

Approval Standard

For

**Firefighting Nozzles for Use
with Hose, Monitor
Assemblies and other
Firefighting Equipment**

Class Number 5511

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Foreword

Approvals are 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 Approval Standards is to present the criteria for Approval of various types of products and services, as guidance for FM Approvals personnel, manufacturers, users and authorities having jurisdiction.

Products submitted for Approval shall demonstrate that they meet the intent of the Approval Standard, and that quality control in manufacturing and/or applications shall ensure a consistently uniform and reliable product or service. Approval Standards strive to be performance-oriented and to facilitate technological development.

For examining equipment, materials and services, Approval Standards:

- a) must be useful to the ends of property conservation by preventing, limiting or not causing damage under the conditions stated by the Approval listing; and
- b) must be readily identifiable.

Continuance of Approval and Listing depends on compliance with the Master Agreement, satisfactory performance in the field, on successful re-examinations of equipment, materials, and services as appropriate, and on periodic follow-up audits of the manufacturing facility or service/application.

FM Approvals LLC reserves the right in its sole judgement to change or revise its standards, criteria, methods, or procedures.

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1.0 INTRODUCTION

1.1 Purpose

- 1.1.1 This standard states FM Approvals criteria for portable adjustable-pattern nozzles for use with 3/4 in. (19 mm), 1 in. (25 mm), 1-1/2 in. (38 mm) and 2-1/2 in. (65 mm) nominal size fire hose and fixed monitor nozzles, or as determined by trade sizes of the coupling, for use with hose, fixed monitor assemblies and other firefighting equipment. Depending on their design and performance, these nozzles are suitability for use on fires in combustible commodities, flammable liquids and/or electrical equipment.
- 1.1.2 FM Approvals criteria may include, but are not limited to, performance requirements, marking requirements, examination of manufacturing facility(ies), audit of quality assurance procedures, and a follow-up program.

1.2 Scope

- 1.2.1 This standard encompasses the design and performance requirements for the basic spray, constant gallonage, and constant pressure spray portable nozzles for use with 3/4 in. (19 mm), 1 in. (25 mm), 1 - 1/2 in. (38 mm) and 2-1/2 in. (65 mm) nominal size fire hose and fixed monitor nozzles 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 Approval, test criteria comparable to the equivalent or nearest nominal inch size shall be used.
- 1.2.2 This standard includes Approval Class 1421 (Monitor Nozzles) and Approval Class 5512 (Special Purpose Nozzle, Combination, for Garden Hose), this standard does not include Approval Class 1411 (Underwriter Playpipes) and Approval Class 1412 (Short Playpipes).
- 1.2.3 Other types of portable nozzles may be FM Approved 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.
- 1.2.4 Approval standards are intended to verify that the product described will meet stated conditions of performance, safety and quality useful to the ends of property conservation.

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 nozzles for the purpose of obtaining Approval. Portable nozzles having characteristics not anticipated by this standard may be FM Approved if performance equal, or superior, to that required by this standard is demonstrated, or if the intent of the standard is met. Alternatively, portable nozzles which meet all of the requirements identified in this standard may not be FM Approved if other conditions which adversely affect performance exist or if the intent of this standard is not met.

1.4 Basis for Approval

Approval 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 by FM Approvals; and, as far as practical,
- The durability and reliability of the product.

1.4.2 An examination of the manufacturing facility(ies) and audit of quality control procedures shall be made to evaluate the manufacturer's ability to produce the product which was examined and tested, and the marking procedures used to identify the product. These examinations are repeated as part of FM Approval's product follow-up program.

1.5 Basis for Continued Approval

Continued Approval is based upon:

- Production or availability of the product as currently FM Approved;
- The continued use of acceptable quality assurance procedures;
- Satisfactory field experience;
- Compliance with the terms stipulated in the Master Agreement;
- Satisfactory re-examination of production samples for continued conformity to requirements; and,
- Satisfactory Facilities and Procedures Audits (F&PAs) conducted as part of FM Approvals' product follow-up program.

Also, as a condition of retaining Approval, manufacturers may not change a product or service without prior authorization by FM Approvals.

1.6 Effective Date

The effective date of an Approval standard mandates that all products tested for Approval after the effective date shall satisfy the requirements of that standard. Products FM Approved under a previous edition shall comply with the new version by the effective date or forfeit Approval.

The effective date of this standard is **October 31, 2006** 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. Appendix A lists the selected units and conversions to SI units for measures appearing in this standard. Conversion of U.S. customary units is in accordance with the American National Standards Institute (ANSI)/Institute of Electrical and Electronics Engineers (IEEE)/American Society for Testing Materials (ASTM) SI 10-97, "Standard for Use of the International System of Units (SI): The Modern Metric System." 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 Applicable Documents

The following standards, test methods, and practices are referenced in this standard:

ANSI/IEEE/ASTM SI 10 - 1997, *Standard for Use of the International System of Units (SI): The Modern Metric System*
 ASTM B 117 - 1995, *Standard Practice for Operating Salt Spray (Fog) Apparatus*
 ASTM D 395 - 1989, *Standard Test Methods for Rubber Property - Compression Set*
 ASTM D 412 - 1997, *Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers - Tension*
 ASTM D 573 - 1988, *Standard Test Method for Rubber - Deterioration in an Air Oven*
 ASTM G 155-2000, *Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Non-Metallic Materials*
 FM Global Property Loss Prevention Data Sheets
 International Standards Organization, ISO 9001 - 1994, *Quality Systems - Model for quality assurance in design, development, production, installation, and servicing*,
 ISO 9002 - 1994, *Quality Systems - Model for quality assurance in production, installation, and servicing*
 National Fire Protection Association (NFPA) 1962, February 2003 *Standard for the Care, Use, and Service Testing of Fire Hose Including Couplings and Nozzles*
 NFPA 1963, August 2003 *Standard for Fire Hose Connections*
 NFPA 1964, February 2003 *Standard for Spray Nozzles*

1.9 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. When this authority is FM Global, such locations are termed "FM Global Accepted". Acceptance is based upon an overall evaluation of the installation. Factors other than the use of FM Approved 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. (Contrast with the definition for "FM Approved").

Basic Spray Nozzle

An adjustable-pattern, spray nozzle in which the rated discharge is delivered at a designated nozzle pressure and nozzle 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 nozzle 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 water is discharged at a designed nozzle pressure. At the rated pressure, the nozzle will deliver a constant gallonage from a straight stream to a wide spray pattern. 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. The constant pressure provides the velocity for an effective stream reach at various discharge rates. This is accomplished by means of a pressure-activated self-adjusting orifice baffle.

Constant/Select Gallonage Feature

A constant/select gallonage feature is a nozzle characteristic that allows on-site manual adjustment of the orifice to effect a predetermined discharge rate. 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, causing pattern disruptions and discharge variation, can pass through. When the flush feature is engaged, the nozzle 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).

FM Approved

This term refers to products FM Approved by FM Approvals. Such products are listed in the Approval Guide, a publication of FM Approvals, issued annually, or its supplements. All products so listed have been successfully examined by FM Approvals, and their manufacturers have signed and returned a Master Agreement to FM Approvals. This form obligates the manufacturer to allow re-examination of the product and audit of facilities and procedures at FM Approvals discretion. It further requires the manufacturer not to deviate from the as-FM Approved configuration of the product without review by and agreement of FM Approvals.

Lever-Type Control

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

Narrow Angle Spray

Type of spray pattern that results in the least amount of spray.

Nozzle Pressure

The velocity pressure that results in water being discharged from the nozzle. Pressure without discharge is known as static pressure. Gauge pressure is measured in pounds per square inch (psi) or bar.

Combustibles Commodities

Property classifications as defined in FM Global Property Loss Prevention Data Sheet 8-1.

Rated Pressure

The pressure at which a nozzle is designed to operate to produce a specified discharge.

Rotational-Type Control

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

Solid Stream

Playpipe type nozzles per Approval Standards for Playpipes, Class 1411 and 1412.

Spray Nozzle

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

Wide Angle Spray

The type of spray pattern in a full wide spray pattern.

Straight Stream

The most dense type of spray pattern in an adjustable spray nozzle.

2.0 GENERAL INFORMATION

2.1 Product Information

- 2.1.1 This standard applies to new fixed or portable adjustable-pattern nozzles intended for general fire department and industry use or for use with fire hoses affixed to standpipe systems. Unless otherwise specified, these requirements apply to basic spray, constant gallonage, and constant pressure spray nozzles with trade sizes of 3/4 in. (19 mm), 1 in. (25 mm), 1-1/2 in. (38 mm), and 2-1/2 in. (65 mm), or as determined by trade sizes of the coupling. Depending on their design and performance, these nozzles are suitable for use on fires in combustible commodities, flammable liquids and/or electrical equipment.

Exempt from these standards are the Underwriter's playpipes for 2-1/2 in. nominal size hose. As they frequently are used as water metering devices they must be made to definite dimensions. The requirements for these nozzles are given in the current Approval Standards for Playpipes, Class Nos. 1411 and 1412.

- 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 Approval Application Requirements

To apply for an Approval examination, the manufacturer, or its authorized representative, should submit a request to:

Hydraulics Group Manager
FM Approvals Hydraulics Laboratory
743A Reynolds Road
West Glocester, RI 02814
U.S.A.

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

- A complete list of all models, types, sizes, and options for the products or services being submitted for Approval 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.