SOUTHWEST GAS CORPORATION
ENGINEERING STAFF
MATERIAL SPECIFICATION

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VALVES AND STOPS
Valve, Ball, Steel or Ductile Iron

1. SCOPE

This specification covers steel, flanged and weld end, and ductile iron flanged end ball valves in sizes 2" NPS and larger. The ball valves have pressure ratings corresponding to ANSI Class 125, 150, 300, 400, 600 and 1500 or other pressure ratings as approved by Southwest. The valves do not require lubrication to obtain a positive shut-off. Ball valves covered by this specification are intended for use as block valves in gas piping, for hot tapping applications, and in facilities where minimum restriction is required in the primary flow path. Ball valves made with ductile (nodular) iron material will not be used in compressor station installations.

All ball valves covered by this specification, when installed as a single component, may be installed without an installation pressure test. When an installation pressure test is required, the maximum installation test pressure will not exceed the manufacture's test pressure shown in the Appendices of this document.

2. APPLICABLE DOCUMENTS

2.1 American National Standards Institute (ANSI) B-1.20.1, "Pipe Threads, General Purpose (Inch)."

2.2 American National Standards Institute (ANSI) B-16.5, "Pipe Flanges and Flanged Fittings."

2.3 American National Standards Institute (ANSI) B-16.10, "Face-to-Face and End-to-End Dimensions of Valves."

2.4 American National Standards Institute (ANSI) B-16.11 "Forged Steel Fittings, Socket Welding and Threaded."

2.5 American National Standards Institute (ANSI) B-16.34, "Steel Valves Flanged and Butt-Welding Ends."

2.6 American Petroleum Institute (API) Specification 6D (23rd Edition, Apr. 2008), "Specification for Pipeline Valves."

2.7 ASTM International (ASTM) A-53M (Oct. 2010), "Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Scanless."

2.8 ASTM International (ASTM) A-106M (Oct. 2010), "Specification for Seamless Carbon Steel Pipe for High-Temperature Service."

2. APPLICABLE DOCUMENTS (Cont'd)

2.9 ASTM International (ASTM) A-395, "Specification for Ferritic Ductile Iron Pressure – Retaining Castings for Use at Elevated Temperatures."

2.10 Manufacturers Standardization Society (MSS) Standard Practice (SP) 25, "Standard Marking System for Valves, Fittings, Flanges and Unions."

2.11 Manufacturers Standardization Society (MSS) Standard Practice (SP) 45, "Bypass and Drain Connection Standard."

2.12 United States Department of Transportation (DOT), Code of Federal Regulations, Title 49, Part 192, "Transportation of Natural and Other Gas by Pipeline; Minimum Safety Standards."

NOTE: Unless otherwise specified, the editions of the above document incorporated by DOT 49 CFR 192 are applicable. The above documents, and parts of documents (including annexes), not incorporated by 49 CFR 192 are incorporated by this Material Specification and will be the most recent edition. If a conflict exists between the applicable documents and/or this Material Specification, the requirements of 49 CFR 192 shall govern, and in the event of all other conflicts, the more stringent requirement shall govern.

3. TERMINOLOGY

3.1 General

3.1.1 "Southwest Gas," "Southwest" or "SWG" wherever used in this specification and other related documents will refer exclusively to Southwest Gas Corporation.

3.1.2 The terms "approved," "as approved," "satisfactory," "as directed," "or equal" or other similar terms wherever used in this specification and other related documents will mean "as determined by Southwest Gas," unless specifically stated otherwise.

3.1.3 "Product Information Package" or "PIP" wherever used in this specification and other related documents will mean the required technical product information that a manufacturer must submit to SWG to determine if the product is suitable for use by SWG, unless specifically stated otherwise.

3. TERMINOLOGY (Cont'd)

3.2 CWP will mean "Cold Working Pressure" and is the maximum service pressure permitted in the ambient temperature range of -20°F to 100°F (-29°C to 38°C). CWP is expressed in psig (pounds per square inch gage).

3.3 WOG will mean "Water, Oil, and Gas" and is equivalent to CWP in Paragraph 3.2.

3.4 The following ANSI Class ratings will mean the corresponding cold working pressures (CWP) as recognized by Southwest Gas:

ANSI CLASS	CWP
	psig
125	200
150	275
300	720
400	960
600	1440
900	2160
1500	3600

TABLE D-3.1

3.5 There are two categories of ball valves.

3.5.1 Pipeline ball valves are intended for use in transmission and distribution facilities operating at pressures exceeding 60 psig. They include body vents and most include emergency sealant ports.

3.5.2 Distribution ball valves are intended for use in distribution facilities operating at 175 psig or less. These valves have no lubrication ports or body vents.

4. MATERIALS AND MANUFACTURING

4.1 All steel valves will be hydrotested in accordance with API 6D unless the testing procedure is specifically pre-approved by Southwest.

4.2 Valve testing records will be documented by one of the following methods:

- Stamped on the valve.
- Retained by the manufacturer and retrievable when provided the valve serial number.

4.3 Ball valves manufactured to this specification will meet the minimum requirements of API Specification 6D, DOT 49 CFR 192 and all additional requirements defined in this material specification. Southwest reserves the right to require an additional air seat test or higher test pressures.

4.4 Flange ends will conform to ANSI B-16.5.

4.5 Weld ends will conform to ANSI B-16.34.

4.6 The valve ball will be made with material approved by Southwest. The ball will be polished or have a protective coating to prevent galling and seizure and to improve sealing and bearing characteristics.

4.7 Seals will be compatible with natural gas.

4.8 All ball valves will be supplied, when specified on the purchase order, with an operation extension for the shank so that the worm gear or wrench can be operated above ground. All vents drains and lubrication ports will also be extended. The extended height will be measured from the centerline of the valve bore to the bottom of the top face of the actuator's mounting flange.

4.9 Wrench-operated valves will be supplied with a 2" operating nut.

4.10 When extensions of sealant or body bleed lines are specified, the following requirements will be met:

4.10.1 All sealant and body bleed lines will be constructed of A-53 or A-106 Grade B, Schedule 80, seamless or ERW pipe.

4.10.2 Threaded and socket weld fittings on sealant and body bleed lines will be at least ANSI 16.11, 2000 lb. rated fittings.

4. MATERIALS AND MANUFACTURING (Cont'd)

4.10.3 All sealant and body bleed lines will be welded, except the following may be welded or threaded:

- The connections to the ball valve
- The bleed line valve
- The sealant injection fitting

4.10.4 No unions will be installed on the sealant and body bleed lines.

4.10.5 The sealant and body bleed lines will be tested for a minimum of five (5) minutes to the same pressure required by API 6D for the valve to which they will be attached. This test may be performed separately or after attachment to the ball valve. The test will be performed so that the ball valve and the seat will not be damaged.

4.11 Ball valves with an operating torque over 200 foot-pounds (271.2 n*m) will be available with a gear operator. Hand wheels will be marked with the direction of movement to open the valve.

4.12 Upon agreement between the supplier and Southwest Gas, the valves will have a protective coating, other than primer, applied to the valve body and sealant body bleed lines. This coating may be paint, epoxy or other corrosion and holiday inhibitors and will be specified on the purchase order. Coatings may be required to pass a holiday test outlined in Paragraph 5.3 of this specification.

4.13 The shank and/or the shank adapter will have a permanent-marking device to indicate if the valve is in the open or closed position.

4.14 Pipeline ball valves will have a drain or by-pass connection meeting the requirements of MSS SP-45 when specified by Southwest Gas.

4.15 All threaded connections and threaded fittings will be in conformance with ANSI B-1.20.1.

4.16 Ball valves made with ductile iron shall meet the requirements of ASTM A-395.

5. PERFORMANCE REQUIREMENTS

5.1 The ball valve will close in a clockwise direction. Stops will be provided to limit rotation to 90° from full open to full close and a position indicator will be provided.

5.2 A new ball valve will not require the injection of sealant to obtain a positive seal.

5.3 When specified by Southwest Gas, epoxy or other electrically insulating coatings will pass a holiday detection test applicable for the specified type of coating.

5.4 Wrench operated ball valves must be available with a compatible locking or tamper proof device. When locked with a padlock or barrel lock, valve operation must be prevented.

6. DIMENSIONS AND TOLERANCES

6.1 Flange dimensions and tolerances will conform to Southwest Gas MS B-1 and ANSI B-16.5.

6.2 Weld ends dimensions and tolerances will conform to ANSI B-16.34.

6.3 Face-to-face, end-to-end and face-to-end dimensions and tolerances will be in accordance to ANSI B-16.10 or API Specification 6D and are shown in Appendix A through C of this specification. Reduced bore valves will have the same end-to-end dimensions as full-bore valves.

7. INSPECTION

7.1 Successful review of the Product Information Package (PIP) as well as any future reference by Southwest to the Seller's part number or internal code number in any future contract or purchase, will mean only that no conflict with the specification was found and will not relieve the seller from meeting all the requirements of this specification.

7.2 SWG retains the option to inspect at the manufacture and testing of all materials, products or systems referenced in this specification that are sold to SWG.

7. INSPECTION (Cont'd)

7.3 SWG will make appropriate inspections and tests of all materials, products or systems supplied to this specification. Southwest will have the right, at their option, to reject any material, which fails to conform to this specification. Any such rejection may take place at the manufacturer's facility; the supplier's warehouse or any subsequent delivery location, before or after Southwest assumes possession. Notice of the rejection will be made promptly to the supplier by SWG. The defective product will be replaced or returned for credit at the manufacturer's expense.

7.4 Any changes in the manufacturing of previously approved materials, products or systems described in this material specification for sale to SWG, must be approved by SWG's Engineering Staff. **Failure to obtain Southwest's approval may be cause for rejection and disqualification as an approved supplier.**

8. CERTIFICATION

The manufacturer's or supplier's certification will be furnished to Southwest. This certification will state that samples representing each lot have been manufactured, tested and inspected in accordance with this specification and that all requirements have been met. When requested or specified in the purchase order or contract, a report of test results will be provided.

For components with nominal diameters greater than 2 inches, testing documentation demonstrating the physical characteristics of the components which include, at a minimum, diameter, yield strength, ultimate tensile strength, wall thickness, seam type and chemical composition shall be provided to Southwest in accordance with 49 CFR 192.

Upon the request of Southwest, the certification of an independent third-party indicating conformance to the specification may be considered at Southwest's expense.

9. SAFETY DATA SHEETS

In accordance with law, the seller will supply Safety Data Sheets for all applicable items supplied under this specification to the following:

1) The Receiving Location

2) Engineering Staff

3) Southwest Gas Corporation
Corporate Safety
Mail Station LVA-120
P.O. Box 98510
Las Vegas, NV 89193-8510

10. PRODUCT MARKING

10.1 Each ball valve will be marked on the body with the following:

- Manufacturer's name or trademark
- Material designation
- Rating designation
- Melt identification (if required by MSS SP-25)
- Nominal pipe size

10.2 Each ball valve will have an identification plate with the following information:

- Manufacturer's name or trademark
- Body material designation
- Rating designation
- Valve trim designation

10.3 Hand wheels will be marked with the direction of movement to open the valve in accordance with Paragraph 5.1 of this specification.

11. PACKAGING AND PACKAGE MARKING

Ball valves with threaded ends will be free of paint and be plugged with thread protectors. Flange ends and weld ends will have a suitable protector to prevent damage to contact surfaces and prevent contamination of the valve. Flange contact faces will be free of protective coating.

12. STOCK CLASSIFICATION DESCRIPTION

12.1 VALVE, BALL; ___-INCH WITH _____ ENDS (FLANGED, WELD OR WELD X FLANGE); ANSI CLASS _____ WITH _____ BORE (REDUCED OR FULL);

12.2 (APPROVED COATING IF OTHER THAN PRIMER, I.E., EPOXY OR MANUFACTURER'S BRAND); ____(GEAR OPERATED IF 6-INCH OR LARGER);

12.3 (W/LOCKING DEVICE, IF APPLICABLE).

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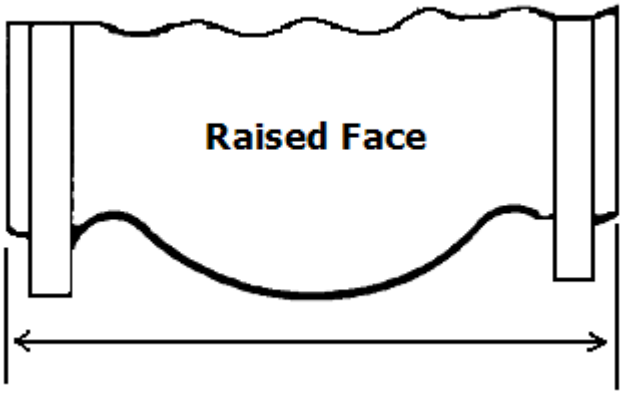
APPENDIX A
Flange End Valves



Valve Size NPS Inches	FULL BORE			
	ANSI CLASS 150 Inches	ANSI CLASS 300 Inches	ANSI CLASS 400 Inches	ANSI CLASS 600 Inches
2	7.00	8.50	11.50	11.50
3	8.00	11.125	14.00	14.00
4	9.00	12.00	16.00	17.00
6	15.50	15.875	19.50	22.00
8	18.00	19.75	23.50	26.00
10	21.00	22.375	26.50	31.00
12	24.00	25.50	30.00	33.00
14	27.00	30.00	32.50	35.00
16	30.00	33.00	35.50	39.00
18	34.00	36.00	38.50	43.00
20	36.00	39.00	41.50	47.00
22	39.00	43.00	45.00	51.00
24	42.00	45.00	48.50	55.00

TABLE D-3.2

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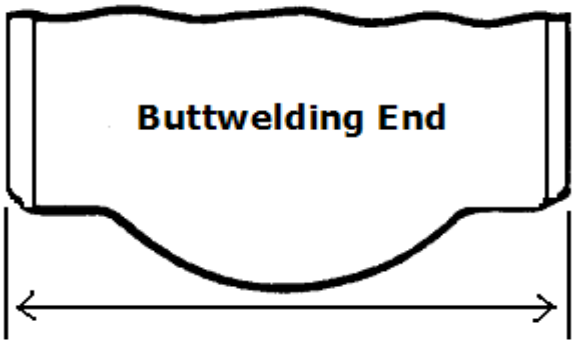
VALVES AND STOPS
Valve, Ball, Steel or Ductile Iron

APPENDIX B
WELD END VALVES



Valve Size NPS Inches	FULL BORE			
	ANSI CLASS 150 Inches	ANSI CLASS 300 Inches	ANSI CLASS 400 Inches	ANSI CLASS 600 Inches
2	8.50	8.50	11.50	11.50
3	11.125	11.125	14.00	14.00
4	12.00	12.00	16.00	17.00
6	18.00	18.00	19.50	22.00
8	20.50	20.50	23.50	26.00
10	22.00	22.00	26.50	31.00
12	25.00	25.00	30.00	33.00
14	30.00	30.00	32.50	35.00
16	33.00	33.00	35.50	39.00
18	36.00	36.00	38.50	43.00
20	39.00	39.00	41.50	47.00
22	43.00	43.00	45.00	51.00
24	45.00	45.00	48.50	55.00

TABLE D-3.3

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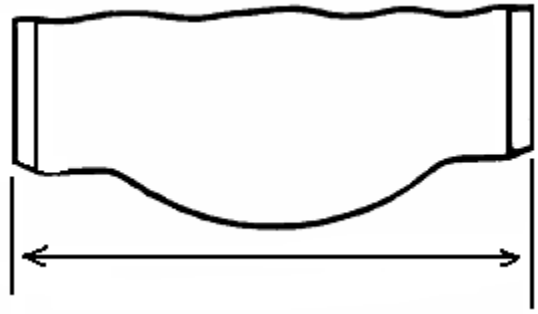
VALVES AND STOPS
Valve, Ball, Steel or Ductile Iron

APPENDIX C
WELD X FLANGE VALVES

Valve Size NPS Inches	FULL BORE			
	ANSI CLASS 150 Inches	ANSI CLASS 300 Inches	ANSI CLASS 400 Inches	ANSI CLASS 600 Inches
2	7.75	8.50	11.50	11.50
3	9.56	11.125	14.00	14.00
4	10.50	12.00	16.00	17.00
6	16.75	16.94	19.50	22.00
8	19.25	20.125	23.50	26.00
10	21.50	22.187	26.50	31.00
12	24.50	25.50	30.00	33.00
14	28.50	30.00	32.50	35.00
16	31.50	33.00	35.50	39.00
18	35.00	36.00	38.50	43.00
20	37.50	39.00	41.50	47.00
22	41.00	43.00	45.00	51.00
24	43.50	45.00	48.50	55.00

TABLE D-3.4

APPENDIX D
THREADED VALVES



Valve Size NPS Inches	ANSI CLASS 150 – REG. BORE
	Inches
1/2	3.875
3/4	4.375
1	4.250
1-1/4	5.250
1-1/2	5.250
2	6.250

TABLE D-3.5

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VALVES AND STOPS

Valve, Ball, Steel or Ductile Iron

ANSI CLASS 125											
Valve Size NPS Inches	Port Inches	WP Class 125 Flat Face	A In.	B In.	C In.	E In.	F In.	G In.	H In.	M In.	N In.
2×1-1/2×2	1-1/2	FF200	7	2-3/4	4-1/4	3-5/8	3/4	.434	.837	7-1/4	5
3×2×3	2	FF200	8	3	5	4-3/8	3/4	.497	.998	10-1/4	5-3/8
4×3×4	3	FF200	9	3-3/8	5-5/8	5-3/4	7/8	.747	1.373	20	6-3/4
6×4×6	4	FF200	10-1/2	3-13/16	6-11/16	6-3/8	7/8	.747	1.373	20	7-3/8

TABLE D-3.11

ANSI CLASS 150							
Size	A Port In.	B In.	C In.	D In.	E In.	F In.	Cv
2×1.5×2	1.5	11.8	5	3-5/8	2	4.5	148
3×2.5×3	2.5	11.8	6-1/8	5-1/4	2	4.5	550
4×3×4	3	12.8	6-3/4	6-1/4	2	4.5	662
6×4×6	4	13.8	7-1/2	6-7/8	2	4.5	800

TABLE D-3.12