternative water mist systems shall be utilized as primary fire protection within buildings or occupancies shall be of the wet pipe or, dry pipe type, or pre-action type.

7.2.4.4 The requirements of 7.2.4.3 shall not apply where environmental or operational conditions dictate whether there is a wet or dry system.
Statement of Problem and Substantiation for Public Comment

It is assumed that the true intent of including the new terminology is to support the concept of water mist systems installed to provide primary fire protection within a building or occupancy. Therefore, the text should be changed to (1) remove all references to sprinkler systems as they are different technology covered by their own design and installation standard, and (2) more accurately reflect the intent of the section which is to provide general requirements for water mist systems that are installed in a building or occupancy to provide primary fire protection. In addition, there are several applications where water mist systems are used for occupancy protection - such as in data centers and server rooms - where they are installed as pre-action systems. Pre-action system configurations should be considered in this section. This comment is being submitted on behalf of the Tyco NFPA750 Codes and Standards task group.

Submitter Information Verification
Submitter Full Name: Zachary Magnone
Organization: Tyco Fire Protection Products
Submittal Date: Thu Nov 15 14:21:19 EST 2012
10.1 General.
The requirements of Section 10.1 shall apply to all automatic sprinkler alternative Water Mist Systems unless utilized to protect a building or occupancy unless modified by a specific section of Chapter 10.

10.1.1 A building or portion thereof shall be permitted to be protected in accordance with any applicable design basis conforming to Section 7.2 at the discretion of the designer.

10.1.2 Water Demand.
The water demand requirements for engineered water mist systems shall be those specified by the water mist equipment manufacturer’s design and installation manual.

10.1.3 Water Supplies.
10.1.3.1 Quantity.
Water supplies for water mist systems shall be in conformance with Chapter 12 of this Standard and this section.

10.1.3.2 For automatic sprinkler alternative water mist systems, the minimum water demand requirements for the water mist system shall be determined by adding the hose stream allowance, if any, to the water demand for the water mist nozzles.

10.1.3.3 Duration.
The minimum water supply shall be available for the minimum duration specified in Chapter 12.

10.1.3.4 Tanks shall be sized to supply the equipment they serve.

10.1.3.5 Pumps shall be sized to supply the equipment they serve.

10.1.4 Hose Allowance.
10.1.4.1 Where the water supply for an automatic sprinkler alternative water mist system serves concurrently as the source for the water mist system and as the source of water for inside or outside hoses, the concurrent hose stream allowance shall be added to the water mist system demand at the point of entry into the building and upstream of any pumps, filters, or strainers on the water mist system.

10.1.4.2 The hose stream allowance shall be in accordance with NFPA 13, Standard for the Installation of Sprinkler Systems, and shall be added to the water mist system demand at the point of entry.

### Table 10.1.4.2 Hose Stream Allowance for water mist systems utilized to provide primary protection within a building or occupancy [13:Table 11.2.3.1.3]

<table>
<thead>
<tr>
<th>Occupancy</th>
<th>Inside Hose</th>
<th>Total Combined Inside and Outside Hose</th>
<th>Duration (minutes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Light hazard</td>
<td>0, 50, or 100</td>
<td>0, 189, or 379</td>
<td>100</td>
</tr>
<tr>
<td>Ordinary hazard</td>
<td>0, 50, or 100</td>
<td>0, 189, or 379</td>
<td>250</td>
</tr>
<tr>
<td>Extra hazard</td>
<td>0, 50, or 100</td>
<td>0, 189, or 379</td>
<td>500</td>
</tr>
</tbody>
</table>
Table 10.1.4.2 Hose stream allowance for water mist systems utilized to provide primary protection within a building or occupancy.

10.1.4.3 Intermediate and High Pressure Water Mist Systems.
Where inside or outside hose streams are required in areas protected by an intermediate or high pressure automatic sprinkler alternative water mist system, a separate standpipe system for the hose stream shall be provided in accordance with NFPA 14, Standard for the Installation of Standpipe and Hose Systems.

10.1.4.4 Low Pressure Water Mist.
Where an automatic sprinkler alternative water mist system is served by a common fire pump capable of meeting the water mist system demand, and the fire standpipe demand is in conformance with NFPA 14, Standard for the Installation of Standpipe and Hose Systems, a separate riser is not required for each system.

Statement of Problem and Substantiation for Public Comment
It is assumed that the intent of new Chapter 10 is to provide specific requirements for water mist systems that are used as primary protection within a building or occupancy. In consideration, the suggested revisions provide a clearer approach to meet the assumed intent. In addition, items such as 10.1.4.2 that attempt to provide prescriptive requirements that relate directly to performance objectives of water mist systems should not be tied to sprinkler technology. Water mist systems protect buildings and occupancies in a fundamentally different way than sprinkler systems do, and should therefore be judged on their own technical merits. The hose stream allowance table has been extracted directly from the 2010 edition of NFPA 13. This comment is being submitted on behalf of the Tyco NFPA750 Codes and Standards task group.

Submitter Full Name: Zachary Magnone
Organization: Tyco Fire Protection Products
Submittal Date: Thu Nov 15 14:41:27 EST 2012
Chapter 10: Automatic Sprinkler Alternative Occupancy Class Water Mist Systems

10.1 General.
The requirements of Section 10.1 shall apply to all automatic sprinkler alternative occupancy class water mist systems unless modified by a specific section of Chapter 10.

10.1.1 A building or portion thereof shall be permitted to be protected in accordance with any applicable design basis conforming to Section 7.2 at the discretion of the designer.

10.1.2* Water Demand.
The water demand requirements for engineered water mist systems shall be those specified by the water mist equipment manufacturer’s design and installation manual.

10.1.3 Water Supplies.
10.1.3.1 Quantity.
Water supplies for water mist systems shall be in conformance with Chapter 12 of this standard and this section.

10.1.3.2 For automatic sprinkler alternative occupancy class water mist systems, the minimum water demand requirements for the water mist system shall be determined by adding the hose stream allowance, if any, to the water demand for the water mist nozzles.

10.1.3.3 Duration.
The minimum water supply shall be available for the minimum duration specified in Chapter 12.

10.1.3.4 Tanks shall be sized to supply the equipment they serve.
10.1.3.5 Pumps shall be sized to supply the equipment they serve.

10.1.4* Hose Allowance.
10.1.4.1 Where the water supply for an automatic sprinkler alternative occupancy class water mist system serves concurrently as the water source for the water mist system and as the source of water for inside or outside hoses, the concurrent hose stream allowance shall be added to the water mist system demand at the point of entry into the building and upstream of any pumps, filters, or strainers on the water mist system.

10.1.4.2 The hose stream allowance shall be in accordance with NFPA 13, Standard for the Installation of Sprinkler Systems, for the occupancy being protected to Table X (Insert Table 11.2.3.1.2 from NFPA 13).

Table X Hose Stream Allowance and Water Supply Duration Requirements for Hydraulically Calculated Systems [13:Table 11.2.3.1.3]

<table>
<thead>
<tr>
<th>Occupancy</th>
<th>Inside Hose</th>
<th>Total Combined Inside and Outside Hose</th>
<th>Duration (minutes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Light hazard</td>
<td>0, 50, or 100</td>
<td>100, 379</td>
<td>30</td>
</tr>
<tr>
<td>Ordinary hazard</td>
<td>0, 50, or 100</td>
<td>250, 946</td>
<td>60–90</td>
</tr>
<tr>
<td>Extra hazard</td>
<td>0, 50, or 100</td>
<td>500, 1893</td>
<td>90–120</td>
</tr>
</tbody>
</table>
10.1.4.3 **Intermediate and High Pressure Water Mist Systems.**
Where inside or outside hose streams are required in areas protected by an intermediate or high pressure automatic sprinkler alternative occupancy class water mist system, a separate standpipe system for the hose stream shall be provided in accordance with NFPA 14, *Standard for the Installation of Standpipe and Hose Systems.*

10.1.4.4 **Low Pressure Water Mist.**
Where an automatic sprinkler alternative occupancy class water mist system is served by a common fire pump capable of meeting the water mist system demand, and the fire standpipe demand is in conformance with NFPA 14, *Standard for the Installation of Standpipe and Hose Systems,* a separate riser is not required for each system.

10.2 **Occupancy Hazard Fire Control Approach.**

10.2.1 **Occupancy Classifications.**

10.2.1.1 Occupancy classifications for this standard shall relate to water mist installations and their water supplies only.

10.2.1.2 Occupancy classifications shall not be used as a general classification of occupancy hazards.

10.2.1.3 Occupancies or portions of building occupancies shall be classified according to the quantity and combustibility of contents, the expected rates of heat release, the total potential for energy release, the heights of stockpiles, and the presence of flammable and combustible liquids, using the definitions contained in Chapter 5.

10.3 **Residential Occupancy Fire Control Approach.**

10.3.1 Residential Occupancies up to and Including Four Stories in Height.

10.3.1.1 **Scope.**

10.3.1.1.1 This section shall cover the design and installation of automatic sprinkler alternative occupancy class water mist systems for protection against fire hazards in residential occupancies up to and including four stories in height.

10.3.1.1.2 The water mist system shall be designed to protect against a fire originating from a single ignition location.

10.3.1.2 **System Arrangement.**
In townhouse-style buildings protected in accordance with this standard, each dwelling unit shall have its own dedicated water mist system, or the control valves for the water mist system shall be located outside the dwelling units or in a common area.

10.3.1.3 **Listed or Labeled.**
Listed or labeled devices listed devices and materials shall be installed and used in accordance with the listing limitations and the manufacturers' instructions unless permitted by other sections of this document.

10.3.1.4 **Nozzles.**

10.3.1.4.1 Only new listed nozzles shall be installed on a water mist system.

10.3.1.4.2 Nozzles shall be installed in accordance with their listing.

10.3.1.4.3 **Nozzle Positioning.**
Nozzles shall be positioned in accordance with the design installation operator manual so that the response time and discharge and not unduly affected by obstructions such as ceiling slope, beams, or light fixtures.

10.3.1.4.4** Painting and Finish.**

10.3.1.4.4.1 Nozzle painting and finish material shall be only as permitted by the manufacturer.

10.3.1.4.4.2 Where nozzles have had paint applied by other than the manufacturer, they shall be replaced with new listed nozzles of the same type.
10.3.1.5 Aboveground Piping and Equipment.

10.3.1.5.1 Where nonmetallic pipe is used, the pipe shall be designed to withstand a working pressure of not less than the anticipated system pressure at 49°C (120°F).

10.3.1.5.2 Pipe or tube listed for light hazard occupancies shall be permitted to be installed in ordinary hazard rooms of otherwise light hazard occupancies where the room does not exceed 37 m² (400 ft²).

10.3.1.6 Valves.

10.3.1.6.1 The control valve sign shall identify the portion of the building served.

10.3.1.6.2 Systems that have more than one control valve that must be closed during work on a system or space shall have a sign referring to the existence and location of the other valves.

10.3.1.7 Design Criteria.

10.3.1.7.1 The system shall provide at least the flow required for the multiple and single nozzle operating criteria as specified by the system listing.

10.3.1.7.2 The system shall provide at least the flow required to produce a minimum discharge density that meets the nozzle listing.

10.3.1.7.3 Number of Design Nozzles.
The number of design nozzles under flat, smooth, horizontal ceilings shall include the number of nozzles within a compartment up to a maximum of four adjacent nozzles that require the greatest hydraulic demand.

10.3.1.8 Pipe Sizing.
Piping shall be sized using hydraulic calculation procedures in accordance with Chapter 11

10.3.1.9 Water Supply.

10.3.1.9.1 Automatic.
Every automatic sprinkler alternative occupancy class water mist system shall have at least one automatic water supply in conformance with Chapter 12 of this standard.

10.3.1.9.2 Minimum Duration.
The water supply shall be capable of supplying the system demand for at least 30 minutes (see Section 12.3).

10.3.1.9.3 Source.
The water supply source shall be one of the following:

1. A connection to a reliable waterworks system with or without a pump, as required
2. An elevated tank
3. A pressure tank installed in accordance with Chapter 12 and NFPA 22, *Standard for Water Tanks for Private Fire Protection*
4. A stored water source with an automatically operated pump

10.3.1.9.4 Fire Pump.
Where a fire pump is installed, the fire pump shall be installed in accordance with Chapter 12 and NFPA 20, *Standard for the Installation of Stationary Pumps for Fire Protection*.

10.3.1.9.5 Domestic Demand.
Domestic demand shall be included as part of the overall system demand for systems with common domestic/fire mains where no provisions are made to prevent the domestic waterflow upon nozzle system activation.
10.3.2 One- and Two-Family Dwellings.
10.3.2.1 Scope.
10.3.2.1.1 This section shall cover the design and installation of automatic sprinkler alternative occupancy class water mist systems for protection against fire hazards in one- and two-family dwellings.
10.3.2.1.2 The automatic sprinkler alternative water mist system shall be designed to protect against a fire originating from a single ignition location.
10.3.2.2 General.
Smoke alarms shall be provided in accordance with NFPA 72, National Fire Alarm and Signaling Code.
10.3.2.3 System Components.
10.3.2.3.1 General.
Tanks, pumps, filters, hangers, waterflow detection devices, and waterflow valves shall be in accordance with manufacturers’ requirements, but are not required to be listed.
10.3.2.3.2 Aboveground Pipe and Tube.
Pipe or tube used in automatic sprinkler alternative occupancy class water mist systems shall be of the materials specified in Table 6.3.3.1 or shall be listed for use with water mist systems at the anticipated system pressure.
10.3.2.3.3 Aboveground Fittings.
Fittings used in automatic sprinkler alternative occupancy class water mist systems shall be in accordance with Section 6.4 or shall be listed for use with water mist systems at the anticipated system pressure.
10.3.2.3.4 Pre-Engineered Systems.
Where listed pre-engineered systems are installed, they shall be installed within the limitations that have been established by the testing laboratories.
10.3.2.4 Installation Requirements.
10.3.2.4.1 Valves.
10.3.2.4.1.1 A single control valve arranged to shut off both the domestic system and the water mist system shall be installed unless a separate shutoff valve for the water mist system is installed in accordance with 10.3.2.4.1.2.
10.3.2.4.1.2 The water mist system piping shall not have a separate control valve installed unless supervised by one of the following methods:
   1. Central station, proprietary, or remote station alarm service
   2. Local alarm service that causes the sounding of an audible signal at a constantly attended location
   3. Valves that are locked open
10.3.2.4.2 Piping Support.
10.3.2.4.2.1 Listed pipe shall be supported in accordance with any listing limitations.
10.3.2.4.2.2 Pipe that is not listed and listed pipe with listing limitations that do not include piping support requirements shall be supported from structural members using support methods in accordance with the design installation operator manual.
10.3.2.4.2.3 Piping laid on open joists or rafters shall be supported in a manner that prevents vertical and lateral movement of the nozzle.
10.3.2.4.3 Nozzles
10.3.2.4.3.1 Listed nozzles shall be used.
10.3.2.4.3.2 Nozzles shall not be used on systems other than wet pipe systems unless specifically listed for use on that particular type of system.
10.3.2.4.3.3 Nozzles shall be supported in manner that prevents lateral and vertical movement.
10.3.2.4.3.4 Painting and Ornamental Finishes.
Nozzles shall not be painted or enameled unless the finishes have been applied by the manufacturer and the nozzle has been listed with such finishes.

10.3.2.4.4 Drains and Test Connections

10.3.2.4.4.1 Each water mist system shall have a drain on the system side of the control valve.

10.3.2.4.4.2 A valve shall be installed in the drain piping.

10.3.2.4.4.3 A drain shall be installed for each trapped portion of a dry system that is subject to freezing temperatures.

10.3.2.4.4.4 Where waterflow alarms are provided, inspector's test connections shall be installed at locations that allow flow testing of water supplies, connections, and alarm mechanisms.

10.3.2.4.4.5 The inspector's test connections shall contain an orifice equal to or smaller than the smallest nozzle installed in the system.

10.3.2.4.5 Pressure Gauges.
Where a dry system is installed, a pressure gauge shall be installed to indicate system air pressure. Where a pressure tank is used for the water supply, a pressure gauge shall be installed to indicate tank pressure.

10.3.2.4.6 Alarms.
Local waterflow alarms shall be provided on all water mist systems in homes not equipped with smoke alarms or smoke detectors in accordance with NFPA 72, National Fire Alarm and Signaling Code.

10.3.2.4.7 Attics.
Where nonmetallic piping is installed in attics, adequate insulation shall be provided on the attic side of the piping to avoid exposure of the piping to temperatures in excess of the pipe's rated temperature.

10.3.2.5 Water Supply.

10.3.2.5.1 The water quality for the system shall meet the requirements of Chapter 12.

10.3.2.5.2 Prior to system acceptance, a system utilizing a pump shall be tested by opening the drain/test connection.

10.3.2.5.3 The pump shall sense the flow, turn on, and flow water for the required duration of 12.1.2 or 12.1.3 without interruption.

10.3.2.5.4 Where a pump and tank is the source of supply for a water mist system but is not a portion of the domestic water system, the following criteria shall be met:

1. A test connection shall be provided downstream of the pump that creates a flow of water equal to the smallest nozzle on the system and shall return water to the tank.

2. Pump motors using ac power shall be connected to a 240 V normal circuit.

3. Any disconnecting means for the pump shall be approved.

4. A method for refilling the tank shall be piped to the tank.

5. A method of seeing the water level in the tank shall be provided without having to open the tank.

6. The pump shall not be permitted to sit directly on the floor.

10.3.2.5.5 Where more than one dwelling unit is served by the same water supply pipe, each dwelling unit shall have an individual control valve that serves the water mist system in that dwelling unit, and the owner of each unit shall have access to the valve that controls the water mist system in the unit.

10.3.2.5.6 The control valve shall be permitted to serve the domestic water supply.

10.3.2.5.7 In the situation addressed by 10.3.2.5.5, no valve controlling the water mist system in a unit shall be located in another unit.
10.3.2.5.8 Manufactured Home Water Supply.
For buildings manufactured off-site, the minimum pressure needed to satisfy the system design criteria on
the system side of the meter shall be specified on a data plate by the manufacturer.

10.3.2.5.9 Common Supply Pipes.
10.3.2.5.9.1 Where common supply pipes serve both water mist and domestic use, they shall comply
with 10.3.2.5.9.2 and 10.3.2.5.9.3.
10.3.2.5.9.2 In common water supply connections serving more than one dwelling unit, and where no
provision is made to prevent flow into the domestic water system upon activation of a nozzle, 19 L/min (5
gpm) shall be added to the water mist system demand to determine the size of common piping and the
size of the total water supply requirements.
10.3.2.5.9.3 A warning sign, with minimum ¼ in. letters, shall be affixed adjacent to the main shutoff
valve and shall state the following;

⚠️ WARNING

The water system for this home supplies water mist nozzles that require
certain flows and pressures to fight a fire.

Devices that restrict the flow or decrease the pressure or automatically shut off the water to the water mist
system, such as water softeners, filtration systems, and automatic shutoff valves, shall not be added to
this system without a review of the water mist system by a fire protection specialist. Do not remove this
sign.

10.3.2.6 Discharge Criteria.
10.3.2.6.1 Number of Design Nozzles.
The number of design nozzles under flat, smooth, horizontal ceilings shall include all nozzles within a
compartment, up to a maximum of two nozzles that require the greatest hydraulic demand.

10.3.2.6.2 The system shall provide at least the flow required for the multiple and single nozzle
operating criteria specified by the nozzle listing.

10.3.2.7 System Design.
10.3.2.7.1 Location of Nozzles.
10.3.2.7.1.1 In basements where ceilings are not required for the protection of piping or where metallic
pipe is installed, residential nozzles shall be permitted to be positioned in a manner that anticipates future
installation of a finished ceiling.
10.3.2.7.1.2 Nozzles shall be installed in all areas except where omission is permitted by 10.3.2.7.1.3
through 10.3.2.7.1.6.
10.3.2.7.1.3 Nozzles shall not be required in bathrooms of 5.1 m² (55 ft²) and less.
10.3.2.7.1.4 Nozzles shall not be required in clothes closets, linen closets, and pantries that meet all of
the following conditions:
   1. The area of the space does not exceed 2.2 m² (24 ft²).
   2. The least dimension does not exceed 0.9 m (3 ft).
   3. The walls and ceilings are surfaced with noncombustible or limited-combustible materials as
defined in NFPA 220, Standard on Types of Building Construction.
10.3.2.7.1.5* Nozzles shall not be required in garages, open attached porches, carports, and similar
structures.
10.3.2.7.1.6 Nozzles shall not be required in attics, penthouse equipment rooms, elevator machine
rooms, concealed spaces dedicated exclusively to and containing only dwelling unit ventilation
equipment, floor/ceiling spaces, elevator shafts, crawl spaces, and other concealed spaces that are not
used or intended for living purposes and do not contain fuel-fired equipment.
10.3.2.7.1.7 Where fuel-fired equipment is present, at least one quick-response intermediate temperature nozzle shall be installed above the equipment.

10.3.2.7.1.8 Nozzles shall not be required in covered unheated projections of the building at entrances/exits as long as the dwelling unit has another means of egress.

10.3.2.7.1.9 Nozzles shall not be required for ceiling pockets that meet the following conditions:

1. The total volume of unprotected ceiling pocket does not exceed 2.83 m$^3$ (100 ft$^3$).
2. The entire floor under the unprotected ceiling pocket is protected by the nozzles at the lower ceiling elevation.
3. Each unprotected ceiling pocket is separated from any adjacent unprotected ceiling pocket by a minimum 3.05 m (10 ft) horizontal distance.
4. The interior finish of the unprotected ceiling pocket is noncombustible or limited-combustible material.
5. Skylights not exceeding 2.97 m$^2$ (32 ft$^2$) shall be permitted to have a plastic cover.

Statement of Problem and Substantiation for Public Comment

Water mist systems should be designed and installed on their own merit, not as comparisons to sprinkler systems. The document should not send readers back to NFPA 13 to pick up design criteria. No reference to dry systems should be made. Important design criteria such as the discharge delay for dry systems time is not included, so these types of systems should not be allowed unless more guidance is provided. What justification is provided to allow the ceiling pocket geometries?

Submitter Information Verification
Submitter Full Name: Peter Thomas
Organization: Victaulic Company
Submittal Date: Fri Nov 16 14:22:00 EST 2012
10.3 - Residential Occupancy Fire Control Approach

10.3.1 - Residential Occupancies up to and Including Four Stories in Height.

10.3.1.1 - Scope.

This section shall cover the design and installation of automatic sprinkler alternative water mist systems for protection against fire hazards in residential occupancies up to and including four stories in height.

10.3.1.2 - The water mist system shall be designed to protect against a fire originating from a single ignition location.

10.3.1.2 - System Arrangement.

In townhouse-style buildings protected in accordance with this standard, each dwelling unit shall have its own dedicated water mist system, or the control valves for the water mist system shall be located outside the dwelling units or in a common area.

10.3.1.3 - Listed or Labeled.

Listed or labeled devices and materials shall be installed and used in accordance with the listing limitations and the manufacturers' instructions unless permitted by other sections of this document.

10.3.1.4 - Nozzles.

10.3.1.4.1 - Only new listed nozzles shall be installed on a water mist system.

10.3.1.4.2 - Nozzles shall be installed in accordance with their listing.

10.3.1.4.3 - Nozzle Positioning.

Nozzles shall be positioned in accordance with the design installation operator manual so that the response time and discharge and not unduly affected by obstructions such as ceiling slope, beams, or light fixtures.

10.3.1.4.4 - Painting and Finish.

Nozzle painting and finish material shall be only as permitted by the manufacturer.

10.3.1.5 - Aboveground Piping and Equipment.

10.3.1.5.1 - Where nonmetallic pipe is used, the pipe shall be designed to withstand a working pressure of not less than the anticipated system pressure at 49°C (120°F).

10.3.1.5.2 - Pipe or tube listed for light hazard occupancies shall be permitted to be installed in ordinary hazard rooms of otherwise light hazard occupancies where the room does not exceed 37 m² (400 ft²).

10.3.1.6 - Valves.

10.3.1.6.1 - Identification of Valves.

The control valve sign shall identify the portion of the building served.

10.3.1.6.2 - Systems that have more than one control valve that must be closed during work on a system or space shall have a sign referring to the existence and location of the other valves.

10.3.1.7 - Design Criteria.

10.3.1.7.1 - The system shall provide at least the flow required for the multiple and single nozzle operating criteria specified by the system listing.

10.3.1.7.2 - The system shall provide at least the flow required to produce a minimum discharge density that meets the nozzle listing.
10.3.1.7.3 Number of Design Nozzles.
The number of design nozzles under flat, smooth, horizontal ceilings shall include the number of nozzles within a compartment up to a maximum of four adjacent nozzles that require the greatest hydraulic demand shall be in accordance with the requirements of the listing.

10.3.1.8 Pipe Sizing. Piping shall be sized using hydraulic calculation procedures in accordance with Chapter 11.

10.3.1.9 Water Supply.
10.3.1.9.1 Automatic.
Every automatic sprinkler alternative water mist system shall have at least one automatic water supply in conformance with Chapter 12 of this standard.

10.3.1.9.2 Minimum Duration.
The water supply shall be capable of supplying the system demand for at least 30 minutes (see Section 12.3).

10.3.1.9.3 Source.
The water supply source shall be one of the following:

1. A connection to a reliable waterworks system with or without a pump, as required
2. An elevated tank
3. A pressure tank installed in accordance with Chapter 12 and NFPA 22, *Standard for Water Tanks for Private Fire Protection*
4. A stored water source with an automatically operated pump

10.3.1.9.4 Fire Pump.
Where a fire pump is installed, the fire pump shall be installed in accordance with Chapter 12 and NFPA 20, *Standard for the Installation of Stationary Pumps for Fire Protection*.

10.3.1.9.5 Domestic Demand.
Domestic demand shall be included as part of the overall system demand for systems with common domestic/fire mains where no provisions are made to prevent the domestic waterflow upon nozzle system activation.

10.3.2 One- and Two-Family Dwellings.
10.3.2.1 Scope.
10.3.2.1.1 This section shall cover the design and installation of automatic sprinkler alternative water mist systems for protection against fire hazards in one- and two-family dwellings.
10.3.2.1.2 The automatic sprinkler alternative water mist system shall be designed to protect against a fire originating from a single ignition location.
10.3.2.2 General.
Smoke alarms shall be provided in accordance with NFPA 72, *National Fire Alarm and Signaling Code*.

10.3.2.3 System Components.
10.3.2.3.1 General.
Tanks, pumps, filters, hangers, waterflow detection devices, and waterflow valves shall be in accordance with manufacturers’ requirements, but are not required to be listed.

10.3.2.3.2 Aboveground Pipe and Tube.
Pipe or tube used in automatic sprinkler alternative water mist systems shall be of the materials specified in Table 6.3.3.1 or shall be listed for use with water mist systems at the anticipated system pressure.
10.3.2.3.3 **Aboveground Fittings.**
Fittings used in automatic sprinkler alternative water mist systems shall be in accordance with Section 6.4 or shall be listed for use with water mist systems at the anticipated system pressure.

10.3.2.3.4 **Pre-Engineered Systems.**
Where listed pre-engineered systems are installed, they shall be installed within the limitations that have been established by the testing laboratories.

10.3.2.4 **Installation Requirements.**

10.3.2.4.1 **Valves.**

10.3.2.4.1.1 A single control valve arranged to shut off both the domestic system and the water mist system shall be installed unless a separate shutoff valve for the water mist system is installed in accordance with 10.3.2.4.1.2.

10.3.2.4.1.2 The water mist system piping shall not have a separate control valve installed unless supervised by one of the following methods:

1. Central station, proprietary, or remote station alarm service
2. Local alarm service that causes the sounding of an audible signal at a constantly attended location
3. Valves that are locked open

10.3.2.4.2 **Piping Support.**

10.3.2.4.2.1 Listed pipe shall be supported in accordance with any listing limitations.

10.3.2.4.2.2 Pipe that is not listed and listed pipe with listing limitations that do not include piping support requirements shall be supported from structural members using support methods in accordance with the design installation operator manual.

10.3.2.4.2.3 Piping laid on open joists or rafters shall be supported in a manner that prevents vertical and lateral movement of the nozzle.

10.3.2.4.3 **Nozzles**

10.3.2.4.3.1 Listed nozzles shall be used.

10.3.2.4.3.2 Nozzles shall not be used on systems other than wet pipe systems unless specifically listed for use on that particular type of system.

10.3.2.4.3.3 Nozzles shall be supported in manner that prevents lateral and vertical movement.

10.3.2.4.3.4 **Painting and Ornamental Finishes.**
Nozzles shall not be painted or enameled unless the finishes have been applied by the manufacturer and the nozzle has been listed with such finishes.

10.3.2.4.4 **Drains and Test Connections**

10.3.2.4.4.1 Each water mist system shall have a drain on the system side of the control valve.

10.3.2.4.4.2 A valve shall be installed in the drain piping.

10.3.2.4.4.3 A drain shall be installed for each trapped portion of a dry system that is subject to freezing temperatures.

10.3.2.4.4.4 Where airflow alarms are provided, inspector's test connections shall be installed at locations that allow flow testing of water supplies, connections, and alarm mechanisms.

10.3.2.4.4.5 The inspector's test connections shall contain an orifice equal to or smaller than the smallest nozzle installed in the system.

10.3.2.4.5 **Pressure Gauges.**

10.3.2.4.5.1 Where a dry system is installed, a pressure gauge shall be installed to indicate system air pressure.
10.3.2.4.5.2 Where a pressure tank is used for the water supply, a pressure gauge shall be installed to indicate tank pressure.

10.3.2.4.6 Alarms.
Local waterflow alarms shall be provided on all water mist systems in homes not equipped with smoke alarms or smoke detectors in accordance with NFPA 72, National Fire Alarm and Signaling Code.

10.3.2.4.7 Attics.
Where nonmetallic piping is installed in attics, adequate insulation shall be provided on the attic side of the piping to avoid exposure of the piping to temperatures in excess of the pipe's rated temperature.

10.3.2.5 Water Supply.

10.3.2.5.1 The water quality for the system shall meet the requirements of Chapter 12.

10.3.2.5.2 Prior to system acceptance, a system utilizing a pump shall be tested by opening the drain/test connection.

10.3.2.5.3 The pump shall sense the flow, turn on, and flow water for the required duration of 12.1.2 or 12.1.3 without interruption.

10.3.2.5.4 Where a pump and tank is the source of supply for a water mist system but is not a portion of the domestic water system, the following criteria shall be met:

1. A test connection shall be provided downstream of the pump that creates a flow of water equal to the smallest nozzle on the system and shall return water to the tank.
2. Pump motors using ac power shall be connected to a 240 V normal circuit.
3. Any disconnecting means for the pump shall be approved.
4. A method for refilling the tank shall be piped to the tank.
5. A method of seeing the water level in the tank shall be provided without having to open the tank.
6. The pump shall not be permitted to sit directly on the floor.

10.3.2.5.5 Where more than one dwelling unit is served by the same water supply pipe, each dwelling unit shall have an individual control valve that serves the water mist system in that dwelling unit, and the owner of each unit shall have access to the valve that controls the water mist system in the unit.

10.3.2.5.6 The control valve shall be permitted to serve the domestic water supply.

10.3.2.5.7 In the situation addressed by 10.3.2.5.5, no valve controlling the water mist system in a unit shall be located in another unit.

10.3.2.5.8 Manufactured Home Water Supply.
For buildings manufactured off-site, the minimum pressure needed to satisfy the system design criteria on the system side of the meter shall be specified on a data plate by the manufacturer.

10.3.2.5.9 Common Supply Pipes.

10.3.2.5.9.1 Where common supply pipes serve both water mist and domestic use, they shall comply with 10.3.2.5.9.2 and 10.3.2.5.9.3.

10.3.2.5.9.2 In common water supply connections serving more than one dwelling unit, and where no provision is made to prevent flow into the domestic water system upon activation of a nozzle, 19 L/min (5 gpm) shall be added to the water mist system demand to determine the size of common piping and the size of the total water supply requirements.

10.3.2.5.9.3 A warning sign, with minimum ¼ in. letters, shall be affixed adjacent to the main shutoff valve and shall state the following;

⚠️ WARNING

The water system for this home supplies water mist nozzles that require certain flows and pressures to fight a fire.
Devices that restrict the flow or decrease the pressure or automatically shut off the water to the water mist system, such as water softeners, filtration systems, and automatic shutoff valves, shall not be added to this system without a review of the water mist system by a fire protection specialist. Do not remove this sign.

10.3.2.6 Discharge Criteria.

10.3.2.6.1 Number of Design Nozzles.
The number of design nozzles under flat, smooth, horizontal ceilings shall include all nozzles within a compartment, up to a maximum of two nozzles that require the greatest hydraulic demand shall be in accordance with the requirements for the listing.

10.3.2.6.2 The system shall provide at least the flow required for the multiple and single nozzle operating criteria specified by the nozzle listing.

10.3.2.7 System Design.

10.3.2.7.1 Location of Nozzles.

10.3.2.7.1.1 In basements where ceilings are not required for the protection of piping or where metallic pipe is installed, residential nozzles shall be permitted to be positioned in a manner that anticipates future installation of a finished ceiling.

10.3.2.7.1.2 Nozzles shall be installed in all areas except where omission is permitted by 10.3.2.7.1.3 through 10.3.2.7.1.6.

10.3.2.7.1.3 Nozzles shall not be required in bathrooms of 5.1 m² (55 ft²) and less.

10.3.2.7.1.4 Nozzles shall not be required in clothes closets, linen closets, and pantries that meet all of the following conditions:
   1. The area of the space does not exceed 2.2 m² (24 ft²).
   2. The least dimension does not exceed 0.9 m (3 ft).
   3. The walls and ceilings are surfaced with noncombustible or limited-combustible materials as defined in NFPA 220, Standard on Types of Building Construction.

10.3.2.7.1.5* Nozzles shall not be required in garages, open attached porches, carports, and similar structures.

10.3.2.7.1.6 Nozzles shall not be required in attics, penthouse equipment rooms, elevator machine rooms, concealed spaces dedicated exclusively to and containing only dwelling unit ventilation equipment, floor/ceiling spaces, elevator shafts, crawl spaces, and other concealed spaces that are not used or intended for living purposes and do not contain fuel-fired equipment.

10.3.2.7.1.7 Where fuel-fired equipment is present, at least one quick-response intermediate temperature nozzle shall be installed above the equipment the space shall be protected.

10.3.2.7.1.8 Nozzles shall not be required in covered unheated projections of the building at entrances/exits as long as the dwelling unit has another means of egress.

10.3.2.7.1.9 Nozzles shall not be required for ceiling pockets that meet the following conditions:
   1. The total volume of unprotected ceiling pocket does not exceed 2.83 m³ (100 ft³).
   2. The entire floor under the unprotected ceiling pocket is protected by the nozzles at the lower ceiling elevation.
   3. Each unprotected ceiling pocket is separated from any adjacent unprotected ceiling pocket by a minimum 3.05 m (10 ft) horizontal distance.
   4. The interior finish of the unprotected ceiling pocket is noncombustible or limited-combustible material.
   5. Skylights not exceeding 2.97 m² (32 ft²) shall be permitted to have a plastic cover.

Statement of Problem and Substantiation for Public Comment
There should be no designation of sprinkler alternative water mist systems in NFPA 750. Information on the proper installation of water mist systems in residential areas is however important to provide in the document. The designation of four nozzles for four story residential buildings and two nozzles for one and two family dwellings is not necessarily appropriate for these systems as it is a designation for sprinkler systems and may not coincide with the mist system listing. The sections designated in the PI as Section 10.3.2.7.1.1 and 10.3.2.7.1.9 are specific to sprinkler systems that would not necessarily be appropriate for water mist systems. Section 10.3.1.5.2 from the PI was removed as well as it referenced hazard classifications. Building code tradeoffs that have been established for fire sprinkler systems are based on reliability and field experience of fire sprinkler systems in a wide variety of real world situations that are very different from laboratory conditions, the safety factors involved in sprinkler system design, while successful in laboratory testing, do not have quantifiable safety factors nor do they have the field experience to show equivalency with fire sprinklers. Field conditions such as ventilation, commodity arrangement, and protection gaps caused by nozzle failure. In addition fire sprinkler systems are given credit for cooling surfaces near fires by direct water spray and for creating water curtains to prevent the travel of heat and smoke. Water mist systems have not proven to provide this same level of protection. As such many of the trade ups that are allowed by the building code for sprinkler systems would not necessarily be appropriate for water mist systems.

Related Public Comments for This Document
Related Comment Relationship
Public Comment No. 52-NFPA 750-2012 [Section No. 3.3.24.1] sprinkler alternative water mist systems
Public Comment No. 58-NFPA 750-2012 [Chapter 5] hazard classifications

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