UL 789

STANDARD FOR SAFETY

Indicator Posts for Fire-Protection Service

UL Standard for Safety for Indicator Posts for Fire-Protection Service, UL 789

Tenth Edition, Dated January 9, 2004

Summary of Topics

This revision of ANSI/UL 789 dated May 6, 2024 includes the following changes in requirements:

> ***– Indicator posts with reducing gears; 5.1, Section 11A, Table 13.1, Section 15A, Section 15B, Section 17***

Text that has been changed in any manner or impacted by ULSE's electronic publishing system is marked with a vertical line in the margin.

The new and revised requirements are substantially in accordance with Proposal(s) on this subject dated October 27, 2023.

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UL 789

Standard for Indicator Posts for Fire-Protection Service

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Tenth Edition

January 9, 2004

This ANSI/UL Standard for Safety consists of the Tenth Edition including revisions through May 6, 2024.

The most recent designation of ANSI/UL 789 as an American National Standard (ANSI) occurred on May 6, 2024. ANSI approval for a standard does not include the Cover Page, Transmittal Pages, and Title Page.

Comments or proposals for revisions on any part of the Standard may be submitted to ULSE at any time. Proposals should be submitted via a Proposal Request in the Collaborative Standards Development System (CSDS) at https://csds.ul.com.

No Text on This Page

CONTENTS

INTRODUCTION

CONSTRUCTION

PERFORMANCE

MARKING

INSTRUCTIONS

Appendix A

No Text on This Page

INTRODUCTION

1 Scope

1.1 These requirements cover indicator posts, including wall, underground, and above ground types, for use in operating valves of the inside-screw pattern and for indicating the position of the gates in such valves. Indicator posts are primarily intended for use with valves controlling water supplies to sprinkler, deluge, water spray, foam, and standpipe systems used in private fire service where connections enter buildings.

1.2 Requirements for the installation and use of the indicator posts covered by this standard are included in the following Standards of the National Fire Protection Association:

a) NFPA 11, Low Expansion Foam and Combined Agent Systems;

b) NFPA 13, Installation of Sprinkler Systems;

c) NFPA 14, Installation of Standpipe and Hose Systems; and

d) NFPA 24, Installation of Private Fire Service Mains.

2 Components

2.1 Except as indicated in 2.2, a component of a product covered by this standard shall comply with the requirements for that component.

2.2 A component is not required to comply with a specific requirement that:

a) Involves a feature or characteristic not required in the application of the component in the product covered by this standard, or

b) Is superseded by a requirement in this standard.

2.3 A component shall be used in accordance with its rating established for the intended conditions of use.

2.4 Specific components are incomplete in construction features or restricted in performance capabilities. Such components are intended for use only under limited conditions, such as certain temperatures not exceeding specified limits, and shall be used only under those specific conditions.

3 Units of Measurement

3.1 Values stated without parentheses are the requirement. Values in parentheses are explanatory or approximate information.

4 Undated References

4.1 Any undated reference to a code or standard appearing in the requirements of this standard shall be interpreted as referring to the latest edition of that code or standard.

CONSTRUCTION

5 Barrels

5.1 The walls of a barrel shall be made of material having physical and corrosion resistant properties at least equivalent to one of the following:

a) Gray iron extra-heavy soil pipe (0.25 inch nominal thickness) in accordance with ASTM A74;

b) Minimum 0.21-inch thick ductile iron in accordance with AWWA C151/A21.51;

c) Schedule 40 steel pipe in accordance with ASTM A53, and ASTM A135;

c1) Steel tubing made in accordance with ASTM A500, with a minimum wall thickness at least equivalent to schedule 40 steel pipe of the same size; or

d) Class 200 polyvinyl chloride (PVC) pipe in accordance with AWWA C-900, for the lower barrel of indicator posts for underground use.

5.2 Ferrous materials having wall thickness less than those specified in 5.1 and provided with a protective interior and exterior coating may be used when determined to be equivalent using comparative corrosion analysis.

5.3 The inside diameter shall be nominally 4 inches (102 mm) at any point throughout its length. The inside diameter at the bottom of the lower part shall be not less than 8 inches (203 mm) over the length required to provide for clearance to the valve bonnet when attached to the valve flange.

5.4 The length of a barrel for an underground valve shall be such that the middle of the target windows can be placed at least 30 inches (760 mm) above the "bury" line marked on the barrel.

5.5 If the length of a barrel for an underground valve is adjustable:

a) The upper part shall extend below the ground a distance of not less than 6 inches (152 mm);

b) The means for connecting the upper and lower parts shall prevent dirt from entering inside the barrel. Means for dirt entrance prevention may include the use of an "O"-ring seal installed in a groove between the upper and lower parts of the barrel constructed to resist dislodgement; having the upper barrel part telescope over the lower barrel part with the top of the lower part extending above the "bury" line; or the like; and

c) The parts shall be clamped together by two 3/4 inch (19.1 mm) diameter mild-steel setscrews, complying with the Specification for Carbon Steel Forgings for Piping Components, ASTM A105/A105M, or having equivalent strength, placed one above the other in the upper part. The lower part shall be arranged so as to prevent separation or rotation of the upper part.

5.6 Prevention of separation may be accomplished by providing on the lower part either deeply spotted holes for the ends of the setscrews or a series of horizontal ribs spaced the same distance apart as the setscrews. Prevention of rotation may be accomplished by casting four vertical ribs on the exterior of the lower part. Setscrews may also be used to prevent separation and rotation.

5.7 The upper part of a barrel for underground service shall be constructed so that there is no projection, flange, taper, or roughness by which the action of frost may lift the part. A bead, if used to mark the "bury" line, shall not be raised more than 1/8 inch (3.2 mm) on the casting.

5.8 An indicator post shall be provided with a base flange for connection to the indicator-post flange provided as part of the inside-screw gate valve. The indicator-post flange shall be drilled for four 5/8 inch

(15.9 mm) diameter mild-steel bolts, complying with the Specification for Carbon Steel Forgings for Piping Components, ASTM A105/A105M, or having equivalent strength, placed at 90 degrees on a bolt circle of 10-1/2 inches (267 mm) for valves up to and including 14 inches (356 mm).

5.9 The barrel for a wall-mounted indicator post shall be provided with an integral flange for bolting to the outside of the wall. The flange shall provide for four 5/8 inch (15.9 mm) diameter mild-steel bolts, complying with the Specification for Carbon Steel Forgings for Piping Components, ASTM A105/A105M, or having equivalent strength, placed at 90 degrees on a bolt circle of at least 10-1/2 inches (267 mm). The inside diameter of the barrel shall provide a minimum 1/2 inch (12.7 mm) clearance between moving parts and the barrel.

5.10 An above ground indicator post shall be provided with a base flange for connection to the indicator-post flange provided as part of the inside-screw gate valve. The base flange shall be integral to the barrel or be securely fastened to the barrel, such as by the use of two 1/2 inch (12.7 mm) diameter mild-steel bolts complying with the Specification for Carbon Steel Forgings for Piping Components, ASTM A105/A105M. The indicator post flange shall be drilled for four 5/8 inch (15.9 mm) diameter mild-steel bolts, complying with the Specification for Carbon Steel Forgings for Piping Components, ASTM A105/A105M, or having equivalent strength, placed at 90 degrees on a bolt circle of 10-1/2 inches (267 mm) for valves up to and including 14 inches (356 mm). An example of an above ground indicator post is shown in Appendix A. The overall height of an above ground indicator post, the distance from the bottom of the base flange to the top of the handwheel or operating wrench, shall be limited to 20 inches.

6 Caps

6.1 A cap shall:

a) Be of weatherproof construction;

b) Be securely fastened to the barrel, such as by the use of two 1/2 inch (12.7 mm) diameter mild-steel bolts complying with the Specification for Carbon Steel Forgings for Piping Components, ASTM A105/A105M;

c) Furnish a bearing complying with the requirements of 7.1.1; and

d) Provide means for lubrication of this bearing.

7 Operating Stems

7.1 General

7.1.1 An operating stem shall:

a) Turn freely in its bearing;

b) Not become clamped to its bearing by locknuts; and

c) Turn no matter what the position may be of any target nut, target, or other indicating mechanism.

7.1.2 The size and length of thread on the operating stem or stem nut for operation of a moving-target mechanism shall be such that the indicator post may be used interchangeably for all sizes of the particular make of valve for which the post is designed.

7.2 Underground types

7.2.1 An operating stem and stem nut shall be made of material having the physical and corrosion resistant properties at least equivalent to those complying with the Specification for Composition Bronze or Ounce Metal Castings, ASTM B62, Copper Alloy No. C83600, or the Specification for Free-Cutting Brass Rod, Bar, and Shapes for Use in Screw Machines, ASTM B16, brass or bronze, except that materials not inherently resistant to corrosion, but otherwise equivalent, may be used if sealed in a housing completely filled with a protective grease lubricant. A stem nut shall be cored at least 4 inches (102 mm) deep to fit loosely over the extension rod.

7.2.2 The upper end of an operating stem nut shall be finished in a solid nut, 1-1/4 inches (31.8 mm) square by 1 inch (25.4 mm) high, unless otherwise specifically ordered to have a different size and shape to fit existing equipment.

7.2.3 The shape of the operating stem nut at the base of the nut shall form a cap of weatherproof construction over the bearing area in the post cap.

8 Position Indicators

8.1 General

8.1.1 An indicator post shall provide a means for visually indicating the OPEN and SHUT positions of a valve to which it is connected. The means provided shall consist of words appearing on movable targets indicating OPEN and SHUT positions or provide equivalent visual indication of the valve position when viewed from at least two positions 180 degrees apart.

8.1.2 The mechanical or other means used for positioning the visual indicators shall be operated in a manner equivalent to that obtained by gearing to the operating stem or stem nut of the valve.

8.1.3 An indicator operating mechanism shall be constructed so that it is not subject to disarrangement in operation. The mechanism shall not limit the turning of the operating stem or stem nut.

8.1.4 Two window openings shall be provided on opposite sides of the barrel near its top for position indicators of the movable-target type. Window openings shall be at least 1-1/4 inches (31.8 mm) high and at least as wide as the word width plus the thickness of the window material, and shall be constructed to show the targets clearly.

8.1.5 Windows for openings shall be of transparent material. When of glass, they shall be at least 1/2 inch (12.7 mm) thick clear sheet or float glass conforming to Federal Specification DD-G-451-C. Glass shall be held in place by a corrosion-resistant metallic ferrule or grating. When constructed of an acrylic or polycarbonate material the minimum thickness shall be 1/8 inch (3.2 mm).

8.1.6 Glass window material shall be protected with a grating of bars 1/8 inch (3.2 mm) wide and 1/4 inch (6.4 mm) deep, arranged with one central horizontal bar and several vertical bars, the latter to come between the target letters. There shall be a space of at least 1/4 inch between the grating and window material.

8.1.7 Target-plate material shall be of aluminum or other equivalent light-colored weather- and corrosion-resistant material.

8.1.8 The words OPEN and SHUT shall be used on targets, and each word shall be on a separate plate. The letters shall be at least 1 inch (25.4 mm) high and raised at least 1/8 inch (3.2 mm). The words shall be not less than 2-1/2 inches (63.5 mm) wide. The face of the letters shall be smoothly finished and shall be 1/8 inch (3.2 mm) wide.

8.1.9 A target background shall be black.

8.1.10 When targets are adjusted as intended, the appropriate word shall be visible at both windows when the valve is open or shut.

8.1.11 Target plates shall be interchangeable to suit valves opening either counterclockwise (right hand) or clockwise (left hand).

8.2 Rotating target mechanisms

8.2.1 Threads and gears shall be made of material having the physical and corrosion resistant properties at least equivalent to bronze complying with the Specification for Composition Bronze or Ounce Metal Castings, ASTM B62, Copper Alloy No. 836, or brass complying with the Specification for Free-Cutting Brass Rod, Bar, and Shapes for Use in Screw Machines, ASTM B16, except that materials not inherently resistant to corrosion, but otherwise equivalent, may be used if sealed in a housing completely filled with a protective grease lubricant. Where other moving parts are in contact outside of a grease-lubricated housing, at least one shall be of brass or bronze.

8.2.2 If the post is adjustable for different sizes of valves, the words OPEN and SHUT shall be on separate plates.

8.3 Vertically moving target mechanisms

8.3.1 Target nut threads shall be made of material having corrosion resistant properties at least equivalent to brass or bronze.

8.3.2 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.

8.3.3 A target mechanism shall be such that, when adjusted as intended, the words OPEN or SHUT will not show when the target nut travels off the thread at the top or bottom of the operating stem.

9 Extension Rods

9.1 An extension rod shall be made of material having physical properties at least equivalent to malleable iron complying with the Specification for Cupola Malleable Iron, ASTM A197, or mild-steel complying with the Specification for Carbon Steel Forgings for Piping Components, ASTM A105/A105M.

9.2 An extension rod shall be secured to the valve-stem nut in a manner permitting the axis of the extension rod to swing in any direction at least 5 degrees off the vertical, thus allowing for nonalignment of parts.

10 Handwheels and Wrenches

10.1 A wrench or a handwheel shall be provided with each indicator post.

10.2 A wrench shall be not less than 12 inches (305 mm) long, measured from the center of the operating nut.

10.3 A handwheel shall be not less than 14 inches (356 mm) in outside diameter. A component that secures a handwheel to the operating nut shall be constructed of high strength metal, such as mild steel.

11 Locking and Sealing

11.1 An indicator post shall permit the operating-stem nut to be sealed in the open or shut position to make it necessary to break the seal before the operating-stem nut can be turned more than two complete turns, or before a post cap can be removed.

11.2 If the method of sealing is by use of a common lead and twisted wire seal inserted through a hole in the operating-stem nut, such hole shall be located so that the sealing wire will not become abraded or broken by repeated applications of the wrench or handwheel to the operating nut during inspection testing of the valve.

11.3 All holes for sealing wire shall be 3/32 inch (2.4 mm) diameter minimum.

11.4 A locking arrangement shall be furnished.

11A Indicator Post With Reducing Gears

11A.1 Indicator posts with reducing gears and gear shafts used to provide a mechanical advantage for valve operation shall be made of materials having strength and resistance to corrosion at least equivalent to cast iron or steel.

11A.2 Indicator post gearing shall be enclosed in a sealed case or housing with a protective grease lubricant to prevent contamination of the gear operating mechanism.

11A.3 The indicator post gear housing shall be made of a material having physical and corrosion resistant properties at least equivalent to 0.23 inch (6 mm) thick cast iron or steel.

11A.4 Indicator posts with reducing gears shall not be permitted to be used with valves 8 inch and smaller sizes.

12 Polymeric Materials and Nonmetallic Parts

12.1 A polymeric or other nonmetallic part, other than an "O" ring, a window as described in 8.1.5, or gasket, shall be evaluated on the basis of:

a) Mechanical strength, see Strength of Parts Test, Section 13;

b) Flammability, see 12.2;

c) Resistance to deterioration due to aging, see Air Oven Aging Tests, 15.1;

d) Exposure to light and water, see Light and Water Test, 15.2;

e) Operation, see 1000 Cycle Operation Test, 15.3.

Exception: A lower barrel complying with 5.1(d) is not required to comply with 12.1 (b), (c), (d), and (e).

12.2 With reference to flammability, polymeric materials shall be classified as Type HB, V-0, V-1, V-2, 5VA, or 5VB when tested in accordance with the Standard for Tests for Flammability of Plastic Materials for Parts in Devices and Appliances, UL 94. Other nonmetallic materials shall have equivalent characteristics.

PERFORMANCE

13 Strength of Parts Test

13.1 Representative samples of each indicator-post design shall be subjected to the Strength of Parts Test.

13.2 An indicator-post assembly, including the barrel, cap, operating stem, stem nut, extension rod, and wrench or handwheel shall withstand, without damage, the turning effort specified in Table 13.1 applied through the wrench or handwheel regularly furnished with the post. The higher torque requirements shall apply in cases where the post is intended for use with both wrench and handwheel.

Table 13.1
Strength of Parts Test Torque

Wrench length		Handwheel diameter		Minimum torque	
inches	(mm)	inches	(mm)	lbf-ft	(N·m)
12	(305)	–	–	260	(353)
13	(330)	–	–	290	(393)
14	(356)	–	–	325	(441)
15	(381)	–	–	375	(508)
16	(407)	14	(356)	450	(610)
17	(432)	15	(381)	540	(732)
18	(457)	16	(407)	640	(868)
19	(483)	17	(432)	760	(1030)
20	(508)	18	(457)	900	(1220)

13.3 The indicator post is to be bolted in place in accordance with the manufacturer's installation instructions.

a) A wall-type indicator is to be supported primarily by its wall flange.

b) An underground-type indicator is to be bolted to a rigidly supported flange representing the flange furnished for this purpose as part of an inside screw valve. The underground-type post may also be supported at the intended ground or "bury" line.

c) An above ground type is to be tested in two orientations, perpendicular to the wall which represents a vertical installation and perpendicular to the floor which represents a horizontal installation. The test specimen shall be bolted to a rigidly supported flange representing the flange furnished for this purpose as part of an inside screw valve.

13.4 The extension-rod coupling or other means normally engaging the nut of the valve to be operated by the indicator post is to be secured against turning.

13.5 The turning force is to be applied using a torque wrench strapped or otherwise secured to the regular handwheel or wrench furnished with the post.

13.6 The turning force is to be applied both in the clockwise and counterclockwise directions and is to be maintained at the value designated in Table 13.1 for not less than 1 minute for each application of the force.

14 Elastomeric Parts (Except Gaskets) Test

14.1 An elastomeric part used to provide a seal shall have the following properties when tested as specified in the Standard for Gaskets and Seals, UL 157:

a) For silicone rubber (having poly-organo-siloxane as its constituent characteristic), a minimum tensile strength of 500 psi (3.4 MPa) and a minimum ultimate elongation of 100 percent.

b) For natural rubber and synthetic rubber other than silicone rubber, a minimum tensile strength of 1500 psi (10.3 MPa) and minimum ultimate elongation of 150 percent; or a minimum tensile strength of 2200 psi (15.2 MPa) and a minimum ultimate elongation of 100 percent.

c) Those properties relating to maximum tensile set; minimum tensile strength and elongation after oven aging; and hardness after oven aging, all as specified in UL 157. The maximum service temperature used to determine the oven time and temperature for oven aging is considered to be 60°C (140°F).

14.2 The Standard for Gaskets and Seals, UL 157, provides for the testing of either finished elastomeric parts or sheet or slab material. Sheet or slab material is to be tested when the elastomeric parts are O-rings having diameters of less than 1 inch (25.4 mm). The material tested is to be the same as that used in the product, regardless of whether finished elastomeric parts or sheet or slab material is tested.

15 Polymeric Parts Tests

15.1 Air oven aging test

15.1.1 Following air-oven aging for 180 days at 121°C (250°F), there shall be no warping, creeping, or other signs of deterioration of a polymeric component that precludes the intended operation of the indicator post. There shall be no cracking of any polymeric component. A valve with aged polymeric components shall demonstrate intended performance when subjected to the Strength of Part Test, Section 13, and the 1000 Cycle Operation Test, 15.3.

15.1.2 A complete assembly, including the polymeric parts, and sample polymeric components to be aged are to be supported in a full-draft, circulating-air oven that has been preheated at full draft, to 121 ±1°C (250 ±1.8°F). The manner of support is to be such that the samples are prevented from touching one another or the sides of the oven. The samples are to be aged for 180 days at full draft and then allowed to cool in air at 23 ±2°C (73.4 ±3.6°F) for at least 24 hours before conducting any test or dimensional check. As used in this test, the term "full draft" refers to the air flow over the samples in the oven with the air inlet and outlets fully open. The oven used for accelerated aging is to be Type IIA as specified in the Standard Specification for Gravity-Convection and Forced-Ventilation Ovens, ASTM E145.

15.1.3 When a polymeric material is not capable of withstanding the temperature indicated without softening, distortion, or deterioration, an air-oven aging test at a lower temperature, minimum 87°C (189°F), for a longer period of time shall be used. When a material is capable of withstanding a higher temperature than that specified in 15.1 without excessive softening, distortion, or deterioration, an air-oven aging test at a higher temperature for a shorter period of time, but not less than 45 days, is to be applied. The duration of exposure is to be calculated using the following equation:

$$D = (790000)e^{-0.0693t}$$

in which:

D is the test duration in days; and

t is the test temperature in °C.

15.2 Light and water test

15.2.1 There shall be no cracking of a polymeric part following exposure to ultraviolet light and water for 720 hours. Aged samples of the part shall perform as intended when subjected to the Strength of Parts Test, Section 13, and the 1000 Cycle Operation Test, 15.3.

15.2.2 The ultraviolet light is to be obtained from two stationary enclosed carbon-arc lamps. The arc of each lamp is to be formed between two vertical carbon electrodes, 1/2 inch (12.7 mm) in diameter, located at the center of a revolvable vertical metal cylinder, 31 inches (787 mm) in diameter and 17-3/4 inches (450 mm) in height. Each arc is to be enclosed with a No. 9200-PX clear Pyrex glass globe. The samples are to be mounted vertically on the inside of the revolvable cylinder, facing the lamps, and the cylinder continuously revolved around the stationary lamps at one revolution per minute. A system of nozzles is to be provided so that each sample, in turn, is sprayed with water as the cylinder revolves. During each operating cycle (total of 20 minutes) each sample is to be exposed to the light and water spray for 3 minutes and to the light only for 17 minutes. The air temperature within the revolving cylinder of the apparatus during operation is to be 145 ±9°F (63 ±5°C).

15.3 1000 cycle operation test

15.3.1 An indicator post assembly, containing polymeric parts which experience stress as a result of operation, shall operate as intended for 1000 cycles without malfunction or damage after being subjected to the exposures specified in 15.1 and 15.2.

15.3.2 The indicator post shall be operated 1000 times from fully open to fully closed.

15A Output Torque Test

15A.1 An indicator post constructed with reducing gears to provide a mechanical advantage for valve operation shall provide an output torque suitable for the valve sizes it is intended for use with when tested in accordance with 15A.2 through 15A.6.

15A.2 The indicator post sample shall be securely mounted with means to measure the input and output torques.

15A.3 The input torque shall be determined based on the indictor post wrench length or handwheel diameter as specified in Table 15A.1.

15A.4 The specified input torque shall be applied to the indicator post wrench or to the handwheel by a torque wrench or equivalent device.

15A.5 The output torque shall be measured based on the input torque in 15A.4.

15A.6 The output torque measured shall be within output torque range specified in Table 15A.2 for the valve sizes that the indicator post is specified for use with.