

Approval Standard

for

Pipe Hanger Components

for

Automatic Sprinkler Systems

Class Numbers 1951, 1952, and 1953

September 2003

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Foreword

FM 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 FM 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 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. FM Approval Standards strive to be performance-oriented and to facilitate technological development.

For examining equipment, materials and services, FM 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 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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I INTRODUCTION

1.1 Purpose

- 1.1.1 This standard states FM Approval criteria for pipe hanger components used in automatic sprinkler systems.
- 1.1.2 FM 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 audit program.

1.2 Scope

- 1.2.1 This standard encompasses the design and performance requirements for pipe hanger components used in automatic sprinkler systems. Appendix D illustrates various sprinkler pipe hanger components, and is intended to serve as a guide to consistent use of nomenclature for the examination and listings. In cases where metric sized pipe hanger components are to be examined for Approval, test loads comparable to the English equivalent shall be used.
- 1.2.2 Pipe hangers encompassed by this standard are designed to support $\frac{3}{4}$, 1, $1\frac{1}{4}$, $1\frac{1}{2}$, 2, $2\frac{1}{2}$, 3, $3\frac{1}{2}$, 4, 5, 6, 8, 10, and 12 in. (20, 25, 32, 40, 50, 65, 80, 90, 100, 125, 150, 200, 250, and 300 mm) nominal pipe sizes.
- 1.2.3 FM 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.
- 1.2.4 Pipe Hanger Types — Some of the common types of sprinkler pipe hanger components covered by this standard are:

Pipe Support Components

Eye Rods
U-Type Hangers
Swivel Hangers
Clevis Hangers
Hinge Hangers
Ring Hangers
Steel Band Hangers

Building Attached Components

C-Type Clamps
Cantilever Brackets
Channel Clamps
I-Beam Clamps
Screw Clips
Ceiling Flanges
Angle Brackets
Expansion Shields
Concrete Inserts
Trapeze Hangers
Tipping Dowels

- 1.2.5 Other types of hanger components may be Approved if they meet the requirements and intent of this standard. Components 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 pipe hanger components for the purpose of obtaining FM Approval. Pipe hanger components 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, pipe hanger components which meet all of the requirements identified in this standard may not be Approved if other conditions which adversely affect performance exist or if the intent of this standard is not met.

1.4 Basis for FM Approval

FM 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 facilities 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 Approvals' product follow-up program.

1.5 Basis for Continued Approval

Continued Approval is based upon:

- production or availability of the product as currently 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 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 September 30, 2004 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."

1.8 Applicable Documents

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

ANSI/IEEE/ASTM SI 10-97, *Standard for Use of the International System of Units (SI): The Modern Metric System*

ASTM A6/A6M-02b, *Standard Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling*

ASTM A653/A653M-02, A635/A635M-02, *Standard Specification for General Requirements for Steel, Sheet and Strip, Heavy-Thickness Coils, Carbon, Commercial Steel, Drawing Steel, Structural, High-Strength Low-Alloy, and High-Strength Low-Alloy with Improved Formability, Hot-Rolled*

ASTM A924/A924M-99, *Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process*

ASTM B-117-02, *Practice for Operating Salt Spray (Fog) Apparatus*

FM Global Property Loss Prevention Data Sheets

International Organization for Standardization (ISO) 3575:1996, *Continuous Hot-Dip Zinc-Coated Carbon Steel Sheet of Commercial, Lock-Forming and Drawing Qualities*

ISO 4998:1996, *Continuous Hot-Dip Zinc-Coated Carbon Steel Sheet of Structural Quality*

Manufacturers Standardization Society of the Valve and Fittings Industry, Inc. (MSS), SP-69-02, *Pipe Hangers and Supports — Selection and Application*

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.)

Adjustable Swivel Band Hanger

A type of band hanger that is adjustable and swivels.

Approval Mark

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

Band Hanger

A type of hanger that is adjustable and utilizes a band looped around the pipe.

Bracket

A cantilever-type hanger that is attached directly to a vertical surface of the building structure.

Building Attached Component

A hanger part that is attached directly to a building structural element.

“C” Clamp

A hanger that grips a flange by means of a jaw and setscrew combination.

Ceiling Flange

A hanger that is attached directly to an overhead surface of a building structure.

Clamp

A hanger part that is rigidly attached to the flange of a steel structural member.

Beam Clamp

A clamp that is rigidly attached to both edges of the bottom flange of a structural member.

Top or Bottom Beam Clamp

A clamp that is rigidly attached to one edge of the top or bottom flange of a structural member.

Clamp (Riser)

A type of pipe clamp used to support risers at various levels.

Clevis Hanger

A type of split ring hanger.

Clip

A pipe support, usually one piece and non-adjustable, that only partially embraces a pipe and that may be attached directly to a building structure.

Concrete Insert

Inserts installed in the freshly poured concrete as the building is constructed.

Coupling

A hanger part used to connect expansion shields or fasteners to a rod. Couplings may have male or female threads and may have a straight or reducing pattern.

Driven Fastener

A hanger that is driven into concrete or steel by use of a special tool, usually powder-actuated. Fasteners may have male or female threads.

Expansion Shell (Case, Shield, or Base)

A hanger that is inserted into a self-drilled or predrilled hole in concrete and then “set”, usually by tightening of a bolt, setting of a cam or semisoft member, or forced expansion over a hardened steel plug.

Fasteners

Anchors, expansion shields, concrete inserts, explosive-driven fasteners and threaded head screws that provide anchorage to building structural members for supporting pipe hangers. For vertical installation only.

FM Approved

This term refers to products Approved by FM Approvals. Such products are listed in the *Approval Guide*, a publication of FM Approvals, issued annually, or one of 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-Approved configuration of the product without review by and agreement of FM Approvals. Approval is product and site specific.

Hanger

A unit assembly used singly or in combination with other assemblies for supporting or hanging pipe.

Non-Heat Sensitive Material

A material whose measured tensile strength at 1005 °F $\pm$ 50 °F (540 $\pm$ 10°C) is at least 90 percent of the value measured at 68 °F $\pm$ 41°F (20 °C $\pm$ 5 °C).

Retaining Strap

A hanger part used to hold a hanger in its intended position, usually on a beam.