

Shipbuilding – Piping systems – Graphic symbols

1. Scope This Japanese Industrial Standard specifies graphic symbols for piping systems and their accessories used in the piping system diagrams in ships.

2. Reference standards The following standard shall form part of the requirements of this Standard when quoted. The latest edition (including supplements) of this reference standard shall be applied.

ISO/R538 (Conventional signs to be used in the scheme for the installation of pipeline systems in ships)

3. Classification of graphic symbols Graphic symbols shall be classified as follows.

- a) Pipes and pipe joints (**Table 1**)
- b) Adjustment and adjustment parts (**Table 2**)
- c) Valves and cocks (**Table 3**)
- d) Pipe accessories (**Table 4**)
- e) Control and instrumentation related equipment (**Tables 5 to 8**)

Remark: Graphic symbols marked with * in **Tables 1 to 8** are identical with those specified in **ISO/R538** (Conventional signs to be used in the schemes for the installation of pipeline systems in ships).

4. The point of application of graphic symbols

4.1 Pipes and pipe joints Graphic symbols of pipes and pipe joints shall be as given in **Table 1**. A pipe shall be shown by a real line, and the real lines showing pipes on the same drawing shall have the same thickness. The nominal diameter and kind of pipe, and the kind and flow direction of fluid, etc. shall be indicated by letters and symbols written along the real line representing the pipe as shown in **Fig. 1**.

If necessary, the lines of different types and thickness may be used to indicate the kind, condition and purpose of fluid flowing through a pipe, or the nominal diameter and kind of the pipe.

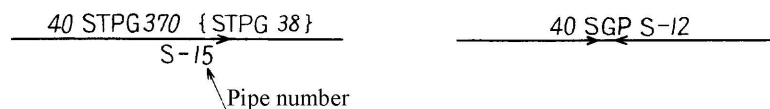


Fig. 1 Example of application of graphic symbols of pipe

4.2 Adjustment and adjustment parts Basic graphic symbols of adjustment and adjustment parts shall be as shown in **Table 2**. The graphic symbols in **Table 2** shall be used in combination with other graphic symbols of valves, cocks, etc. as illustrated in **Fig. 2**.

Example: A three-way diaphragm regulating valve with positioner and manual handle

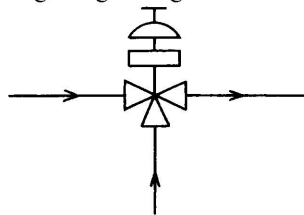


Fig. 2: Example of application of the graphic symbols for adjustment and adjustment parts

4.3 Valves and cocks Graphic symbols for valves and cocks shall be as given in **Table 3**.

4.4 Pipe accessories Graphic symbols for pipe accessories shall be as given in **Table 4**.

4.5 Control and instrumentation related equipment

4.5.1 Kinds of the symbols The symbols shall be classified into graphic symbols, letter symbols and individual numbers.

a) Graphic symbols Basic graphic symbols shall be as given in **Table 5**.

b) Letter symbols Letter symbols shall generally indicate the purposes and functions of measurement. The letter symbols shall apply as follows.

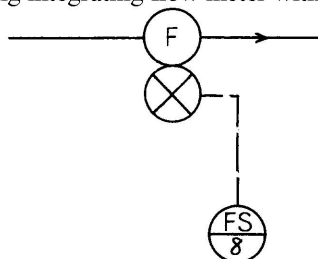
- 1) In the letter symbols, the first letter shall indicate variation or operation as given in **Table 6**, and the second letter and the third letter downward shall indicate the type or function of measuring system elements as given in **Table 7**. These symbols shall apply by being combined together if necessary.
- 2) No dot or hyphen shall be used between the letter symbols.
- 3) The letter symbols shall be arranged as shown in the examples shown in **Table 8**.

c) Individual numbers The individual numbers shall be used when it is necessary to discriminate one measuring instrument from others. Arabic figures shall be used as the individual numbers.

Remark: The individual numbers used may be a series of numbers or random numbers or the numbers appropriately classified according to the types or functions of measuring instrument elements.

4.5.2 Application of the symbols In the graphic symbol shown by a circle, the letter symbols shall be entered in the upper half of the circle, and the individual number in the lower half of it. **Fig. 3** shows the examples of application of graphic symbols.

a) A remote indicating integrating flow meter with electric transmitter



b) A remote indicating orifice type differential pressure flow meter with pneumatic transmitter (with flow control and records)

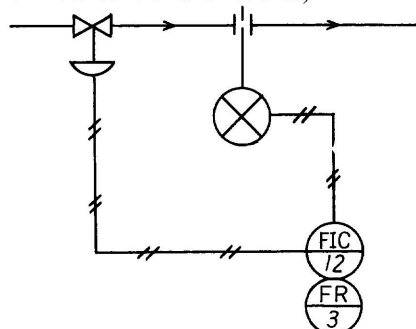
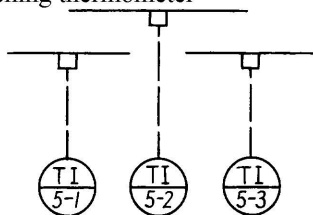
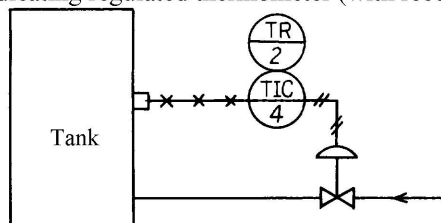


Fig. 3: The example of application of graphic symbols for control, and instrumentation related equipment

- c) A multipoint switching thermometer



- d) A remote indicating regulated thermometer (with records)



- e) A recording level and recording regulated flow meter with pneumatic level and flow transmitter

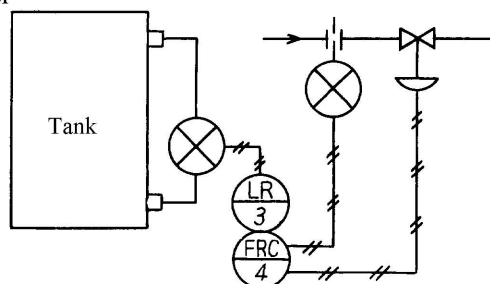
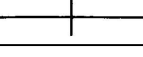
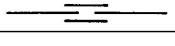
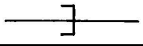
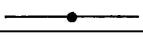
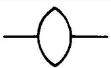
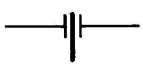
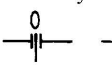
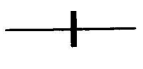


Fig. 3: The example of application of graphic symbols for control, and instrumentation related equipment (cont'd)

Table 1 Pipes and pipe joints

No.	Name	Graphic symbol	Remark
1.1	not connected crossing pipes	 *	 Also applicable.
1.2	connected crossing pipes	 *	
1.3	tee pipe	 *	
1.4	flexible joint, flexible pipe joint	 *	
1.5	flanged joint	 *	
1.6	sleeve joint	 *	
1.7	reducer		 An example of application.
1.8	screwed joint	 *	
1.9	welded joint	 *	
1.10	sleeve type expansion joint, sleeve type expansion pipe joint	 *	
1.11	bellows type expansion joint, bellows type expansion pipe joint	 *	
1.12	expansion joint, expansion pipe joint	 *	
1.13	blank flange	 *	
1.14	cap nut	 *	
1.15	spectacle flange	 *	When necessary, "O" shall be used for normally open and "C" for normally closed. 
1.16	penetrating, watertight bulkhead and deck crossing	 *	 An example of application when the equipment has flanges.
1.17	penetrating, non-watertight bulkhead and deck crossing	 *	
1.18	to bilge		To be released on the spot.