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(JVMA)

**Bronze, gate, globe, angle, and
check 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 2011 : 2009** has been replaced with this Standard.

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Bronze, gate, globe, angle, and check valves

Introduction

The main revisions at this time include the correspondence to the standardization of lead-free copper alloy bronze casting series and the unification of testing methods for dezincification corrosion resistant brass in accordance with the revisions of **JIS H 5120** and **JIS H 5121**, the review of pressure-temperature criteria in accordance with the revision of **JIS B 2240**, the alteration of format of standard in accordance with the revision of **JIS Z 8301**. And, the criteria for determination of leaching performance has been reviewed in accordance with the latest Ministerial Ordinance of Ministry of Health, Labour and Welfare.

1 Scope

This Japanese Industrial Standard specifies bronze gate, globe, angle, and check valves (hereafter referred to as "valves") to be used for pipes of water, oil, gas, air and steam, etc. in the water/hot water supply equipment, air conditions and general mechanical equipment. However, valves used for combustible gas and toxic gas are excluded.

NOTE 1 The nominal sizes given in parentheses () in this Standard are of nominal size in series B of table 1 (hereafter referred to as "nominal size B").

NOTE 2 The pressure used in this Standard is 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 1051 *Mechanical properties of fasteners made of carbon steel and alloy steel—Part 1 : Bolts, screws and studs*

JIS B 1181 *Hexagon nuts and hexagon thin nuts*

JIS B 1351 *Split pins*

JIS B 2003 *General rules for inspection of valves*

JIS B 2240 *Copper alloy pipe flanges*

JIS B 7502 *Micrometer callipers*

JIS B 7507 *Vernier, dial and digital callipers*

- JIS G 3141 *Cold-reduced carbon steel sheet and strip*
JIS G 5501 *Grey 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 3260 *Copper and copper alloy wires*
JIS H 3300 *Copper and copper alloy seamless pipes and tubes*
JIS H 5120 *Copper and copper alloy castings*
JIS H 5121 *Copper alloy continuous castings*
JIS H 5301 *Zinc alloys die castings*
JIS H 5302 *Aluminium alloy die castings*
JIS K 7137-1 *Plastics—Polytetrafluoroethylene (PTFE) semi-finished products—
Part 1 : Requirements and designation*
JIS S 3200-7 *Equipment for water supply service—Test methods of effect to water
quality*
JIS Z 3282 *Soft solders—Chemical compositions and forms*
JIS Z 8301 *Rules for the layout and drafting of Japanese Industrial Standards*

3 Terms and definitions

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

3.1 valve seat bore

the diameter of the flow channel in the seat of a valve

3.2 lead-free copper alloy material

the copper alloy material containing 0.25 % lead or less

4 Classification

The classification of valves shall be as given in table 1 according to the combination of nominal pressures, types of valve, seats and nominal diameters.

Table 1 Classification

Nominal pressure	Type of valve	Seat	Nominal diameter											
			A	8	10	15	20	25	32	40	50	65	80	100
			B	(1/4)	(3/8)	(1/2)	(3/4)	(1)	(1 1/4)	(1 1/2)	(2)	(2 1/2)	(3)	(4)
5K	Screwed-end globe valve	Metal and soft	—	—	○	○	○	○	○	○	○	○	○	—
	Soldered-end globe valve ^{a)}		—	—	○	○	○	○	○	○	○	—	—	—
	Screwed-end gate valve	Metal	—	—	○	○	○	○	○	○	○	○	○	—
	Soldered-end gate valve ^{a)}		—	—	○	○	○	○	○	○	○	—	—	—
10K	Screwed-end globe valve	Metal and soft	○	○	○	○	○	○	○	○	○	○	○	○
	Screwed-end angle valve		—	—	○	○	○	○	○	○	○	—	—	—
	Soldered-end globe valve ^{a)}		—	—	○	○	○	○	○	○	○	—	—	—
	Screwed-end gate valve	Metal	—	—	○	○	○	○	○	○	○	○	○	—
	Soldered-end gate valve ^{a)}		—	—	○	○	○	○	○	○	○	—	—	—
	Screwed-end lift check valve	Metal and soft	—	○	○	○	○	○	○	○	○	—	—	—
	Screwed-end swing check valve		—	—	○	○	○	○	○	○	○	—	—	—
	Soldered-end lift check valve ^{a)}		—	—	○	○	○	○	○	○	○	—	—	—
	Soldered-end swing check valve ^{a)}		—	—	○	○	○	○	○	○	○	—	—	—
10K	Flanged-end globe valve	Metal and soft	—	—	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎
	Flanged-end angle valve		—	—	◎	◎	◎	◎	◎	◎	◎	—	—	—
	Flanged-end gate valve	Metal	—	—	—	—	◎	◎	◎	◎	◎	◎	◎	—

NOTE : Mark ○ of the nominal diameter may take either A or B. Mark ◎ shall take A.
Note ^{a)} Soldered-end type shall be applied only to copper piping.

5 Relationship between the temperature of fluid and the maximum permissible working pressure

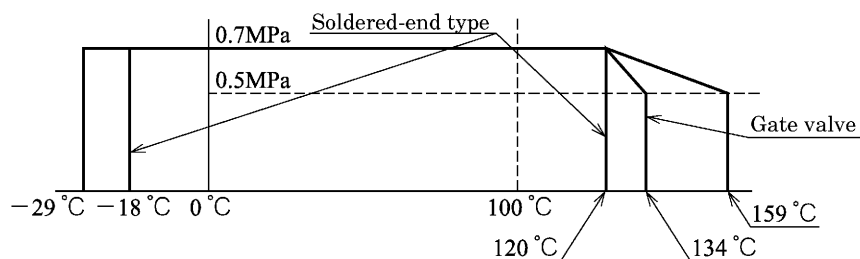
The relationship between the temperature of fluid and the maximum permissible pressure (hereinafter, referred to as the "pressure-temperature criteria") shall be in accordance with table 2. However, the fluid shall not be frozen. And, if necessary, it may be altered within the range of table 2.

In the case where the use is prohibited or restricted by the High Pressure Gas Safety Act and other regulations, the user shall use the valves within the range of laws and ordinances.

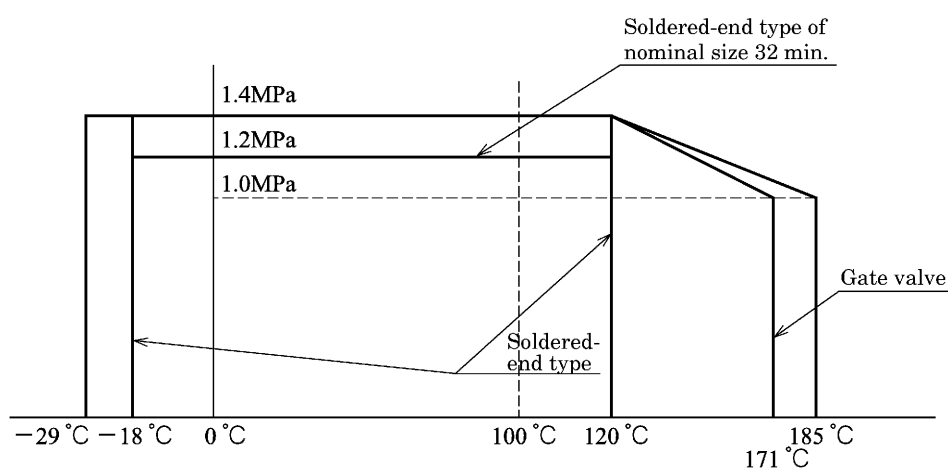
Table 2 Pressure-temperature criteria

Nominal pressure	Temperature of fluid °C	Maximum permissible working pressure ^{e)} MPa
5K	-29 ^{a)} to 120	0.7
	159 ^{b) c)}	0.5
10K	-29 ^{a)} to 120	1.4
	185 ^{b) d)}	1.2 ^{f)}
		1.0

- Notes ^{a)} For the soldered-end type, the temperature is assumed to be -18 °C.
^{b)} This shall not be applied to the soldered-end type.
^{c)} It shall be the maximum service temperature, and in the case of gate valve, it shall be 134 °C.
^{d)} It shall be the maximum service temperature, and in the case of gate valve, it shall be 171 °C.
^{e)} The maximum permissible pressure at the intermediate temperature between over 120 °C and the maximum service temperature shall be obtained by proportional interpolation.
^{f)} This shall be applied to the soldered-end type of nominal diameter 32 (1 1/4) min.



Nominal pressure 5K



Nominal pressure 10K

6 Qualities

6.1 Performance

The performances of valves shall be as given in the following :

- a) **Pressure resistance performance** The pressure-resistant part of the valve, when tested in accordance with **8.1**, shall be free from abnormalities such as deformation or leakage in any portion.
- b) **Valve seat leakage performance** The valve seat leakage performance, when tested in accordance with **8.2**, shall conform to table 3.

Table 3 Permissible leakage from valve seat

Type of valve		Rate
Globe valve and angle valve	Metal seat	A
		B a) b)
	Soft seat	A
Gate valve	Metal seat	A
		D a) c)
Lift check valve and swing check valve	Metal seat	D c)
	Soft seat	A
		B a) b)

NOTE : The rate indicates the division of the amount of leakage from the valve seat as specified in **JIS B 2003**.

Notes a) This shall apply to the case where no impediment in use is expected.

b) In the case of hydraulic pressure, for the valve of under 25 in nominal diameter, the permissible leakage shall be 0.25 mm³/s.

c) In the case of hydraulic pressure, for the valve of under 25 in nominal diameter, the permissible leakage shall be 2.5 mm³/s.

- c) **Actuation performance** When tested in accordance with **8.3**, each moving part of a valve shall function so as to enable smooth opening and closing operations of the valve.

In addition, the valve discs of the lift check valve and swing check valve shall return to the shut-off positions by their self weight.

- d) **Leaching performance** When tested in accordance with **8.6**, the leaching performance of the valve used for water/hot water supply equipment for potables shall conform to table 4.

Table 4 Criteria for leaching performance

Item	Criteria
Cadmium and its compounds ^{a)}	0.003 mg/L max. as Cd
Mercury and its compounds	0.000 5 mg/L max. as Hg
Selenium and its compounds	0.01 mg/L max. as Se
Lead and its compounds	0.01 mg/L max. as Pb
Arsenic and its compounds	0.01 mg/L max. as As
Hexavalent chromium compounds	0.05 mg/L max. as Cr ⁺⁶
Cyanide ion and a cyanogen chloride	0.01 mg/L max. as CN
Nitrate nitrogen and nitrite nitrogen	10 mg/L max.
Fluorine and its compounds	0.8 mg/L max. as F
Boron and its compounds	1.0 mg/L max. as B
Carbon tetrachloride	0.002 mg/L max.
1,4-Dioxane	0.05 mg/L max.
1,2-Dichloroethane	0.004 mg/L max.
<i>cis</i> -1,2-Dichloroethylene and <i>trans</i> -1,2-Dichloroethylene	0.04 mg/L max.
Dichloromethane	0.02 mg/L max.
Tetrachloroethylene	0.01 mg/L max.
1,1,2-Trichloroethane ^{b)}	0.006 mg/L max.
Trichloroethylene	0.03 mg/L max.
Benzene	0.01 mg/L max.
Formaldehyde	0.08 mg/L max.
Zinc and its compounds	1.0 mg/L max. as Zn
Aluminium and its compounds	0.2 mg/L max. as Al
Iron and its compounds	0.3 mg/L max. as Fe
Copper and its compounds	1.0 mg/L max. as Cu
Sodium and its compounds	200 mg/L max. as Na
Manganese and its compounds	0.05 mg/L max. as Mn
Chloride ion	200 mg/L max.
Evaporation residue	500 mg/L max.
Anionic surfactant	0.2 mg/L max.
Nonionic surfactant	0.02 mg/L max.
Phenols	0.005 mg/L max. as phenol
Organic matters [amount of total organic carbon (TOC)]	3 mg/L max.
Taste	Not abnormal
Odour	Not abnormal
Chromaticity	5 degrees max.
Turbidity	2 degrees max.
Epichlorohydrin	0.01 mg/L max.
Amines	0.01 mg/L max. as triethylenetetramine
2,4-Toluene diamine	0.002 mg/L max.
2,6-Toluene diamine	0.001 mg/L max.
Vinyl acetate	0.01 mg/L max.
Styrene	0.002 mg/L max.
1,2-Butadiene	0.001 mg/L max.
1,3-Butadiene	0.001 mg/L max.
Notes ^{a)} Cadmium and its compounds shall be 0.01 mg/L until March 31st, 2010 and 0.003 mg/L max. from April 1st, 2010.	
^{b)} 1,1,2-Trichloroethane is applicable until March 31st, 2010.	

6.2 Structure, shapes and dimensions

The structure and shapes of valves, when inspected visually, and dimensions, when tested in accordance with 8.4, shall be as follows :

6.2.1 Common matters

The common matters of the structure, shapes and dimensions of valves shall be in accordance with the following:

- a) The principal dimensions of valves shall be as given in table 6.
- b) Examples of structure and shapes shall be as given in Annex B.
- c) Pertaining to the opening and closing of the valve, counterclockwise turning of the hand wheel shall be taken as "Opening", and clockwise turning as "Closing".
- d) For the valve stem screw, a trapezoidal screw shall be used. However, when the other screws are used, it shall be subjected to the agreement between the parties concerned with delivery.
- e) The passage area in each part of the valve body shall be not smaller than the area of valve seat bore. However, in the case where a disc guide is attached to the valve disc, the area of disc guide may be deducted from the passage area.
- f) The tolerances on the face to face dimensions (L) shall comply with **JIS B 2003**.
- g) The permissible values for the coaxiality and rectangularity between the screw thread axial lines of both ends of the screwed-end type shall comply with **JIS B 2003**, and those of the soldered-end type shall comply with the screwed-end type, as appropriate.
- h) The flange dimensions of the flanged-end type valve shall be as given in attached table 2 of **JIS B 2240**.
- i) The tolerance on the dimension of the flange of the flanged-end type valve shall be as given in attached table 4 of **JIS B 2240**.
- j) The permissible values for the inclination and rectangularity of the flanges of both ends of the flanged-end type are shown in Annex A of **JIS B 2003**.
- k) The hexagon nuts shall comply with **JIS B 1181**.
- l) The split pins shall comply with **JIS B 1351**.

6.2.2 Globe valve and angle valve

The structure and shapes of the globe valves and the angle valves shall be as given in the following:

- a) The connection of the valve body and the bonnet shall be the screwed-end type for the metal seat, and the union type for the soft seat.

However, the connection for the valve with the nominal pressure of 10 K and the nominal diameter of 80 (3) or over shall be the flanged-end type and shall be made by bolting.

- b) The valve disc and valve stem shall be joined so as not to fall off during operation, and be so constructed as to rotate smoothly. However, the nominal diameter shall be 25 (1) or under if screw-ended. For that of nominal diameter 15 (1/2) or under, the valve disc and valve stem may be constructed as an integral type.