



Standard Practice for Piping System Drawing Symbols¹

This standard is issued under the fixed designation F1000; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

This standard has been approved for use by agencies of the U.S. Department of Defense.

1. Scope

1.1 This practice establishes piping system drawing symbols for marine use.

1.2 This set of standard symbols is intended for use on piping system diagrammatics and arrangements for ships.

1.3 Where graphical symbols are required for an item or equipment not covered by this practice, the form and character of the symbol will be left to the discretion of the activity concerned, provided that the symbol used does not duplicate any of those contained herein, and is clearly understandable, subject to one interpretation only, or explained by a suitable note on the drawing when necessary.

1.4 Since symbolic representation does not usually involve exact or scale layout or the actual run or leads of piping, the same symbol may be used for all projections of the system (plan, elevations, and sections).

1.5 Symbols for fluid power, heating, ventilation, and air conditioning (HVAC), and Navy damage control diagrams are not included in this practice.

1.6 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

¹ This practice is under the jurisdiction of ASTM Committee F25 on Ships and Marine Technology and is the direct responsibility of Subcommittee F25.11 on Machinery and Piping Systems.

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2. Significance and Use

2.1 Fig. 1 provides symbols for strainers, separators, and filters.

2.2 Fig. 2 provides symbols for valves. Valves are categorized under the following headings: globe, angle, check, ball, butterfly, gate, relief, manifolds, control, noise control, and miscellaneous.

2.3 Fig. 3 provides symbols for valve appendages such as actuators and locking devices. Symbols shown on Fig. 3 are to be combined with the appropriate symbol from Fig. 2.

2.4 Fig. 4 provides symbols for piping system–related instrumentation. These symbols are categorized under the following headings: pressure, temperature, flow, level, switches, alarms, and miscellaneous.

2.5 Fig. 5 provides symbols for fans, pumps, and turbines.

2.6 Fig. 6 provides symbols for plumbing components.

2.7 Fig. 7 provides symbols for pipe and pipe fittings.

2.8 Fig. 8 provides symbols for noise control components and designations. These symbols are generally used for submarine design.

2.9 Fig. 9 provides symbols for transitions. These symbols identify transitions such as pipe material or pipe schedule changes.

2.10 Fig. 10 provides symbols for miscellaneous components. These are components which could not be classified under the above categories. Examples include heat exchangers, flasks, and sea chests.

2.11 Fig. 11 provides symbols for grooved piping.

3. Keywords

3.1 drawing symbols; piping; piping drawings; piping symbols

| Number | Title | Symbol |
|-------------|--------------------------------------------------------|--------|
| 1 | Strainer, duplex basket type | |
| 2 | Strainer, duplex edge type | |
| 3 | Strainer, duplex magnetic | |
| 4 | Strainer, Y-type basket | |
| 5 | Strainer, Y-type edge | |
| 6 | Strainer, simplex basket type | |
| 7 | Strainer, simplex edge type | |
| 8 | Strainer, box type | |
| 9 | Strainer, basket type, steam | |
| 10 fn. 1 | Strainer, sea chest | |
| 11 | Separator, moisture | |
| 12 | Separator, cyclone | |
| 13 fn. 2 | Separator, oil-water | |
| 14 | Filter | |
| 15 | Filter with shielded container | |
| 16 | Filter with mechanical differential pressure indicator | |

FIG. 1 Strainers, Separators, and Filters

| Number | Title | Symbol |
|-------------|-----------------------------------------------------------------------------|--------|
| 17 | Filter with mechanical differential pressure indicator and automatic bypass | |
| 18 | Filter, oil, cartridge type | |
| 19 | Filter, coalescing | |
| 20 | Filter, duplex | |
| 21 | Filter, charcoal | |
| 22 | Precipitator, electrostatic | |
| 23 | Centrifugal purifier | |
| 24 fn. 3 | Screen | |

FIG. 1 (continued)

Footnotes:

1. To be combined with the symbol for sea chest (Fig 10, No. 24)
2. Parallel plate type
3. Typically used on blower intake


| 1. Globe | | |
|----------|---------------------------------------------------------------------------------------------------|--------|
| Number | Title | Symbol |
| 1.1 | Valve, globe | |
| 1.2 | Valve, globe with flow control device | |
| 1.3 | Valve, globe, stop check | |
| 1.4 | Valve, globe, positive stop | |
| 1.5 | Valve, globe, combined spring-loaded exhaust and relief | |
| 1.6 | Valve, globe, Y-pattern | |
| 1.7 | Valve, globe, stop check, Y-pattern | |
| 1.8 | Valve, globe, reverse seated | |
| 1.9 | Bridgewall | |
| fn. 4 | Note 1  Note 2 | |
| 2. Angle | | |
| 2.1 | Valve, angle | |
| 2.2 | Valve, angle bellows packless | |
| 2.3 | Valve, angle, diaphragm packless | |
| 2.4 | Valve, angle, stop check | |
| 2.5 | Valve, angle, needle or throttling | |

FIG. 2 Valves

| 2. Angle - Continued | | |
|----------------------|-----------------------------------------------------|--------|
| Number | Title | Symbol |
| 2.6 | Valve, angle, check | |
| 2.7 fn. 5 | Valve, angle, solenoid | |
| 2.8 | Valve, angle, with lock box | |
| 2.9 | Valve, angle, capped | |
| 2.10 | Valve, angle, ball | |
| 2.11 | Valve, angle, lift check | |
| 3. Check | | |
| 3.1 | Valve, swing check | |
| 3.2 | Valve, lift check | |
| 3.3 | Valve, vented swing check | |
| 3.4 fn. 6 | Valve, check, spring loaded | |
| 3.5 | Valve, swing check, Y-pattern | |
| 3.6 | Valve, check, hydraulic | |
| 3.7 | Valve, check, hydraulic with external loading | |
| 3.8 | Valve, check, in-line ball or poppet | |
| 3.9 | Valve, check, in-line ball or poppet, spring loaded | |

FIG. 2 (continued)

Footnotes:

- 4. Note 1: Fluid in pipe on this side of valve is isolated from stem packing with valve shut.
Note 2: Fluid in pipe on this side of valve is in contact with stem packing with valve shut.
- 5. "Solenoid valve" shown as example. See Fig. 3 for operators.
- 6. Include normally shut or normally open as shown on lines 11.38 or 11.39; as applicable.















| 3. Check - Continued | | |
|----------------------|------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Number | Title | Symbol |
| 3.10 | Valve, wafer check |  |
| 3.11 | Valve, check, with manual gagging provision |  |
| 3.12 | Valve, check, flow limiting |  |
| 3.13 | Valve, check, counterbalanced with external weights |  |
| 3.14 | Valve, flapper |  |
| 3.15 fn. 7 | Valve, check, swing, with integral orifice |  |
| 4. Ball | | |
| 4.1 | Valve, ball |  |
| 4.2 | Valve, ball, bleed port |  |
| 4.3 | Valve, ball, three port |  |
| 4.4 | Valve, ball, three port, normally shut |  |
| 4.5 | Valve, ball, three port - showing other than normally shut |  |
| 4.6 | Valve, ball, spring return |  |
| 4.7 fn. 8 | Valve, ball check |  |
| 4.8 | Valve, ball, four port |  |

FIG. 2 (continued)















| 5. Butterfly | | |
|--------------------|--------------------------------------------------------|---------------------------------------------------------------------------------------|
| Number | Title | Symbol |
| 5.1 | Valve, butterfly |  |
| 5.2 | Valve, butterfly, locked open |  |
| 5.3 | Valve, butterfly, locked shut |  |
| 6. Gate | | |
| 6.1 | Valve, gate |  |
| 6.2 fn. 9 | Valve, gate, double disc with internal bypass |  |
| 6.3 | Valve, gate, with three-way bypass |  |
| 7. Pressure Relief | | |
| 7.1 | Valve, angle, pressure relief (self actuated) |  |
| 7.2 | Valve, angle, pressure relief, differential |  |
| 7.3 | Valve, angle, pilot-actuated pressure relief |  |
| 7.4 | Valve, inward pressure relief, high capacity gas flow |  |
| 7.5 | Valve, outward pressure relief, high capacity gas flow |  |
| 7.6 | Valve, self-actuated pressure relief, globe |  |
| 7.7 | Valve, pilot-actuated pressure relief, globe |  |
| 7.8 | Valve, pressure relief, angle, diaphragm |  |

FIG. 2 (continued)

Footnotes:

- 7. This valve permits limited backflow.
- 8. Combination of ball and swing check.
- 9. Space between discs vents to side with mark.