



STANDARD PRACTICE **SP-80**
1997
Edition

BRONZE GATE, GLOBE, ANGLE AND CHECK VALVES

Developed and Approved
by the
Manufacturers Standardization Society
of the
Valve and Fittings Industry, Inc.
127 Park Street, N.E.
Vienna, VA 22180
(703) 281-6613

Originally Approved November, 1974

An MSS Standard Practice is intended as a basis for common practice by the manufacturer, the user, and the general public. The existence of an MSS Standard Practice does not in itself preclude the manufacture, sale, or use of products not conforming to the Standard Practice. Mandatory conformance is established only by reference in a code, specification, sales contract, or public law, as applicable.

Unless otherwise specifically noted in this MSS SP, any standard referred to herein is identified by the date of issue that was applicable to the referenced standard(s) at the date of issue of this MSS SP. (See Annex C.)

Substantive changes in this 1997 edition are “flagged” by parallel bars as shown on the margins of this paragraph. The specific detail of the change may be determined by comparing the material flagged with that in the previous edition.

Any part of this standard may be quoted. Credit lines should read ‘Extracted from MSS SP-80, 1997, with permission of the publisher, the Manufacturers Standardization Society.’ Reproduction prohibited under copyright convention unless written permission is granted by the Manufacturers Standardization Society of the Valve and Fittings Industry, Inc.

Copyright ©, 1983 by
Manufacturers Standardization Society
of the
Valve and Fittings Industry, Inc.
Printed in U.S.A.

CONTENTS

Page

| | |
|--|----|
| 0. PURPOSE | 1 |
| 1. SCOPE AND VALVE TYPES | 1 |
| 2. PRESSURE-TEMPERATURE RATINGS | 2 |
| 3. MATERIALS | 4 |
| 4. DESIGN | 4 |
| 5. MARKINGS | 13 |
| 6. TOLERANCE | 13 |
| 7. INSPECTION AND TESTING | 13 |
| TABLE 1 — PRESSURE-TEMPERATURE RATINGS | 3 |
| 2 — LIST OF MATERIAL SPECIFICATIONS | 5 |
| 3 — MINIMUM LENGTH AND DEPTH OF THREAD | 8 |
| 4 — BRONZE GATE VALVES — DIAMETER OF STEM | 11 |
| 5 — BRONZE GLOBE AND ANGLE VALVES — DIAMETER OF STEM | 11 |
| 6 — BRONZE GATE VALVES — DIAMETER OF HANDWHEEL | 12 |
| 7 — BRONZE GLOBE AND ANGLE VALVES — DIAMETER OF HANDWHEEL | 12 |
| 8A — SHELL TEST — THREADED AND SOLDER END VALVES | 13 |
| 8B — SHELL TEST — FLANGED END VALVES | 13 |
| 9A — SEAT TEST — THREADED AND SOLDER END VALVES | 14 |
| 9B — SEAT TEST — FLANGED END VALVES | 14 |
| A1 — PRESSURE-TEMPERATURE LIMITATIONS | 15 |
| FIGURE B1 — GATE VALVE — TYPE 1 | 16 |
| B2 — GATE VALVE — TYPE 2 | 16 |
| B3 — GATE VALVE — TYPE 3 | 17 |
| B4 — GATE VALVE — TYPE 4 | 17 |
| B5 — GLOBE AND ANGLE VALVES — TYPE 1 | 18 |
| B6 — GLOBE AND ANGLE VALVES — TYPE 2 | 18 |
| B7 — GLOBE AND ANGLE VALVES — TYPE 3 | 19 |
| B8A — CHECK VALVE — TYPE 1 — HORIZONTAL LIFT CHECK | 20 |
| B8B — CHECK VALVE — TYPE 1 — ANGLE LIFT CHECK | 20 |
| B9A — CHECK VALVE — TYPE 2 — HORIZONTAL AND ANGLE LIFT CHECK | 21 |
| B9B — CHECK VALVE — TYPE 2 — VERTICAL LIFT CHECK | 21 |
| B10 — CHECK VALVE — TYPE 3 | 22 |
| B11 — CHECK VALVE — TYPE 4 | 22 |
| ANNEX A STRENGTH OF SOLDER JOINTS | 15 |
| ANNEX B VALVE TYPES | 16 |
| ANNEX C REFERENCE STANDARDS | 23 |

BRONZE GATE, GLOBE, ANGLE AND CHECK VALVES

0. PURPOSE

This MSS Standard Practice covers bronze gate, globe, angle, and check valves in Classes 125, 150, 200, 300 and 350 for threaded and solder ends and Classes 150 and 300 for flanged ends. Pressures in this Standard Practice are gage pressure in pounds per square inch. Hereafter the pressure will appear as psi.

1. SCOPE AND VALVE TYPES

1.1 Scope - This standard practice covers bronze gate, globe, angle, and check valves for general purpose services and provides requirements for the following:

- a) Pressure-Temperature Ratings
- b) Materials
- c) End Connections
- d) Dimensions
- e) Markings
- f) Testing and Inspection

1.2 Valve Types

1.2.1 Gate Valves

- a) Type 1 — Solid Wedge: Non-Rising Stem (NRS) Fig B1, Annex B
- b) Type 2 — Solid Wedge: Inside Screw Rising Stem (ISRS) Fig. B2, Annex B
- c) Type 3 — Split Wedge (Double Disc)— Inside Screw Rising Stem (ISRS) Fig. B3, Annex B

- d) Type 4 — Double Disc — Parallel Seat — Inside Screw Rising Stem (ISRS) Fig. B4, Annex B

1.2.2. Globe and Angle Valves

- a) Type 1 — Metal Disc, Integral Seat Fig. B5, Annex B
- b) Type 2 — Non-Metallic Disc, Integral Seat Fig. B6, Annex B
- c) Type 3 — Metallic Disc, Renewable Seat Fig. B7, Annex B

1.2.3 Check Valves

- a) Type 1 — Horizontal, Angle and Vertical Lift Check, Metal Disc to Metal Seat Fig. B8, Annex B
- b) Type 2 — Horizontal, Angle and Vertical Lift Check, Non-Metallic Disc to Metal Seat Fig. B9, Annex B
- c) Type 3 — Swing Check, Metal Disc to Metal Seat Fig. B10, Annex B
- d) Type 4 — Swing Check, Non-Metallic Disc to Metal Seat Fig. B11, Annex B.

1.3 Nominal Pipe Sizes — This Standard covers valve sizes 3 and under as follows:

- a) Threaded Ends — Sizes 1/8 through 3
- b) Solder Ends — Sizes 1/4 through 3
- c) Flanged Ends — Sizes 1/2 through 3

2. PRESSURE-TEMPERATURE RATINGS

2.1 The pressure-temperature ratings in Table 1 apply to all products covered by this Standard Practice. Valves conforming to the requirements of this Standard Practice shall in all respects, merit these ratings.

2.2 These ratings are the maximum allowable non-shock pressures at the temperatures shown, and allowable pressures may be interpolated between temperatures shown.

2.3 Rating Temperature: The temperature shown corresponding to the pressure rating shall be the material temperature of the pressure retaining structure. In view of the various environments in which piping components may be installed (i.e. — insulated or not, and either heated or cooled), it is assumed that the material temperature of the pressure retaining structure is the temperature of the contained fluid. Use of a pressure rating at a material temperature other than the temperature of the contained fluid is the responsibility of the user, and subject to the requirements of applicable codes.

2.4 The safe pressure-temperature rating of a solder-joint piping system is dependent, not only on valve, fitting and tubing strength, but also on the composition of the solder used

for joints. Pressure-temperature ratings for solder joints made with typical commercial solders are given in Annex A. It shall be the responsibility of the user to select a solder composition that is compatible with the service conditions; (as well as to assure adequacy of workmanship employed in making the joints).

2.5 The ratings given in Table 1 at -20°F to 150°F shall also apply at lower temperatures. Products that are to operate at low temperatures shall conform to the rules of the applicable codes under which they are to be used.

2.6 The safe pressure-temperature rating of valves fitted with non-metallic disc, (i.e. globe and angle valves, Type 2 and check valves, Types 2 and 4) is dependent upon the composition of the disc material. It shall be the responsibility of the user to specify the service application. When no service application is specified, discs suitable for steam service at rated working conditions shall be furnished in all bronze globe and angle valves, Type 2, and in all bronze check valves, Types 2 and 4. Users are advised to consult with the manufacturer in cases of doubt.

TABLE 1 — PRESSURE-TEMPERATURE RATINGS

| PRESS. CLASS | PRESSURE ^(c) — psi | | | | | | | |
|--------------------------------|-------------------------------|--------------------|--------------------|-----------|--------------------|-----|--------------------|------|
| | 125 | 150 | | 200 | 300 | | | 350 |
| END CONN. | THD | THD | FLG ^(b) | THD | THD ^(e) | THD | FLG ^(b) | THD |
| TEMP. ^(a) deg. F | MATERIAL | | | | | | | |
| | ASTM B-62 | | | ASTM B-61 | | | | |
| -20 To 150 | 200 | 300 | 225 | 400 | 1000 | 600 | 500 | 1000 |
| 200 | 185 | 270 | 210 | 375 | 920 | 560 | 475 | 920 |
| 250 | 170 | 240 | 195 | 350 | 830 | 525 | 450 | 830 |
| 300 | 155 | 210 | 180 | 325 | 740 | 490 | 425 | 750 |
| 350 | 140 | 180 | 165 | 300 | 650 | 450 | 400 | 670 |
| 400 | — | — | — | 275 | 560 | 410 | 375 | 590 |
| 406 | 125 | 150 | 150 | — | — | — | — | — |
| 450 | 120 ^(d) | 145 ^(d) | — | 250 | 480 | 375 | 350 | 510 |
| 500 | — | — | — | 225 | 390 | 340 | 325 | 430 |
| 550 | — | — | — | 200 | 300 | 300 | 300 | 350 |

Notes: ^(a) — For lower temperatures, See Paragraph 2.5

^(b) — P-T Ratings — ASME B16.24

^(c) — Refer to Paragraph 2.4 for safe P-T rating for solder-joint piping systems.

^(d) — Some codes (i.e.-ASME BPVC, Section I) limit the rating temperatures of the indicated material to 406°F.

^(e) — Alternate ratings for valve size 1/8 - 2 having threaded ends and union ring body-bonnet joints.

3. MATERIALS

3.1 General — All valve components manufactured to this standard shall be made from materials produced under recognized quality control procedures. Recommended materials are listed in Table 2.

3.2 Castings — All castings shall be clean and sound, without defects which will impair their service. No plugging, welding, repairing or impregnating is allowed.

3.3 Users are cautioned against application with fluids which may react chemically with any material used in these valves. In certain areas of the country, where water conditions are particularly "aggressive", piping components made from certain zinc-bearing copper-base alloys are susceptible to a form of corrosion known as dezincification. Consultation with the manufacturer is advised to determine suitability in cases of doubt.

4. DESIGN

4.1 General — Valves shall be of substantial construction to resist permanent distortion under normal service conditions and shall be free of imperfections and defects which may be injurious to the performance of the valve.

4.2 Flow Passage Area

4.2.1 The flow passageway of bronze gate valves, shall have a minimum area of not less than the area of a circle having a diameter equal to the nominal pipe size except that valves fitted with seat rings may reduce the passageway area by the area of the seat ring driving lugs. The valve shall be so designed that the stem and/or wedge clear the waterway when the valve is fully open.

4.2.2 The flow passageway of bronze globe and angle valves, Types 1 and 2, designed with integral seats and when fully open, shall have an area at all points equal to the area of a circle having a diameter equal to the nominal pipe size except the area through the seat may be reduced by the area of the disc guides.

4.2.3 The flow passageway area of bronze globe and angle valves, Type 3, of the full flow design, may be reduced by the area of the seat ring driving lugs.

4.2.4 The flow passageway of bronze globe and angle valves, Type 3, of the plug design, for throttling service, may have a reduced area through the seat.

4.2.5 The flow passageway of bronze check valves, Types 3 and 4, shall have a minimum area of not less than the area of a circle having a diameter equal to the nominal pipe size except that valves fitted with seat rings may reduce the passageway area by the area of the seat ring driving lugs.

TABLE 2 — LIST OF MATERIAL SPECIFICATIONS

| PART NAME | VALVE STYLE | VALVE TYPE | PRESSURE CLASS | |
|-------------------|-----------------------------------|------------|--|--|
| | | | 125 & 150 | 200, 300, & 350 |
| Body | Gate | 1-4 | ASTM B62-C83600-Note(b) | ASTM B61-C92200-Note (a) |
| | Globe & Angle | 1-3 | | |
| | Check | 1-4 | | |
| Bonnet | Gate | 1-4 | ASTM B62-C83600-Note(b) ASTM B124-C37700 & C67500 | ASTM B61-C92200-Note (a) ASTM B124-C67500 |
| | Globe & Angle | 1-3 | ASTM B16-C36000-Note(c) ASTM B584-C86400 | ASTM B16-C36000-Note(c) ASTM B584-C86400 |
| Cap | Check | 1-4 | ASTM B62-C83600-Note(b) ASTM B124-C37700 & C67500 ASTM B16-C36000-Note(c) ASTM B584-C86400 ASTM B371-C69700-Note(c) | ASTM B61-C92200-Note (a) ASTM B124-C67500 ASTM B584-C86400 ASTM B16-C36000-Note(c) ASTM B371-C69700-Note (c) |
| Union Ring | Gate Globe Angle & Check | | ASTM B62-C83600-Note(b) ASTM B16-C36000-Note(c) ASTM B124-C37700 | ASTM B61-C92200 ASTM B16-C36000-Note(c) |
| Disc-Metal | Gate | 1-4 | ASTM B62-C83600 Copper-Nickel Alloy Nickel-Copper Alloy ASTM B584-C86400, C87600 & C97600 Note(d) | ASTM B61-C92200 ASTM B62-C83600-Note(a) Copper-Nickel Alloy Nickel-Copper Alloy ASTM B584-C87600 & C97600 |
| | Globe & Angle | 1&3 | ASTM B62-C83600 ASTM B124-C67500 & C37700 ASTM B584-C86400 Copper-Nickel Alloy Nickel-Copper Alloy Stn. Stl. Alloy (400-500 BHN) Note(d) | ASTM B61-C92200 ASTM B62-C83600-Note(a) ASTM B150-C64200 ASTM B584-C86400 ASTM B99-C65100 Copper-Nickel Alloy Nickel-Copper Alloy Stn. Stl. Alloy (400-500 BHN) Note(d) |
| | Check | 1&3 | ASTM B62-C83600 ASTM B16-C36000-Note(c) ASTM B140-C32000-Note(c) Copper-Nickel Alloy Nickel-Copper Alloy Stn. Stl. Alloy (400-500 BHN) Note(d) | ASTM B61-C92200 ASTM B62-C83600-Note(a) ASTM B16-C36000-Note (c) ASTM A494-GR.M35 ASTM B140-C32000-Note(c) ASTM B371-C69700-Note(c) Copper-Nickel Alloy Nickel-Copper Alloy Stn. Stl. Alloy (400-500 BHN) Note(d) |
| Disc Holder | Globe & Angle | 2 | ASTM B62-C83600 ASTM B124-C37700 & C67500 ASTM B16-C36000-Note(c) | ASTM B61-C92200 ASTM B62-C83600-Note(a) ASTM B124-C37700-Class 200 only |
| | Check | 2&4 | ASTM B584-C86400 ASTM B140-C32000-Note(c) Note(d) | ASTM B124-C67500-Class 200 only ASTM B16-C36000-Note(c) Note(d) |
| Disc Non-Metallic | Globe & Angle | 2 | Suitable for service specified in Paragraph 2.6. Pressure-Temperature Ratings | |
| | Check | 2&4 | | |

TABLE 2 — LIST OF MATERIAL SPECIFICATIONS (CONTINUED)

| PART NAME | VALVE STYLE | VALVE TYPE | PRESSURE CLASS | |
|--|-----------------------|------------|---|--|
| | | | 125 & 150 | 200, 300 & 350 |
| Seat Rings | Gate | 1-4 | Copper-Nickel Alloy Nickel-Copper Alloy Stn. Stl. Alloy (250-500 BHN) 300 Series Stn. Stl. Alloy-Note(h) Note(d) | Copper-Nickel Alloy Nickel-Copper Alloy Stn. Stl. Alloy (250-500 BHN) 300 Series Stn. Stl. Alloy-Note(h) Note(d) |
| | Globe & Angle | 3 | Copper-Nickel Alloy Nickel-Copper Alloy Stn. Stl. Alloy (400-500 BHN) | Copper-Nickel Alloy Nickel-Copper Alloy Stn. Stl. Alloy (400-500 BHN) |
| | Check | 1-4 | 300 Series Stn. Stl. Alloy-Note(h) Note(d) | 300 Series Stn. Stl. Alloy-Note(h) Note(d) |
| Disc Nut Disc Locknut | Globe & Angle | 2 | ASTM B62-C83600 ASTM B16-C36000 ASTM B150-C64200 ASTM B371-C69700 Note(d) | ASTM B61-C92200 ASTM B62-C83600 ASTM B16-C36000 ASTM B150-C64200 ASTM B371-C69700 Note(d) |
| | Check | 2&4 | | |
| Stem | Gate | 1-4 | ASTM B61-C92200 ASTM B62-C83600 ASTM B98-C65100 ASTM B99-C65100 ASTM B148-C95600 ASTM B371-C69400 & C69700 ASTM B584-C86400 & C87400 ASTM B584-C87500 & C87600 ASTM B21-C46400 & C47940 ASTM B21-C48200 ASTM B505-C83600 QQ-C-390-C86500 & C92200 QQ-C-465-C61400 QQ-C-591-C65100 Note(d) | ASTM B61-C92200 ASTM B62-C83600-Note(a) ASTM B98-C65100 ASTM B99-C65100 ASTM B148-C95600 ASTM B371-C69400 & C69700 ASTM B584-C86500 & C87400 ASTM B584-C87500 & C87600 ASTM B21-C46400 & C48200 ASTM B505-C83600-Note(a) QQ-C-390-C86500 QQ-C-591-C65100 Note(d) |
| Hanger (Hinge) | Check | 3&4 | ASTM B62-C83600 ASTM B584-C87600 Stainless Steel Alloy Note(d) | ASTM B61-C92200 ASTM B62-C83600-Note(a) ASTM B584-C87600 Note(d) |
| Hanger Pin (Hinge Pin) Side Plug Stop Plug Washer | Check | 3&4 | ASTM B150-C64200 ASTM B16-C36000 ASTM B371-C69700 Copper Alloy Nickel-Copper Alloy Stainless Steel Alloy | ASTM B150-C64200 ASTM B16-C36000 ASTM B371-C69700 Copper Alloy Nickel-Copper Alloy Stainless Steel Alloy |
| Stuffing Box Packing Box | Gate Globe & Angle | | ASTM B62-C83600 ASTM B124-C37700 ASTM B16-C36000 ASTM B584-C86400 & C84400 ASTM B282 Type II-Note(f) Other Copper Alloy materials having physical and corrosive properties equivalent to those of the listed materials | ASTM B62-C83600 ASTM B124-C37700 ASTM B16-C36000-Note(g) ASTM B584-C86400 ASTM B584-C84400-Note(e) ASTM B282 Type II-Note(f) Other Copper Alloy materials having physical and corrosive properties equivalent to those of the listed materials |

TABLE 2 — LIST OF MATERIAL SPECIFICATIONS (CONTINUED)

| PART NAME | VALVE STYLE | VALVE TYPE | PRESSURE CLASS | |
|------------------------------|--------------------------|------------|---|--|
| | | | 125 & 150 | 200, 300 & 350 |
| Packing Gland Packing Nut | Gate Globe & Angle | | ASTM B62-C83600 ASTM B124-C37700 ASTM B16-C36000 ASTM B584-C86400 & C84400 ASTM B282 Type II-Note ^(f) Other Copper Alloy materials having physical and corrosive properties equivalent to those of the listed materials | ASTM B62-C83600 ASTM B124-C37700 ASTM B16-C36000 ASTM B584-C86400 ASTM B584-C84400-Note ^(e) ASTM B282 Type II-Note ^(f) Other Copper Alloy materials having physical and corrosive properties equivalent to those of the listed materials |
| Retaining Ring | Check | 3&4 | Copper Alloy Stainless Steel | Copper Alloy Stainless Steel |
| Handwheels | Gate Globe & Angle | | Ferrous, non-ferrous alloys or of a non-metallic material of sufficient strength and durability. | |

NOTES: (a) — ASTM B62-C83600, may be used in place of ASTM B61-C92200 for class 200, 300 and 350 valves provided that a temperature limitation of 450°F is shown on the identification plate.

(b) — ASTM B61-C92200 may be used in Class 125 and 150 valves at the manufacturer's option.

(c) — Bonnet, cap, disc and discholder, sizes 3/4 and smaller only. Union rings, sizes 3/8 and smaller only.

(d) — Other materials having physical and corrosion resistant properties equivalent to those of the listed material.

(e) — For use in Class 200 valves with non-metallic discs when temperature limitation of the disc is a maximum of 450 degrees F.

(f) — Glands (non-bolted, non-threaded) only.

(g) — For sizes 3/4 and smaller.

(h) — Manufacturer's standard hardness

4.3. Body and Bonnet

4.3.1 The body-bonnet joint on bronze gate, globe and angle valves and the body-cap joint on bronze check valves may be inside screw, screw-over, union ring or bolted construction.

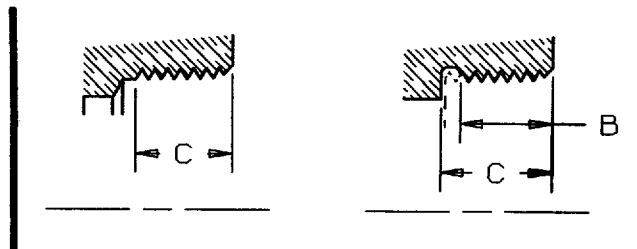
4.3.2 Threaded Ends

4.3.2.1 Threaded end bodies may have polygon ends or may have rounded ends with ribs. Valves with threaded ends shall be threaded in accordance with the requirements of ANSI/ASME B1.20.1, Pipe Threads, General Purpose (Inch).

4.3.2.2 All threads shall be countersunk a distance not less than one-half the pitch of threads at an angle of approximately 45 degrees. Countersinking shall be concentric with threads.

4.3.2.3 The length of threads specified in Table 3 shall be measured to include the countersink or chamfer. The maximum allowable variation in the alignment of threads of all openings of threaded valves shall be 0.06 inches in 12 inches.

TABLE 3 — MINIMUM LENGTH AND DEPTH OF THREAD



| Nominal Pipe Size | B Length of Thread (minimum) | C Depth of Thread Chamber (a) (minimum) |
|-------------------------|------------------------------------|---|
| | Inches | Inches |
| 1/8 | 0.25 | 0.35 |
| 1/4 | 0.28 | 0.40 |
| 3/8 | 0.31 | 0.42 |
| 1/2 | 0.37 | 0.54 |
| 3/4 | 0.44 | 0.57 |
| 1 | 0.51 | 0.70 |
| 1-1/4 | 0.60 | 0.71 |
| 1-1/2 | 0.62 | 0.75 |
| 2 | 0.67 | 0.79 |
| 2-1/2 | 0.82 | 1.14 |
| 3 | 0.88 | 1.20 |

Note: (a) Allowable entry of male pipe thread.

4.3.3 Solder Joint Ends — Solder joint ends shall be prepared in accordance with applicable requirements of ANSI B16.18.

4.3.4 Flanged Ends — Flanges and drilling of flanged end valves shall be in accordance with applicable requirements of ASME B16.24. The finish of facing shall be in accordance with MSS SP-6.

4.3.5 Stem Thread Engagement

4.3.5.1 Rising stem valves shall have a minimum length of stem thread engagement equal to the outside diameter of the thread when the valve is closed and 75% of the outside diameter of the stem thread when the valve is fully open.

4.3.5.2 In the case of non-rising stem valves, the length of the stem thread in contact with the wedge shall be at least equal to the outside diameter of the thread when the valve is closed.

4.3.6 Backseat — A backseat shall be provided in gate, globe and angle valves; however, repacking while the valve is pressurized is not recommended.

4.4 Discs and Seat Rings

4.4.1 Discs and Seat Rings for Bronze Gate Valves

4.4.1.1 Solid wedge discs shall be of one piece construction with disc guides. The stem chamber of the NRS discs shall be open at the bottom for proper drainage.

4.4.1.2 Split wedge and parallel seat (double disc) shall be so designed that on reaching the point of closure, thrust from the stem will cause the disc to contact and bear evenly against the seat.

4.4.1.3 All discs shall have machined seating surfaces and shall be securely attached to the stem in all operating positions.

4.4.1.4 Seats may have expanded-in, threaded-in or otherwise renewable seat rings or may be cast integral with the body at the manufacturer's option.

4.4.2 Discs and Seat Rings for Bronze Globe and Angle Valves

4.4.2.1 Discs or disc holders shall be securely fastened to the end of the stem in such a manner as to allow these parts to freely swivel. Valve Types 1 and 2 in sizes 1/2 and smaller may have the disc or disc holder formed on the end of the stem. Discs, plugs or disc holders of the slip-on type shall be adequately guided for self-centering and shall be so constructed with relation to body and bonnet that when the valve is fully opened, they will not slip off the stem.

Disc holders for Valves Type 2 shall be designed to contain the periphery of the non-metallic disc in position.

4.4.2.2 The seat may have an expanded-in, threaded-in or otherwise renewable seat ring or may be cast integral with the body at the manufacturer's option.

4.4.3 Discs and Seats for Bronze Check Valves

4.4.3.1 Bronze check valves, Types 1 and 2 shall have the disc or disc holder substantially guided to ensure proper seating.

4.4.3.2 Bronze check valves, Types 3 and 4 shall have disc and disc holder securely fastened to the hanger or hinge. The connection shall allow sufficient freedom so that the disc will properly seat by gravity. The joint shall swivel freely to allow uniform wear except that disc or disc holders and hanger may be integral in Class 125 valves.

4.4.3.3 Disc holders for Bronze check valves, Types 2 and 4 shall be designed to hold and support the non-metallic disc.

4.4.3.4 The seat may have an expanded-in, threaded-in or otherwise renewable seat ring or may be cast integral with the body at the manufacturer's option.

4.5 Stems for Bronze Gate Valves, and Bronze Globe and Angle Valves

Stems shall be threaded with either Acme form threads or 60° truncated "V" threads, so that the valve will be opened when the handwheel is rotated counter-clockwise. The handwheel end of the stem shall be a tapered square with its greatest diagonal approximately equal to the diameter of the stem or it may be of the splined or serrated design of equal strength. A threaded extension shall be provided to accommodate a handwheel nut.

The handwheel nut may be brass, or if made of steel, it shall have a corrosion protective plating. The diameter of that portion of the stem passing through the packing shall not be less than shown in Tables 4 and 5.

4.6 Packing Box and Packing Nut for Bronze Gate Valves and Bronze Globe and Angle Valves

4.6.1 Packing box for Class 125 valves may be of gland follower type or packing nut type. Packing box for all other valves, sizes greater than 1/2, shall be of the gland follower type. The length of packing in contact with the stem shall be at least one diameter of the stem passing through it. The thread of the packing nut shall be of sufficient length to enable the nut to be threaded on to the packing box or bonnet at least two full threads when the full amount of packing is in place and the length of thread engagement between the packing box or bonnet and the packing nut shall be sufficient for full travel of the gland.

4.6.2 Stem Packing — Stem packing shall be braided, twisted, or formed ring type made from non-asbestos material suitable for the pressure-temperature ratings of the valve.

4.7 Handwheels for Bronze Gate Valves, and Bronze Globe and Angle Valves

Handwheels smaller than 6 in. in diameter shall be of the non-heat design with a raised rim to protect the hands. Handwheels 6 in. in diameter and larger may be of the plain rim type marked to show the direction of opening. The diameter of the handwheel shall not be less than shown in Tables 6 and 7. All handwheels shall have at least three spokes.

TABLE 4 — BRONZE GATE VALVES

| Nominal Valve Size | DIAMETER OF STEM — MINIMUM | | | |
|--------------------------|----------------------------|--------|--------|-----------|
| | PRESSURE CLASS | | | |
| | 125 | 150 | 200 | 300 & 350 |
| | Inches | Inches | Inches | Inches |
| 1/4 | 0.25 | 0.29 | 0.31 | 0.31 |
| 3/8 | 0.28 | 0.29 | 0.31 | 0.31 |
| 1/2 | 0.31 | 0.31 | 0.34 | 0.34 |
| 3/4 | 0.35 | 0.35 | 0.38 | 0.38 |
| 1 | 0.39 | 0.40 | 0.40 | 0.40 |
| 1-1/4 | 0.42 | 0.43 | 0.44 | 0.44 |
| 1-1/2 | 0.48 | 0.48 | 0.50 | 0.50 |
| 2 | 0.53 | 0.53 | 0.53 | 0.53 |
| 2-1/2 | 0.59 | 0.59 | 0.61 | 0.61 |
| 3 | 0.67 | 0.67 | 0.70 | 0.70 |

TABLE 5 — BRONZE GLOBE AND ANGLE VALVES

| Nominal Valve Size | DIAMETER OF STEM — MINIMUM | | | |
|--------------------------|----------------------------|--------|--------|-----------|
| | PRESSURE CLASS | | | |
| | 125 | 150 | 200 | 300 & 350 |
| | Inches | Inches | Inches | Inches |
| 1/4 | 0.24 | 0.28 | 0.28 | 0.28 |
| 3/8 | 0.28 | 0.28 | 0.28 | 0.28 |
| 1/2 | 0.31 | 0.35 | 0.35 | 0.35 |
| 3/4 | 0.35 | 0.39 | 0.40 | 0.40 |
| 1 | 0.39 | 0.42 | 0.44 | 0.44 |
| 1-1/4 | 0.42 | 0.49 | 0.50 | 0.50 |
| 1-1/2 | 0.49 | 0.53 | 0.53 | 0.53 |
| 2 | 0.53 | 0.59 | 0.62 | 0.62 |
| 2-1/2 | 0.59 | 0.67 | 0.67 | 0.67 |
| 3 | 0.67 | 0.75 | 0.75 | 0.75 |

TABLE 6 — BRONZE GATE VALVES

| Nominal Valve Size | DIAMETER OF HANDWHEEL — MINIMUM | | | |
|---|---------------------------------|--------|--------|-----------|
| | PRESSURE CLASS | | | |
| | 125 | 150 | 200 | 300 & 350 |
| | Inches | Inches | Inches | Inches |
| 1/4 | 1.62 | 1.75 | 2.00 | 2.00 |
| 3/8 | 1.62 | 1.75 | 2.00 | 2.00 |
| 1/2 | 1.88 | 2.00 | 2.25 | 2.25 |
| 3/4 | 2.25 | 2.50 | 2.50 | 2.50 |
| 1 | 2.62 | 2.62 | 2.75 | 2.75 |
| 1-1/4 | 3.00 | 3.00 | 3.25 | 3.25 |
| 1-1/2 | 3.25 | 3.50 | 3.62 | 3.62 |
| 2 | 3.62 | 4.00 | 4.00 | 4.00 |
| 2-1/2 | 4.38 | 4.62 | 4.62 | 4.62 |
| 3 | 5.00 | 5.00 | 5.50 | 5.50 |
| When irregular handwheels are furnished, the largest dimension of the shape shall be considered the handwheel diameter. | | | | |

TABLE 7 — BRONZE GLOBE AND ANGLE VALVES

| Nominal Valve Size | DIAMETER OF HANDWHEEL — MINIMUM | | | |
|---|---------------------------------|--------|--------|-----------|
| | PRESSURE CLASS | | | |
| | 125 | 150 | 200 | 300 & 350 |
| | Inches | Inches | Inches | Inches |
| 1/4 | 1.50 | 1.75 | 1.75 | 1.75 |
| 3/8 | 1.75 | 2.00 | 2.00 | 2.00 |
| 1/2 | 2.00 | 2.25 | 2.50 | 2.50 |
| 3/4 | 2.50 | 2.62 | 2.75 | 2.75 |
| 1 | 2.75 | 3.00 | 3.00 | 3.00 |
| 1-1/4 | 3.00 | 3.50 | 3.50 | 3.50 |
| 1-1/2 | 3.50 | 3.75 | 4.00 | 4.00 |
| 2 | 4.00 | 4.38 | 4.75 | 4.75 |
| 2-1/2 | 4.75 | 5.00 | 5.38 | 5.38 |
| 3 | 5.38 | 5.75 | 6.00 | 6.00 |
| When irregular handwheels are furnished, the largest dimension of the shape shall be considered the handwheel diameter. | | | | |

5. MARKINGS

5.1 All valves shall be marked in accordance with the requirements of MSS SP-25.

5.2 All bronze check valve bodies shall be marked to indicate the direction of flow by means of an arrow cast on the valve body or the word "in" or "inlet" cast or stamped on the inlet end of the body.

6. TOLERANCE

Tolerance specified in the standards referenced for dimensions shall be applied to these valves.

7. INSPECTION AND TESTING

7.1 All valve parts shall be made within inspection limits which will ensure ready interchangeability of parts.

7.2 Manufacturers shall be prepared to certify that their products meet the minimum requirements of this Standard Practice.

7.3 Pressure Test

7.3.1 Shell Test — Each valve assembly shall be given a hydrostatic or pneumatic shell test as specified in Tables 8A and 8B. No visible leakage is permitted in the valve pressure boundary except at the stem packing (when adjustable) or test connection seals.

**TABLE 8A — SHELL TEST
THREADED AND SOLDER END VALVES**

| Pressure | | SHELL TEST PRESSURE-MINIMUM | |
|--------------------|------|-----------------------------|-------|
| | | Air | Water |
| Class | CWP | psi | psi |
| 125 | 200 | 80 | 300 |
| 150 | 300 | 80 | 450 |
| 200 | 400 | 80 | 600 |
| 300 | 600 | 80 | 900 |
| 300 ^(a) | 1000 | 80 | 1500 |
| 350 | 1000 | 80 | 1500 |

^(a) See Table 1, Note e

**TABLE 8B — SHELL TEST
FLANGED END VALVES**

| Pressure | | SHELL TEST PRESSURE-MINIMUM | |
|----------|-----|-----------------------------|-------|
| | | Air | Water |
| Class | CWP | psi | psi |
| 150 | 225 | 80 | 350 |
| 300 | 500 | 80 | 750 |

7.3.2 Seat Test

7.3.2.1 Each gate, globe and angle valve shall be given a hydrostatic or pneumatic seat test as specified in Tables 9A and 9B. The maximum permissible leakage rate shall be 10 ml of water per hour per inch of diameter of nominal valve size or 0.1 of a standard cubic foot of air per hour (50 standard ml of air per minute) per inch of diameter of nominal valve size for valves in sizes 1 and larger, and 10 ml of water per hour or 0.1 of a standard cubic foot of air per hour (50 standard ml of air per minute) for valves in sizes smaller than 1.

7.3.2.2 Each check valve shall be given a hydrostatic or pneumatic seat test. The test pres-

sure shall be equal to 50 psi minimum. The pressure is to be applied at the outlet side of the disc. The maximum permissible leakage rate shall be 40 ml of water per hour per inch of diameter of nominal valve size or 0.4 of a standard cubic foot of air per hour (200 standard ml of air per minute) per inch of nominal valve size for valves in sizes 1 and larger and 40 ml of water per hour or 0.4 of a standard cubic foot of air per hour (200 standard ml of air per minute) for valves in sizes smaller than 1.

7.3.3. Alternate Test Methods

Alternate test procedures may be substituted when an established quality assurance program provides equivalent results to the test requirements of Paragraphs 7.3.1 and 7.3.2.

**TABLE 9A — SEAT TEST
THREADED AND SOLDER END VALVES**

| Pressure | | SEAT TEST PRESSURE-MINIMUM | |
|--------------------|------|----------------------------|-------|
| | | Air | Water |
| Class | CWP | psi | psi |
| 125 | 200 | 80 | 200 |
| 150 | 300 | 80 | 300 |
| 200 | 400 | 80 | 400 |
| 300 | 600 | 80 | 600 |
| 300 ^(a) | 1000 | 80 | 1000 |
| 350 | 1000 | 80 | 1000 |

^(a) See Table 1, Note c.

**TABLE 9B — SEAT TEST
FLANGED END VALVES**

| Pressure | | SEAT TEST PRESSURE-MINIMUM | |
|----------|-----|----------------------------|-------|
| | | Air | Water |
| Class | CWP | psi | psi |
| 150 | 225 | 80 | 225 |
| 300 | 500 | 80 | 500 |

| ANNEX A |

STRENGTH OF SOLDER JOINTS

(This Annex is an integral part of this Standard Practice and placed after the main text for convenience.)

Extracted from American National Standard - ANSI B16.18, Cast Copper Alloy Solder Joint Pressure Fittings.

The maximum recommended pressure-temperature limitations for solder joints made with copper tube and cast copper alloy fittings, using representative commercial solders, are listed in the table below.

NOTE: For working temperatures, in the 0° F to -20° F range, it is recommended that a joint material melting at or above 1000° F be employed.(d)

CAUTION: When solder joint valves are used, the rating will be the lowest value of Table 1 or Table A1. Also refer to Paragraph 2.4.

Table A1 — Pressure-Temperature Limitations

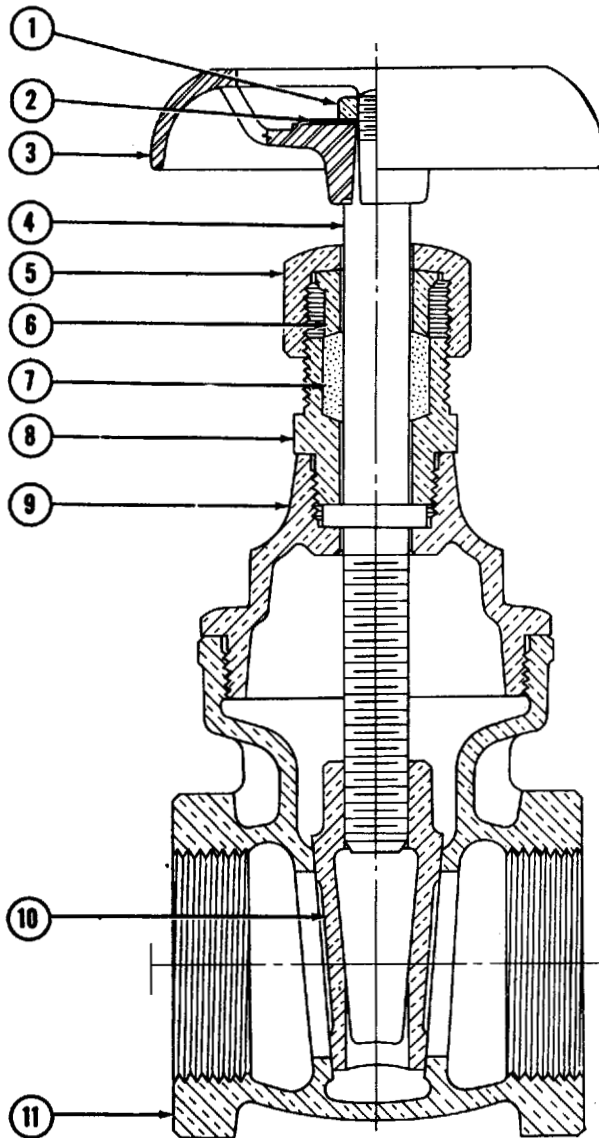
| Joining Material | Working Temperature | Maximum Working Pressure | | |
|---|--|--------------------------------|----------------------------------|----------------------------------|
| | F° | Size 1/4 thru 1 ^(a) | Size 1 1/4 thru 2 ^(a) | Size 2 1/2 thru 3 ^(a) |
| | | psi | psi | psi |
| 50-50 Tin-Lead Solder (b) (e) | 100 | 200 | 175 | 150 |
| | 150 | 150 | 125 | 100 |
| | 200 | 100 | 90 | 75 |
| | 250 | 85 | 75 | 50 |
| 95-5 Tin-Antimony Solder(c) | 100 | 500 | 400 | 300 |
| | 150 | 400 | 350 | 275 |
| | 200 | 300 | 250 | 200 |
| | 250 | 200 | 175 | 150 |
| Joining (d) Materials Melting at or above 1000° F | Pressure-temperature ratings consistent with the materials and procedures employed | | | |

NOTES:

- (a) Standard water tube sizes.
- (b) ANSI/ASTM B32 Alloy Grade 50A.
- (c) ANSI/ASTM B32 Alloy Grade 95TA.
- (d) These joining materials are defined as "brazing alloys" by the American Welding Society.
- (e) The Safe Drinking Water Act Amendment of 1986 prohibits any solder with a lead content in excess of 0.2% for use on potable water systems.

ANNEX B VALVE TYPES

This Annex is an integral part of this Standard Practice which is placed after the main text for convenience.

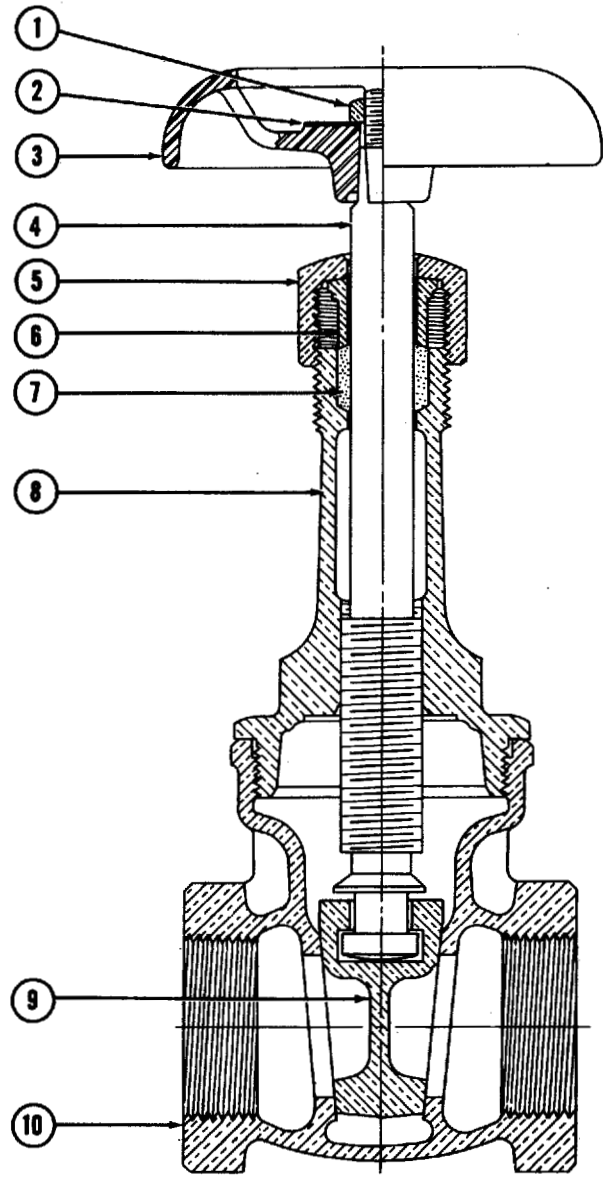


| PART NAME | |
|-----------|----------------------|
| 1 | HANDWHEEL NUT |
| 2 | IDENTIFICATION PLATE |
| 3 | HANDWHEEL |
| 4 | STEM |
| 5 | PACKING NUT |
| 6 | GLAND |
| 7 | PACKING |
| 8 | PACKING BOX |
| 9 | BONNET |
| 10 | SOLID WEDGE |
| 11 | BODY |

**GATE VALVE
TYPE 1**

Figure B1

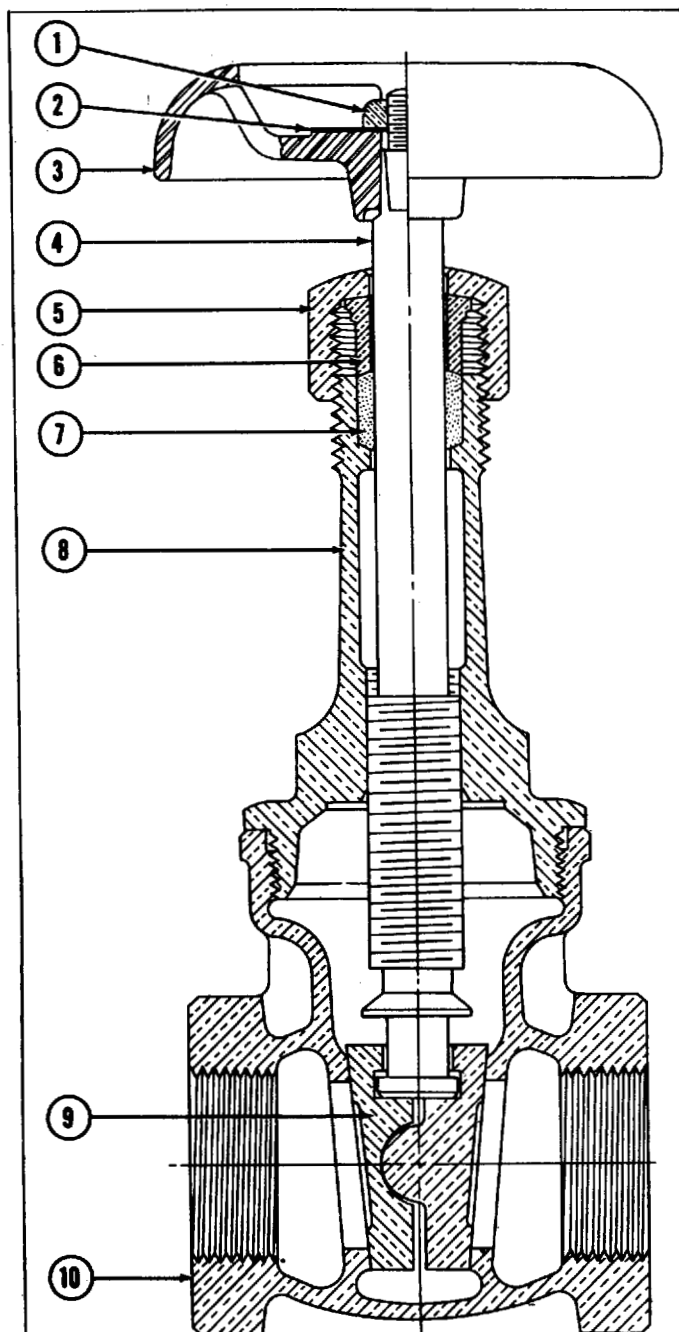
Note: The valve sketches herein are for the purpose of illustration and nomenclature only. They do not represent any manufacturer's product.



| PART NAME | |
|-----------|----------------------|
| 1 | HANDWHEEL NUT |
| 2 | IDENTIFICATION PLATE |
| 3 | HANDWHEEL |
| 4 | STEM |
| 5 | PACKING NUT |
| 6 | GLAND |
| 7 | PACKING |
| 8 | BONNET |
| 9 | SOLID WEDGE |
| 10 | BODY |

**GATE VALVE
TYPE 2**

Figure B2

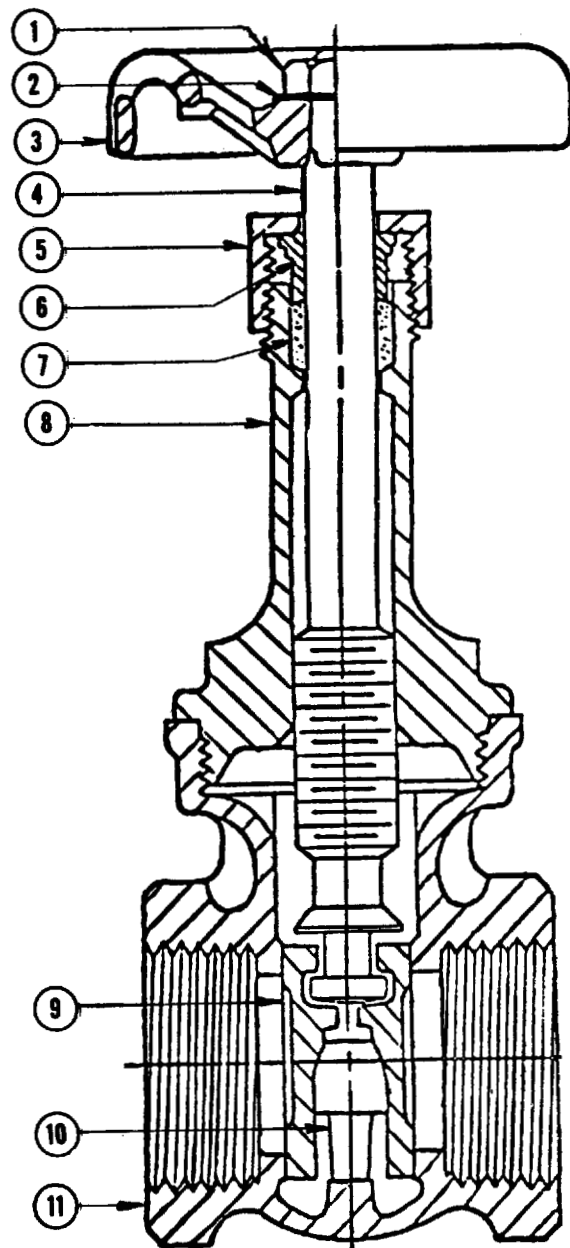


| PART NAME | |
|-----------|----------------------|
| 1 | HANDWHEEL NUT |
| 2 | IDENTIFICATION PLATE |
| 3 | HANDWHEEL |
| 4 | STEM |
| 5 | PACKING NUT |
| 6 | GLAND |
| 7 | PACKING |
| 8 | BONNET |
| 9 | SPLIT WEDGE |
| 10 | BODY |

GATE VALVE
TYPE 3

Figure B3

Note: The valve sketches herein are for the purpose of illustration and nomenclature only. They do not represent any manufacturer's product.



| PART NAME | |
|-----------|----------------------|
| 1 | HANDWHEEL NUT |
| 2 | IDENTIFICATION PLATE |
| 3 | HANDWHEEL |
| 4 | STEM |
| 5 | PACKING NUT |
| 6 | GLAND |
| 7 | PACKING |
| 8 | BONNET |
| 9 | DOUBLE DISC |
| 10 | DISC WEDGE |
| 11 | BODY |

GATE VALVE
TYPE 4

Figure B4

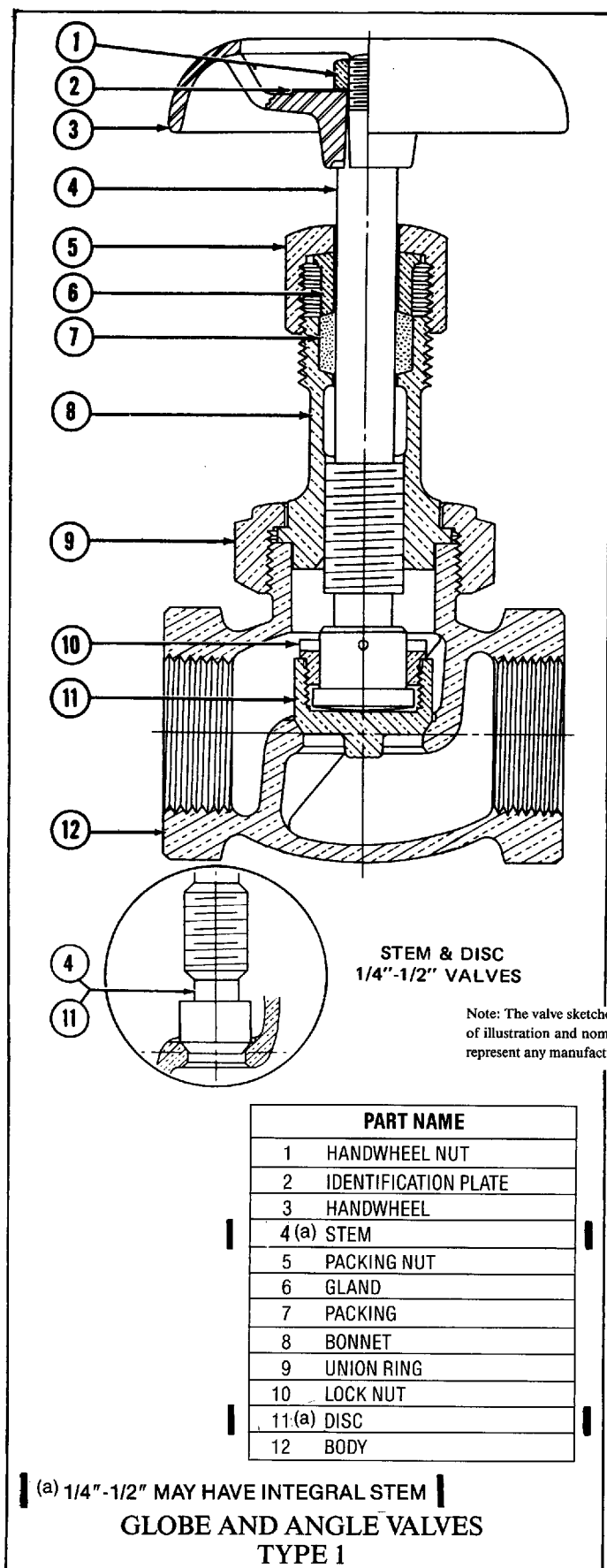


Figure B5

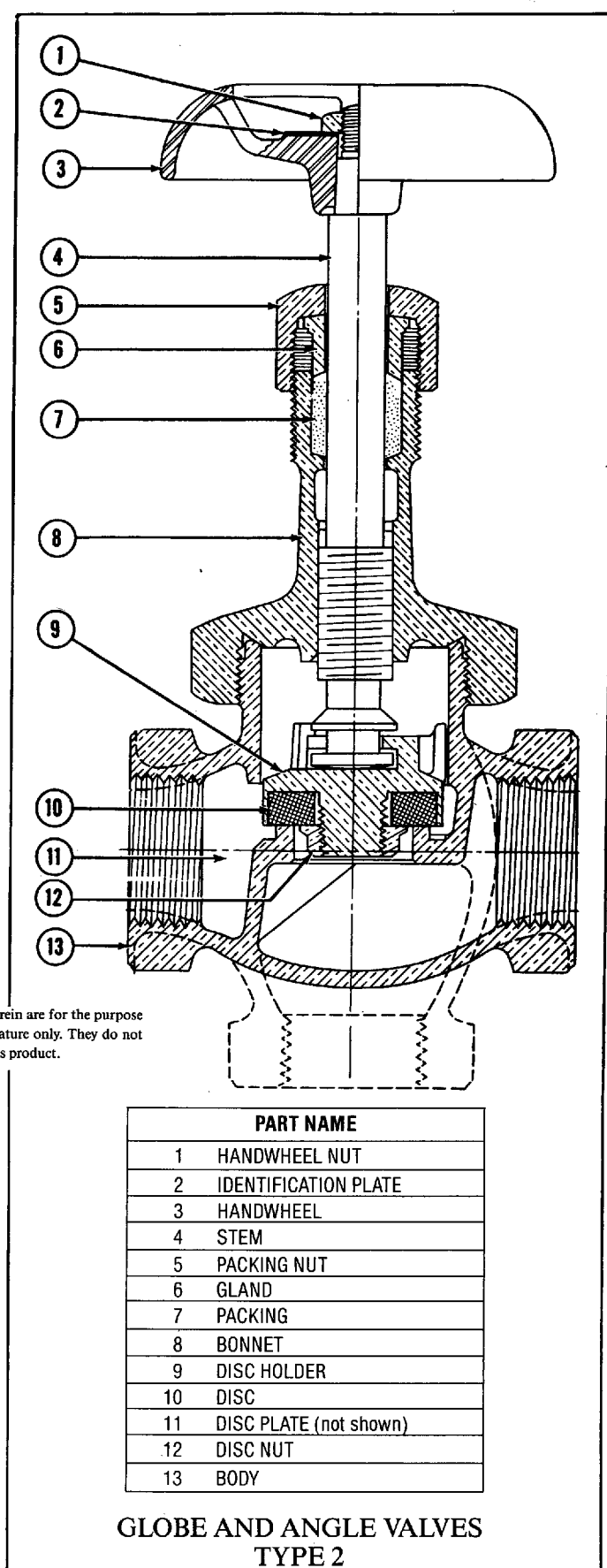
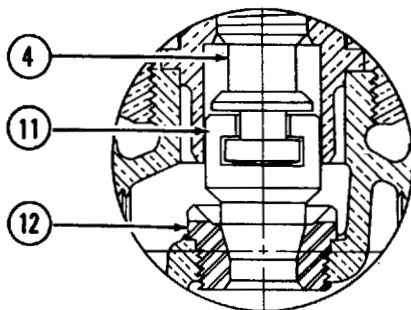
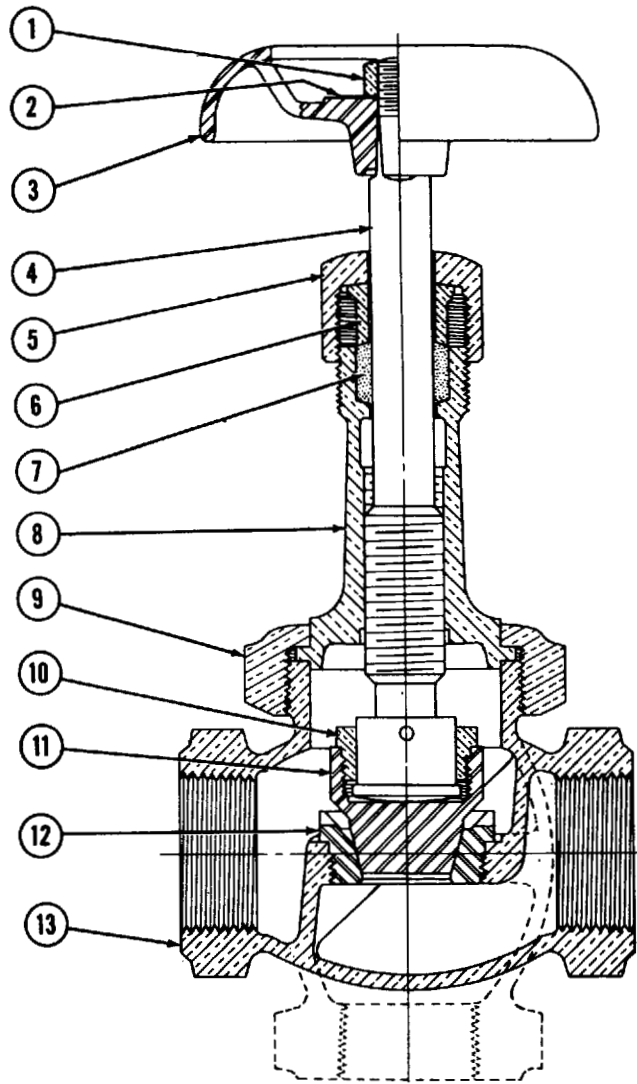


Figure B6



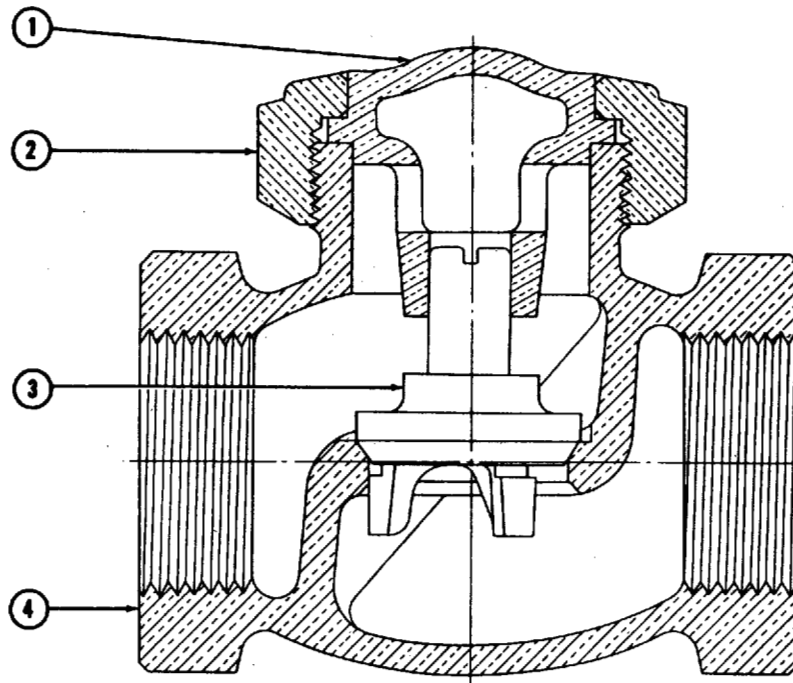
SLIP-ON DISC ASSEMBLY

Note: The valve sketches herein are for the purpose of illustration and nomenclature only. They do not represent any manufacturer's product.

| PART NAME | |
|-----------|----------------------|
| 1 | HANDWHEEL NUT |
| 2 | IDENTIFICATION PLATE |
| 3 | HANDWHEEL |
| 4 | STEM |
| 5 | PACKING NUT |
| 6 | GLAND |
| 7 | PACKING |
| 8 | BONNET |
| 9 | UNION RING |
| 10 | LOCK NUT |
| 11 | PLUG DISC |
| 12 | SEAT RING |
| 13 | BODY |

GLOBE AND ANGLE VALVES TYPE 3

Figure B7

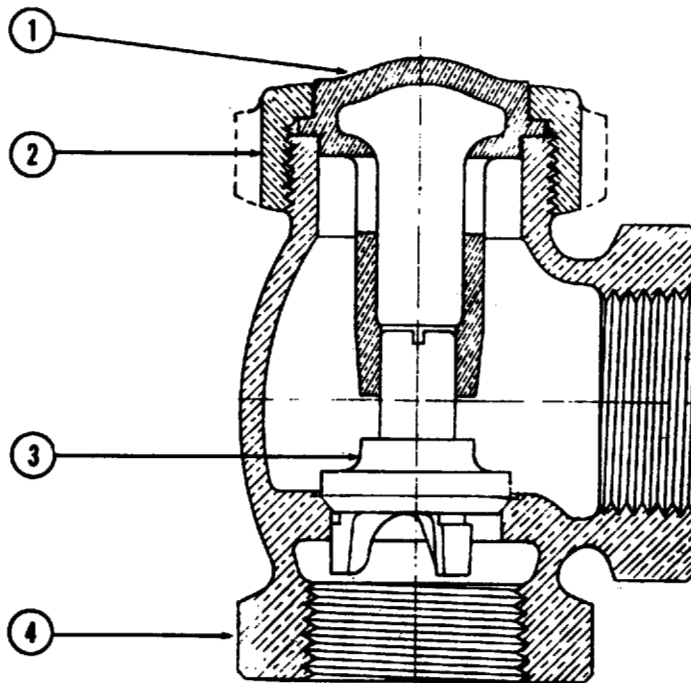


| PART NAME | |
|-----------|------------|
| 1 | CAP |
| 2 | UNION RING |
| 3 | DISC |
| 4 | BODY |

CHECK VALVE — TYPE 1
Horizontal Lift Check — Metal to Metal Seat

Figure B8A

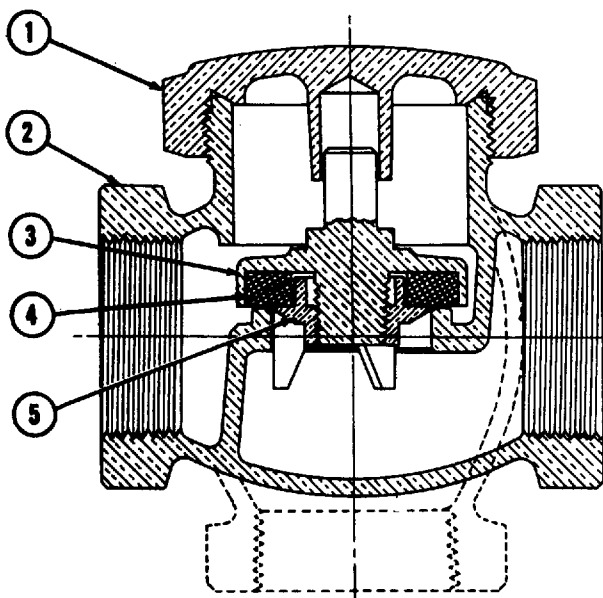
Note: The valve sketches herein are for the purpose of illustration and nomenclature only. They do not represent any manufacturer's product.



| PART NAME | |
|-----------|------------|
| 1 | CAP |
| 2 | UNION RING |
| 3 | DISC |
| 4 | BODY |

CHECK VALVE — TYPE 1
Angle Lift Check — Metal to Metal Seat

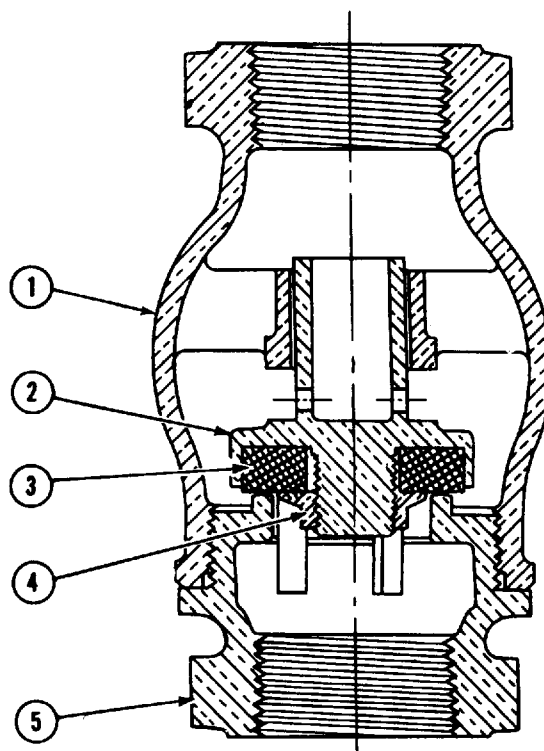
Figure B8B



| PART NAME | |
|-----------|----------------|
| 1 | CAP OR COVER |
| 2 | BODY |
| 3 | DISC HOLDER |
| 4 | DISC |
| 5 | DISC GUIDE NUT |

**CHECK VALVE
TYPE 2**
Horizontal and Angle Lift Check
Composition to Metal Seat

Figure B9A

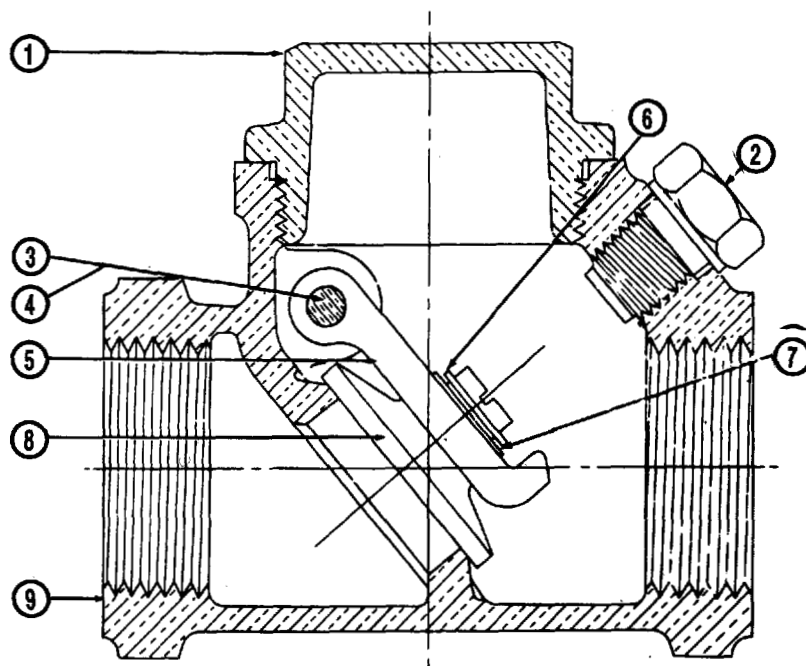


| PART NAME | |
|-----------|-----------------|
| 1 | BODY |
| 2 | DISC HOLDER |
| 3 | DISC |
| 4 | DISC GUIDE NUT |
| 5 | THREADED-IN HUB |

**CHECK VALVE
TYPE 2**
Vertical Lift Check
Composition to Metal Seat

Figure B9B

Note: The valve sketches herein are for the purpose of illustration and nomenclature only. They do not represent any manufacturer's product.

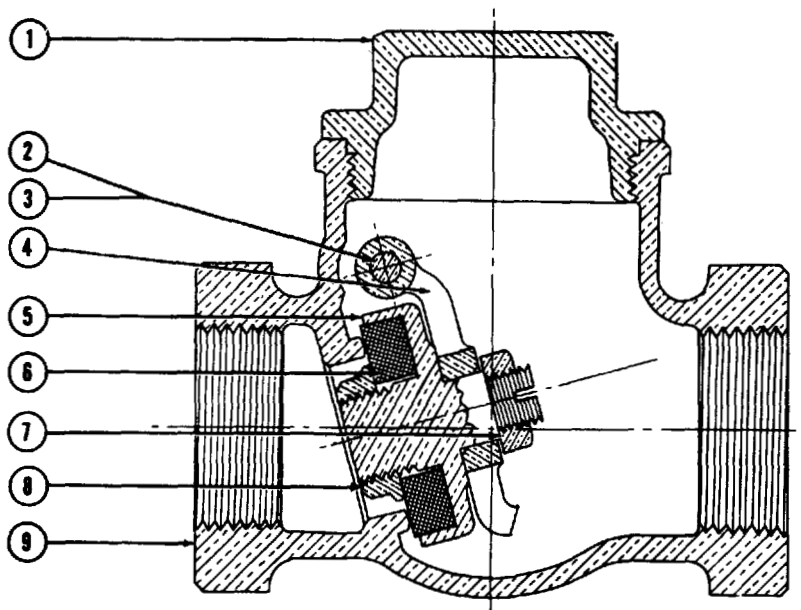
CHECK VALVE
TYPE 3

| PART NAME | |
|-----------|----------------|
| 1 | CAP |
| 2 | STOP PLUG |
| 3 | SIDE PLUGS |
| 4 | HANGER PIN |
| 5 | HANGER |
| 6 | RETAINING RING |
| 7 | WASHER |
| 8 | DISC |
| 9 | BODY (a) |

(a) Body of "Y" type
design also acceptable

Figure B10

Note: The valve sketches herein are for the purpose of illustration and nomenclature only. They do not represent any manufacturer's product.

CHECK VALVE
TYPE 4

| PART NAME | |
|-----------|-------------|
| 1 | CAP |
| 2 | SIDE PLUGS |
| 3 | HANGER PIN |
| 4 | HANGER |
| 5 | DISC HOLDER |
| 6 | DISC |
| 7 | HANGER NUT |
| 8 | DISC NUT |
| 9 | BODY (a) |

(a) Body of "Y" type
design also acceptable

Figure B11

| ANNEX C | REFERENCE STANDARDS

This Annex is an integral part of this Standard Practice which is placed after the main text for convenience.

List of standards and specifications referenced in this Standard Practice show the year of approval.

ASME Publications (Approved as American National Standards)

ANSI/ASME B1.20.1-

| | |
|------------------|--|
| 1992 | Pipe Threads, General Purpose (Inch) |
| ANSI B16.18-1984 | Cast Copper Alloy Solder-Joint Pressure Fittings |
| ASME B16.24-1991 | Cast Copper Alloy Pipe Flanges, Class 150, 300, 400, 600, 900, 1500, and 2500, and Flanged Fittings, Class 150 and 300 |

ASTM Publications

| | |
|---------------|---|
| ASTM A494-94 | Specification for Nickel and Nickel Alloy Castings |
| ASTM B16-92 | Specification for Free-Cutting Brass Rod, Bar, and Shapes for Use in Screw Machines |
| ASTM B21-96 | Specification for Naval Brass Rod, Bar, and Shapes |
| ASTM B61-93 | Specification for Steam or Valve Bronze Castings |
| ASTM B62-93 | Specification for Composition Bronze or Ounce Metal Castings |
| ASTM B98-93 | Specification for Copper-Silicon Alloy Rod, Bar and Shapes |
| ASTM B99-93 | Specification for Copper-Silicon Alloy Wire for General Purposes |
| ASTM B124-94 | Specification for Copper and Copper-Alloy Forging Rod, Bar and Shapes |
| ASTM B140-92 | Specification for Copper, Zinc, Lead (Leaded Red Brass or Hardware Bronze) Rod, Bars and Shapes |
| ASTM B148-93A | Specification for Aluminum-Bronze Sand Castings |
| ASTM B150-95A | Specification for Aluminum Bronze Rod, Bar and Shapes |
| ASTM B282-95 | Specification for Sintered Brass Structural Parts |
| ASTM B371-96 | Specification for Copper-Zinc-Silicon Alloy Rod |
| ASTM B584-93 | Specification for Copper Alloy Sand Castings for General Applications |

MSS Publications

| | |
|----------------|---|
| MSS SP-6-1996 | Standard Finishes for Contact Faces of Pipe Flanges and Connecting-End Flanges of Valves and Fittings |
| MSS SP-25-1993 | Standard Marking System for Valves, Fittings, Flanges and Unions |

Federal Specifications

| | |
|----------|--|
| QQ-C-390 | Copper Alloy Castings |
| QQ-C-465 | Copper-Aluminum Alloys |
| QQ-C-591 | Copper-Silicon, Copper-Zinc-Silicon & Copper-Nickel-Silicon Alloys |

Publications of the following organizations appear on above list:

| | |
|------|---|
| ASME | The American Society of Mechanical Engineers 345 East 47th Street, New York, NY 10017 |
| ASTM | American Society for Testing and Material 100 Barr Harbor Drive, West Conshohocken, PA 19428 |
| MSS | Manufacturers Standardization Society of the Valve and Fittings Industry, Inc. 127 Park Street, N.E., Vienna, VA 22180 |

Publications appearing above which have been approved as American National Standards may also be obtained from:

| | |
|------|--|
| ANSI | American National Standards Institute, Inc. 11 West 42nd Street, New York, NY 10036 |
|------|--|

LIST OF MSS STANDARD PRACTICES

NUMBER

| | |
|----------------------|--|
| SP- 6-1996 | Standard Finishes for Contact Faces of Pipe Flanges and Connecting-End Flanges of Valves and Fittings |
| SP- 9-1997 | Spot Facing for Bronze, Iron and Steel Flanges |
| SP-25-1993 | Standard Marking System for Valves, Fittings, Flanges and Unions |
| SP-42-1990 (R 1995) | Class 150 Corrosion Resistant Gate, Globe, Angle and Check Valves with Flanged and Butt Weld Ends |
| SP-43-1991 (R 1996) | Wrought Stainless Steel Butt-Welding Fittings |
| SP-44-1996 | Steel Pipeline Flanges |
| SP-45-1992 | Bypass and Drain Connections |
| SP-51-1991 (R 1995) | Class 150 LW Corrosion Resistant Cast Flanges and Flanged Fittings |
| SP-53-1995 | Quality Standard for Steel Castings and Forgings for Valves, Flanges, and Fittings and Other Piping Components — Magnetic Particle Examination Method |
| SP-54-1995 | Quality Standard for Steel Castings for Valves, Flanges, and Fittings and Other Piping Components — Radiographic Examination Method |
| SP-55-1996 | Quality Standard for Steel Castings for Valves, Flanges and Fittings and Other Piping Components — Visual Method for Evaluation of Surface Irregularities |
| SP-58-1993 | Pipe Hangers and Supports — Materials, Design and Manufacture |
| SP-60-1991 | Connecting Flange Joint Between Tapping Sleeves and Tapping Valves |
| SP-61-1992 | Pressure Testing of Steel Valves |
| SP-65-1994 | High Pressure Chemical Industry Flanges and Threaded Stubs for Use with Lens Gaskets |
| SP-67-1995 | Butterfly Valves |
| SP-68-1988 | High Pressure Butterfly Valves with Offset Design |
| SP-69-1996 | Pipe Hangers and Supports — Selection and Application |
| SP-70-1990 | Cast Iron Gate Valves, Flanged and Threaded Ends |
| SP-71-1990 | Cast Iron Swing Check Valves, Flanged and Threaded Ends |
| SP-72-1992 | Ball Valves with Flanged or Butt-Welding Ends for General Service |
| SP-73-1991 (R 1996) | Brazing Joints for Wrought and Cast Copper Alloy Solder Joint Pressure Fittings |
| SP-75-1993 | Specifications for High Test Wrought Butt Welding Fittings |
| SP-77-1995 | Guidelines for Pipe Support Contractual Relationships |
| SP-78-1987 (R 1992) | Cast Iron Plug Valves, Flanged and Threaded Ends |
| SP-79-1992 | Socket-Welding Reducer Inserts |
| SP-80-1997 | Bronze Gate, Globe, Angle and Check Valves |
| SP-81-1995 | Stainless Steel, Bonnetless, Flanged-Knife Gate Valves |
| SP-82-1992 | Valve Pressure Testing Methods |
| SP-83-1995 | Class 3000 Steel Pipe Unions, Socket-Welding and Threaded |
| SP-85-1994 | Cast Iron Globe & Angle Valves, Flanged and Threaded Ends |
| SP-86-1987 (R 1992) | Guidelines for Metric Data in Standards for Valves, Flanges, Fittings and Actuators |
| SP-87-1991 (R 1996) | Factory-Made Butt-Welding Fittings for Class I Nuclear Piping Applications |
| SP-88-1993 | Diaphragm Type Valves |
| SP-89-1991 | Pipe Hangers and Supports — Fabrication and Installation Practices |
| SP-90-1986 (R 1991) | Guidelines on Terminology for Pipe Hangers and Supports |
| SP-91-1992 (R 1996) | Guidelines for Manual Operation of Valves |
| SP-92-1987 (R 1992) | MSS Valve User Guide |
| SP-93-1987 (R 1992) | Quality Standard for Steel Castings and Forgings for Valves, Flanges, and Fittings and Other Piping Components — Liquid Penetrant Examination Method |
| SP-94-1992 | Quality Standard for Ferritic and Martensitic Steel Castings for Valves, Flanges, and Fittings and Other Piping Components — Ultrasonic Examination Method |
| SP-95-1986 (R 1991) | Swage(d) Nipples and Bull Plugs |
| SP-96-1996 | Guidelines on Terminology for Valves and Fittings |
| SP-97-1995 | Integrally Reinforced Forged Branch Outlet Fittings — Socket Welding, Threaded and Buttwelding Ends |
| SP-98-1996 | Protective Coatings for the Interior of Valves, Hydrants, and Fittings |
| SP-99-1994 | Instrument Valves |
| SP-100-1997 | Qualification Requirements for Elastomer Diaphragms for Nuclear Service Diaphragm Type Valves |
| SP-101-1989 | Part-Turn Valve Actuator Attachment — Flange and Driving Component Dimensions and Performance Characteristics |
| SP-102-1989 | Multi-Turn Valve Actuator Attachment — Flange and Driving Component Dimensions and Performance Characteristics |
| SP-103-1995 | Wrought Copper and Copper Alloy Insert Fittings for Polybutylene Systems |
| SP-104-1995 | Wrought Copper Solder Joint Pressure Fittings |
| SP-105-1996 | Instrument Valves for Code Applications |
| SP-106-1990 (R 1996) | Cast Copper Alloy Flanges and Flanged Fittings, Class 125, 150 and 300 |
| SP-107-1991 | Transition Union Fittings for Joining Metal and Plastic Products |
| SP-108-1996 | Resilient-Seated Cast Iron-Eccentric Plug Valves |
| SP-109-1991 | Welded Fabricated Copper Solder Joint Pressure Fittings |
| SP-110-1996 | Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flanged Ends |
| SP-111-1996 | Gray-Iron and Ductile-Iron Tapping Sleeves |
| SP-112-1993 | Quality Standard for Evaluation of Cast Surface Finishes — Visual and Tactile Method. This SP must be sold with a 10-surface, three-dimensional Cast Surface Comparator, which is a necessary part of the Standard. Additional comparators may be sold separately. |
| SP-113-1994 | Connecting Joint between Tapping Machines and Tapping Valves |
| SP-114-1995 | Corrosion Resistant Pipe Fittings, Threaded and Socket Welding, Class 150 and 1000 |
| SP-115-1995 | Excess Flow Valves for Natural Gas Service |
| SP-116-1996 | Service Line Valves and Fittings for Drinking Water Systems |
| SP-117-1996 | Bellows Seals for Globe and Gate Valves |
| SP-118-1996 | Compact Steel Globe & Check Valves — Flanged, Flangeless, Threaded & Welding Ends (Chemical & Petroleum Refinery Service) |
| SP-119-1996 | Belled End Socket Welding Fittings, Stainless Steel and Copper Nickel |

R-Year — Indicates year standard reaffirmed without substantive change.

Prices available upon request

A large number of former MSS Practices have been approved by the ANSI or ANSI Standards, published by others. In order to maintain a single source of authoritative information, the MSS withdraws its Standard Practices in such cases.

MANUFACTURERS STANDARDIZATION SOCIETY OF THE VALVE AND FITTINGS INDUSTRY, INC.

127 PARK STREET, N.E.

VIENNA, VIRGINIA 22180