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**Cast iron, copper and stainless steel valves with screwed  
connections**

铁制、铜制和不锈钢制螺纹连接阀门

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# Cast iron, copper and stainless steel valves with screwed connections

## 1 Scope

This document specifies the structure types, materials, technical requirements, test methods, inspection rules, marking, packaging, transportation, and storage of cast iron, copper, and stainless steel gate valves, globe valves, ball valves, and check valves with screwed connections.

This document applies to:

Gray cast iron valves with a nominal pressure not exceeding PN16 and a nominal size not exceeding DN100.

Malleable cast iron valves and ductile cast iron valves with a nominal pressure not exceeding PN25 and a nominal size not exceeding DN100.

Copper alloy valves and stainless steel valves with a nominal pressure not exceeding PN40 and a nominal size not exceeding DN100.

The operating temperature is not higher than 180 °C, and the working medium is water, non-corrosive liquid, air, saturated steam, etc.

**Note 1:** The valves in this document refer to gate valves, globe valves, ball valves, or check valves with screwed connections.

**Note 2:** For valves with a nominal size greater than or equal to DN50, the working medium does not include air or saturated steam.

## 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

GB/T 700, Carbon structural steels

GB/T 1176, Casting copper and copper alloys

GB/T 1184-1996, Geometrical tolerancing - Geometrical tolerance for features without individual tolerance indications

GB/T 17241.7, Specifications for cast iron pipe flanges

GB/T 29528, Specification of copper alloy forgings for valves

GB/T 35741, Specification of stainless steel forgings for industrial valves

QB/T 5257, Polytetrafluoroethylene (PTFE) sheet

### **3 Terms and definitions**

For the purposes of this document, the following terms and definitions apply.

#### **3.1**

##### **wrench**

The part where the installation tool contacts the threaded head of the valve pipe when clamping the valve to the pipeline.

### **4 Structure type**

**4.1** A typical structure of the gate valve with screwed connections is shown in Figure 1.

**5.2** The technical requirements for gray iron castings shall comply with the provisions of GB/T 12226; the technical requirements for malleable iron castings shall comply with the provisions of GB/T 9440; the technical requirements for ductile iron castings shall comply with the provisions of GB/T 12227; the technical requirements for copper alloy castings shall comply with the provisions of GB/T 12225; the technical requirements for copper alloy forgings shall comply with the provisions of GB/T 29528; the technical requirements for stainless steel castings shall comply with the provisions of GB/T 12230; the technical requirements for stainless steel forgings shall comply with the provisions of GB/T 35741.

## **6 Technical requirements**

### **6.1 Pressure-temperature rating**

**6.1.1** The pressure-temperature rating shall be determined by the smaller pressure-temperature rating of the valve body and internal component materials.

**6.1.2** The pressure-temperature rating of cast iron valves shall comply with the provisions of GB/T 17241.7.

**6.1.3** The pressure-temperature rating of copper alloy valves shall comply with the provisions of GB/T 15530.8.

**6.1.4** The pressure-temperature rating of stainless steel valves shall comply with the provisions of GB/T 12224.

### **6.2 Structure length**

The structure length of valves shall comply with the provisions of GB/T 12221 or the requirements of the purchase contract.

### **6.3 Connection end**

**6.3.1** The pipe threads at both ends of the valve shall comply with the provisions of GB/T 7306 (all parts), GB/T 7307, and GB/T 12716.

**6.3.2** The surface roughness Ra value of the pipe thread shall not exceed 6.3  $\mu\text{m}$ , and the thread surface shall be smooth and free from obvious defects such as dents and broken thread.

**6.3.3** The angular deviation of the pipe thread axis at both ends shall not exceed 1°.

### **6.4 Minimum flow diameter**

The minimum flow diameter of the valve shall not be less than the specifications in Table 4.

**6.13.2** After the sealing packing is installed in the stuffing box, the sealing performance shall be guaranteed and a certain adjustment margin shall be provided.

**6.13.3** When the ball valve is fully open, the angular deviation between the axis of the ball through-hole and the axis of the valve body through-hole shall not exceed 3°.

## **6.14 Operation**

**6.14.1** Regardless of the type of hand wheel or handle configured for the valve, under the condition of maximum differential pressure of the valve, the maximum operating force of the hand wheel or handle configured shall not exceed 360 N.

**6.14.2** For gate valves, ball valves, and globe valves, rotating the hand wheel or handle clockwise closes the valve and counterclockwise opens it. When opening a ball valve, the handle shall be parallel to the ball passage.

**6.14.3** Hand wheels and handles shall be provided with permanent markings indicating the direction of switching.

**6.14.4** Hand wheels and handles shall be securely installed and easy to disassemble and replace.

**6.14.5** Ball valves shall be provided with limit structures for full opening and full closing.

## **6.15 Appearance**

**6.15.1** The valve surface shall be free from defects such as sand-holes, cracks, looseness, and non-metallic inclusions.

**6.15.2** All non-machined outer surfaces of cast iron valves shall be painted or powder coated. The paint or powder coating shall be firmly adhered and uniform in color, and shall not have obvious defects such as paint runs, bubbles, or poor coatings.

**6.15.3** The valve cavity shall not be painted, but shall be provided with rust prevention measures.

## **6.16 Shell strength**

After the shell test, there shall be no structural damage, and no visible leakage through the valve shell wall and any fixed valve body connection.

## **6.17 Sealing performance**

When valves are tested for sealing, during the test duration, the maximum permissible leakage at the seal of non-metallic valves shall meet the Class A requirements of GB/T 13927-2022, and the maximum permissible leakage at the seal of metallic valves shall meet the Class D requirements of GB/T 13927-2022.

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