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Gray cast iron valves

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Foreword

This translation has been made based on the original Japanese Industrial Standard revised by the Minister of Economy, Trade and Industry, through deliberations at the Japanese Industrial Standards Committee as the result of proposal for revision of Japanese Industrial Standard submitted by Japan Valve Manufacturers' Association (JVMA) with the draft being attached, based on the provision of Article 12 Clause 1 of the Industrial Standardization Law applicable to the case of revision by the provision of Article 14.

Consequently **JIS B 2031**:1994 is replaced with this Standard.

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Gray cast iron valves

Introduction

This Japanese Industrial Standard was established in 1958 and has gone through 6 revisions to this day. The last revision was made in 1994, and the revision at this time is to respond to the review of the relation between the temperature of fluid and the maximum allowable pressure according to the revision of **JIS B 2239**, the review of the division of seat leakage volume according to the revision of **JIS B 2003**, the review of materials according to the revisions of **JISs** of related materials, and the like.

No International Standard corresponding to this Standard has been established at this point.

1 Scope

This Standard specifies the gray cast iron valves (hereafter referred to as “valves”) to be used for general mechanical devices, etc. Also, the operation restriction torque of handwheel is shown in Annex B as reference.

NOTE : Every pressure herein is the gauge pressure.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this Standard. The most recent editions of the standards (including amendments) indicated below shall be applied.

- JIS B 0100 *Glossary of terms for valves*
- JIS B 0203 *Taper pipe threads*
- JIS B 0253 *Gauges for taper pipe threads*
- JIS B 2001 *Nominal size and bore of valves*
- JIS B 2002 *Face-to-face and end-to-end dimensions of valves*
- JIS B 2003 *General rules for inspection of valves*
- JIS B 2004 *General rules for marking on valves*
- JIS B 2239 *Cast iron pipe flanges*
- JIS G 3101 *Rolled steels for general structure*
- JIS G 3214 *Stainless steel forgings for pressure vessels*
- JIS G 3507-2 *Carbon steels for cold heading—Part 2: Wires*
- JIS G 4303 *Stainless steel bars*
- JIS G 5121 *Corrosion-resistant cast steels for general applications*
- JIS G 5501 *Grey iron castings*
- JIS G 5502 *Spheroidal graphite iron castings*
- JIS G 5705 *Malleable iron castings*

JIS H 3100 *Copper and copper alloy sheets, plates and strips*

JIS H 3250 *Copper and copper alloy rods and bars*

JIS H 5120 *Copper and copper alloy castings*

JIS K 6896 *Polytetrafluoroethylene powder for molding and extrusion materials*

JIS K 7137-1 *Plastics—Polytetrafluoroethylene (PTFE) semi-finished products—
Part 1: Requirements and designation*

3 Terms and definitions

For the purposes of this Standard, the terms and definitions given in **JIS B 0100** apply.

4 Classification

The classification of valves shall be as given in table 1 according to the combination of nominal pressure, type of valve and nominal size.

Table 1 Classification

Nominal pressure	Type of valve		Nominal size										Series number of face-to-face dimension according to specification of JIS B 2002
			40	50	65	80	100	125	150	200	250	300	
5K	Flanged end type	Outside screw type gate valve	—	○	○	○	○	○	○	○	○	—	2
10K		Globe valve	○	○	○	○	○	○	○	○	—	—	19 or 20
		Angle valve	○	○	○	○	○	○	○	○	—	—	27
		Inside screw type gate valve	—	○	○	○	○	○	○	○	○	○	5 or 6
		Outside screw type gate valve	—	○	○	○	○	○	○	○	○	○	5 or 6
		Swing check valve	○	○	○	○	○	○	○	○	—	—	19 or 20

5 Relation between temperature of fluid and maximum allowable pressure

The relation between the temperature of fluid and the maximum allowable pressure (hereafter referred to as “pressure-temperature rating”) shall be as follows.

In some cases, the use of valve is prohibited or restricted by the High Pressure Gas Safety Act and others independently of **a)** and **b)**. The user of this Standard shall use the valves within the restriction of laws and regulations.

- a) The relation between the temperature of fluid and the maximum allowable pressure shall be as given in table 2 and figure 1. However, if necessary, it may be altered within the range of table 2 and figure 1.

- b) For the relation between the temperature of fluid and the maximum allowable pressure for the valve having the press-in valve seat, 0.2 MPa shall be taken as the standard within the range of 220 °C or lower in temperature.

Table 2 Relation between temperature of fluid and maximum allowable pressure

Unit: MPa

Nominal pressure	Maximum allowable pressure	
	Temperature of fluid	
	-10 °C to 120 °C	220 °C
5K	0.7	0.5
10K	1.4	1.0

NOTE : The maximum allowable pressure at intermediate temperature between 120 °C to 220 °C is obtained by the proportional interpolation method.

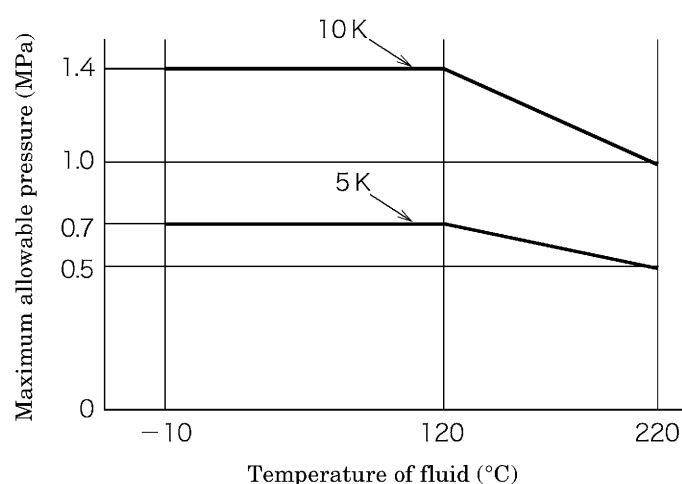


Figure 1 Pressure-temperature rating

6 Qualities

6.1 Performances

The performances of valves shall be as follows.

- a) **Pressure resistance performance** For the pressure resistance part of valve, when tested according to **a)** of clause **9**, there shall be no leakage, spreading and abnormalities on every part.
- b) **Seat leakage performance** For the seat leakage performance, when tested according to **b)** of clause **9**, it shall conform to table 3.
- c) **Actuation performance** When tested according to **c)** of clause **9**, each moving part shall be smoothly actuated so as to be suited for the opening/closing operation of valve. The swing check valve shall be such that it returns to the closing position by its own weight.

Table 3 Allowable leakage rate of valve seat

Type of valve		Rate
Globe valve and angle valve	Metal seat	A
		B ^{a)}
	Soft seat	A
Gate valve	Metal seat	A
		D ^{a)}
Swing check valve	Metal seat	D
		A
	Soft seat	B ^{a)}
NOTE : The rate shows the division of leakage volume specified in JIS B 2003 .		
Note ^{a)} Applicable if it is permissible in use.		

6.2 Constructions, shapes and dimensions

6.2.1 Common items

The constructions and shapes of valves shall be visually checked, and the dimensions, when tested according to **d)** of clause **9**, shall satisfy the following.

- The bore of valve shall be according to **JIS B 2001**.
- The flanges at both ends of valve body of flanged end type valve shall be according to **JIS B 2239**.
- The face-to-face dimension of valve shall be as given in table 4. The correspondence between the face-to-face dimension and the type of valve shall be as given in table 1.
- The wall thickness of valve body and the diameter of valve stem shall be as given in table 5.
- The screw thread for drain shall be provided, if necessary, and be according to **JIS B 0203**.

When the wall thickness of valve body is insufficient compared with the specified length of effective threaded portion, the drain seat shall be provided. The dimensions of the screw thread and the drain seat shall be as given in table 6.

- For the reference to identify the size of valve, the height fully opened and the diameter of handwheel of the valve of 10 K in nominal pressure are given in table 4 and table 5.
- Examples of constructions and shapes are given in figure 2 to figure 6. The correspondence between the part number and the name of part in figure 2 to figure 6 is given in table 8.
- As to the opening/closing of valve, the counterclockwise turn of handwheel shall be defined as “opening”, and the clockwise turn as “closing”.

- i) The connection between the valve body and the bonnet shall be the bolted bonnet type.
- j) The valve disc may be equipped with the disc seat ring. For the attaching method of valve seat, either of the screw-in type or the press-in type is allowed.
- k) For the body seat ring, either of the screw-in type or the press-in type is allowed.
- l) The gasket contact surfaces of flanges at both ends of valve body should be of the flat face.
- m) The trapezoidal screw thread shall be used for the screw thread of valve stem. The case where other screw thread is used shall be upon the agreement between the parties concerned with delivery.
- n) The length of engagement between the screw thread of valve stem and the internal thread shall be at least 1.2 times the diameter of valve stem of table 5.
- o) The depth of stuffing box shall be at least 5 times the clearance between the valve stem and the stuffing box except the valve of 5 K.
- p) The valve to be used in cold districts may be equipped with the water extracting mechanism to prevent breakage due to freezing of valve.
- q) If necessary, an operation machine of geared manual, electric, pneumatic, hydraulic or other type may be attached.
- r) The tolerances and permissible values of dimension, inclination, etc. shown below shall be according to **JIS B 2003**.
 - 1) Tolerances of face-to-face dimension
 - 2) Permissible values of inclination of flanges at both ends
 - 3) Permissible values of difference in circumferences at flange coupling part between valve body and bonnet