

MSS SP-42-1999

**Class 150 (PN 20)  
Corrosion Resistant Gate,  
Globe, Angle and Check Valves  
with Flanged and Butt Weld Ends**

Standard Practice

Developed and Approved by the  
Manufacturers Standardization Society of the  
Valve and Fittings, Industry, Inc.

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This document has been substantively revised from the previous edition. It is suggested that if the user is interested in knowing what changes have been made, direct page by page comparison should be made of this document with the 1995 edition.

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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 B.

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## CLASS 150, CORROSION RESISTANT GATE, GLOBE, ANGLE AND CHECK VALVES WITH FLANGED AND BUTT WELD ENDS

### 1. SCOPE

1.1 This Standard Practice is intended to provide a vehicle for the standardization, to the extent indicated, of those features of the valves covered herein. The valves are made from corrosion resistant alloys whose properties are uniquely suited to the service into which they are placed. Chemical process and cryogenic fluid service constitute two such applications.

1.2 This Standard Practice covers corrosion resistant alloy gate, globe, angle and check valves conforming to ASME B16.34 with flanged and butt weld ends with pressure containing parts made from the alloys listed herein or in ASME B16.34.

#### 1.3 Valve Types and Sizes

1.3.1 Types. The following valve types are covered herein and are illustrated in Figures 1 through 8 in Annex A.<sup>(a)</sup>

- a) Gates, outside screw and yoke design (OS&Y).
- b) Globes, T, Y-pattern and angle, outside screw and yoke (OS&Y).
- c) Checks, lift, swing and Y-pattern.

#### 1.3.2 Nominal Pipe Sizes

- a) NPS 1/4 through 24 (DN 8 through 600) gate valves.
- b) NPS 1/4 through 24 (DN 8 through 600) globe and angle valves.
- c) NPS 1/2 through 24 (DN 15 through 600) Y-pattern globe valves.
- d) NPS 1/4 through 24 (DN 8 through 600) lift check valves.
- e) NPS 1/2 through 24 (DN 15 through 600) swing check valves.

### 2. STANDARD UNITS

The values stated in either U.S. customary units or metric units are to be regarded separately as the standard. Within the text, the metric units are shown in parentheses. The values stated in each system are not exact equivalents; therefore, each system must be used independently of the other. Combining values from the two systems may result in nonconformance with this standard.

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<sup>(a)</sup>The valve sketches in Annex A are for the purpose of illustration and nomenclature only. They do not represent any manufacturer's product.

### 3. MATERIALS

**3.1 General.** The specific body, bonnet or cover plate and bolting material shall be produced in accordance with the applicable ASTM Specification listed herein or in materials group 2, 3, or 4 of ASME B16.34. Users are cautioned against applications with fluid which may react harmfully with any materials used in these valves. Consultation with the manufacturer is advised to determine suitability in cases of doubt.

**3.2 Castings.** Bodies, bonnets and cover plates shall be made of materials conforming to the requirements of specifications listed in Table 1. Other parts in contact with the contained fluid shall be of material comparable to the body material. All castings shall be clean, sound and shall be produced to the quality level represented by MSS SP-55.

**3.3 Investment Castings.** When investment castings are used for bodies, bonnets, cover plates or other pressure components of valves in sizes 4 NPS (DN 100) and smaller, the requirements of the ASTM specifications referred to in Table 1 shall be met except that it is permissible to determine mechanical and chemical properties from a master heat and to use a 1 inch x 0.25 inch diameter (30mm x 6mm diameter) tensile specimen in place of the standard 2-inch (62.5mm) tensile specimen. A master heat is previously refined metal of a single furnace charge. Tensile specimens shall be cast in

molds of the same refractory as the casting and shall be heat treated with the casting.

**3.4 Wrought Parts.** Stems, packing glands and other wrought parts in contact with the contained fluids shall be of materials comparable to the body and as listed in Table 1.

#### 3.5 Fabrication by Welding

**3.5.1** Valve bodies, bonnets or cover plates fabricated by welding shall be in accordance with paragraph 2.1.5 of ASME B16.34.

**3.5.2** Welding procedures and welders shall be qualified in accordance with ASME Boiler and Pressure Code, Section IX.

**3.5.3** Where maximum corrosion resistance of welded austenitic stainless steel is desired it is advisable to heat treat in such a fashion as to place all chromium carbide in solution. See Para. UHA-105 in Section VIII-DIV. 1 of the ASME Boiler and Pressure Vessel Code for guidance on post weld heat treatment.

**3.6 Bolting.** Body-Bonnet and Body-cover plate bolts or studs shall be ASTM A193-Grade B8 or B8M. Nuts for body-bonnet bolting shall be ASTM A194, Grade 8, 8M or 8F. Gland bolting shall be Type 303, 304, 305, or 316 conforming to ASTM A193, A194, or A276.

TABLE 1—MATERIALS

Nominal Designation	ASTM Specification and Grade/Type							
	Casting		Bar		Forging		Plate	
	No. <sup>(a)</sup>	A351	No. <sup>(a)</sup>	A182, A276 <sup>(b)</sup> & A479	No. <sup>(a)</sup>	A182	No. <sup>(a)</sup>	A240
18Cr-8Ni	2.1	Grade CF8	2.1	Type 304	2.1	F304	2.1	Type 304
16Cr-12Ni-2Mo	2.2	Grade CF8M	2.2	Type 316	2.2	F316	2.2	Type 316
18Cr-10Ni-Cb	2.5	Grade CF8C	2.5	Type 347	2.5	F347	2.5	Type 347
18Cr-8Ni	2.1	Grade CF3	2.3	Type 304L	2.3	F304L	2.3	Type 304L
16Cr-12Ni-2Mo	2.2	Grade CF3M	2.3	Type 316L	2.3	F316L	2.3	Type 316L
28Ni-19Cr-Cu-Mo	3.1	CN7M	3.1	ASTM B473, N08020	3.1	ASTM B462, N08020	3.1	ASTM B463, N08020

Note:

<sup>(a)</sup> ASME B16.34, Table 1 Material Group Number

<sup>(b)</sup> Not to be used for pressure boundary items including bodies, bonnets and caps.

3.7 Handwheels. Handwheels shall be of steel, malleable iron, ductile iron or aluminum. They shall be of the spoked design.

3.8 Gaskets. Body-bonnet and body cover plate gaskets shall be suitable for the applicable ratings listed herein, and for service with the types of fluids for which the valves are intended to be used.

#### 4. DESIGN

4.1 General. Valves shall be designed so that during testing, permanent distortion of body, bonnet, coverplate or seat faces does not occur to the extent that valve function is impaired.

##### 4.2 Wall Thickness

4.2.1 The minimum wall thickness of the body, bonnet, and coverplates shall be in accordance with ASME B16.34. The body wall thickness governs the pressure-temperature rating. If the bon-

net or cover material is not in the same material group as the body, its wall thickness shall support the pressure-temperature rating of the body.

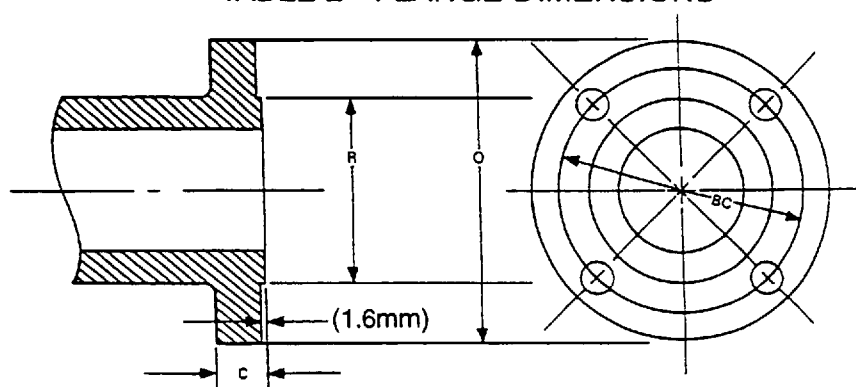
4.2.2 Additional metal thickness as needed for assembly, closing stresses, shapes other than circular, and stress concentrations shall be provided to meet the requirements of Subsection 4.1.

##### 4.3 End Flanges

4.3.1 End flanges shall be integrally cast with the valve body or may be attached by welding. Welding shall be in accordance with subsection 3.5.

4.3.2 The outside diameter, thickness, raised face diameter, number, size and location of bolt holes and tolerances of end flanges shall be in accordance with ASME B16.5. The integral flange dimensions listed in Table 2 shall be used for sizes NPS 1/4 through NPS 3/4 (DN 8 through DN 20) which are not listed in ASME B16.5.

TABLE 2—FLANGE DIMENSIONS



Nominal Pipe Size <sup>(b)</sup>		Flange Diameter O		Flange Thickness C		Raised Face Diameter R		Bolt Circle Diameter BC		No. <sup>(a)</sup> of Bolts	Bolt Size		Bolt Hole Diameter	
NPS	DN	in.	mm.	in.	mm.	in.	mm.	in.	mm.		in.	mm.	in.	mm.
1/4	8	2.50	65	0.34	9	1.00	25	1.69	43.0	4	3/8	M10	0.44	11
3/8	10	2.50	65	0.34	9	1.00	25	1.69	43.0	4	3/8	M10	0.44	11
1/2	15	3.50	90	0.38	10	1.38	35	2.38	60.5	4	1/2	M14	0.63	16
3/4	20	3.88	100	0.41	10	1.69	43	2.75	70.0	4	1/2	M14	0.63	16

General Note:

See Subsection 4.3.2 for tolerances.

Notes:

<sup>(a)</sup> Bolt holes for valves are located to straddle the center line

<sup>(b)</sup> Dimensions for all larger sizes are per ASME B16.5.

4.3.3 The flange face finish shall be in accordance with ASME B16.5.

4.3.4 Spot facing is not necessary provided that the back side of the end flange is parallel to the flange face within 1 degree. Spot facing, if used, shall be in accordance with MSS SP-9.

4.4 Weld Ends. Butt weld end dimensions and contour shall be as specified in ASME B16.25. The pipe schedule number shall be 40S in accordance with ASME B16.39M, unless otherwise specified in the Purchase Order.

4.5 Face-to-Face and End-to-End Dimensions. The face-to-face dimensions of valves shall be in accordance with ASME B16.10 except for "Y" pattern swing check valves with threaded cover plates as illustrated in Annex A, Figure 7. The face-to-face dimensions of "Y" pattern swing check valves with threaded cover plates shall be as follows:

U.S. Customary Units						
Valve Size, NPS	1/2	3/4	1	1 1/4	1 1/2	2
Face-to-Face, in.	4.50	5.00	5.75	6.50	7.25	8.50
Metric Units						
Valve Size, DN	15	20	25	32	40	50
Face-to-Face, mm.	114	127	146	165	184	216

4.6 Wedges and Discs. Gate valve wedges may be solid, split or double type. Solid wedges may be either plain having an I-shaped cross section or a tapered H, or inverted U cross section. Globe, angle, and lift check valve discs may be plug or spherical type or non-metallic. Swing check valve discs may be metallic with flat faces or non-metallic. Non-metallic discs shall be fitted to disc holders of corrosion resistant metal equal to the body. Wedges and discs of all types shall be properly guided to the seats.

TABLE 3—STUFFING BOX DIMENSIONS

Nominal Stem Diameter		Nominal Stuffing Box Bore		Nominal Packing Size		Nominal Stuffing Box Depth	
in.	mm.	in.	mm.	in.	mm.	in.	mm.
0.31	7.9	0.56	14.2	1/8	3.2	0.63	15.9
0.38	9.7	0.63	16.0	1/8	3.2	0.63	15.9
0.44	11.2	0.75	19.1	5/32	4.0	0.78	19.8
0.50	12.7	0.88	22.4	3/16	4.8	0.94	23.8
0.56	14.2	0.94	23.9	3/16	4.8	0.94	23.8
0.62	15.7	1.12	28.4	1/4	6.4	1.25	31.8
0.69	17.5	1.19	30.2	1/4	6.4	1.25	31.8
0.75	19.1	1.25	31.8	1/4	6.4	1.25	31.8
0.88	22.4	1.38	35.1	1/4	6.4	1.25	31.8
1.00	25.4	1.50	38.1	1/4	6.4	1.25	31.8
1.12	28.4	1.75	44.5	5/16	7.9	1.56	39.7
1.25	31.8	1.88	47.8	5/16	7.9	1.56	39.7
1.38	35.1	2.00	50.8	5/16	7.9	1.56	39.7
1.50	38.1	2.25	57.2	3/8	9.5	1.88	47.6
1.62	41.1	2.38	60.5	3/8	9.5	1.88	47.6
1.75	44.5	2.50	63.5	3/8	9.5	1.88	47.6
1.88	47.8	2.63	66.8	3/8	9.5	1.88	47.6
2.00	50.8	2.88	73.2	7/16	11.1	2.19	55.6
2.12	53.8	3.00	76.2	7/16	11.1	2.19	55.6
2.25	57.2	3.25	82.6	1/2	12.7	2.50	63.5

4.7 Seats. Seats may be integral with the valve body. When inserted body seats are furnished, users are cautioned to consider the effects of crevice corrosion.

4.8 Glands. Glands shall be bolted type, solid, or two piece design.

4.9 Gland Bolting. Studs, stud bolts, hinge bolts, or headed bolts through drilled or slotted holes in the packing box flange may be used. In all cases gland bolting shall be securely held in place and

shall provide adequate adjustment for progressive compression of packing material.

4.10 Stuffing Box. The stuffing box bore for the corresponding stem diameter shall be as listed in Table 3. The nominal stuffing box depth shall be at least equivalent to 5 rings of square packing.

4.11 Backseating. All valve types, other than check valves, shall be designed with a backseating feature. Repacking under pressure is not recommended as a normal maintenance procedure.

TABLE 4—PRESSURE-TEMPERATURE RATINGS

U.S. Customary Units

Service <sup>(a)</sup> Temperature °F	Maximum working pressure, psig				
	CF8, CF3, 304	CF8M, CF3M, 316	304L, 316L	CF8C, 347	CN7M
-20 to 100	275	275	230	275	230
150	253	255	213	265	215
200	230	235	195	255	200
250	218	225	185	243	195
300	205	215	175	230	190
350	198	205	168	215	190
400	190	195	160	200	190
450	180	183	153	185	180
500	170	170	145	170	170

Metric Units

Service <sup>(a)</sup> Temperature °C	Maximum working pressure, bar				
	CF8, CF3, 304	CF8M, CF3M, 316	304L, 316L	CF8C, 347	CN7M
-29 to 38	19.0	19.0	15.9	19.0	15.9
50	18.3	18.4	15.3	18.7	15.4
100	15.7	16.0	13.3	17.4	13.7
150	14.1	14.8	12.0	15.8	13.1
200	13.2	13.6	11.1	14.0	13.1
250	12.0	12.0	10.2	12.1	12.0
300	10.2	10.2	9.8	10.3	10.2
260	11.7	11.7	10.0	11.7	11.7

Note: <sup>(a)</sup>See Subsection 5.3.1



#### 4.12 Stems

4.12.1 Stems shall be threaded with single or multiple Acme-type thread or 60-degree thread approximating the Stub form.

4.12.2 Gate valve stems shall be of sufficient length so as to be at least flush with the top of the stem nut thread after the wedge has worn into its lowest position.

4.13 Packing. Stem packing shall be of design and materials suitable for the primary service temperature.

4.14 Gaskets. Body-bonnet gaskets may be either full faced or extending to the inside of the bonnet bolts, or retained in recess in the bonnet flange of the body.

### 5. PRESSURE-TEMPERATURE RATINGS

5.1 General. Flanged end and butt weld end valves covered by this Standard Practice shall be designated as Class 150 (PN 20). Except as provided in 5.5, ratings for all valves are the maximum allowable working pressures, expressed as gage pressure, at the temperatures shown. For intermediate temperatures linear interpolation is permitted. The ratings listed in Table 4 are identical to those listed in ASME B16.34 Class 150 (PN 20) Standard Class for the applicable materials.

5.1.1 Flanged End Valves. Valves conforming to the requirements of this Standard Practice for flanged end valves shall have the ratings as shown in Table 4. For an installed valve to merit the pressure-temperature ratings listed herein, the bolting and gaskets for the end flanges must be in accordance with ASME B16.5.

5.2 The temperatures listed are the material temperatures of the pressure retaining structure. In view of the various environments in which piping components may be installed (for example, insulated or uninsulated, heated or cooled externally) in establishing pressure ratings, it is assumed that the material temperature of the pressure retaining structure is the temperature of the contained fluid. Use of a temperature other than that of the contained fluid is the responsibility of the user and

subject to the requirements of any applicable code.

5.3 Temperature Effects. Some considerations of the effect of temperature in application are given below. Additional guidance can be found in ASME B16.5 as related to line flange joints.

5.3.1 Low Temperature. For a material shown in Table 1, the pressure rating for service at any temperature below -20°F (-29°C) shall be no greater than the rating shown in the Table for -20°F (-29°C).

5.3.2 Fluid Thermal Expansion. Under certain conditions, some double seated valve designs are capable of sealing simultaneously against pressure differential from the bonnet section to the adjacent pipe in both directions. A circumstance in which the bonnet section is filled with liquid and subjected to an increase in temperature can result in a buildup of pressure in the bonnet section. An example is an isolation valve in a cryogenic fluid system having the liquified gas trapped in the bonnet cavity of the closed valve. If the cavity pressure is not relieved by a suitable auxiliary means, pressure increase will result during subsequent warming of the cryogenic fluid. Where such a condition is possible, it is the responsibility of the purchaser to provide or require to be provided means in design and/or installation, or procedure in operation to assure that the pressure in the valve will not exceed that allowed by this standard for the attained temperature.

5.4 Guidance for the Use of Flanged Valve Ratings. Application of flanged end valves at either high or low temperatures or in a service subject to rapid fluid temperature variations entails some risk of flanged joint leakage. Guidance, which is intended to minimize these risks, is provided in ASME B16.5. Precautions regarding the bolting of steel flanged end valves to cast iron flanges are given in ASME B16.5.

5.5 Variances. Except as provided for below, the ratings are the maximum allowable working pressure for the corresponding temperature.

5.5.1 Safety Valve, Relief Valve or Rupture Disc Operation. Under conditions of safety valve, relief valve or rupture disc operations, the pressure may exceed the rated pressure for a valve furnished

under this standard by no more than 10 percent of that defined by the pressure-temperature rating. Such conditions are necessarily of limited duration.

Operating excursions in excess of the aforementioned are the sole responsibility of the user and are subject to the requirements of applicable codes and regulations.

**5.5.2 Other Variances.** Subjecting valves to operating variances (transients) in excess of the valve ratings is solely the responsibility of the user and is subject to the requirements of applicable codes and regulations.

**5.5.3 System Hydrostatic Tests.** If valves conforming to this standard are subjected to hydrostatic pressure testing of systems with the valve in the closed position at pressures greater than the 100°F (38°C) rating, such testing will be the responsibility of the user. In the open position, valves installed in a piping system may be subjected to system tests at conditions not to exceed the hydrostatic shell test of Section 7 provided the user has determined that there are no functional limitations, for example, restrictions on actuating devices or special materials of construction.

## 6. WORKMANSHIP

Valve parts shall be designed and manufacturing tolerances set so as to provide interchangeability of the like parts in the product of any one manufacturer between units of the same size and type, except the individual fit of the wedge or disc in the body seats.

## 7. TESTS

All pressure tests shall be performed on completed valves prior to shipment from the manufacturer's works in accordance with MSS SP-61.

## 8. MARKING

Marking shall conform to MSS SP-25 and ASME B16.34 where applicable. Trim material symbols need not be marked on identification plate unless the valve is trimmed with materials having basic chemistry different from the valve body.

## 9. PAINTING

Valves shall not be painted or provided with other protective coating unless specified on purchase order. However, exterior parts not in contact with the corrosive media and regularly furnished from material other than stainless steel may be coated to prevent atmospheric corrosion.

ANNEX A

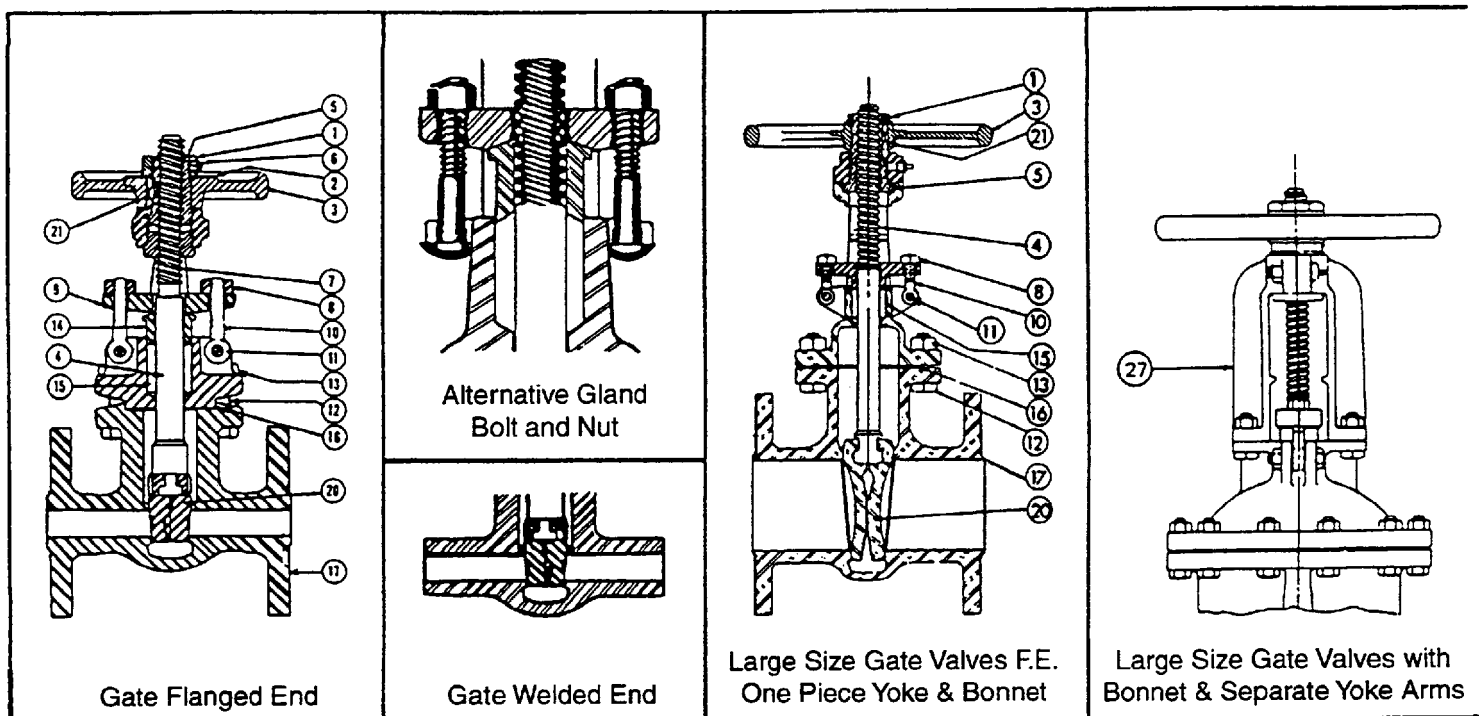


FIGURE 1

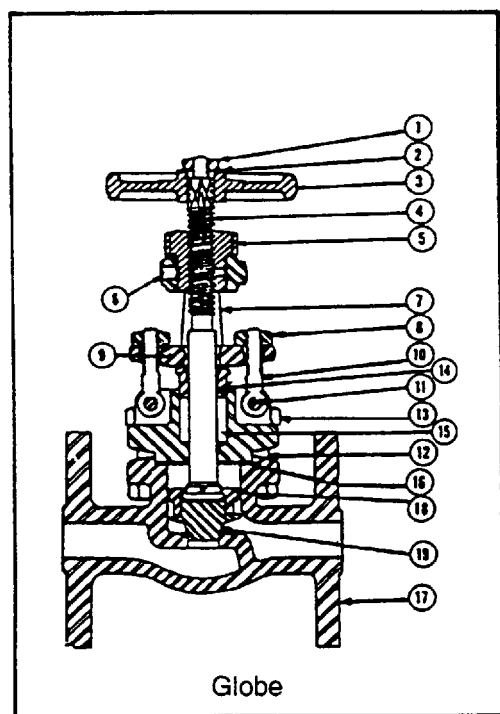


FIGURE 2

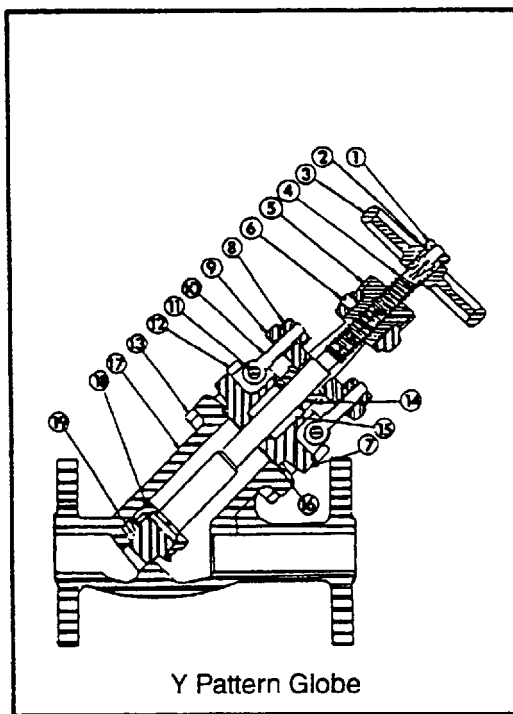


FIGURE 3

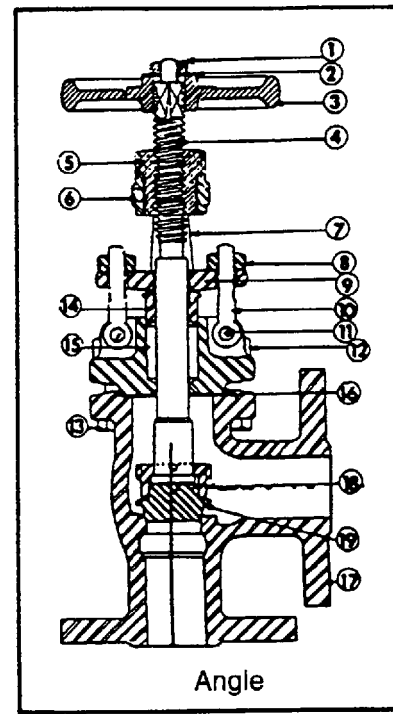


FIGURE 4

## ANNEX A

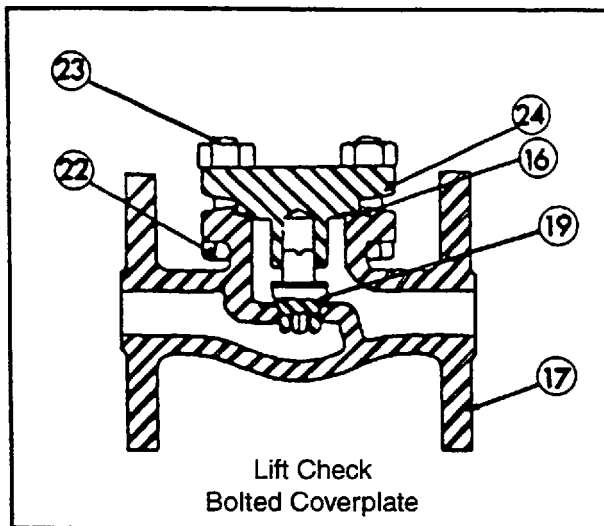


FIGURE 5

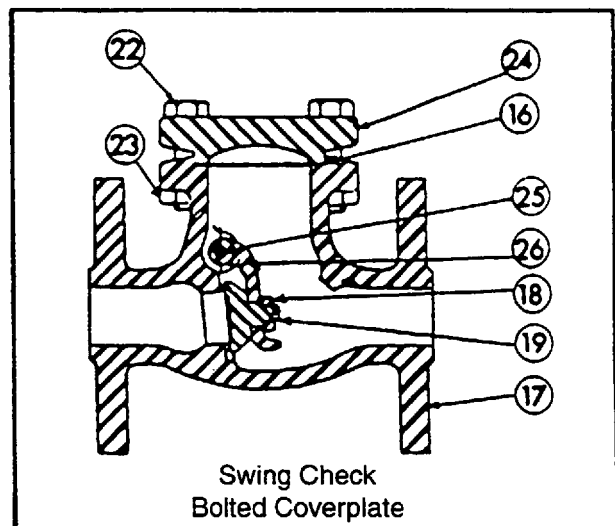


FIGURE 6

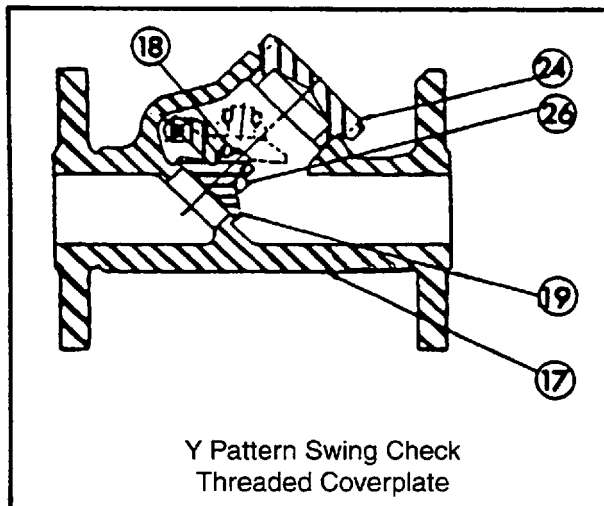


FIGURE 7

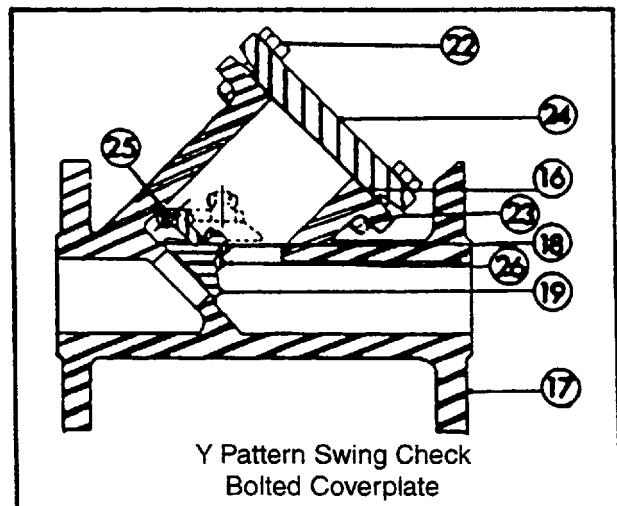


FIGURE 8

## PART NAMES

- |                         |                         |
|-------------------------|-------------------------|
| 1. Handwheel Nut        | 15. Packing             |
| 2. Identification Plate | 16. Gasket              |
| 3. Handwheel            | 17. Body                |
| *4. Stem                | *18. Disc Locknut       |
| 5. Stem Nut             | *19. Disc               |
| 6. Set Screw            | *20. Wedge              |
| 7. Yoke Bonnet          | 21. Stem Nut Key        |
| 8. Gland Bolt Nut       | 22. Cap Bolt            |
| 9. Gland Flange         | 23. Cap Bolt Nut        |
| 10. Gland Bolt          | 24. Coverplate          |
| 11. Gland Bolt Pin      | *25. Hinge Pin          |
| 12. Body Bolt           | *26. Hinge              |
| 13. Body Bolt Nut       | 27. Separable Yoke Arms |
| 14. Gland               |                         |

\*Valve Trim Parts

## ANNEX B

## REFERENCED STANDARDS AND APPLICABLE DATES

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

ASME, ANSI/ASME, ANSI, ASME/ANSI

B16.34-1996	Valves—Flanged, Threaded and Welding End
B36.19M-1985	Stainless Steel Pipe
B16.5-1996	Pipe Flanges and Flanged Fittings
B16.10-1992	Face-to-Face and End-to-End Dimensions of Valves
B16.25-1997	Buttwelding Ends

Boiler and Pressure Vessel Code, 1998 Edition (including addenda)

Section III	Rules for Construction of Nuclear Power Plant Components
Section VIII	Pressure Vessels
Section IX	Welding and Brazing Qualifications

MSS

SP-6-1996	Standard Finishes for Contact Faces of Pipe Flanges and Connecting 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 45-1992	Bypass and Drain Connections
SP 55-1996	Quality Standard for Steel Castings for Valves, Flanges and Fittings and Other Piping Components—Visual Method.
SP 61-1992	Pressure Testing of Steel Valves

ASTMSpecifications for:

A 182-1997	Forged or Rolled Alloy Steel Pipe Flanges, Forged Fittings and Valves and Parts for High Temperature Service
A 193-1997	Alloy Steel and Stainless Steel Bolting Materials for High temperature Service
A 194-1996	Carbon and Alloy Steel Nuts for bolts for High Pressure and High Temperature Service
A 240-1997	Heat Resisting Chromium and Chromium-Nickel Stainless Steel Plate, Sheet and Strip for Pressure Vessels
A 276-1997	Stainless and Heat Resisting Steel Bars and Shapes
A 351-1994	Castings, Austenitic, Austenitic Ferritic (Duplex), for Pressure-Containing Parts
A 473-1997	Stainless and Heat Resisting Steel Forgings
A 479-1997	Stainless and Heat Resisting Steel Wire Bars and Shapes for Use in Boilers and Other Pressure Vessels

Publications of the following organizations appear in the above list:

ANSI	American National Standards Institute, Inc. 11 West 42nd Street, New York, NY 10036
ASME	The American Society of Mechanical Engineers 345 East 47th Street, New York, NY 10017
ASTM	American Society for Testing and Materials 100 Barr Harbor Drive, West Conshocken, PA 19428-2959
MSS	Manufacturers Standardization Society of the Valve and Fittings Industry, Inc. 127 Park Street, N.E., Vienna, VA 22180

**List of MSS Standard Practices**  
(Price List Available Upon Request)

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-25-1998	Standard Marking System For Valves, Fittings, Flanges and Unions
SP-42-1999	(R 95) Class 150 Corrosion Resistant Gate, Globe, Angle and Check Valves with Flanged and Butt Weld Ends
SP-43-1991	(R 96) Wrought Stainless Steel Butt-Welding Fittings
SP-44-1996	Steel Pipeline Flanges
SP-45-1998	Bypass and Drain Connections
SP-51-1991	(R 95) Class 150LW 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 Eval. of Surface Irregularities
SP-58-1993	Pipe Hangers and Supports - Materials, Design and Manufacture
SP-60-1999	Connecting Flange Joint Between Tapping Sleeves and Tapping Valves
SP-61-1992	Pressure Testing of Steel Valves
SP-65-1999	High Pressure Chemical Industry Flanges and Threaded Stubs for Use with Lens Gaskets
SP-67-1995	Butterfly Valves
SP-68-1997	High Pressure Butterfly Valves with Offset Design
SP-69-1996	Pipe Hangers and Supports - Selection and Application
SP-70-1998	Cast Iron Gate Valves, Flanged and Threaded Ends
SP-71-1997	Gray 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 96) Brazing Joints for Wrought and Cast Copper Alloy Solder Joint Pressure Fittings
SP-75-1998	Specification for High Test Wrought Butt Welding Fittings
SP-77-1995	Guidelines for Pipe Support Contractual Relationships
SP-78-1998	(R 92) 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-86-1997	Guidelines for Metric Data in Standards for Valves, Flanges, Fittings and Actuators
SP-87-1991	(R 96) Factory-Made Butt-Welding Fittings for Class 1 Nuclear Piping Applications
SP-88-1993	Diaphragm Type Valves
SP-89-1998	Pipe Hangers and Supports - Fabrication and Installation Practices
SP-90-1986	(R 91) Guidelines on Terminology for Pipe Hangers and Supports
SP-91-1992	(R 96) Guidelines for Manual Operation of Valves
SP-92-1987	(R 92) MSS Valve User Guide
SP-93-1987	(R 92) Quality Standard for Steel Castings and Forgings for Valves, Flanges, and Fittings and Other Piping Components - Liquid Penetrant Examination Method
SP-94-1992	Quality Std for Ferritic and Martensitic Steel Castings for Valves, Flanges, and Fittings and Other Piping Components - Ultrasonic Examination Method
SP-95-1986	(R 91) 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 96) 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-109-1996	Welded Fabricated Copper Solder Joint Pressure Fittings
SP-110-1996	Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared 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 at \$19.00 each. Same quantity discounts apply on total order.
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-115-1999	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	Bellied End Socket Welding Fittings, Stainless Steel and Copper Nickel
SP-120-1997	Flexible Graphite Packing System for Rising Stem Steel Valves (Design Requirements)
SP-121-1997	Qualification Testing Methods for Stem Packing for Rising Stem Steel Valves
SP-122-1997	Plastic Industrial Ball Valves
SP-123-1998	Non-Ferrous Threaded and Solder-Joint Unions for Use With Copper Water Tube

(R-YEAR) Indicates year standard reaffirmed without substantive changes

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.

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