



Water Mist Fire Protection- **Revisions to UL 2167 and NFPA Standards**

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Key Learning Objectives



1. Identify current applications for water mist fire protection systems described in ANSI/UL 2167.
2. Recognize revisions related to water mist systems that are considered for the new editions of :
 - a) NFPA 20 (Fire Pumps),
 - b) NFPA 25 (Inspection, Testing and Maintenance of Water-Based Systems) and...
 - c) NFPA 750 (Water Mist Fire Protection Systems).



Introduction to UL 2167

ANSI/UL 2167 Overview

- First Edition of the Standard for Water Mist Nozzles for Fire Protection Service, ANSI/UL 2167 was published on December 27, 2002.
- Includes over 30 different performance tests to investigate the ability of nozzles to perform as intended during field use:
 - Physical Strength and Leakage Tests
 - Operation Tests (Maximum Permitted RTI is 50 $(m \cdot s)^{1/2}$ [90 $(ft \cdot s)^{1/2}$])
 - Exposure and Corrosion Tests
 - Discharge Characteristics Tests
 - Fire Tests
- Required to be installed in accordance with the manufacturer's instructions and applicable requirements of the Standard on Water Mist Fire Protection Systems, NFPA 750.



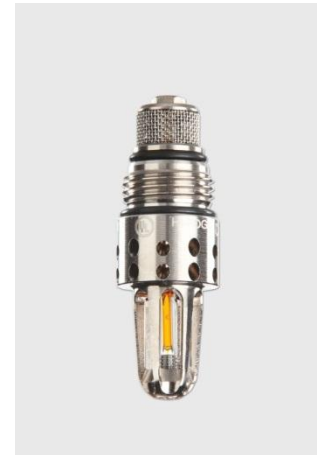
ANSI/UL 2167 Overview

- Current end-use applications referenced in ANSI/UL 2167:
- Maritime applications:
 - *Shipboard Machinery Spaces*
 - *Shipboard Passenger Cabins*
 - *Shipboard Public Spaces*
 - ❖ *Light hazard*
 - ❖ *Ordinary hazard*
- *Land based applications:*
 - *Residential Areas*
 - *Light Hazard Occupancies*
 - *Ordinary Group 1 Occupancies*
 - *Ordinary Group 2 Occupancies*



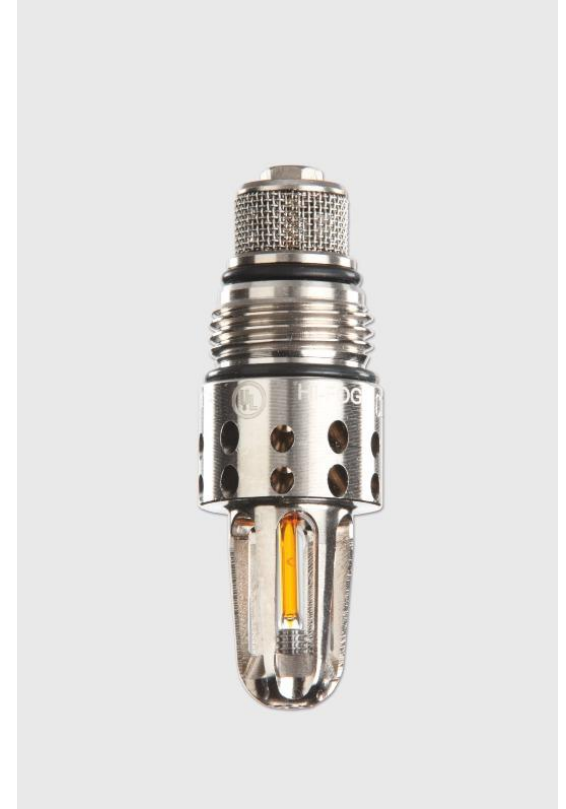
Current UL Certifications

- Maritime system applications:
 - *Shipboard Machinery Spaces, IMO 913 (19) (Grinnell Low Pressure, 175-250 Psig)*
 - *Shipboard Passenger Cabins, IMO A 800(19) (Grinnell Low Pressure, 100-250 Psig)*
 - *Shipboard Public Spaces, IMO A 800(19) (Grinnell Low Pressure, 100-250 Psig)*
 - *Shipboard Storage Areas, IMO A 800(19) (Grinnell Low Pressure, 100-250 Psig)*
 - *Shipboard Corridors, IMO A 800(19) (Grinnell Low Pressure, 120-250 Psig)*
- land-based applications:
 - *Ordinary Group 1 Occupancies, UL 2167 (Marioff NA High Pressure, 1160-1885 psig)*



Information on Recent OH1 Nozzle Listing

- Marioff NA
- Nozzle Style – Pendent
- Nozzle K-factor = $0.284 \text{ gpm}/(\text{psi})^{1/2}$
- Temperature Ratings – 135, 155 and 175°F
- Maximum Nozzle Spacing – 10 ft. by 10 ft.
- Nozzle Pressure Range – 1,160 to 1885 psig
- Maximum Ceiling Height – 13.1 ft.
- Design Area = 1500 ft² or as specified by the AHJ
- Stainless Steel Tubing Used for Water Distribution
- Water Mist Pump Package Currently Not UL Listed





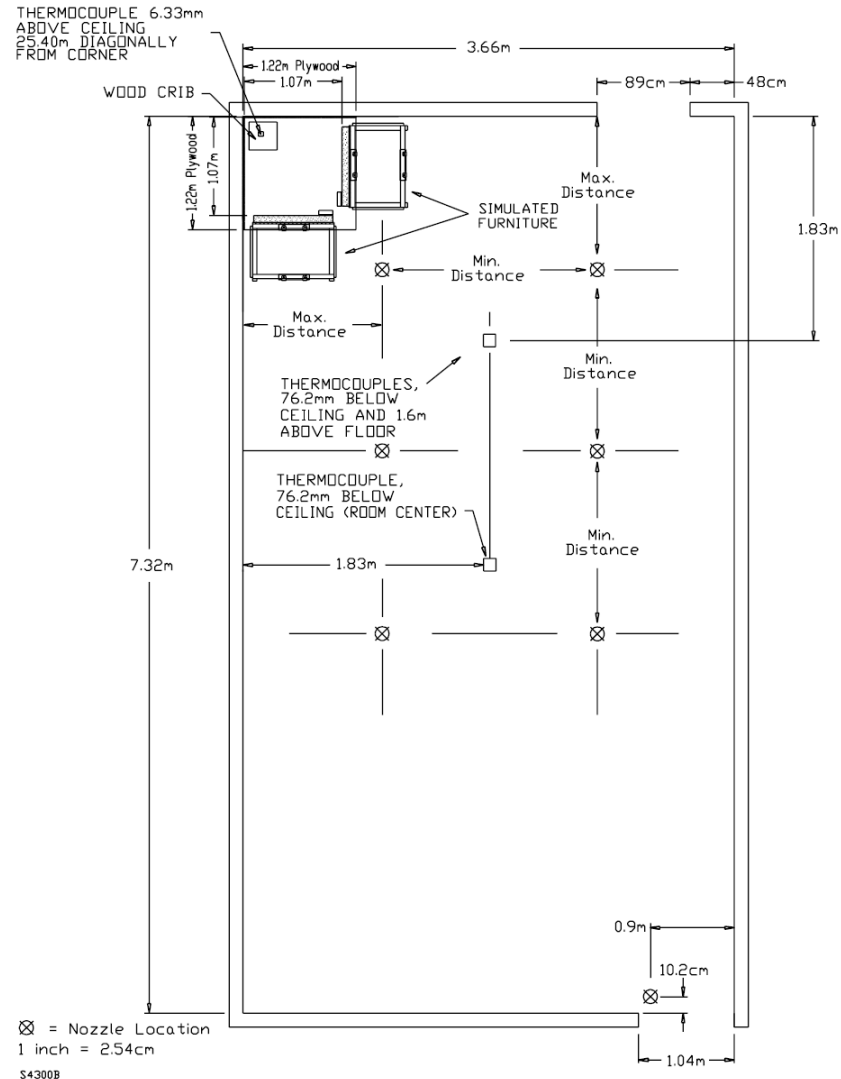
Recent Revisions to ANSI/UL 2167

Residential Area Fire Test

Recent Revisions to ANSI/UL 2167 Residential Area Fire Test

Anterior Fire Test Arrangement

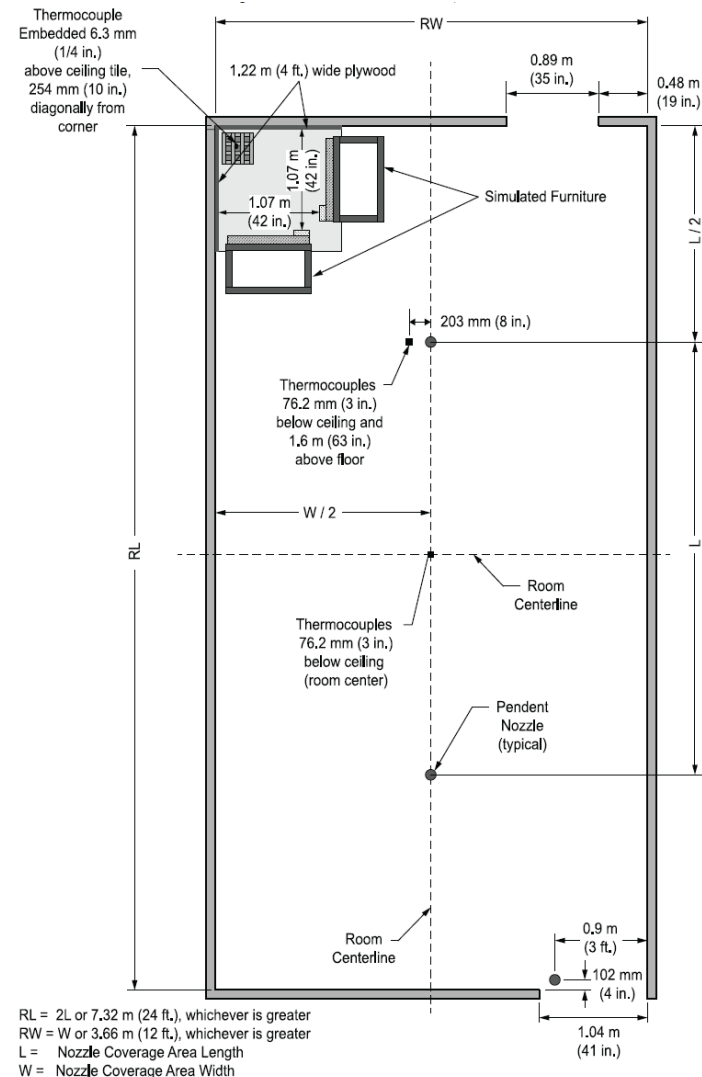
- Utilized existing ANSI/UL 1626 (Residential Sprinklers) fuel package with a fixed room size of 12 ft. by 24 ft.
- Nozzle test arrangement was designed for closely spaced water mist nozzles which was the technology that existed when the standard was originally developed.
- Addressed pendent style nozzles and did not include a test arrangement for sidewall nozzles.
- No provision for testing nozzles intended for ceiling heights greater than 8 ft.



Recent Revisions to ANSI/UL 2167 Residential Area Fire Test

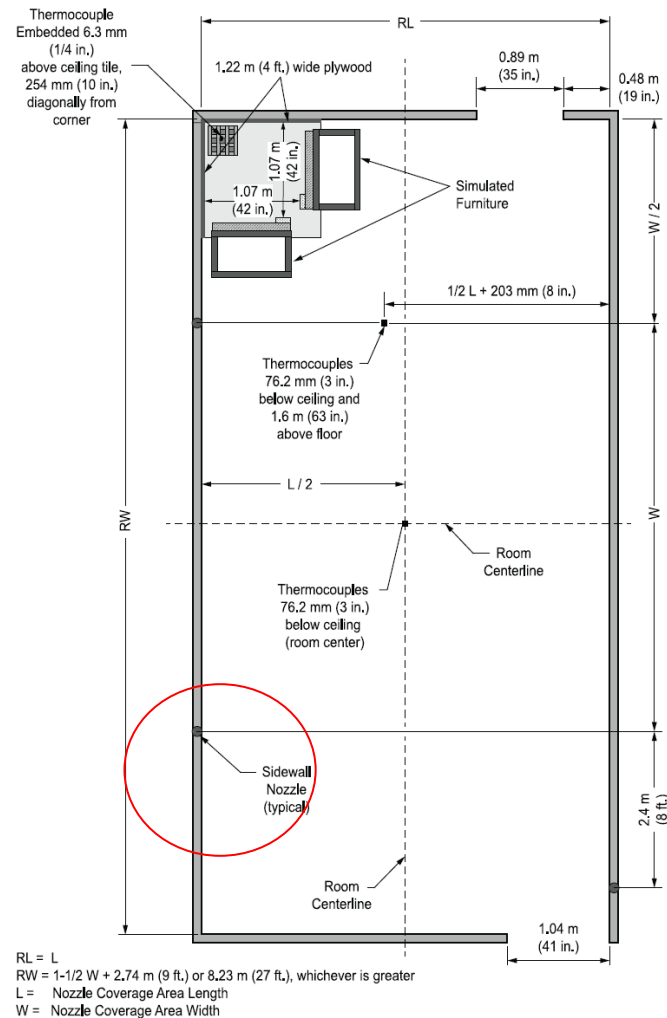
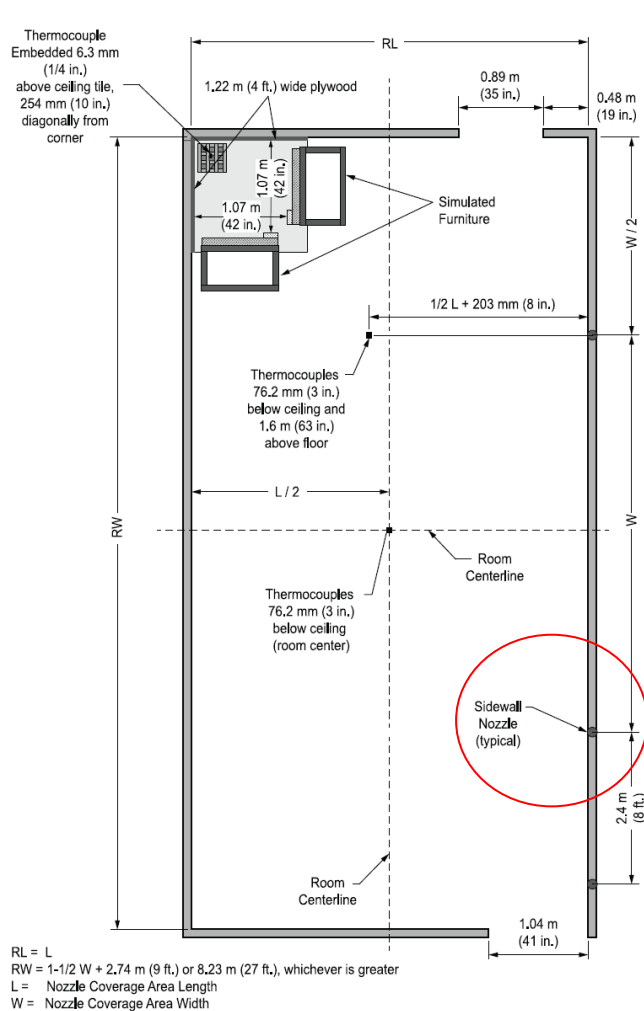
New Fire Test Arrangement

- Utilizes existing ANSI/UL 1626 fuel package with an adjustable room size based upon nozzle spacing desired by manufacturer.
- Layout of the nozzles in the test room similar to ANSI/UL 1626.
- Testing arrangements are referenced for both pendent and sidewall style nozzles.
- Requires fire testing with an 8 ft. high ceiling and the maximum ceiling height for nozzles intended for ceiling heights greater than 8 ft.



Recent Revisions to ANSI/UL 2167 Residential Area Fire Test

New Fire Test Arrangement – Sidewall Nozzles



Recent Revisions to ANSI/UL 2167 Residential Area Fire Test

Information in Manufacturer's Design and Installation Parameters

l) For Residential Areas (Section 44), the manufacturer shall specify a minimum of **two automatic nozzles** in the water mist system hydraulic design with a **water supply duration of not less than 10 minutes** when protecting dwelling units described in the Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes, **NFPA 13D**. For dwelling units described in the Standard for Installation of Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height, **NPFA 13R** and the Standard for the Installation of Sprinkler Systems, **NFPA 13**, the manufacturer shall specify a **minimum of four operating nozzles** in the water mist system hydraulic design with a **water supply duration not less than the duration specified in these standards**;





Revisions to NFPA 20

**(Standard for the Installation of Stationary Pumps for
Fire Protection) Related to Water Mist Systems**

NFPA 20 - 2010

4.7 Pumps, Drivers, and Controllers.

4.7.1* Fire pumps shall be dedicated to and listed for fire protection service.

4.7.2 Acceptable drivers for pumps at a single installation shall be electric motors, diesel engines, steam turbines, or a combination thereof.

4.7.3* A pump shall not be equipped with more than one driver.

4.7.4 Each fire pump shall have its own dedicated driver unless otherwise permitted in 8.5.3.1.

4.7.5 Each driver shall have its own dedicated controller.

4.7.6* The driver shall be selected in accordance with 9.5.2 (electric motors), 11.2.2 (diesel engines), or 13.1.2 (steam turbines) to provide the required power to operate the pump at rated speed and maximum pump load under any flow condition.



Revisions to NFPA 20 -2013 Edition

New Definition



3.3.37.18 (New) Water Mist Positive Displacement Pumping Unit – Multiple positive displacement pumps designed to operate in parallel that discharges into a single common water mist distribution system.

A.3.3.37.18 (New) It is not the intent of this standard to apply this term to individual pumps used to supply water mist systems. This term is intended to apply to water mist systems designed with multiple pumps where a pump operates individually or multiple pumps operate in parallel based on the demand of the system downstream and the number of nozzles that discharge. These pumps work together as a single unit to provide the necessary flow and pressure of the water mist system.

Key Criteria



8.4 Water Mist Positive Displacement Pumping Units.

8.4.1 Water mist positive displacement pumping units shall be dedicated to and listed as a unit for fire protection service.

8.4.2 Except as provided in 8.4.3 – 8.4.8, all the requirements of this standard shall apply.

8.4.3 Water mist positive displacement pumping units shall include pumps, driver(s) and controller as a complete operating unit.

8.4.4 The pump controller shall manage the performance of all pumps and drivers to provide continuous and smooth operation without intermittent pump cycling, or discharge pressure varying by more than 10 percent during pump sequencing after rated pressure has been achieved.

8.4.5 Redundancy shall be built in to the units such that failure of a line pressure sensor or primary control board will not prevent the system from functioning as intended.

8.4.6 Where provided with a variable speed control, failure of the variable speed control feature shall cause the controller to bypass and isolate the variable speed control system.

8.4.7 The unit controller shall be arranged so that each pump can be manually operated individually without opening the enclosure door.

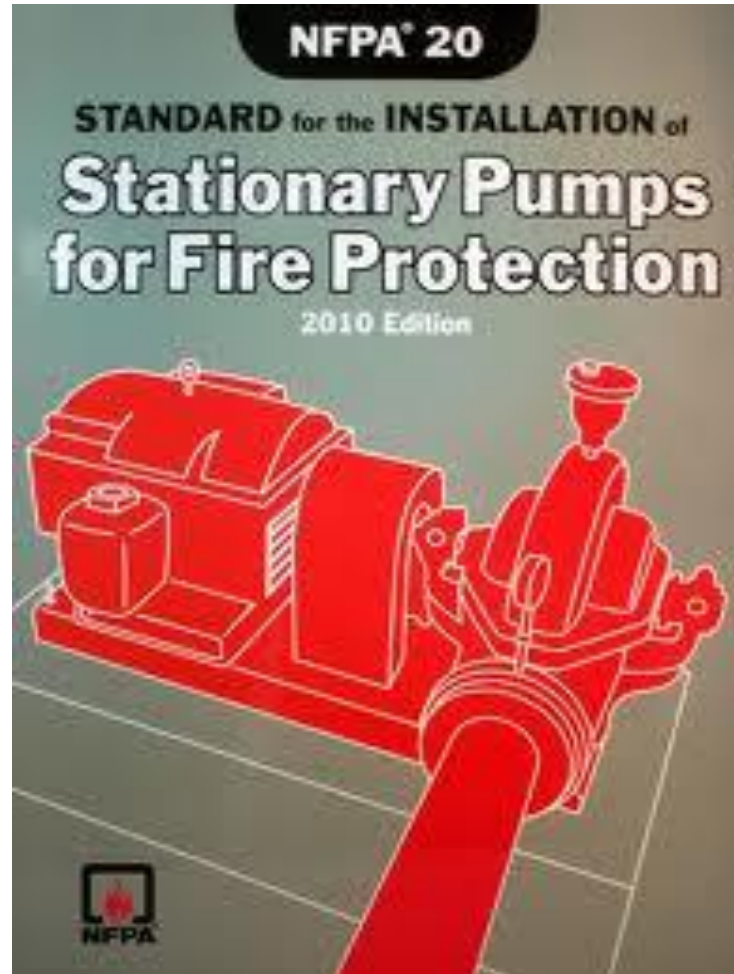
8.4.8 The requirement in 10.3.4.3 shall apply to each individual motor and the entire unit.



Revisions to NFPA 20

Eleven (11) Report on Comments Actions Addressing Water Positive Displacement Pumping Units

- Log 20-9 (Chapter 3)
- Log 20-12 (Chapters 4 & 14)
- Log 20-14 (Chapter 4)
- Log 20-36 (Chapter 4)
- Log 20-38 (Chapter 4)
- Log 20-41 (Chapter 5)
- Log 20-45 (Chapter 8)
- Log 20-79 (Chapter 10)
- Log 20-80 (Chapter 10)
- Log 20-105 (Chapter 14)
- Log 20-107 (Chapter 14)





Proposed Revisions to NFPA 25

**(Standard for Inspection, Testing
and Maintenance of Water-Based
Fire Protection Systems) Related to
Water Mist Systems**

Proposed Revisions to NFPA 25

Current State – The inspection, testing and maintenance requirements for water mist systems are included in both NFPA 750 and NFPA 25.

Proposed NFPA TC Actions – All inspection, testing and maintenance requirements for water mist systems will be consolidated into **NFPA 25** only.

Note: Both Standards are in the revision cycle.

- ✓ NFPA 25 is in the Annual 2013 cycle
- ✓ NFPA 750 is in the Fall 2013 cycle.



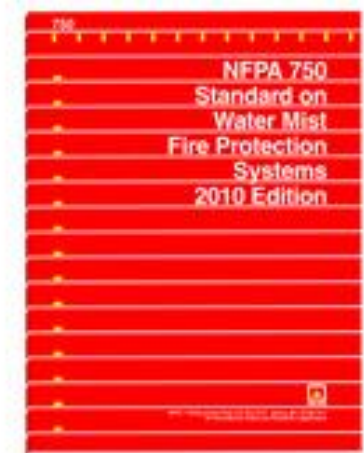


Proposed Revisions to NFPA 750

**(Standard on Water Mist Fire
Protection Systems)**

Proposed NFPA TC Actions

- Considered over 100 proposals
- Remove inspection, testing and maintenance requirements in favor of including these requirements in NFPA 25.
- Accepted new section addressing Water Mist Protection for One- and Two-Family Dwellings
 - Content similar to NFPA 13D
 - Use of some non-listed components permitted
 - Allowance for unprotected areas i.e. attics, closets, small bathrooms, etc.
 - Two nozzle design with 10 minute water supply



Small Test

Questions

1. ANSI/UL 2167 includes fire test requirements for water mist nozzles intended to provide protection for residential areas (dwelling units).

True

False

2. If adopted, proposed revisions to NFPA 20 would permit a dedicated controller to operate multiple water mist pump drivers.

True

False





LISTED

