

Approval Standard

Suction Pressure Regulating Valves

Class Number 1363
January 2012



Member of the FM Global Group

Approval Standard for Suction Pressure Regulating Valves

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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 FM 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, on successful re-examinations of equipment, materials, and services as appropriate, and on 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 suction pressure regulating valves for use in fire protection systems when local law or the Authority Having Jurisdiction require that a minimum suction pressure be maintained.
- 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 suction pressure regulating valves.
- 1.2.2 Suction pressure regulating valves are installed downstream of booster pumps in fire protection systems and maintain minimum required suction pressure by reducing the discharge flow through the valve.
- 1.2.3 Other types and sizes, including metric sizes, of suction pressure regulating valves not discussed in this standard may be FM Approved if they meet the requirements and intent of this standard. Suction pressure regulating valves 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 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. The requirements of this standard reflect tests and practices used to examine characteristics of suction pressure regulating valves for the purpose of obtaining Approval. Suction pressure regulating valves 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, suction pressure regulating valves 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 A first 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 audits 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;
- 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 Surveillance Audits conducted as part of FM Approval's product follow-up program.

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

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 **December 31, 2012** 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 Institute of Electrical and Electronics Engineers (IEEE)/American Society for Testing Materials (ASTM) SI 10-2002, *American National Standard for Use of the International System of Units (SI): The Modern Metric System*. Two units of measurement (Bar and Liter), 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 or beneficial in understanding this standard:

- ANSI/American Society of Mechanical Engineers (ASME) B16.5 - 1988, *Pipe Flanges and Flanged Fittings*
- ANSI/American Society of Mechanical Engineers (ASME) B1.20.1 - 1983 (2006), *Pipe Threads, General Purpose, (Inch)*
- British Standards Institution European Specifications (BS EN) 10242 - 2003, *Threaded Pipe Fittings in Malleable Cast Iron*
- International Organization for Standardization (ISO) 7-1 - 2007, *Pipe Threads Where Pressure-Tight Joints are made on the Threads- Part 1: Dimensions, Tolerances and Designation*
- ISO 17025 - 2006, *General Requirements for the Competence of Testing and Calibration Laboratories*
- American Society for Testing and Materials (ASTM) D 471 - 1997, – *Standard Test Method for Rubber Property – Effect of Liquids*.
- American Society for Testing and Materials (ASTM) D 572 - 1988 (Re-Approved 1994), – *Standard Test Method for Rubber – Deterioration by Heat and Oxygen*.

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 the 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 whether to accept the product. Acceptance is not a characteristic of a product. It is installation specific. A product accepted for one installation may not be acceptable elsewhere. (Contrast with FM Approved.)

End Connections

The term “End Connections” refers to the method of connecting components of a fire protection system. Typical end connections in fire protection service are flanged, grooved, threaded and welded end.

FM Approvals Certification Marks

The FM Approvals Certification Marks are detailed in Appendix B. Their use is mandatory on all units of FM Approved products. 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 on-line resource of FM Approvals, see Appendix C. 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 surveillance audits 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. Approval is product specific.

Rated Working Pressure

This is the maximum sustained pressure at or below which the device shall operate trouble free for its entire design life. This value sets the basis for the testing described in Section 4.

Suction Pressure Regulating Valve

A valve installed downstream of a fire pump which senses suction pressure to the pump. When the suction pressure to the pump drops below a pre-determined level the suction pressure regulating valve will begin to modulate towards the closed position thereby maintaining the pre-determined minimum suction pressure in the main supplying the fire pump, protecting it from possible damage. As the pump inlet pressure increases the suction pressure regulating valve will modulate open. When suction pressure to the pump is above a pre-determined level the suction pressure regulating valve remains fully open.

2. GENERAL INFORMATION

2.1 Product Information

- 2.1.1 The products discussed in this standard are for use in a booster pump discharge line in fire protection systems when local law or Authority Having Jurisdiction require that a minimum suction pressure be maintained. Installations shall be in accordance with FM Global Property Loss Prevention Data Sheets and the manufacturer's installation instructions.
- 2.1.2 In order to meet the intent of this standard, suction pressure regulating valves shall 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 sometimes been shown to perform differently in testing. Sample suction pressure regulating valves selected in conformance to this criterion shall satisfy all of the requirements of this standard.
- 2.1.3 A suction pressure regulating valve assembly usually consists of a main line regulating valve, a pilot control valve and associated trim.

2.2 Approval Application Requirements

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

Fire Protection Group Manager
FM Approvals Hydraulics Laboratory
743A Reynolds Road
West Glocester, RI 02814

- 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, and options for the products or services being submitted for Approval consideration,
 - General assembly drawings, one complete set of manufacturing drawings, materials list(s) (e.g., ASTM A 48, Class 40A, Gray Iron Casting), anticipated marking format, piping and electrical schematics, nameplate format, brochures, sales literature, specification sheets, installation, operation and maintenance procedures, and
 - The number and location(s) of manufacturing facilities.
- 2.2.3 All the above referenced documents shall be controlled by the manufacture'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.

2.3 Requirements for Samples for Examination

Following set-up and authorization of an Approval examination, the manufacturer shall submit samples for examination and testing. Sample requirements shall be determined by FM Approvals following review of the preliminary information. Sample requirements may vary depending on design features, results of prior testing, and results of the foregoing tests. It is the manufacturer's responsibility to submit samples representative of production. Any decision to use data generated utilizing prototypes is at the discretion of FM Approvals. The manufacturer shall provide any special test fixtures, which may be required to evaluate the suction pressure regulating valves discussed in this standard.