



Member of the FM Global Group

Approval Standard for Angle and Straightaway Hose Valves

Class Number 1521/1522

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Foreword

The FM Approvals certification mark is intended to verify that the products and services described will meet FM Approvals' 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 certification by FM Approvals shall demonstrate that they meet the intent of the Approval Standard, and that quality control in manufacturing shall ensure a consistently uniform and reliable product. Approval Standards strive to be performance-oriented. They are intended 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 Approval Agreement, satisfactory performance in the field, successful re-examinations of equipment, materials, and services as appropriate, and surveillance audits of the manufacturing facility.

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

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1. INTRODUCTION

1.1 Purpose

- 1.1.1 This standard states Approval criteria for angle and straightaway hose valves for use in aboveground standpipe systems, hose cabinets, and in fire pump discharge lines with playpipes.
- 1.1.2 Approval 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 audit program.

1.2 Scope

- 1.2.1 This standard encompasses the design and performance requirements for right angle and straightaway hose valves for use in aboveground standpipe pipe systems designed and installed in accordance with FM Global Property Loss Prevention Data Sheets.
- 1.2.2 This Approval standard has been based on NPS (Nominal Pipe Size) 1-1/2 and 2-1/2 in (DN 40 and DN 65 mm) common sizes. Other sizes may be considered for Approval on case by case basis.
- 1.2.3 Hose valves considered under this standard may be designed with horizontal, bib-nosed, oblique, or right angle body patterns.
- 1.2.4 This standard encompasses traditional hose valves, pressure restricting hose valves, and pressure reducing hose valves. **Note:** Hose valves with pressure reducing features are not intended to replace the pressure reducing valve that sets the water supply pressure for combined systems that supply water to the sprinkler system and the standpipe system.
- 1.2.5 The minimum rated working pressure for hose valves evaluated using this standard is 175 psi (1205 kPa).
- 1.2.6 This standard is 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 hose valves for the purpose of obtaining Approval. Hose valves having characteristics not anticipated by this standard may be Approved if performance equal, or superior, to that required by this standard is demonstrated, or if the intent of the standard is met. Alternatively, hose valves that 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:
 - Suitability of the product;
 - Performance of the product as specified by the manufacturer and required by FM Approvals; and, as far as practical,
 - Durability and reliability of the product.

- 1.4.2 An initial audit shall be conducted to evaluate the manufacturer's ability to consistently produce the product that was examined and tested as part of the Approval project. The audit shall review the facility and in-place quality control procedures used in the manufacturing of the product. Typically, areas of review are incoming inspection, work in progress, production testing, final quality control, marking, calibration of equipment, shipping procedures, and document and drawing control. These examinations are repeated periodically as part of the FM Approvals Surveillance Audit Program. (Refer to Section 5.2, Surveillance Audit Program).

1.5 Basis for Continued Approval

- 1.5.1 Continued Approval is based upon:

- Production or availability of the product as currently FM Approved;
- 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 Surveillance Audits conducted as part of FM Approvals' Surveillance Audit Program.

- 1.5.2 Also, as a condition of retaining FM Approval, manufacturers shall not change an FM Approved product or service without prior written authorization by FM Approvals. (Refer to Section 5.1.3 for further details regarding changes.)

1.6 Effective Date

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

The effective date of this Standard is **April 1, 2015** 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 measurements appearing in this standard. Conversion of U.S. customary units is in accordance with the Institute of Electrical and Electronics Engineers (IEEE)/American Society for Testing Materials (ASTM) SI10 - 2010 *American National Standard for Metric Practice*.

1.8 Applicable Documents

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

American National Standards Institute (ANSI)/American Water Works Association (AWWA) C606 - 2011, *Standard for Grooved and Shouldered Joints*

American Society of Mechanical Engineers (ASME) B1.20.1 - 2013, *Pipe Threads, General Purpose (Inch)*

ASME B1.20.7, *Hose Coupling Screw Threads (Inch)* – 1991(R2013)

ASME B16.5-2013, *Pipe Flanges and Flanged Fittings NPS ½ Through 24, Metric / Inch Standard*

ASME B16.24-2011, *Cast Copper Alloy Pipe Flanges and Flanged Fittings: Classes 150, 300, 400, 600, 900, 1500, and 2500*

ASME B36.10M - 2004, *Welded and Seamless Wrought Steel Pipe*

ASTM A53/A53M - 12, *Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless*

ASTM D471-12a, *Standard Test Method for Rubber Property – Effect of Liquids*

ASTM D 572-04(R2010), *Standard Test Method for Rubber – Deterioration by Heat and Oxygen*
British Standard (BS) 10-2009, *Specification for Flanges and Bolting for Pipes, Valves and Fittings*
BS 336-2010, *Specification for Fire Hose Couplings and Ancillary Equipment*
BS (European Norm) EN (International Organization for Standardization) ISO 228-1 - 2003, *Pipe threads where pressure-tight joints are not made on the threads, Part 1: Dimensions, tolerances, and designations*
BS EN 10226-1-2004, *Pipe threads where pressure-tight joints are made on the threads, Part 1: Taper external threads and parallel internal threads – Dimensions, tolerances, and designation*
EN 10226-2-2006, *Pipe threads where pressure-tight joints are made on the threads, Part 2: Taper external threads and taper internal threads – Dimensions, tolerances, and designation*
EN 1092-1-2007, *Flanges and Their Joints – Circular Flanges for Pipes, Valves, Fittings and Accessories, PN Designated - Part 1: Steel Flanges*
FM Global Property Loss Prevention Data Sheets
IEEE/ASTM SI 10 - 2010, *American National Standard for Metric Practice*
ISO 9001-2008, *Quality Management Systems - Requirements*
ISO / International Electrotechnical Commission (IEC) 17025-2005 (R2010), *General Requirements for the Competence of Testing and Calibration Laboratories*
National Fire Protection Association (NFPA) 14-2013, *Standard for the Installation of Standpipe and Hose Systems*
NFPA 1963, *Standard for Fire Hose Connections*

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 (Authority Having Jurisdiction). 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 the product. Acceptance is not a characteristic of a product, it is installation specific. A product accepted for one installation may thus not be acceptable elsewhere. (Contrast with FM Approved.)

Bib-Nose Body Pattern

This term refers to a body shape that results in the valve stem being roughly 90 degrees from the valve inlet, and the valve outlet being roughly 135 degrees from the valve stem.

Combined Standpipe System

This term refers to the piping arrangement where a common main feeds both the sprinkler system and the hose connections.

End Connections

The term refers to the types of joints used to connect components of a pipe system. Typical end connections in hose pipe systems are: threaded (pipe threads), threaded (hose threads), flanged, instantaneous connections (those meeting the requirements of BS 336), and Storz connections.

FM Approvals Certification Mark

The FM Approvals Certification Marks are detailed in Appendix B. Their use is mandatory on all manufactured FM Approved hose valves. These registered marks cannot be used except as authorized by FM Approvals via the granting of Approval to a specific product.

FM Approved

This term refers to products FM Approved by FM Approvals. Such products are listed in the *Approval Guide*, an online resource of FM Approvals. All products so listed have been successfully examined by FM Approvals, and their manufacturers have signed and returned a Master Agreement to FM Approvals. These forms obligate the manufacturer to allow re-examination of the product and surveillance audits at the discretion of FM Approvals. 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. Approval is product specific.

Horizontal Body Pattern

This term refers to a body pattern shape that results in the inlet and outlet connections sharing the same axis. The waterway flow path typically resembles that of a globe valve in that the fluid enters the valves and then enters the seat ring from underneath, passes up and around the sealing assembly, and then falls back toward the valve outlet.

Hose Station

This term refers to the combination of a hose rack, hand held nozzle, fire hose, and hose valve with threaded connection.

Landing Valve

This term is commonly used to describe a hose valve used at each floor of a multi-story structure.

Oblique Body Pattern

This term refers to a body pattern shape that results in the valve stem being inline with the valve inlet, and the valve outlet being at an angle of roughly 45 degrees in relation to the valve stem.

Pressure Reducing Hose Valve

This term refers to a hose valve that has replaced the traditional bonnet sub-assembly with a single stage regulator. The field adjustable regulator feature will limit the outlet pressure of the hose valve by balancing the water supply pressure against the force generated by an internal component (i.e. spring). Once the inlet pressure is increased above the lower limit of the adjustable range of the pressure reduction feature, the valve will supply a consistent outlet pressure under flowing conditions.

Pressure Restricting Hose Valve

This term refers to a hose valve that has been designed with an adjustable stop that limits travel of the rising stem of the hose valve when the valve is opened. The effect of the adjustable stop is to increase the friction loss through the valve by restricting the distance that the sealing ring can rise away from the seat ring within the valve. Pressure restriction is only observed under flowing conditions.

Rated Working Pressure

The rated working pressure for a product described in this standard is the maximum pressure at which the hose valve can be expected to operate in normal service. The minimum rated working pressure for hose valves considered for FM Approval is 175 psi (1205 kPa). The rated working pressure of an assembly is that of its lowest pressure rated component.

Right Angle Body Pattern

This term refers to a body pattern shape that results in the stem being inline with the valve inlet connection, and the outlet connection being at an angle of roughly 90 degrees from the inlet connection.

Schedule 40 Steel Pipe

This term refers to a combination of outside diameter and pipe wall thicknesses that are commonly used within industry for hose pipe systems. For clarity, the dimensional values may be referenced in ASME B36.10, Welded and Seamless Wrought Steel Pipe.

Snoot

This term refers to a threaded adapter that allows the connection of fire hose to standpipe connections. Common connections utilize different combinations male or female tapered pipe threads x male or female hose threads.

Standpipe

This term refers to the piping within a building that provides water supply to the hose connections, hose stations, as well as sprinkler systems (on combined systems). Standpipes are classified as either "Automatic" or "Manual", where the difference is whether or not the standpipe is connected to a water supply. If connected to a water supply on continuous basis, and all that is required to get water at the hose valve is to open the hose valve, then the system is regarded as "Automatic". For standpipe systems that receive primary water supply from the fire department

connection at the exterior wall of the building, this is regarded as “Manual”. Secondary classifications for standpipes are “Dry” or “Wet” which is a reference to the normal condition within the actual standpipe. Standpipe systems are further classified as vertical when supplying water to hose connections floor to floor, and horizontal when supplying water to hose connections on the same floor.

Storz Connection

This term refers to a joint comprised of mating identical ends with interlocking hooks and flanges originally designed by August Guido Storz. The joint is made with the insertion of the hooks into the receiving hole on the mating flange, and then turning a quarter turn until the joint locks in place.

2. GENERAL INFORMATION

2.1 Product Information

- 2.1.1 Traditional hose valves discussed in this standard are assemblies of the following common types of components: body, bonnet, stem, seat assembly, seat ring, seat clamping ring, seat ring clamping nut, stem seal, hand wheel, and hand wheel nut. Please note that product designs and part names may vary between manufacturers.
- 2.1.2 Pressure restricting hose valves differ from the traditional hose valve by the addition of pressure restriction feature components. While designs differ between manufacturers, this valve assembly achieves pressure restriction by limiting the travel of the seat assembly.
- 2.1.3 Pressure reducing hose valves differ from the traditional hose valve by the addition of the pressure reducing feature components that typically replace the bonnet assembly entirely. While the designs vary, the pressure reducing feature allows for a maximum outlet pressure to be set in the flowing condition.
- 2.1.4 In order to meet the intent of this Standard, hose valves 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 using identical materials by different manufacturers, or even by different plants of the same manufacturer, have been seen to perform differently in testing. Sample hose valves, selected in conformance to this criterion, shall satisfy all of the requirements of this Standard.

2.2 Approval Application Requirements

- 2.2.1 To apply for an FM Approval examination, the manufacturer, or an authorized representative, shall submit a request to:

Manager of Fire Protection
FM Approvals - Hydraulics Laboratory
743A Reynolds Road
West Glocester, RI 02814 U.S.A.

- 2.2.2 The manufacturer shall provide the following preliminary information with any request for Approval consideration:
 - A complete list of all models, types, sizes, end connections, and options for the products 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
 - Number and location(s) of manufacturing facilities making the products submitted for Approval.
- 2.2.3 All of the above referenced documents shall be controlled by the manufacturer's Quality Assurance procedures, and 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 at the time of submittal.