



Member of the FM Global Group

Approval Standard for Indicator Posts

Class Number 1110

November 1990

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 periodic follow-up 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.

TABLE OF CONTENTS

I INTRODUCTION	1
1.1 Purpose	1
1.2 Scope	1
1.3 Basis for FM Approval	1
1.4 Basis for Continued Approval	1
1.5 Basis for Requirements	1
1.6 Effective Date	2
1.7 System of Units	2
II GENERAL INFORMATION	2
III GENERAL REQUIREMENTS	2
3.1 Materials	2
3.2 Barrel	3
3.3 Post Cap	3
3.4 Operating Stem	3
3.5 Target Mechanism	4
3.6 Extension Rod	4
3.7 Wrench or Handwheel	4
3.8 Locking and Sealing	5
3.9 Markings	5
3.10 Drawings/Plans/Specifications Required	6
IV PERFORMANCE REQUIREMENTS	6
4.1 Visibility	6
4.2 Weatherability	6
4.3 Torque, Vertical Indicator Posts	7
4.4 Torque, Wall Type Indicator Posts	7
4.5 Nonmetallic Components	7
4.6 Other Tests	7
V OPERATIONS REQUIREMENTS	8
5.1 Demonstrated Quality Control Program	8
5.2 Facilities and Procedures Audit (F&PA)	8
APPENDIX A: APPROVAL MARKS	9
APPENDIX B: UNITS OF MEASUREMENT	10

I INTRODUCTION

1.1 Purpose

This Standard states FM Approval requirements for indicator posts.

1.2 Scope

1.2.1 This standard sets performance requirements for indicator posts. Indicator posts are controls, extending aboveground or through building walls, for operating gate valves used in fire protection systems. An important feature of their design is a target indicator, visible through an opening in the post, which is provided to show whether the valve is open or shut.

1.2.2 This standard applies to both wall and vertical type indicator posts for use in operating inside-screw gate valves.

1.3 Basis for FM Approval

FM Approval is based upon satisfactory evaluation of the product and the manufacturer in the following major areas:

1.3.1 Examination and tests on production samples shall be performed to evaluate

- the suitability of the product;
- the proper operation and 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.

1.3.2 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 is 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.

1.4 Basis for Continued Approval

Continued Approval is based upon:

- production or availability of the product as currently Approved;
- the continued use of acceptable quality control procedures;
- satisfactory field experience;
- compliance with the terms stipulated in the Approval Agreement; and
- re-examination of production samples for continued conformity to requirements.

1.5 Basis for Requirements

1.5.1 The requirements of this standard are based on experience, research and testing and/or the standards of other national and international organizations. The advice of manufacturers, users, trade associations and loss control specialists was also considered.

1.5.2 The requirements of this standard reflect tests and practices used to examine characteristics of indicator posts for the purpose of obtaining FM Approval. These requirements are intended primarily as guides, and strict conformity is not always mandatory. Indicator posts 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, indicator posts that do meet all 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.

1.6 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 else forfeit Approval. The effective date shall apply to the entire Approval Standard, or, where so indicated, only to specific paragraphs of the standard.

The effective date of this Standard is **July 1, 1991** for full compliance with all requirements.

1.7 System of Units

Units of measurements are English System standard units. These are followed by their arithmetic equivalents in International System (SI) units, enclosed in parentheses. Appendix B lists the selected units for quantities dealt with in testing these products; conversions to SI units are included. Conversion of U.S. customary units is in accordance with ASTM E380.

II GENERAL INFORMATION

2.1 The indicator post consists of a barrel, a flanged extension which allows the height at the barrel to be adjusted and a stem which operates the underground valve and simultaneously moves the target. To permit turning the stem from a constant height, a telescoping union is commonly employed.

III GENERAL REQUIREMENTS

3.1 Materials

All materials used in the construction of indicator posts shall be suitable for the intended application. Parts exposed to water shall be resistant to corrosion. Nonmetallic components shall be considered for non-stress-bearing applications if tested to the requirements of Paragraph 4.5.

3.2 Barrel

- 3.2.1 The barrel shall be of such material and thickness as to provide adequate strength and corrosion resistance. A typical material is cast iron with a $\frac{3}{8}$ in. (9.6 mm) wall thickness.
- 3.2.2 Sufficient clearance between the post inside the wall and the operating stem, target mechanism, valve operating nut and other moving parts shall be provided.
- 3.2.3 The length of the barrel for underground valves shall be such that the middle of the target windows shall be at least 30 in. (762 mm) above the intended ground level.
- 3.2.4 A suitable seal shall be provided to minimize the possibility of water entering between two telescoping sections that form an adjustable barrel for application with underground valves. This may be accomplished by extending the upper part below the ground a distance of not less than 10 in. (254 mm) and telescoping over the lower part which projects above the bury line.
- 3.2.5 To prevent separation from or rotation of the upper part of the telescoping sections, the parts shall be securely attached.
- 3.2.6 To minimize the lifting action of frost, the upper portion of telescoping sections shall be constructed such that there is no projection, flange or taper.
- 3.2.7 The indicator post shall be provided with a base flange which has been designed to provide attachment to the gate valve using bolts or other suitable means. The flange shall accept four bolts (minimum size $\frac{5}{8}$ in. [16 mm]) 90 degrees apart on a bolt circle of 10.5 in. (267 mm).
- 3.2.8 For a wall-mounted indicator post, the barrel shall be provided with an integral flange or other suitable means for attachment to the outside of the wall.
- 3.2.9 Where target assemblies are internal to the barrel, there shall be adequate visibility of such targets through at least two openings 180 degrees apart and near the top. Typical openings are at least $1\frac{1}{3}$ in. (31.7 mm) high and $\frac{1}{2}$ in. (12.7 mm) wider than any wording appearing on the targets.
- 3.2.10 The windows for the openings shall be of suitable transparent material and held in place using a corrosion-resistant frame, grating or other suitable means.
- 3.2.11 To provide protection for indicator post windows that are of such material and have been installed in such locations that they are susceptible to breakage, the manufacturer shall make a protection grating available. Typical gratings incorporate bars with cross sections of $\frac{1}{8}$ in. (3.2 mm) wide by 1.4 in. (6.4 mm) deep, attached with one central horizontal bar and several vertical members positioned between the target letters. Such gratings are positioned at least $\frac{1}{4}$ in. (6.4 mm) from the transparent material.

3.3 Post Cap

The post cap shall be of weatherproof design and be secured to the barrel. The cap shall furnish a suitable bearing for the operating stem and shall have provision for lubrication of such bearing.

3.4 Operating Stem

- 3.4.1 The operating stem shall be made of suitable corrosion-resistant material such as bronze, with adequate provision for attachment to the valve extension rod. This may be accomplished by providing a core at least 4 in. (101.6 mm) deep and designed to fit freely over the extension rod. The operating stem shall be so designed that it will turn freely in its bearing and not be prevented from turning regardless of the target nut or target position.

3.4.2 The upper end of the stem shall be provided with a nut or other suitable means of stem operation. A typical nut is 1¼ in. (31.8 mm) square by 1 in. (25.4 mm) high. Sizes and shapes may vary to conform with other indicator posts at a specific location.

3.5 Target Mechanism

3.5.1 The target mechanism shall be designed and constructed so that it will not be subject to incorrect assembly or give incorrect indication during operation. The target plate material shall be aluminum or suitable corrosion-resistant material.

3.5.2 For targets incorporating the words "OPEN" and "SHUT", the letters shall be of sufficient size that the requirements of Paragraph 4.1 are met. Typical letters are at least 1 in. (25.4 mm) high and raised at least ⅛ in. (3.2 mm). The words are at least 3 in. (76.2 mm) long with the face of the letters finished smooth ⅛ in. (3.2 mm) wide. Target letters shall be light in color and contrast a dark background or vice versa.

3.5.3 When properly adjusted, the proper word shall be visible at all windows indicating when the valve is open or shut. To provide identification of possible malfunction, the target mechanism shall be such that, when properly adjusted, the words "OPEN" and "SHUT" or other suitable means of valve position identification will become visible if the target nut travels off the thread at the top or bottom of the operating stem.

3.5.4 The target plate shall be interchangeable to suit valves opening either clockwise (left hand) or counter-clockwise (right hand). The target plates shall be adjustable relative to each other to suit the number of turns required by the different sizes of the make of valve for which the post is designed.

3.5.5 The target nut threads shall be made of corrosion-resistant material, such as bronze.

3.5.6 Techniques of valve position identification other than a target assembly of the type described in Paragraphs 3.5.1, 3.5.2 and 3.5.3, may be acceptable, provided the requirements of Paragraph 4.1 are met.

3.6 Extension Rod

3.6.1 The extension rod shall be of sufficient strength as to meet the requirements of Paragraph 4.3.

3.6.2 The extension rod shall be secured to the valve stem nut in such a manner as to permit the axis of the extension rod to swing in any direction at least 5 degrees off the vertical, thus allowing for non-alignment of parts.

3.6.3 A satisfactory method of meeting the requirement above is to provide a coupling, cored to fit the turning members loosely, with two corrosion-resistant cotter pins at least ¼ in. (6.4 mm) in diameter, one through the coupling and stem nut and the other with axis at right angles to the former through the coupling and extension rod. Both pins are tight in the coupling, but loose in the other members. The strength of the joint in torsion shall not be made dependent upon the shearing strength of the pins.

3.7 Wrench or Handwheel

3.7.1 a) Either a wrench or handwheel of suitable strength shall be provided with each indicator post. The wrench shall not be less than 12 in. (304.8 mm) long from center of operating nut to the end.

b) In the stored position, one end of the wrench fits over the stem nut. The other end fits over the hasp against the barrel. The hasp slot in the wrench shall be of limited size, so that it is not possible to raise the top end of the wrench off the stem nut and turn the stem nut by any means.

- c) Wrenches made from ductile material such as carbon steel, which could be pried off the stem nut, are not acceptable.
- 3.7.2 Wall indicator posts are normally operated by a handwheel. A chain and padlock are usually used to minimize unauthorized operation of the post. The handwheel shall not be less than 14 in. (355 mm) in diameter.
- 3.7.3 The handwheel shall be fastened to the post in such manner that it is not possible to remove it without first removing the chain. A typical method employs an eyebolt to fasten the handwheel to the post. The hole in the eyebolt shall be $1\frac{3}{8}$ in. (35 mm) minimum, and the wall thickness $\frac{1}{4}$ in. (6 mm) minimum. For padlocking purposes, the chain is passed through the hasp on the barrel, a spoke of the handwheel and the hole in the eyebolt.

3.8 Locking and Sealing

- 3.8.1 Suitable provision shall be made for locking either type of indicator post in the open position.
- 3.8.2 Where mechanical linkages, such as a wrench, are employed with a lock to prevent rotation of the operating stem, rotation of such stem shall not be possible without obvious physical damage to the post and/or lock linkages.
- 3.8.3 The indicator post shall also be designed to permit the indicator post to be sealed in the open position with a common lead seal and twisted wire, in such a manner that it is necessary to break the seal before the operating stem can be turned more than two complete turns, or before the post cap can be removed.
- 3.8.4 The hole for the sealing wire in the operating stem shall be so located that the sealing wire will not become frayed or broken by repeated applications of the wrench or handwheel to the operating nut during inspection testing of the valve.
- 3.8.5 Where cap screws are used to fasten the post cap to the barrel, a drilled hole shall be provided through one of the screws near the locking arrangement.
- 3.8.6 Where bolts having removable nuts are used, a drilled hole shall be provided through one nut and its bolt.
- 3.8.7 All drilled holes shall be large enough to accommodate a 0.05 in. (1.3 mm) diameter twisted wire.

3.9 Markings

- 3.9.1 The indicator post shall be permanently marked with the following information which may be cast onto the body or inscribed on a securely attached corrosion-resistant metal nameplate:
- manufacturer's name and location
 - model or type designation
 - year of manufacture
 - FM Approval mark (see Appendix A for acceptable formats).
- Ample room shall be provided on the barrel for stenciling or marking, to indicate the service which the indicator post/valve assembly controls, for example, the number of a building.
- 3.9.2 To indicate which direction of wrench or handwheel rotation is required to open the valve, readily visible instructions shall be provided as an integral part of the post assembly. The instructions shall be large enough to be easily read by a person with normal vision standing 3 ft (0.9 m) from the post. Typical instructions may include an arrow on the post cap showing the direction to open plus the word "OPEN" with letters and figures approximately $\frac{3}{4}$ in. (19.1 mm) high and raised $\frac{1}{8}$ in. (3.2 mm).

3.10 Drawings/Plans/Specifications Required

- 3.10.1 Indicator posts submitted for testing shall be true production samples, and shall be free of sharp edges, burrs or other imperfections liable to injure the installer or interfere with proper installation of the unit.
- 3.10.2 A comparison of detail and assembly drawings shall be made with samples submitted to FM Approvals, in order to evaluate material compatibility. Also, items defined under General Information and General Requirements are to be reviewed by visual examination and/or desk review prior to the start of Approval testing.

IV PERFORMANCE REQUIREMENTS

4.1 Visibility

4.1.1 Requirement

The indicator shall be of such size and shape that an informed observer, when standing 40 ft (12.2 m) away, at any of at least two positions which are 180 degrees apart, will be able to tell if the valve is open.

4.1.2 Test/Verification

Two informed observers with 20/20 vision (corrected) shall be placed 40 ft (12.2 m) from an indicator post and their observations recorded as to position of the target. The observations shall correspond to the actual position of the targets.

4.2 Weatherability

4.2.1 Requirement

An indicator post in the vertical position shall withstand exposure to simulated rain and freezing conditions.

4.2.2 Test/Verification

An upright indicator post sample shall be subjected to a water spray at a rate of 0.6 in./min. (15 mm/min.) for an elapsed time of 30 minutes to observe the collection of water, if any, within the post. This is to simulate exposure to a heavy rainstorm. If an examination of the interior of the indicator post after the spray test shows that the interior is completely dry, the freeze test shall be waived.

If moisture has accumulated inside the indicator post, then the assembly shall be reassembled and immediately subjected to an exposure of -40°F (-40°C) for 72 hours. At the conclusion of the cold exposure, the operating mechanism of the post shall still function normally. Failure to operate because of freezing is grounds for rejection.

4.3 Torque, Vertical Indicator Posts

4.3.1 Requirement

The indicator post shall withstand the following torque test without evidence of impending failure.

4.3.2 Test/Verification

A representative sample post shall be firmly supported. The extension rod that is normally engaged in the nut of the valve shall be secured against turning. For indicator posts intended for use with valves up to and including 14 in. (350 mm), a torque of 900 lb-ft (1220 N·m) shall be applied in both the clockwise and counter-clockwise direction to the stem nut. The indicator post shall not show signs of impending failure following the test.

4.4 Torque, Wall Type Indicator Posts

4.4.1 Requirement

Wall type indicators intended for use with valves up to and including 10 in. (250 mm) shall be subjected to a torque of 600 lb-ft (815 N·m) as described in Paragraph 5.3.2.

4.4.2 Test/Verification

The indicator shall be capable of normal operation following the test and shall not show signs of impending failure.

4.5 Nonmetallic Components

4.5.1 Requirement

An indicator post with plastic components shall withstand high temperature exposures without impaired operation.

4.5.2 Test/Verification

- a) A fully assembled indicator post (with plastic components installed) shall be subjected to a temperature of 800°F (427°C) for 2 hours, cooled to room temperature, then operated. The indicator post shall be capable of full operation upon completion of this test.
- b) Two additional indicator posts with plastic components installed shall be subjected to temperatures which induce partial melting, cooled to room temperature, and then operated. The indicator posts shall be capable of full operation upon completion of the tests.
- c) Additional tests, some of which may require utilization of fully-assembled indicator posts with their respective plastic components installed, may be required at the discretion of FM Approvals.
- d) Upon completion of any of the aforementioned tests, a melted plastic component which has re-solidified may cause an initial “freezing” of the indicator post, which would necessitate increased initial torque in order to “free” the indicator post and allow it to operate. An indicator post found in this condition, which requires an initial torque in excess of that which can be reasonably applied by one person using the wrench provided, is considered to be inoperative. Any condition which renders the indicator post inoperative shall be grounds for rejecting the use of the particular plastic component in question.

4.6 Other Tests

At the discretion of FM Approvals, other tests may be performed to verify the integrity and reliability of an unusual design or material application.

V OPERATIONS REQUIREMENTS

5.1 Demonstrated Quality Control Program

5.1.1 A Quality Control Program is required to assure that each subsequent indicator post produced by the manufacturer shall present the same quality and reliability as the specific samples examined. Design quality, conformance to design, and performance are the areas of primary concern.

Design quality is determined during the examination and tests.

Conformance to design is verified by control of quality in the following areas:

- existence of corporate quality control guidelines
- incoming assurance, including testing
- in-process assurance, including testing
- final inspection and test
- equipment calibration
- drawing and change control
- packaging and shipping
- handling discrepant materials.

Quality of performance is determined by field performance and by re-examination and test.

5.1.2 The manufacturer shall establish a system of product configuration control to prevent unauthorized changes, including, as appropriate:

- engineering drawings
- engineering change requests
- engineering orders
- change notices

These shall be executed in conformance with a written policy and detailed procedures. Records of all revisions to all Approved products shall be kept.

5.1.3 The manufacturer shall assign an appropriate person or group to be responsible to obtain FM Approvals' authorization of all changes applicable to Approved products. FM Approvals' Form 797, "Approved Product Revision Report or Address/Contact Change Notice", is provided to notify FM Approvals' of pending changes.

5.2 Facilities and Procedures Audit (F&PA)

5.2.1 An inspection of the product manufacturing facility shall be part of the Approval investigation. Its purpose shall be to determine that equipment, procedures, and the manufacturer's controls are properly maintained to produce a product of the same quality as initially tested.

5.2.2 Unannounced follow-up inspections shall be conducted to assure continued quality control and product uniformity.

APPENDIX A:
APPROVAL MARKS

REPRODUCTION ART: FM Approval Marks

**For use on nameplates, in literature, advertisements,
packaging and other graphics.**



- 1) The FM Approvals diamond mark is acceptable to FM Approvals as an Approval mark when used with the word "Approved."
- 2) The FM Approval logomark has no minimum size requirement, but should always be large enough to be readily identifiable.
- 3) Color should be black on a light background or a reverse may be used on a dark background.

For Cast-On Marks



- 4) Where reproduction of the mark described above is impossible because of production restrictions, a modified version of the diamond is suggested. Minimum size specifications are the same as for printed marks. Use of the word "Approved" with this mark is optional.

NOTE: These Approval marks are to be used only in conjunction with products or services that have been FM Approved. The FM Approval marks should never be used in any manner (including advertising, sales or promotional purposes) that could suggest or imply FM Approval or endorsement of a specific manufacturer or distributor. Nor should it be implied that Approval extends to a product or service not covered by written agreement with FM Approvals. The Approval marks signify that products or services have met certain requirements as reported by FM Approvals.

Additional reproduction art is available through

FM Approvals
P.O. Box 9102,
Norwood, Massachusetts 02062
U.S.A.

APPENDIX B:
UNITS OF MEASUREMENT

LENGTH:	in. – “inches”; (mm – “millimeters”) $\text{mm} = \text{in.} \times 25.4$ ft = feet (m = meters) $\text{m} = \text{ft} \times 0.03048$
PRESSURE:	psi = “pounds per square inch”; kPa = “kilopascals” $\text{kPa} = \text{psi} \times 6.8948$
FLOW:	gal/min = gallons per minute (dm^3/min = cubic decimeters per minute) $\text{dm}^3/\text{min} = \text{gal}/\text{min} \times 3.7854$
TORQUE or MOMENT:	ft.lb = pound-feet N.m = newton-meters $\text{N.m} = \text{lb.ft} \times 1.356$