



Member of the FM Global Group

Examination Standard for Firefighting Nozzles for Use with Hose, Monitor Assemblies and Other Firefighting Equipment

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Foreword

This standard is intended to verify that the products and services described will meet stated conditions of performance, safety and quality useful to the ends of property conservation. The purpose of this standard is to present the criteria for examination of various types of products and services.

Examination in accordance with this standard shall demonstrate compliance and verify that quality control in manufacturing shall ensure a consistent and reliable product.

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1 INTRODUCTION

1.1 Purpose

- 1.1.1** This standard states testing and certification requirements for portable adjustable-pattern water spray nozzles for use with residential and industrial fire hose and fixed monitor assemblies. Depending on their design and performance, these nozzles are suitable for use on fires in combustible commodities, flammable liquids and/or electrical equipment.
- 1.1.2** Testing and certification criteria may include, but are not limited to, performance requirements, marking requirements, examination of manufacturing facility(ies), audit of quality assurance procedures, and a surveillance program.

1.2 Scope

- 1.2.1** This standard applies to basic spray, constant gallonage, constant/select gallonage, and constant pressure portable spray nozzles in nominal inlet sizes of 3/4" or larger for use with residential and industrial fire hose and fixed monitor assemblies for their intended application for use on combustible commodities, flammable liquid, and/or electrical fires. In cases where metric sized portable nozzles are to be examined for certification, test criteria comparable to the equivalent or nearest nominal inch size shall be used.
- 1.2.2** Nozzles certified by this standard are intended to be inspected, maintained, and used in accordance with the requirements in NFPA 1962, *Standard for the Care, Use, Inspection, Service Testing, and Replacement of Fire Hose, Coupling, Nozzles, and Fire Hose Appliances*.
- 1.2.3** This standard does not apply to underwriters playpipes.
- 1.2.4** Other types of portable nozzles may be certified if they meet the requirements and intent of this standard. Portable nozzles of unusual design may be subjected to special tests to determine their suitability.

1.3 Basis for Requirements

- 1.3.1** The requirements of this standard are based on experience, research and testing, and/or the standards of other organizations. The advice of manufacturers, users, trade associations, jurisdictions and/or loss control specialists was also considered.
- 1.3.2** The requirements of this standard reflect tests and practices used to examine characteristics of portable the nozzles for the purpose of obtaining certification. Portable nozzles having characteristics not anticipated by this standard may be certified if performance equal, or superior, to that required by this standard is demonstrated.

1.4 Basis for Certification

Certification is based upon satisfactory evaluation of the product and the manufacturer in the following major areas:

- 1.4.1** Examination and tests on production samples shall be performed to evaluate:
- the suitability of the product;
 - the performance of the product as specified by the manufacturer and required for certification; and as far as practical,
 - the durability and reliability of the product.

- 1.4.2 An examination of the manufacturing facilities and audit of quality control procedures is made to evaluate the manufacturer's ability to consistently produce the product which is examined and tested,

1.5 Basis for Continued Certification

The basis for continual certification may include, but is not limited to, the following based upon certification scheme and requirements of the certification agency:

- production or availability of the product as currently certified;
- the continued use of acceptable quality assurance procedures;
- satisfactory field experience;
- compliance with the terms stipulated in the by the certification;
- satisfactory re-examination of production samples for continued conformity to requirements; and,
- satisfactory surveillance audits conducted as part of the certification agency's product surveillance program.

1.6 Effective Date

The effective date of this certification standard mandates that all products tested for certification after the effective date shall satisfy the requirements of this standard.

The effective date of this standard is eighteen (18) months after the publication date of the standard for compliance with all requirements.

1.7 System of Units

Units of measurement used in this Standard are United States (U.S.) customary units. These are followed by their arithmetic equivalents in International System (SI) units, enclosed in parentheses. The first value stated shall be regarded as the requirement. The converted equivalent value may be approximate. Conversion of U.S. customary units is in accordance with ANSI/IEEE/ASTM SI 10.

Two units of measurement (liter and bar), outside of, but recognized by SI, are commonly used in international fire protection and are used in this standard

1.8 Normative References

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the cited edition applies.

American National Standards Institute

ANSI/IEEE/ASTM SI 10, *American National Standard for Metric Practice*

ANSI/NEMA 250, *Enclosures for Electrical Equipment (1000 Volts Maximum)*

ASTM International

ASTM B117, *Standard Practice for Operating Salt Spray (Fog) Apparatus*

ASTM D395, *Standard Test Methods for Rubber Property - Compression Set*

ASTM D412, *Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers - Tension*

ASTM D573, *Standard Test Method for Rubber - Deterioration in an Air Oven*

ASTM G155, *Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Non-Metallic Materials*

FM Approvals LLC

FM 3600, *Examination Standard for Electrical Equipment for Use in Hazardous (Classified) Locations – General Requirements*

FM 3611, *Examination Standard for Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations*

FM 3615, *Examination Standard for Explosionproof Electrical Equipment General Requirements*

FM 3810, *Examination Standard for Electrical and Electronic Test, Measuring and Process Control Equipment*

FM 5130, *Examination Standard for Foam Extinguishing Systems*

National Fire Protection Association

NFPA 1962, *Standard for the Care, Use, Inspection, Service Testing, and Replacement of Fire Hose, Couplings, Nozzles, and Fire Hose Appliances*

NFPA 1963, *Standard for Fire Hose Connections*

Underwriters Laboratories

UL508, *Standard for Safety, Industrial Control Equipment*

UL508A, *Standard for Safety, Industrial Control Panels*

UL 1004 (series), *Standard for Safety, Rotating Electrical Machines*

1.9 Terms and Definitions

For purposes of this standard, the following terms apply:

Accepted

This term refers to installations acceptable to the authority enforcing the applicable installation rules. Acceptance is based upon an overall evaluation of the installation. Factors other than the use of certified equipment impact upon the decision to accept, or not to accept the product. Acceptance is not a characteristic of a product, it is installation specific, and a product accepted for one installation may not be accepted elsewhere.

Basic Spray Nozzle

An adjustable-pattern, spray nozzle in which the rated discharge is delivered at a designated rated pressure and spray pattern setting. Due to its basic design, as the pattern changes from a straight stream to a wide spray pattern, the discharge (gal/min) will vary. The inlet pressure will also be affected. This is caused by changes in the orifice size to affect pattern adjustment.

Constant Gallonage Spray Nozzle

A constant gallonage spray nozzle is an adjustable-pattern nozzle in which the nozzle will deliver a constant discharge flow throughout all spray patterns from straight stream to wide angle spray at its rated pressure. This is accomplished by maintaining a constant orifice size during discharge pattern adjustment.

Constant Pressure (Automatic) Spray Nozzle

A constant pressure (automatic) spray nozzle is an adjustable-pattern nozzle in which the pressure remains constant through a range of discharge rates. This is accomplished by means of a pressure-activated self-adjusting orifice baffle.

Constant/Select Gallonage Spray Nozzle

A constant/select gallonage spray nozzle is a constant-gallonage nozzle that allows on-site manual adjustment of the orifice to choose between multiple options of rated discharge flow at a given rated pressure. The discharge rate remains constant throughout the range of pattern selection from straight stream to wide spray.

Flush Feature

Flush is a nozzle characteristic that allows the orifice to be opened so that small debris that might otherwise be trapped in the nozzle, which may cause pattern disruptions and discharge variation, can pass through. When the flush feature is engaged, the inlet pressure will drop and the pattern will deteriorate. In fire fighting, caution must be exercised when the flush feature is engaged.

Flammable Liquid

Any liquid that has a flash point below 100°F (38°C).

Full-Time Swivel

A swivel coupling connection at the inlet of a spray nozzle designed to rotate independently from the nozzle.

Handline Nozzle

A portable handheld spray nozzle designed to be affixed to an industrial fire hose, or other water hose.

Lever-Type Control

A control in which a handle or lever operates along the axis of the nozzle.

Master Stream Nozzle

A spray nozzle designed to be affixed to a firefighting monitor assembly. Also known as monitor nozzles.

Maximum Rated Operating Pressure

The maximum pressure, measured at the nozzle inlet, at which a nozzle is rated to operate as intended.

Narrow Angle Spray

A spray pattern between straight stream and wide angle spray patterns.

Combustible Commodities

Ordinary combustible materials, such as wood, cloth, paper, rubber, and many plastics. Also known as Class A fire applications.

Rated Flow

The rated flow rate of the nozzle achieved while flowing at the specified rated inlet pressure. Also known as rated discharge.

Rated Inlet Pressure

The inlet pressure at which a nozzle is designed to operate to produce the rated discharge. Also known as rated pressure.

Rotational-Type Control

A control that rotates in a plane perpendicular to the axis of the nozzle.

Spray Angle

The angle at which the nozzle's spray radiates outward from the nozzle outlet. Also known as the discharge cone angle.

Spray Nozzle

A generic term applying to all nozzles covered by this standard.

Straight Stream

The most dense type of spray pattern in an adjustable spray nozzle to achieve the maximum reach.

Trigger-Type Lever Controls

A control that is activated by a squeezing or pinching movement and features a spring-operated automatic return to the closed position.

Wide Angle Spray

The spray pattern resulting in the widest possible spray angle.

2 GENERAL INFORMATION

2.1 Product Information

2.1.1 This standard applies to portable adjustable-pattern nozzles intended for general fire department and industry use, for use with fire hoses affixed to standpipe systems, or for use with fixed monitor assemblies. Depending on their design and performance, these nozzles are suitable for use on fires in combustible commodities, flammable liquids, and/or electrical equipment. Nozzles may be either basic spray, constant gallonage, constant/select gallonage, or constant pressure (automatic) types. Nozzles are typically supplied with rotational-type pattern controls that are used to control and adjust the spray pattern of the discharge from straight stream to wide angle spray. Nozzles may also be supplied with a shutoff valve, or have twist shutoff capabilities, to provide on/off control of water flow. Nozzles will provide their rated flow at the rated pressure.

2.1.2 In order to meet the intent of this standard, nozzles must be examined on a model-by-model, type-by-type, manufacturer-by-manufacturer, and plant-by-plant basis. This is predicated on the basis that identical designs, fabricated in identical materials by different manufacturers or, even by different plants of the same manufacturer, have been seen to perform differently in testing. Sample nozzles, selected in conformance to this criterion, shall satisfy all of the requirements of this standard,

2.2 Certification Application Requirements

The manufacturer shall provide the following preliminary information with any request for certification consideration:

- A complete list of all models, types, sizes, and options for the products or services being submitted for certification consideration.
- General assembly drawings, one complete set of manufacturing drawings, materials list(s), anticipated marking format, brochures, sales literature, specification sheets, installation, operation and maintenance procedures; and,
- The number and location(s) of the manufacturing facilities.

All documents shall identify the manufacturer's name, document number or other form of reference, title, date of last revision, and revision level. All foreign language documents shall be provided with English translation.

2.3 Requirement for Samples for Examination

2.3.1 Following authorization of a certification examination, the manufacturer shall submit samples for examination and testing based on the sample requirements determined by the certification agency.

2.3.2 Requirements for samples may vary depending on design features, results of prior or similar testing, and results of any foregoing tests.

2.3.3 The manufacturer shall submit samples representative of production. Any decision to use data generated using prototypes is at the discretion of the certification agency.

2.3.4 It is the manufacturer's responsibility to provide any necessary test fixtures, such as those which may be required to evaluate the nozzles.