

# NFPA® 750

## Standard on Water Mist Fire Protection Systems

### 2023 Edition



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## NFPA® 750

### Standard on

## Water Mist Fire Protection Systems

### 2023 Edition

This edition of NFPA 750, *Standard on Water Mist Fire Protection Systems*, was prepared by the Technical Committee on Water Mist Fire Suppression Systems. It was issued by the Standards Council on March 20, 2022, with an effective date of April 9, 2022, and supersedes all previous editions.

This edition of NFPA 750 was approved as an American National Standard on April 9, 2022.

### Origin and Development of NFPA 750

In 1993, representatives from the research and engineering communities, water mist system manufacturers, the insurance industry, enforcement authorities, and industrial users met and organized the NFPA Technical Committee on Water Mist Fire Suppression Systems. The committee started developing a new NFPA document that would begin to standardize water mist technology and provide for reliable design and installation of these systems.

Water mist systems were introduced in the 1940s and were used for specific applications. The renewed interest in water mist systems is due partially to the phasing out of halon and their potential as a fire safety system for spaces where the amount of water that can be stored or that can be discharged is limited. In addition, water mist systems' application and effectiveness for residential occupancies, flammable liquids storage facilities, and electrical equipment spaces continues to be investigated with encouraging results.

NFPA 750 contains elements that are similar to standards on other types of fire protection systems such as automatic sprinklers, fixed water spray, carbon dioxide, and halon. In many ways, water mist can be thought of as a hybrid of those systems. Overall, water mist systems use water as the extinguishing, suppression, or control medium but do so in a nontraditional manner. In developing this standard, the committee addressed system components and hardware, system types, installation requirements, design objectives, hazard classifications, calculations, water supplies, atomizing media, plans, documentation, acceptance criteria, and maintenance considerations.

The 2000 edition of NFPA 750 represented a significant advancement in water mist technology and the knowledge base associated with its application. This edition included a new definition of *water mist* and a complete rewrite and reorganization of what was Chapter 5, Design Objectives and Fire Test Protocols. Additionally, many new sections were added to address the design and safety considerations associated with positive displacement water mist pumps. New guidance was provided for the measurement of the water mist spray characteristics, including drop distribution. Finally, two new appendices were added to address many of the current and proposed fire test protocols and the reliability of water mist systems.

The 2003 edition incorporated revisions that updated the standard to comply with the *Manual of Style for NFPA Technical Committee Documents*. Style changes included a restructuring of the document, reworded exceptions as requirements, and transition to a metric-as-primary document. The 2003 edition contained updated requirements for additives, proportioning methods, supervision, calculation methods, and inspection and testing of water mist systems. New requirements were added that addressed protection of machinery spaces on towing vessels.

The 2006 edition updated requirements for hangers, supports, reserve water supplies, pump capacities, and appropriate test connections.

The 2010 edition included new annex material that provided guidance on obstruction to nozzle discharge and a number of editorial revisions.

The 2015 edition of NFPA 750 provided significant development in the knowledge to design water mist systems for various defined occupancies. Two chapters were added to address the



dynamics of occupancy classification in designing a water mist system: Chapter 5, Classification of Occupancies, and Chapter 10, Occupancy Protection Systems. In addition, the inspection, testing, and maintenance sections for water mist systems, other than those installed in one- and two-family dwellings, were removed and referenced NFPA 25, *Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems* instead.

The 2019 edition of NFPA 750 contained updates that clarified the definitions of the terms *gridded water mist system* and *twin-fluid system*, which devices could be used as automatic means, which components could be used as provisions for cleaning, and the requirements for pressure-indicating devices used on common manifold systems. Further updates clarified that a listed system requires that any mixed components or systems have been tested together and expand requirements to include configurations allowed in current listed solutions. New sections were added to specify the design, testing, and installation of preaction water mist systems. Another section was added to prevent debris and contaminants from entering a water mist system by adding a requirement for a strainer or filter after the fire department connection (FDC). It also clarified the location of the FDC on a low-pressure water mist system. Throughout the standard, the terms *pressure container* and *pressurized container* were replaced with the newly defined term *pressure vessel*, and the phrase *safety device to release excess pressure* was replaced with *pressure relief device*. These changes were made to stay consistent with industry practices and terminology. This edition also incorporated revisions that updated referenced documents, extracts, and formatting to comply with the *Manual of Style for NFPA Technical Committee Documents*.

The 2023 edition of NFPA 750 was revised to include various definitions related to electronically operated water mist nozzles and incorporated requirements related to such systems. Hazard occupancies were updated based on the latest changes in the 2022 edition of NFPA 13. Further changes include additional components that require a listing, clarification for inclusion of unloader valves, expansion of components that are required to have corrosion resistance, enhancement of overpressure section to require additional valving for system protection, and updated low-rise building installation requirements.



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**Committee Scope:** This Committee shall have primary responsibility for documents on the design and installation of systems which use a water mist for the control, suppression, or extinguishment of fire.



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## NFPA 750

## Standard on

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2023 Edition

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Information on referenced and extracted publications can be found in Chapter 2 and Annex E.

## Chapter 1 Administration

**1.1\* Scope.** This standard contains the minimum requirements for the design, installation, maintenance, and testing of water mist fire protection systems. This standard does not provide definitive fire performance criteria, nor does it offer specific guidance on how to design a system to control, suppress, or extinguish a fire. Reliance is placed on the procurement and installation of listed water mist equipment or systems that have demonstrated performance in fire tests as part of a listing process.

**1.2\* Purpose.**

**1.2.1** The purpose of this standard is to provide protection for life and property from fire through the standardization of design, installation, maintenance, and testing requirements for water-based fire suppression systems that use a specific spray (mist) that absorbs heat, displaces oxygen, or blocks radiant heat to control, suppress, or extinguish fires as required by the application.

**N 1.2.2** The purpose of this standard for low-rise occupancies in accordance with 10.3.1, and one- and two-family dwellings in accordance with 10.3.2, shall be to provide the requirements for a water mist system that aids in the detection and control of residential fires and, thus, provides improved protection against injury, life loss, and property damage.

**N 1.2.3** For low-rise occupancies in accordance with 10.3.1, and one- and two-family dwellings in accordance with 10.3.2, a water mist system shall be designed and installed in accordance with this standard to prevent flashover (total involvement) in the room of fire origin where water mist nozzles are installed, and to improve the ability of occupants to escape or be evacuated.

**1.2.4** The user of this standard shall recognize the complexity of water mist fire suppression systems. Therefore, the designer shall be cautioned that the standard is not a design handbook. The standard shall not do away with the need for the engineer or for competent engineering judgment. It is the intent that a designer capable of applying more complete and rigorous analysis to special or unusual problems shall have latitude in the development of such designs. In such cases, the designer shall be responsible for demonstrating the validity of the design approach.

**1.3 Application.** This standard shall apply to water mist fire protection systems and shall establish minimum requirements for water mist technology on the basis of sound engineering principles, test data, and field experience.

**1.4 Retroactivity.** The provisions of this standard reflect a consensus of what is necessary to provide an acceptable degree of protection from the hazards addressed in this standard at the time the standard was issued.

**1.4.1** Unless otherwise specified, the provisions of this standard shall not apply to facilities, equipment, structures, or installations that existed or were approved for construction or installation prior to the effective date of the standard. Where specified, the provisions of this standard shall be retroactive.

**1.4.2** In those cases where the authority having jurisdiction determines that the existing situation presents an unacceptable degree of risk, the authority having jurisdiction shall be permitted to apply retroactively any portions of this standard deemed appropriate.

**1.4.3** The retroactive requirements of this standard shall be permitted to be modified if their application clearly would be impractical in the judgment of the authority having jurisdiction, and only where it is clearly evident that a reasonable degree of safety is provided.

**1.5 Equivalency.** Nothing in this standard is intended to prevent the use of systems, methods, or devices of equivalent or superior quality, strength, fire resistance, effectiveness, durability, and safety over those prescribed by this standard.

**1.5.1** Technical documentation shall be submitted to the authority having jurisdiction to demonstrate equivalency.

**1.5.2** The system, method, or device shall be approved for the intended purpose by the authority having jurisdiction.



## 1.6\* Units.

**1.6.1** Metric units of measurement in this standard are in accordance with the modernized metric system known as the International System of Units (SI).

**1.6.2** Two units (liter and bar) outside of but recognized by SI are commonly used in international fire protection.

**1.6.3** These units are listed in Table 1.6.3 with conversion factors.

**Table 1.6.3 Metric Conversion Factors**

Name of Unit	Unit Abbreviation or Symbol	Conversion Factor
Millimeter	mm	1 in. = 25.4 mm
Square meter	m <sup>2</sup>	1 ft <sup>2</sup> = 0.0929 m <sup>2</sup>
Liter	L	1 gal = 3.785 L
Cubic decimeter	dm <sup>3</sup>	1 gal = 3.785 dm <sup>3</sup>
Cubic meter	m <sup>3</sup>	1 ft <sup>3</sup> = 0.028317 m <sup>3</sup>
Kilogram	kg	1 lb = 0.4536 kg
Kilograms per cubic meter	kg/m <sup>3</sup>	1 lb/ft <sup>3</sup> = 16.0183 kg/m <sup>3</sup>
Pascal	Pa	1 psi = 6895 Pa
Bar	bar	1 psi = 0.0689 bar; 1 bar = 10 <sup>5</sup> Pa
Liter per minute per square meter	L/min/m <sup>2</sup>	1 gpm = 40.746 L/min/m <sup>2</sup>
Micron	μ	1 mm = 1000 μ

**1.6.4** If a value for measurement as given in this standard is followed by an equivalent value in other units, the first stated is to be regarded as the requirement.

## Chapter 2 Referenced Publications

**2.1 General.** The documents or portions thereof listed in this chapter are referenced within this standard and shall be considered part of the requirements of this document.

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

NFPA 13, *Standard for the Installation of Sprinkler Systems*, 2022 edition.

NFPA 14, *Standard for the Installation of Standpipe and Hose Systems*, 2019 edition.

NFPA 20, *Standard for the Installation of Stationary Pumps for Fire Protection*, 2022 edition.

NFPA 22, *Standard for Water Tanks for Private Fire Protection*, 2018 edition.

NFPA 25, *Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems*, 2023 edition.

NFPA 70®, *National Electrical Code®*, 2023 edition.

NFPA 72®, *National Fire Alarm and Signaling Code®*, 2022 edition.

NFPA 170, *Standard for Fire Safety and Emergency Symbols*, 2021 edition.

NFPA 220, *Standard on Types of Building Construction*, 2021 edition.

## 2.3 Other Publications.

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

ANSI/ASME B1.20.1, *Pipe Threads, General Purpose (Inch)*, 2013.

ANSI/ASME B16.18, *Cast Copper Alloy Solder Joint Pressure Fittings*, 2012.

ANSI/ASME B16.22, *Wrought Copper and Copper Alloy Solder Joint Pressure Fittings*, 2013.

ASME B31.1, *Power Piping Code*, 2016.

ASME Boiler and Pressure Vessel Code, 2015.

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

ASTM A269/A269M, *Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service*, 2015A.

ASTM A351/A351M, *Standard Specification for Castings, Austenitic, Austenitic-Ferritic (Duplex) for Pressure-Containing Parts*, 2016.

ASTM A403/A403M, *Standard Specification for Wrought Austenitic Stainless Steel Piping Fittings*, 2016.

ASTM A632, *Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing (Small-Diameter) for General Service*, 2014.

ASTM A774/A774M, *Standard Specification for As-Welded Wrought Austenitic Stainless Steel Fittings for General Corrosive Service at Low and Moderate Temperatures*, 2014.

ASTM A778/A778M, *Standard Specification for Welded, Unannealed Austenitic Stainless Steel Tubular Products*, 2016.

ASTM A789/A789M, *Standard Specification for Seamless and Welded Ferritic/Austenitic Stainless Steel Tubing for General Service*, 2016A.

ASTM A815/A815M, *Standard Specification for Wrought Ferritic, Ferritic/Austenitic, and Martensitic Stainless Steel Piping Fittings*, 2014.

ASTM B32, *Standard Specification for Solder Metal*, 2014.

ASTM B42, *Standard Specification for Seamless Copper Pipe, Standard Sizes*, 2015.

ASTM B75/B75M, *Standard Specification for Seamless Copper Tube*, 2011.

ASTM B88, *Standard Specification for Seamless Copper Water Tube*, 2014.

ASTM B251, *Standard Specification for General Requirements for Wrought Seamless Copper and Copper-Alloy Tube*, 2010.

ASTM B813, *Standard Specification for Liquid and Paste Fluxes for Soldering Applications of Copper and Copper-Alloy Tube*, 2016.

**2.3.3 AWS Publications.** American Welding Society, 8669 NW 36 Street, #130, Miami, FL 33166-6672.

AWS A5.8M/A5.8, *Specification for Filler Metals for Brazing and Braze Welding*, 2011.