



Examination Standard for Indicating Valves (Butterfly or Ball Type)

Class Number 1112

December 2020

Foreword

This standard is 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 standard is to present the criteria for examination of various types of products and services.

Examination in accordance with this standard shall demonstrate compliance and verify that quality control in manufacturing shall ensure a consistent and reliable product.

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1. INTRODUCTION

1.1 Purpose

- 1.1.1 This standard states testing and certification requirements for manually operated indicating valves that control the water supply to a fire protection system.
- 1.1.2 Testing and certification 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 indicating valves for their intended application of long-term water flow control. Indicating valves are usually installed above ground and indoors. They are constructed so that an informed observer can visually determine the position of the valve ball or disc indicating if the valve is open or closed.
- 1.2.2 This standard encompasses the design and performance requirements for indicating valves in the following sizes: 1, 1-1/4, 1-1/2, 2, 2-1/2, 3, 4, 5, 6, 8, 10 and 12 in. nominal pipe sizes (NPS) and equivalent metric sizes. Other sizes will be evaluated on a case-by-case basis.
- 1.2.3 This standard defines the requirements for indicating valves in either butterfly or ball valve configurations. Typical end connections for butterfly valves are: grooved end, lug style, wafer style, flanged or threaded. Typical end connections for ball valves are: grooved end and threaded. Other styles of end connection shall be evaluated on a case-by-case basis.
- 1.2.4 This standard is 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 indicating valves for the purpose of obtaining certification. Indicating valves having characteristics not anticipated by this standard may be certified if performance equal, or superior, to that required by this standard is demonstrated.

1.4 Basis for Certification

Certification is based upon satisfactory evaluation of the product and the manufacturer in the following 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 for certification; 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 consistently produce the product which was examined and tested. Subsequent surveillance may be required by the certification agency in accordance with the certification scheme to ensure ongoing compliance.

1.5 Basis for Continued Certification

1.5.1 The basis for continual certification may include, but is not limited to, the following based upon the certification scheme and requirements of the certification agency:

- Production or availability of the product as currently certified;
- The continued use of acceptable quality assurance procedures;
- Satisfactory field experience;
- Compliance with the terms stipulated in the certification;
- Satisfactory re-examination of production samples for continued conformity to requirements; and,
- Satisfactory surveillance audits conducted as part of the certification agency's product surveillance program.

1.6 Effective Date

The effective date of this certification standard mandates that all products tested for certification after the effective date shall satisfy the requirements of this standard.

The effective date of this standard is eighteen (18) months after the publication date of the standard 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. Conversion of U.S. customary units is in accordance with ANSI/IEEE/ASTM SI 10.

One unit of measurement (liters), outside of, but recognized by SI, is commonly used in international fire protection and is used in this standard.

1.8 Normative References

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the cited edition applies.

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

ANSI/ASME B16.5, *Pipe Flanges and Flanged Fittings*

ASME/ANSI B1.20.1, *Pipe Threads, General Purpose (Inch)*

ASME B36.10M, *Welded and Seamless Wrought Steel Pipe*

ASTM D471, *Standard Test Method for Rubber Property - Effect of Liquids*

ASTM D572, *Standard Test Method for Rubber - Deterioration by Heat and Oxygen*

ASTM D2444, *Standard Test Method for Determination of the Impact Resistance of Thermoplastic Pipe and Fittings By Means of A Tup (Falling Weight)*

American Water Works Association (AWWA) C606, *Joints, Grooved and Shouldered Type*

National Electrical Manufacturers Association (NEMA) Standards Publication 250, *Enclosures for Electrical Equipment (1000 Volts Maximum)*

1.9 Definitions

For purposes of this standard, the following terms apply:

Accepted

Installations acceptable to the authority having jurisdiction and enforcing the applicable installation rules. Acceptance is not a characteristic of a product. It is installation specific. A product accepted for one installation may not be acceptable elsewhere.

Corrosion Resistant

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

Flanged End Valves

Valves having flanged ends per the dimensional values shown in ANSI/ASME B16.5, *Pipe Flanges and Flanged Fittings*, as a default. Flanges to other national or international standards shall be evaluated on a case-by-case basis.

Grooved End Valves

A grooved end valve is characterized by having grooved ends cast or subsequently machined on the inlet and outlets of the valve body; such that the valve may be installed in the sprinkler system piping using certified grooved end couplings. Manufacturers are allowed to define their own dimensional values in order to achieve higher performance for the assembled joint. However, most grooved end connections follow the dimensional values shown in AWWA C606, *Joints, Grooved and Shouldered Type*, for IPS Pipe.

Indicating Valve

An indicating valve is a valve that indicates orientation of the ball or disc by visual observation. The position of the valve ball or disc may also be monitored by the use of supervisory switches.

Lug Style Valves

This valve type refers to a butterfly valve design wherein tapped holes are machined into “lugs” found around the circumference of the valve body. This allows for flange bolting to connect to each side of the valve during installation in the sprinkler system piping. For the purposes of this standard, lug style valves shall comply with the dimensional values shown in ANSI/ASME B16.5, *Pipe Flanges and Flanged Fittings*. Lug style valves manufactured to other national or international standards shall be evaluated on a case-by-case basis.

Maximum Operating Torque

The maximum torque required to either open or close a valve. The opening maximum operating torque is the maximum torque, measured at the handwheel shaft, necessary to translate a closed valve (against the valve stops) to the full open position. While closed, the valve will be subjected to an upstream pressure equal to the rated working pressure. The closing maximum operating torque is the maximum torque necessary to translate a full open valve to the full closed position. The torque shall be measured as the valve is closed against the flow rate developed by a fluid velocity of 20 ft/sec (6.1 m/sec) in Schedule 40 steel pipe.

Rated Working Pressure

This is the maximum sustained pressure at or below which the valve shall operate trouble free. This also sets the basis for the testing described in Section 4, Performance Requirements.

Schedule 40 Steel Pipe

For the purposes of this Approval Standard, references have been made to “Schedule 40” steel sprinkler pipe. In all cases, the reference is made to the pipe dimensions outlined in ASME B36.10M, *Welded and Seamless Wrought Steel Pipe*. It is important to note that other national or international standards also make reference to “Schedule 40” pipe but may in fact have different dimensions for the same nominal pipe size.

Threaded End Valves

A threaded end valve is characterized by having threads machined into the valve body and endplate such that the valve may be installed in a threaded pipe system. For the purposes of this standard, threaded end refers to

ASME/ANSI B1.20.1, *Pipe Threads, General Purpose (Inch)*, for tapered pipe threads. Other thread forms may be acceptable on a case-by-case basis.

Ultimate Operator Torque (UOT)

The ultimate operator torque (UOT) is defined as the input torque applied to the operator handwheel or crank, with the disc or ball blocked in the open position that causes a component inside the gear operator to fail.

Wafer Style Valves

This valve type refers to a butterfly valve design wherein the valve is placed between two pipe flanges and held in place by the flange bolting. In this style of valve, the flange bolts surround the valve but do not connect to the valve directly.

2. GENERAL INFORMATION

2.1 Product Information

- 2.1.1 These valves usually have six major components: a body, valve operator, drive shaft, resilient or metal seat, disc or ball, and visual indicator.
- 2.1.2 The valve operator is a gear box mechanism that is mounted on top of the valve body. A handwheel or crank provides the input torque to the operator that rotates the disc or ball through the valve drive shaft. The gear box provides a torque multiplier ratio, such that the output torque to the disc is several multiples of the input (handwheel or crank) torque. This ratio also results in an incremental turn of the valve element for every full turn of the handwheel or crank. This prevents closing the disc or ball rapidly, and therefore precludes water hammer.
- 2.1.3 The disc or ball is mounted in the waterway of the valve body and controls waterflow when it is rotated between 0E and 90E (fully opened to fully closed).
- 2.1.4 The indicator is the top most component of the valve operator and is assembled directly to the drive shaft. It shows the position of the disc or ball in the waterway at all times, even after the determination of the Ultimate Operator Torque.
- 2.1.5 In order to meet the intent of this standard, indicating valves must 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 in identical materials by different manufacturers or, even by different plants of the same manufacturer, have been seen to perform differently in testing. Sample indicating valves, selected in conformance to this criterion, shall satisfy all of the requirements of this standard.

2.2 Application Requirements

- 2.2.1 The manufacturer shall provide, at a minimum, the following preliminary information with any request for certification consideration:
- a complete list of all models, types, sizes, and options for the products or services being submitted for certification consideration;
 - general assembly drawings, one complete set of manufacturing drawings, materials list(s) and physical property specifications, anticipated marking format, brochures, sales literature, specification sheets, installation, operation and maintenance procedures; and
 - the number and location of manufacturing facilities.
- 2.2.2 All documents shall be controlled by the manufacturer'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 documents shall be provided with English translation.

2.3 Requirements for Samples for Examination

- 2.3.1 Following authorization of a certification examination, the manufacturer shall submit samples for examination and testing based on the following:
- Sample requirements to be determined by the certification agency.
- 2.3.2 Requirements for samples may vary depending on design features, results of prior or similar testing, and results of any foregoing tests.
- 2.3.3 The manufacturer shall submit samples representative of production. Any decision to use data generated using prototypes is at the discretion of the certification agency.