



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.

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.

2. Significance and Use

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

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

Current edition approved May 1, 2013. Published June 2013. Originally approved in 1986. Last previous edition approved in 1995 as F1000 – 95, which was withdrawn December 2003 and reinstated in May 2013. DOI: 10.1520/F1000-13.

2.2 Figure 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 Figure 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 Figure 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 Figure 5 provides symbols for fans, pumps, and turbines.

2.6 Figure 6 provides symbols for plumbing components.

2.7 Figure 7 provides symbols for pipe and pipe fittings.

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

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

2.10 Figure 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 Figure 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 gaging 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.

7. Pressure Relief - Continued		
Number	Title	Symbol
7.9	Valve, boiler safety	
7.10	Valve, relief, superheater safety, pilot actuated	
8. Manifolds		
8.1	Manifold, single row	
8.2	Manifold, double row	
8.3	Manifold, single row, stop check valves	
8.4	Manifold, double row, "●" locked shut	
8.5	Manifold, double row, "○" stop check valves	
8.6	Manifold, single row, interlocked	
9. Control		
9.1	Valve, control, pilot actuated (increased actuating pressure closes valve)	
9.2	Valve, control, pilot actuated (increased actuating pressure opens valve)	
9.3	Valve, pressure reducing (increase of downstream pressure shuts valve)	
9.4	Valve, pressure regulating (increase of upstream pressure opens valve)	
9.5	Valve, priority (decrease of upstream pressure shuts valve)	
9.6	Valve, pressure reducing, diaphragm (increase of downstream pressure shuts valve)	

FIG. 2 (continued)

9. Control - Continued		
Number	Title	Symbol
9.7	Valve, pressure regulating, diaphragm (increase of upstream pressure opens valve)	
9.8	Valve, control, diaphragm, pilot actuated (increased actuating pressure closes valve)	
9.9	Valve, control, diaphragm, pilot actuated (increased actuating pressure opens valve)	
9.10	Valve, control, diaphragm, pilot actuated (increased actuating pressure closes valve) with check feature	
9.11	Valve, control, diaphragm, pilot actuated (increased actuating pressure opens valve) with check feature	
9.12	Valve, thermostatic expansion	
9.13	Valve, thermostatic control	
9.14	Valve, thermostatic control, three-way	
9.15	Valve, temperature control	
9.16	Valve, three-way modulating temperature control	
9.17	Valve, three-way modulating (pressure sensing)	
9.18	Valve, back pressure regulator with remote sensing	
9.19	Valve, regulator, back pressure	
9.20	Valve, feedwater regulator, motor or manual operation	

FIG. 2 (continued)

















9. Control - Continued		
Number	Title	Symbol
9.21	Valve, boiler feedwater regulator with manual control	
9.22	Valve, compressed gas cylinder regulator	
9.23 fn. 10	Valve, proportioning, automatic	
9.24	Valve, temperature pilot control	
9.25	Valve, level pilot control	
9.26	Valve, pressure pilot control	
9.27	Valve, manual opening automatic closing	
9.28	Valve, regulated bypass	
9.29	Valve, hydraulically operated flow control with pilot	
9.30	Valve, globe, relief, adjustable or spring loaded, reducing	
9.31 fn. 11	Valve, hydraulic control, three-way	
9.32	Valve, micrometer	
9.33	Valve, unloading	
9.34	Valve, governor	
9.35	Valve, capacity control	
9.36	Valve, control, balanced pressure proportioning	

FIG. 2 (continued)











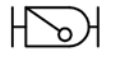




9. Control - Continued		
Number	Title	Symbol
9.37	Valve, typical control valve, with test fitting	
10. Noise Control (fn. 12)		
10.1	Valve, quiet throttling	
10.2	Valve, quiet vent	
10.3	Valve, vent, quiet air throttling with shroud	
10.4	Valve, quiet reducing	
10.5	Valve, quiet reducing, pilot operated	
10.6	Valve, standard, with attached quieting orifice	
10.7	Valve, quiet automatic balancing	
10.8	Valve, quiet throttling, tank mounted	
11. Miscellaneous		
11.1	Valve, frictional throttle	
11.2	Valve, priming, float type	
11.3	Valve, needle	
11.4	Valve, three-way, two position	
11.5	Valve, gage, with test connection	
11.6	Valve, minimum volume vent with cap	

FIG. 2 (continued)

Footnotes:

10. Two inlets, one outlet.

11. Water pressure actuates valve.

12. In general, symbols for quiet valves are accompanied by the quiet component symbol:



11. Miscellaneous - Continued		
Number	Title	Symbol
11.7	Valve, minimum volume drain with cap	
11.8	Valve, minimum volume vent without cap	
11.9	Valve, minimum volume drain without cap	
11.10	Valve, foot	
11.11	Valve, four way	
11.12	Valve, double ball, combination hull & backup	
11.13	Valve, combination poppet hull and ball backup	
11.14	Valve, angle, hull	
11.15	Valve, double-poppet hull and backup	
11.16	Valve, poppet, hull	
11.17	Valve, angle, ball, hull	
11.18	Valve, diaphragm, packless	
11.19	Valve, petcock	
11.20	Valve, cock stop	
11.21	Valve, cock stop, plug or cylinder, three-way, two-port	
11.22	Valve, cock stop, plug or cylinder, four-way, two-port	

FIG. 2 (continued)

11. Miscellaneous - Continued		
Number	Title	Symbol
11.23	Valve, demand regulator	
11.24	Valve, angle, sentinel	
11.25	Valve, drain regulator, float-operated, with gage glass and vent	
11.26	Valve, vent/drain	
11.27	Valve, throttle trip	
11.28	Valve, pilot, four-way	
11.29	Valve, automatic shutoff	
11.30	Valve, salvage hull, with capped salvage hose connection	
11.31	Valve, ship's whistle control	
11.32	Valve, diaphragm, hand expansion	
11.33	Valve, vacuum breaker	
11.34	Valve, fueling or defueling	
11.35	Valve, manipulating, four-way three-position	
11.36	Valve, manipulating, three-way	
11.37 fn. 13	Valve, rotary, solenoid-operated with manual override	

FIG. 2 (continued)

Footnotes:

13. This valve is also referred to as: "Solenoid Operated Pilot Valve" (SOPV). May have two outlet ports.

11. Miscellaneous - Continued		
Number	Title	Symbol
11.38 fn. 14	Valve, normally shut	NS
11.39 fn. 14	Valve, normally open	NO
11.40 fn. 15	Valve, fails open (FO) or fails shut (FS).	FO or FS
11.41	Cock, stop, plug or cylinder, four-way, three-port	
11.42	Foot valve special	

Number	Title	Symbol
1	Valve, locked open	
2	Valve, locked shut	
3	Valve, with lock shield	
4	Valve, capped	
5	Valve, with capping provision	
6	Valve, solenoid operated, spring closing	
7	Valve, solenoid operated, spring opening	
8	Valve, with hose connection	
9	Valve, quick opening	
10	Valve, quick closing	
11	Valve, electric motor operated, two positions	
12 fn. 16	Valve, electric motor operated	
13	Valve, with internal orifice	
14	Valve, with integral strainer	
15	Valve, with bypass valve	
16	Valve, hydraulically operated, two positions	

FIG. 3 Appendages

Footnotes:

- 14. Global valve shown for example.
- 15. Control valve shown for example.
- 16. X-indicates number of positions if greater than two.

Number	Title	Symbol
17 fn. 17	Valve, hydraulically operated	
18	Valve, hydraulically operated with remote power closure	
19 fn. 18	Valve, position indicator-remote	
20	Valve, float operated	
21	Valve, remote mechanical operator	
22 fn. 19	Valve, manual override	
23	Valve, two-station operator	
24	Valve, X operated open, X is replaced with E for electric motor, H for hydraulic.	
25	Valve, X operated closed, X is replaced with E for electric motor, H for hydraulic.	
26	Valve, pneumatically operated closed, spring open	
27	Valve, pneumatically operated open, spring open	
28	Valve, pneumatically operated two positions	
29 fn. 17	Valve, pneumatically operated	
30	Valve, deck operated	
31	Valve, with reachrod	
32	Valve, operated locally and from adjacent space	

FIG. 3 (continued)

Footnotes:

- 17. X-indicates number of positions if greater than two.
- 18. A typical valve with an operator and position indicator is shown as:
- 19. Hydraulic operator shown for example.



1. Pressure		
Number	Title	Symbol
1.1	Gage, pressure, local reading	
1.2	Gage, vacuum, local reading	
1.3	Gage, differential pressure	
1.4	Gage, absolute pressure, local reading	
1.5	Gage, pressure vacuum protected	
1.6	Gage, vacuum and pressure, local reading	
1.7	Gage, pressure (P) or vacuum (V) or absolute pressure (A), distant reading	
1.8	Gage, duplex	
1.9	Transducer, pressure	
1.10	Transducer, differential pressure	
1.11	Transmitter, pressure	
1.12	Transmitter, differential pressure	
1.13	Pressure test station	
2. Temperature		
2.1	Thermometer, local reading	
2.2	Thermometer, distant reading	

FIG. 4 Instrumentation



















2. Temperature - Continued		
Number	Title	Symbol
2.3	Thermometer, resistance type	
2.4	Thermometer, resistance type, dual element	
2.5	Thermometer, resistance type, quad element	
2.6	Thermocouple	
2.7	Thermometer, liquid in glass	
2.8	Thermostat	
2.9	Thermometer, gas activated	
2.10	Heat sensing device	
3. Flow		
3.1	Flow indicator, sight type	
3.2	Flow meter, displacement type	
3.3	Flow meter, orifice	
3.4	Flow meter, venturi	
3.5	Flow meter, rotometer	
3.6	Flow meter, totalizing	
3.7	Flow meter, remote reading	
3.8	Flow meter, flow nozzle	
3.9	Flow indicator, slight	
3.10	Flow meter, area type	

FIG. 4 (continued)


















4. Level		
Number	Title	Symbol
4.1	Gage, liquid level, local reading	
4.2	Gage, liquid level, remote reading	
4.3	Gage, float-operated, liquid level	
4.4	Gage, glass	
4.5	Gage, glass, welded pad with integral valves	
4.6	Level detector, single point	
4.7	Level transducer	
5. Switch		
5.1	Switch, pressure operated	
5.2	Switch, differential pressure	
5.3	Switch, limit	
5.4	Switch, temperature operated	
5.5	Switch, liquid level	
5.6	Switch, liquid level, float operated	
5.7	Switch, flow	
6. Alarms		
6.1	Alarm, high pressure	
6.2	Alarm, low pressure	
6.3	Alarm, high level	

FIG. 4 (continued)

6. Alarms - Continued		
Number	Title	Symbol
6.4	Alarm, low level	
6.5	Alarm, high temperature	
6.6	Alarm, low temperature	
7. Miscellaneous		
7.1	Monitor, dew point	
7.2	Salinity cell	
7.3 fn. 20	Indicator, liquid flow moisture	
7.4 fn. 21	Electrode, water sensing	
7.5	Indicator, position	
7.6	Sensor, nonpenetrating	
7.7	Sensing bulb	
7.8	Detector, oil	
7.9	Monitor, oil content	

FIG. 4 (continued)

Number	Title	Symbol
1	Pump, centrifugal	
2	Pump, hand operated	
3	Pump, hand piston	
4	Pump, rotary, positive displacement	
5	Pump, sliding shoe type, positive displacement	
6	Pump, portable submersible permanently installed	
7	Pump, reciprocating, positive displacement	
8	Pump, rotary, vane type	
9	Pump, vacuum	
10	Compressor	
11	Fan, centrifugal	
12	Turbine, gas	
13 fn. 22	Turbine, steam	
14	Pump, positive displacement (non-reciprocating) (identify type)	
15	Fan, axial	

FIG. 5 Fans, Pumps, and Turbines

Footnotes:

- 20. Used in refrigerant systems.
- 21. Electrode detects presence of water.
- 22. This type of turbine should be clearly labeled when this symbol is used and turbine appurtenances (glands, drains, bearings) and pipe system connections appropriate to the specific diagram should be indicated on the symbol.

Number	Title	Symbol
1	Drain, deck or shower	
2	Drain, deck, with valve	
3	Trap	
4	Hot water heater	
5	Urinal	
6	Water closet	
7	Mixing faucet	
8	Shower head	
9	Grease trap	
10	Backflow preventer, with check valve	
11	Water seal	
12	Drinking fountain	
13	Lavatory	
14	Lavatory, folding	
15	Valve, flush	
16	Valve, automatic flush	
17	Eye wash nozzles	

FIG. 6 Plumbing Components

Number	Title	Symbol
18	Sink	
19	Test sink with tailpiece	
20	Washdown faucet	
21	Dishwasher	
22	Washing machine	

FIG. 6 (continued)

Number	Title	Symbol
1	Union	
2	Blanked union	
3	Orifice union	
4	Flange joint	
5 fn. 23	Pipe connection, MS thread	
6	Fitting, flareless	
7	Fitting, bite type	
8	Hose, flexible	
9	Hose, flexible tygon	
10	Hose, portable	
11	Pipe hose connection	
12	Pipe hose connection, capped	
13	Female swivel hose adapter	
14	Quick disconnect	
15	Orifice	
16	Orifice, multiple	

FIG. 7 Pipe and Pipe Fittings

Number	Title	Symbol
17	Cascade orificial resistive device (CORD)	
18	Adapter, flareless	
19	Reducing adapter, butt weld x socket weld	
20	Reducing adapter, butt weld x flareless	
21	Reducing adapter, butt weld x O-ring	
22	Reducing adapter, socket weld x flareless	
23	Tubing adapter	
24	Reducer, flareless tube	
25 fn. 23	MS with O-Ring connection	
26	Reducing adapter bite type	
27 fn. 23	MS adapter with union	
28 fn. 23	Adapter, MS x bite	
29	Test tee connection	
30 fn. 23	MS drain and vent fitting with provision for positive closure	
31	Boss with thermal sleeve fitting	
32 fn. 23	MS boss plug	

FIG. 7 (continued)

Footnotes:

23. MS = machine screw

Number	Title	Symbol
33	Constant flow fitting	
34	Spectacle flange (blind in line)	
35	Spectacle flange (spectacle in line)	
36	Line blind flange	
37	Cap, pipe end	
38	Cap, seal welded	
39	Pipe plug	
40	Seal weld plug	
41	Pipe blanked with blind flange	
42	Spool piece	
43	Connection, swing	
44	Reducer	
45	Reducer, eccentric	
46	Pitot tube connection	
47	Pressure tap	
48	Funnel, open	

FIG. 7 (continued)

Number	Title	Symbol
49	Funnel, hinged cover	
50	Funnel, covered	
51	Funnel, covered with flow indicator	
52	Funnel, with screen	
53	Thermometer well	
54 fn. 24	Tailpipe with diffuser and splash plate	
55 fn. 25	Tailpipe, bellmouth	
56 fn. 25	Tailpipe with nonvortex bellmouth	
57 fn. 25	Tailpipe with nonvortex bellmouth and splashplate	
58 fn. 24	Tailpipe, diffuser	
59	Expansion joint, bellows or corrugated	
60	Expansion joint, sliding in pipe line	
61	Deck, bulkhead or tank penetration with sleeve	
62	Tee, straight	
63 fn. 26	Tee, straight reducing	
64	Tee, double sweep	

FIG. 7 (continued)

Footnotes:

- 24. Discharge tailpipe
- 25. Suction tailpipe
- 26. Numerical designations indicate connecting pipe size.

Number	Title	Symbol
65	Tee, single sweep	
66	Tee, outlet up	
67	Tee, outlet down	
68	Lateral, 45°	
69	Elbow, 90°, short radius	
70	Elbow, 90°, long radius	
71	Elbow, 90°, long radius	
72 fn. 27	Elbow, 90°, reducing	
73	Elbow, turned down	
74	Elbow, turned up	
75	Cross, straight	
76 fn. 27	Cross, reducing	
77	Pipe, new	
78	Pipe, existing	

FIG. 7 (continued)

Number	Title	Symbol
1 fn. 28	Quiet component	
2	Resiliently mounted	
3 fn. 29	Distributed isolation material	
4	Limited displacement mounts	
5	Solidly mounted	
6	Solidly mounted to resiliently mounted equipment	
7 fn. 29	DIM mounted to resiliently mounted equipment	
8	LDM mounted to resiliently mounted equipment	
9	Sound isolated deck	
10	Sound isolated via piping mounts	
11	Damped foundation or structure	
12	Foundation structure not damped	
13	Damped bedplate	
14	Quiet pressure release device	
15	Acoustically balanced diffuser	
16	Airborne noise enclosure	

FIG. 8 Noise Control Components/Designations

Footnotes:

- 27. Numerical designations indicate connecting pipe size.
- 28. This symbol can be applied to components or valves.
- 29. X indicated number of layers of DIM.

Number	Title	Symbol
17	Muffler	
18	Flexible fitting (RISIC)	
19	Flexible fitting (RISIC), bi-metallic	
20	Hose, filter flex	
21	Filter flex RISIC	
22	Filter flex RISIC, bi-metallic	
23	Acoustic filter	
24	Pipe damping	
25	Noise intersection point	
26	Piping up lead with sound isolator fitting	
27	Piping down lead with sound isolator fitting	
28	Rubber block hanger, hard mounted	
29	Rubber block hanger, resiliently mounted	
30	Strap hanger, resiliently mounted	
31	Strap hanger, hard mounted	
32	Steel block hanger, hard mounted	

FIG. 8 (continued)

Number	Title	Symbol
33	Steel block hanger, resiliently mounted	
34	Pipe strap, no foundation	
35	Resilient bulkhead penetrator	
36 fn. 30	Hole cut	
37 fn. 31	Flow silencer	
38	Noise control terminal-supply	
39	Noise control terminal-return	
40	Noise critical transmission loss treatment penetration	
41 fn. 32	Noise critical transmission loss treatment penetration, distributed isolation material	
42	Airborne noise baffle	
43	Sonic inlet device	
See Fig. 2 for noise control valve symbols.		

FIG. 8 (continued)

Footnotes:

- 30. Add drawing reference if acoustically sealed.
- 31. Used on air systems.
- 32. X indicates number of layers of DIM.

Number	Title	Symbol
1 fn. 33	Pipe wall schedule change	
2 fn. 34	Bimetallic transition, flanged	
3 fn. 34	Bimetallic transition, welded	
4 fn. 34	Trimetallic transition, welded	
5 fn. 35	Temperature boundary	
6 fn. 36	Pressure boundary	

FIG. 9 Transitions

Number	Title	Symbol
1 fn. 37	Component, name or description of component written in rectangle	
2	Heat exchanger	
3	Heat exchanger, multi-pass, single tube sheet	
4	Heat exchanger, multi-pass, double tube sheet	
5	Heat exchanger, multi-pass, U-tube	
6	Heat exchanger, multi-pass, U-tube, double tube sheet	
7	Condenser-receiver	
8	Air ejector and gland exhaust condenser	
9	Cooling coil	
10	Soot blower	
11 fn. 38	Flask	
12 fn. 38	Flask, spherical	
13	Oxygen diffuser	
14	Ship's whistle	
15	Hose reel	
16	Hose rack	

FIG. 10 Miscellaneous

Footnotes:

- 33. Pipe schedules are written inside hexagon.
- 34. Metal designations are written inside circle.
- 35. Temperatures are written inside oval.
- 36. Pressures are written inside oval.
- 37. May be used as a symbol for components not address by this standard.
- 38. Number inside indicates cubic feet.









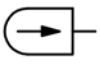

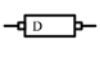





Number	Title	Symbol
17 fn. 39	Gas cylinder	
18	Vent pipe	
19	Air escape terminal with screen	
20	Stand pipe	
21	Gas overboard diffuser	
22	Poly bottle	
23	Oil lubricator	
24	Sea chest	
25	Sea chest, scoop injection	
26	Discharge, overboard	
27	Pulsation dampener	
28	Desurger	
29	Fire plug	
30	Steam trap, thermostatic type with integral strainer	
31	Steam trap, impulse type with integral strainer	
32	Steam trap, bucket type	

FIG. 10 (continued)

















Number	Title	Symbol
33	Steam trap, orifice type with integral strainer	
34	Steam drain orifice	
35	Trap, float type	
36	Trap, power magnet-pneumatic	
37	Trap, running	
38	Air ejector	
39	Motor, electric	
40	Motor, air	
41	Mechanical linkage	
42	Securing lanyard	
43	Sea chest drydock connection	
44	Transfer barrier	
45	Sounding rod	
46	Deck connection, sounding tube	
47	Desuperheater	
48	Drip trough	

FIG. 10 (continued)

Footnotes:

39. Designation of gas type (e.g., CO₂, O₂, air) shall be indicated.

Number	Title	Symbol
49	Drip trough	
50	Tubing clamp	
51	Freeze seal point	
52	Nozzle, spray	
53	Nozzle, ejection	
54	Nozzle, spray, horizontal	
55	Nozzle, spray, horizontal 45°	
56	Fill connection	
57	Hull penetration, thermal sleeve type	
58	Shielded thermal penetration	
59	Immersion heater	
60	Dehydrator, for liquid refrigerant	
61	Eductor	
62	Manifold, two outlet, air breathing system	
63	Manifold, four outlet, air breathing system	
64	Bellows	
65	Flame arrestor	

FIG. 10 (continued)

Number	Title	Symbol
66	Overpressure trip mechanism	
67	Fixed restrictor	
68	Drain box	
69	Test casting	
70	Flexible boot	
71	Bulkhead expansion joint	
72	Fire extinguisher, AFFF	
73	Fire extinguisher, CO ₂	
74	Fire extinguisher, PKP	
75	Condensate/seal pot	
76	Condensate pot with dam	
77	Condensate pot, dual chamber	
78	Sediment pot	
79	Soft tank designation	
80	Hard tank designation	
81	Firm tank designation	
82	Trap, steam, with integral strainer	

FIG. 10 (continued)

Number	Title	Symbol
1	Rigid Coupling	
2	Flexible Coupling	
3	Reducing Coupling	
4	Outlet Coupling	
5	Male Thd. Outlet Coupling	
6	Female Thd. Outlet Coupling	
7	Flange Adapter	
8	Branch Outlet	
9	Female Thd. Outlet	
10	Cross	
11	Outlet	
12	Thermowell	
13	Expansion Joint One Piece	
14	Expansion Joint Assembly Type	
15	Suction Diffuser	
16	Tee Type Strainer	

FIG. 11 Grooved Piping

Number	Title	Symbol
17	Butterfly Valve	
18	Three-Way Control Valve	
19	Check Valves	
20	Triple Service Valve	
21	Ball Valve	
22	Venturi	
23	Orifice Indicator	
24	Plug Valve (AWWA Size)	
25	Straight Cross	
26	Reducing Cross	
27	90° Elbow	
28	Turned Up 90° Elbow	
29	Turned Down 90° Elbow	
30	45° Elbow	
31	Turned Up 45° Elbow	
32	Turned Down 45° Elbow	

FIG. 11 (continued)

Number	Title	Symbol
33	22-1/2° Elbow	
34	11-1/4° Elbow	
35	Reducing Base Elbow R-10 Grooved x Grooved	
36	Reducing Base Elbow R-10 Flanged x Grooved	
37	True Wye	
38	Tee	
39	Tee Turned Up	
40	Tee Turned Down	
41	Reducing Tee	
42	Threaded Outlet	
43	Reducer Concentric	
44	Reducer Eccentric	
45	Reducer Threaded Small End	
46	Dielectric Waterway Grooved x Thd.	
47	Dielectric Waterway Grooved x Plain	
48	Dielectric Waterway Thd. x Thd.	

FIG. 11 (continued)

Number	Title	Symbol
49	Bull Plug	
50	Cap	
51	45° Lateral Straight	
52	45° Lateral Reducing	
53	90° Elbow-Adapter	
54	45° Elbow-Adapter	

FIG. 11 (continued)

ASTM International takes no position respecting the validity of any patent rights asserted in connection with any item mentioned in this standard. Users of this standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, are entirely their own responsibility.

This standard is subject to revision at any time by the responsible technical committee and must be reviewed every five years and if not revised, either reapproved or withdrawn. Your comments are invited either for revision of this standard or for additional standards and should be addressed to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee, which you may attend. If you feel that your comments have not received a fair hearing you should make your views known to the ASTM Committee on Standards, at the address shown below.

This standard is copyrighted by ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959, United States. Individual reprints (single or multiple copies) of this standard may be obtained by contacting ASTM at the above address or at 610-832-9585 (phone), 610-832-9555 (fax), or service@astm.org (e-mail); or through the ASTM website (www.astm.org). Permission rights to photocopy the standard may also be secured from the ASTM website (www.astm.org/COPYRIGHT/).