

Approval Standard

For

Waterflow Detector Check Valves

Class Number 1045

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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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TABLE OF CONTENTS

1. INTRODUCTION	1
1.1 Purpose	1
1.2 Scope	1
1.3 Basis for Requirements	1
1.4 Basis for Approval	2
1.5 Basis for Continued Approval	2
1.6 Effective Date	2
1.7 System of Units	2
1.8 Applicable Documents	3
1.9 Definitions	3
2. GENERAL INFORMATION	4
2.1 Product Information	4
2.2 Approval Application Requirements	4
2.3 Requirements for Samples for Examination	5
3. GENERAL REQUIREMENTS	5
3.1 Review of Documentation	5
3.2 Physical or Structural Features	5
3.3 Clearances	6
3.4 Materials	7
3.5 Markings	7
3.6 Manufacturer's Installation and Operation Instructions	7
3.7 Calibration	7
4. PERFORMANCE REQUIREMENTS	8
4.1 Examination	8
4.2 Clapper Strength	8
4.3 Resilient Seat (Reverse Flow) Leakage	8
4.4 Metal-To-Metal (Reverse Flow) Seat Leakage	8
4.5 Hydrostatic Strength	9
4.6 Friction Loss Determination	9
4.7 Differential Cracking Pressure	10
4.8 Cycle Test	10
4.9 Bonding Adequacy	11
4.10 Water Absorption	11
4.11 Aging	12
4.12 Additional Tests	12
5. OPERATIONS REQUIREMENTS	12
5.1 Demonstrated Quality Control Program	12
5.2 Facilities and Procedures Audit (F&PA)	14
5.3 Manufacturer's Responsibilities	14
5.4 Manufacturing and Production Tests	15
APPENDIX A: Units Of Measurement	16
APPENDIX B: Approval Marks	17
APPENDIX C: Tolerances	18
APPENDIX D: Drawings	19
APPENDIX E: Sample Listing	22

1. INTRODUCTION

1.1 Purpose

- 1.1.1 This standard states FM Approvals criteria for waterflow detector check valves. These devices are required by waterworks authorities to supervise private fire service lines in order to detect loss of water through leakage or misuse. Detector check valves permit the flow of water in one direction and prevent flow in the opposite direction. Additionally, these valves direct small flows through a by-pass line that contains a water meter. Large flows for fire protection lift the clapper within the waterflow detector check valve and pass without being metered. When used as part of a Compound Fire Service Meter Assembly the mainline flow is metered by an upstream mainline meter.
- 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 follow-up program.

1.2 Scope

- 1.2.1 This standard encompasses the design and performance requirements for 2, 2-1/2, 3, 3-1/2, 4, 5, 6, 8, 10 and 12 in. nominal size waterflow detector check valves for their intended application of permitting flow of water in one direction and preventing flow in the opposite direction while permitting the supervision of private fire service lines in order to detect loss of water through leakage or misuse. Sizes refer to the nominal diameter of the pipeline to which the valve will be connected. Sizes outside the range shown above shall be evaluated on a case-by-case basis. In cases where metric sized waterflow detector check valves 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 defines the requirements for waterflow detector check valves. Waterflow detector check valves covered in this Approval Standard are supplied with either flanged or grooved end connections, and are provided with hand hold covers. Other types of waterflow detector check valves may be FM Approved if they meet the requirements and intent of this standard. Waterflow detector check valves of unusual design may be subjected to special tests to determine their suitability.
- 1.2.3 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 waterflow detector check valves for the purpose of obtaining Approval. Waterflow detector check 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, waterflow detector check 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 An initial facilities and procedures audit shall be conducted to evaluate the manufacturer's ability to consistently produce the product which was examined and tested as part of the Approval project. The audit will 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 drawing control. These examinations are repeated periodically as part of the FM Approvals' product follow-up program, (Refer to Section 5.2, Facilities and Procedures Audits).

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 Facilities and Procedures Audits (F&PAs) conducted as part of FM Approvals' product follow-up program.

1.5.2 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 **July 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."

2 FM APPROVALS

1.8 Applicable Documents

The latest versions of the following standards, test methods, and practices are referenced in this standard:

ANSI/American Society of Mechanical Engineers (ASME) B1.20.1-2001, *Pipe Threads, General Purpose (Inch) and Redesignation of ASME/ANSI B2.1 - 1968 (R2001)*
ANSI/ASME B16.5 - 1988, *Pipe Flanges and Flanged Fittings*
ANSI/IEEE/ASTM SI 10-1997, *Standard for Use of the International System of Units (SI): The Modern Metric System*
ASTM D471 - 1998e1, *Standard Test Method for Rubber Property - Effect of Liquids*
ASTM D572 - 1999, *Standard Test Method for Rubber - Deterioration by Heat and Oxygen*
American Water Works Association (AWWA) C606-1997, *Joints, Grooved and Shouldered Type*
FM Global Property Loss Prevention Data Sheets

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 to accept, or not to accept. 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.)

Approval Mark

The Approval Mark is detailed in Appendix B. Its use is mandatory on all units of FM Approved valves. These registered marks cannot be used except as authorized by FM Approvals via the granting of Approval to a specific product.

Corrosion resistant

Having resistance to corrosion equal to or exceeding that of a bronze alloy having a minimum copper content of 80 percent, or constructed of 300 or 400 Series Stainless Steel.

End Connections

The method of connecting components of a pipe system to the ends of the valve.

Flanged End Valve

Valves having mating flanged ends per the dimensional values shown in ANSI/ASME B16.5. Flanges to other national or international standards shall be evaluated on a case-by-case basis.

FM Approved

This term refers to products that have received Approval by FM Approvals. Such products are listed in the Approval Guide, a publication of FM Approvals, issued annually, or one of the 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 that the manufacturer not deviate from the FM Approved configuration of the product without review by and agreement of FM Approvals. Approval is product specific.