

Shipbuilding – Application for valves and cocks

1. Scope This Japanese Industrial Standard specifies application standard for valves and cocks used in ship's general piping.

Remark: This standard makes reference standards given in **Attached Table 1**.

2. Grouping of valves and cocks by their function and application The valves and cocks in this standard shall be grouped as below according to their function and application.

- (1) **Globe valves and angle valves** These valves find wide applications generally in flow regulation duties and also applicable to duties under high temperature and pressure. Globe valves are designed to be useful in linear portions of piping and angle valves in bent portions.
- (2) **Gate valves** Gate valves are not suited for flow regulation duties. Generally, they are used either being fully opened or closed. Having smaller resistance against fluid and smaller space between flange faces than that of globe valves, gate valves are suited for applications in piping in narrower spaces. Especially, those of larger aperture contribute to economy. However, gate valves of inside screw type are not suited for duties under high temperature and high pressure according to their construction.
- (3) **Check valves** Check valves are designed to be installed in positions where counterflow must be prevented. Their use varies in screw-down check valves, lift check valves and swing check valves. Screw-down check valves are used in positions where only counterflow check is required and can be regrouped into globe valves and angle valves. Lift check valves are used in positions where only counterflow check is required and again can be regrouped in globe valves and angle valves. Swing check valves are used in positions where it is required that the valves are opened and closed by small difference in pressure and that the resistance against fluid is small when it passes through the valves. Swing check valves, however, are not suited for duties under high temperature and high pressure according to their construction.
- (4) **Butterfly valves** Butterfly valves are used either for being fully opened or closed, as well as for flow regulation duties. Having relatively smaller resistance against fluid and smaller installed space between flange faces and smaller weight than those of other types of valves, butterfly valves are convenient for applications to piping in narrower space. Especially, those of larger aperture contribute to economy. However, extra attention is required for the service temperature because rubber is used for the valve seat.
- (5) **Cocks** Cocks are used in positions where quick opening and closing of passage or switching of flow direction is required. Especially for switching flow direction, three-way cocks are useful. Cocks, however, are not suited for duties under high temperature and high pressure according to their construction.

3. Application of standards for valves and cocks according to piping system

3.1 Steam piping The application to steam piping shall be as follows:

- (1) The figures listed below shall define the application of globe valves and angle valves in respect of working temperature and pressure.
 - (a) Fig. 1.1 For valves of nominal diameters 6 and 10
 - (b) Fig. 1.2 For valves of nominal diameters 15 to 40 (except for malleable iron valves)
 - (c) Fig. 1.3 For malleable iron valves of nominal diameters 15 to 40
 - (d) Fig. 1.4 For valves of nominal diameters 50 to 200
 - (e) Fig. 1.5 For valves of nominal diameters 250 to 400

Remark: For the service range of butterfly valves exceeding 1.3 MPa shown by chain lines in Fig. 1.4, service restrictions are specified for bronze valves and cast iron valves by some classification societies, in such a case, the selection of valves shall be made in accordance with the requirements of the classification society concerned.

- (2) Gate valves shall be used mainly for exhaust and Fig. 1.6 shall define their application in respect of working temperature and pressure.
- (3) Lift check valves shall not be used in steam piping on account of their construction.
- (4) Also swing check valves shall not be used in steam piping on account of their construction.
- (5) Cast iron valves and cast steel valves can be regrouped into Classes B and S. Class S shall be selected for gate valves. Class S is also preferable for globe valves and angle valves even when they are used under 205°C or less.
- (6) For systems having comparatively large number of drains or for larger apertures, cast steel valves are recommended for safety even under the working pressure around 1.0 MPa.
- (7) Cocks shall be used only with drains of saturation temperature or less and Table 1 shall define their application in respect of working pressure.
- (8) For drain piping on higher pressure level to trap, globe valves and angle valves in Figs. 1.1 to 1.5 shall be applied.
While, drain piping on lower pressure level to trap shall be deemed as condensate piping and globe valves and angle valves in Table 2.1 for fresh water piping or gate valves in Table 2.2 may be used therewith.
- (9) Fig. 1.7 shall define the application of hose globe valves and angle valves of flanged type and screwed type, nominal diameter 15 mm, for cleaning and soda boiling in respect of working temperature and pressure.

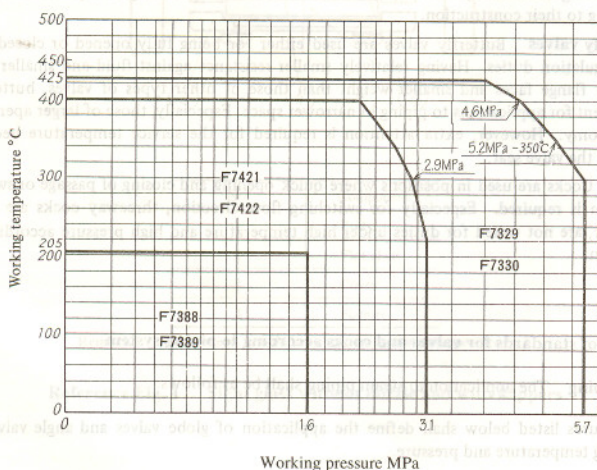
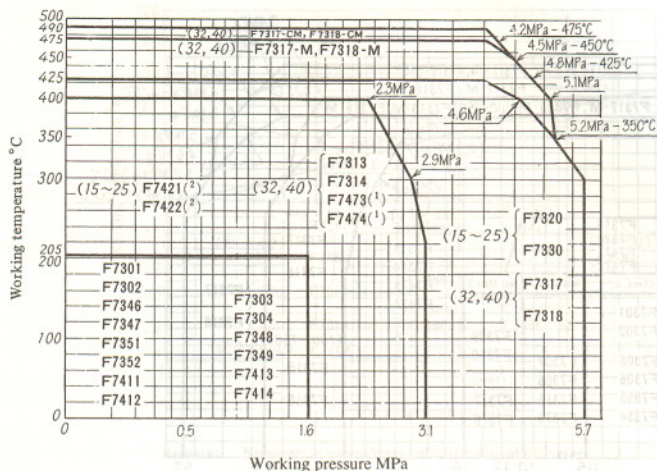


Fig. 1.1 Globe valves and angle valves with nominal diameters 6 and 10 in steam piping and boiler circulating water piping



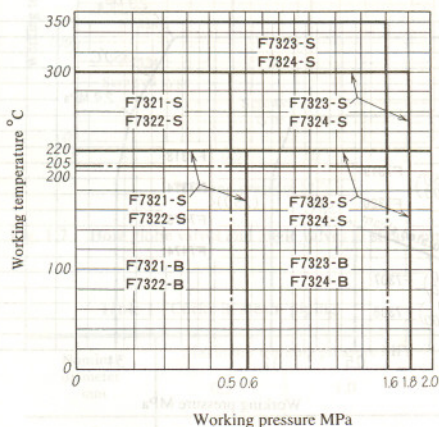
Notes: (1): 350°C – 2.6 MPa shall be the upper limit.

(2): For globe valves specified in JIS F 7421 and angle valves specified in JIS F 7422, 2.2 MPa shall be the upper limit.

Remarks: 1. Numerals in parentheses show nominal diameter.

2. "M" suffixed to JIS number signifies that the material of valve bonnet is molybdenum steel, and "CM" chromium molybdenum steel.

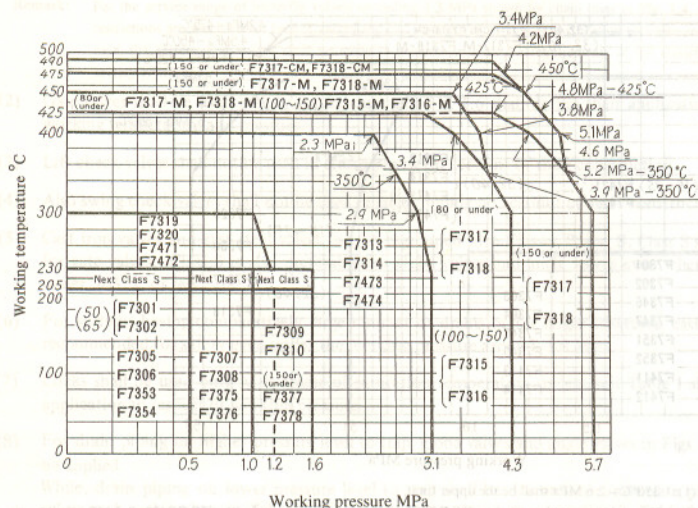
Fig. 1.2 Globe valves and angle valves with nominal diameters 15~40 (excluding malleable case iron valves) in steam piping and boiler circulating water piping



Remarks: 1. "S" suffixed to JIS number signifies that the material is in Class S, and "B" Class B.

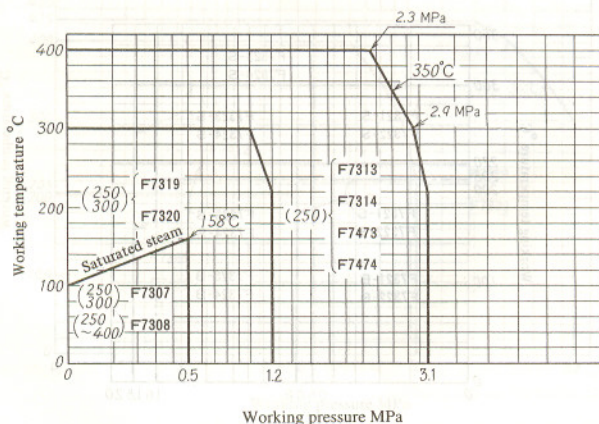
2. The portions enveloped by dashed lines show Class B.

Fig. 1.3 Malleable cast iron globe valves and angle valves with nominal diameters 15~40 in steam piping and boiler circulating water piping



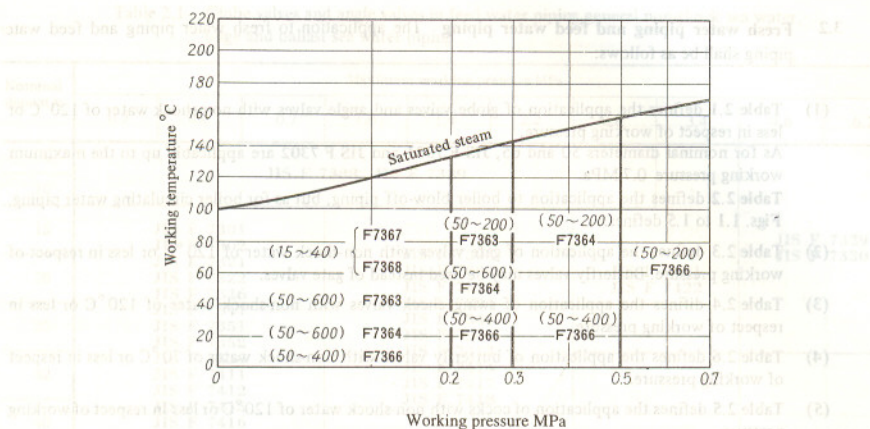
Remarks: 1. Numerals in parentheses show nominal diameters.
 2. "M" suffixed to JIS number signifies that the material of valve bonnet is molybdenum steel, and "CM" chromium molybdenum steel.

Fig. 1.4 Globe valves and angle valves with nominal diameters 50~200 in steam piping and boiler circulating water piping



Remark: Numerals in parentheses indicate nominal diameter.

Fig. 1.5 Globe valves and angle valves with nominal diameters 250~400 in steam piping and boiler circulating water piping



Remark: Numerals in parentheses indicate nominal diameter.

Fig. 1.6 Gate valves in steam piping

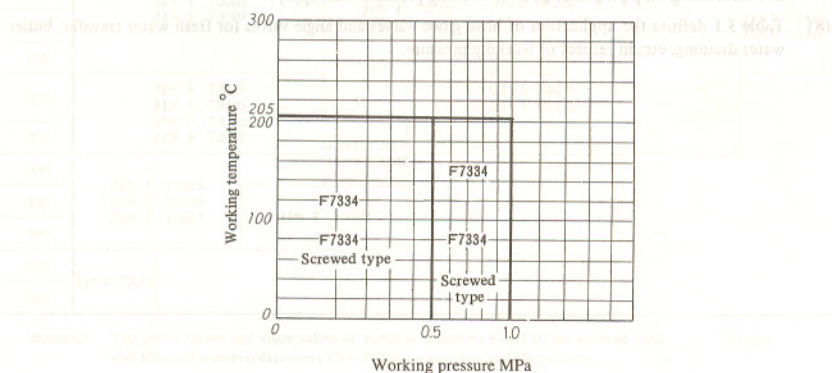


Fig. 1.7 Hose globe valves and angle valves in steam piping

Table 1 Cocks in steam piping

Nominal diameter mm	Maximum working pressure MPa	
	0.5	1.0
6	JIS F 7387	
10		
15		
20		

3.2 Fresh water piping and feed water piping The application to fresh water piping and feed water piping shall be as follows:

- (1) Table 2.1 defines the application of globe valves and angle valves with non-shock water of 120 °C or less in respect of working pressure.
As for nominal diameters 50 and 65, JIS F 7301 and JIS F 7302 are applicable up to the maximum working pressure 0.7 MPa.
Table 2.2 defines the application to boiler blow-off piping, but as for boiler circulating water piping, Figs. 1.1 to 1.5 defines.
- (2) Table 2.3 defines the application of gate valves with non-shock water of 120 °C or less in respect of working pressure. Butterfly valves may be used instead of gate valves.
- (3) Table 2.4 defines the application of swing check valves with non-shock water of 120 °C or less in respect of working pressure.
- (4) Table 2.6 defines the application of butterfly valves with non-shock water of 70 °C or less in respect of working pressure.
- (5) Table 2.5 defines the application of cocks with non-shock water of 120 °C or less in respect of working pressure.
- (6) The cast iron valves in Tables 2.1 to 2.3 can be regrouped into Classes B and S. Class B is preferable for application with non-shock water of 120 °C or less, but Class S is preferable when cast steel gate valves of nominal pressure 10 K are to be less.
- (7) As for application with pulsation water, Tables 4.1 to 4.4 defining the application to fuel oil piping and lubricating oil piping in respect of working pressure shall apply.
- (8) Table 3.1 defines the application of hose globe valves and angle valves for fresh water transfer, boiler water draining, etc. in respect of working pressure.

Fig. 1.4 Globe valves and angle valves with nominal diameters 25 to 400 to steam piping and boiler circulating water piping

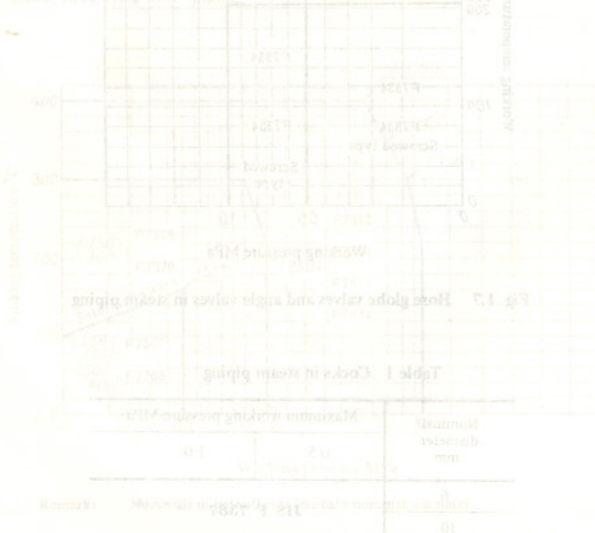


Fig. 1.5 Globe valves and angle valves with nominal diameters 25 to 400 to steam piping and boiler circulating water piping

Table 2.1 Globe valves and angle valves in feed water piping general non-shock sea water, bilge and ballast sea water piping

Nominal diameter	Maximum working pressure MPa									
	0.5	0.6	0.7	1.0	1.4	2.2	2.8	3.4	4.6	6.2
6	JIS F 7388, JIS F 7389									
10										
15	JIS F 7301	JIS F 7303				JIS F 7421 JIS F 7422	JIS F 7329 JIS F 7330			
20	JIS F 7302									
	JIS F 7321	JIS F 7323	JIS F 7421 JIS F 7422	JIS F 7329 JIS F 7330						
JIS F 7322	JIS F 7324									
25	JIS F 7346	JIS F 7348	JIS F 7421 JIS F 7422	JIS F 7329 JIS F 7330						
	JIS F 7347	JIS F 7349								
32	JIS F 7351	JIS F 7413	JIS F 7421 JIS F 7422	JIS F 7329 JIS F 7330						
	JIS F 7352	JIS F 7414								
	JIS F 7356	JIS F 7417								
	JIS F 7411	JIS F 7418								
40	JIS F 7412		JIS F 7421 JIS F 7422	JIS F 7329 JIS F 7330						
	JIS F 7415									
50	JIS F 7416		JIS F 7421 JIS F 7422	JIS F 7329 JIS F 7330						
65										
80	JIS F 7305		JIS F 7309 JIS F 7310	JIS F 7313 JIS F 7314 JIS F 7473 JIS F 7474	JIS F 7315 JIS F 7316					
100	JIS F 7306	JIS F 7307								
	JIS F 7353	JIS F 7308	JIS F 7377							
125	JIS F 7354	JIS F 7375	JIS F 7378	JIS F 7315 JIS F 7316						
	JIS F 7358	JIS F 7376								
150	JIS F 7359									
200	JIS F 7305		JIS F 7309 JIS F 7310	JIS F 7313 JIS F 7314 JIS F 7473 JIS F 7474	JIS F 7315 JIS F 7316					
	JIS F 7306									
250	JIS F 7353		JIS F 7309 JIS F 7310	JIS F 7313 JIS F 7314 JIS F 7473 JIS F 7474	JIS F 7315 JIS F 7316					
	JIS F 7354	JIS F 7307								
300		JIS F 7307								
350	JIS F 7305	JIS F 7308								
	JIS F 7306									
400	JIS F 7354									
450	JIS F 7354									
500	JIS F 7354									

Remark: The globe valves and angle valves of nominal diameters 6 and 10 are screwed type and those of nominal diameters 15 ~ 25 are socket type and flange type.