SOUTHWEST GAS CORPORATION

ENGINEERING STAFF

MATERIAL SPECIFICATION

Section No:	MS B-1
Page No.:	1 of 19
Issue Date:	05/05/26
Superseded Date:	02/26/20

Prepared By: Engineering Staff LM

Approved By: Kevin Lang

PIPE FITTINGS

Flanges, Steel

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PIPE FITTINGS
Flanges, Steel

1. SCOPE

This specification covers weld neck, blind, and threaded flanges in nominal pipe sizes 1/2-inch to 42-inch and socket weld flanges in 3/4-inch to 3-inch, all with ANSI Class Ratings 150, 300, 400, 600, 900.

All pipe flanges covered by this specification must be tested in accordance with DS G-2 prior to installation.

2. APPLICABLE DOCUMENTS

2.1 American Society of Mechanical Engineers (ASME) B16.5, “Pipe Flanges and Flanged Fittings”

2.2 American Society of Mechanical Engineers (ASME) B16.47, “Large Diameter Steel Flanges NPS 26 Through NPS 60 Metric/Inch Standard”

2.3 Manufacturer's Standardization Society of the Valve and Fittings Industry (MSS) SP-44, “Steel Pipeline Flanges.”

2.4 American Society of Mechanical Engineers (ASME) B1.20.1, “Pipe Threads, General Purpose (INCH).”

2.5 Title 49, Code of Federal Regulations, part 192, “Transportation of Natural and other Gas by Pipeline: Minimum Federal Safety Standards” (49 CFR 192).

NOTE: Unless otherwise specified, the editions of the document incorporated in whole or in part by 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. The application of earlier editions of those documents not incorporated by reference in 49 CFR 192 can be applied with engineering staff approval.

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.

4. MATERIALS AND MANUFACTURE

4.1 Flanges purchased to this specification will be manufactured, as a minimum, in accordance with ASME B16.5 or MSS SP-44 for grade B flange. Flanges F42 and higher shall be purchased to MSS SP-44.

4.2 The threads in threaded flanges will conform to ASME B1.20.1.

4.3 Weld neck flange ends will be beveled for welding in accordance with ASME B16.5 or MSS SP-44.

4.4 Flanges will be painted or treated with corrosion inhibiting agents to prevent rusting. These coatings will not interfere with the sealing surfaces.

4.5 Flanges will not be taper bored to obtain the specified wall thickness without prior approval from the requestor at Southwest Gas.

4. MATERIALS AND MANUFACTURE (Cont'd)

4.6 Material specified on the purchase order to match a specific pipe grade may be supplied to a lesser grade material than the pipe quoted provided the pressure rating of the fitting matches the hoop strength of the quoted pipe. An approval drawing of the weld end dimensions shall be submitted to SWG by the flange supplier for approval prior to purchasing. The approval drawing shall include the specification and grade of the forging, the size and class of the flange, and the wall thickness and grade specified for the matching pipe.

4.7 Grade F36 flanges in Classes 400 and higher shall be annealed, normalized, normalized and tempered, or quenched and tempered. Flanges in grades F42 and higher shall be supplied in the normalized, normalized and tempered, or quenched and tempered condition. Minimum tempering temperature shall be 1,000 °F

4.8 Flanges manufactured in accordance with MSS SP-44 with a Carbon Equivalent (C.E.) in excess of 0.48% shall not be accepted. While flanges with a C.E. of 0.42% or less are preferred, if the actual C.E. is greater than 0.45%, the parts shall be stamped, or paint marked with the actual C.E. as shown in Section 10 – Product Marking.

4.9 For flanges purchased to MSS SP-44, the supplementary requirements specified in SR-2, SR-13, and SR-18 shall be invoked:

- SR-2: Actual yield strength shall not exceed the specified minimum yield strength by more than 138 MPa (20 ksi).
- SR-13: Individual Hardness Testing for Quench and Tempered Flanges
- SR-18: PSL2
    - PSL2 flange chemistry shall be High Yield Carbon Steel. If approved by Company in writing, flange chemistry may be Vanadium Nitride (VN) Strengthened Steel.

5. PERFORMANCE REQUIREMENTS

All fittings under this specification will be able to withstand a hydrostatic test at a pressure equal to at least the pressure shown below.

CLASS	TEST PRESSURE CAPABILITY (psig)
150	450
300	1125
400	1500
600	2225
900	3350

6. DIMENSIONS AND TOLERANCES

6.1 The flange dimensions are shown in Appendices A, B, C, D, and E of this document for flanges of Classes 150, 300, 400, 600, and 900 respectively.

6.2 All flanges NPS 24 and smaller manufactured to this specification will meet the dimension and tolerance requirements of ASME B-16.5 and/or MSS SP-44. All Flanges larger than NPS 24 manufactured to this specification will meet the dimension and tolerance requirements of ASME B-16.47 and/or MSS SP-44.

7. INSPECTION

7.1 Successful review of the Product Information Package (PIP), as well as any future reference by SWG 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 the manufacture and testing of all materials, products and systems referenced in this specification that are sold to SWG.

7. INSPECTION (Cont'd)

7.3 Southwest will make appropriate inspections and tests of all materials, products or systems supplied to this specification. SWG will have the right, at its 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 SWG's approval may be cause for rejection and disqualification as an approved supplier.**

8. PRODUCT MARKING

All flanges sold to Southwest will be marked with the following as a minimum as per MSS SP-25:

- Manufacturer's name or trademark
- Rating class
- Material designation (ASTM spec., grade identification symbol)
- Heat number
- Nominal Pipe Size
- Conformance to either ASME B16.5 or MSS SP-44, as applicable

For MSS SP-44 flanges:

- The letters PL shall precede the grade symbol marking (example: PL F42/X60 would designate a MSS SP-44 flange having a Grade F42 hub designed to be used with Grade X60 pipe).
- The Charpy temperature shall be identified using the designation MXF or PXF with X corresponding to the Charpy test temperature (example: Minus 20 degrees F is M20F and Positive 32 degrees F is P32F).
- If the carbon equivalent is over 0.45% the actual CE shall be marked (example: CE = 0.46).

9. CERTIFICATION

The manufacturer's or supplier's certification/material test report (MTR) will be furnished to Southwest. For flanges made to MSS SP-44, the MTR shall conform to the requirements of MSS SP-44-2019, and any additional requirements or tests specified in this specification. 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 material yield strength grades of 42,000 psi (Y42) or greater and with nominal diameters of 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.

To demonstrate complete conformance with MSS SP-44-2019 and specified supplementary requirements, the material test report must also comply with Section 11.5 of MSS SP-44-2019. The following supplementary requirements apply:

- SR-10: Raw Material MTR
- SR-11: Heat Treatment Charts
- SR-12: Lab Stress-Strain Curves for Mechanical Tests
- SR-13: Individual Hardness Testing for Quench and Tempered Flanges
- SR-18: PSL2

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

10. 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 LVO-511
P.O. Box 98512
Las Vegas, NV 89193-8512

11. PACKAGING AND PACKAGE MARKING

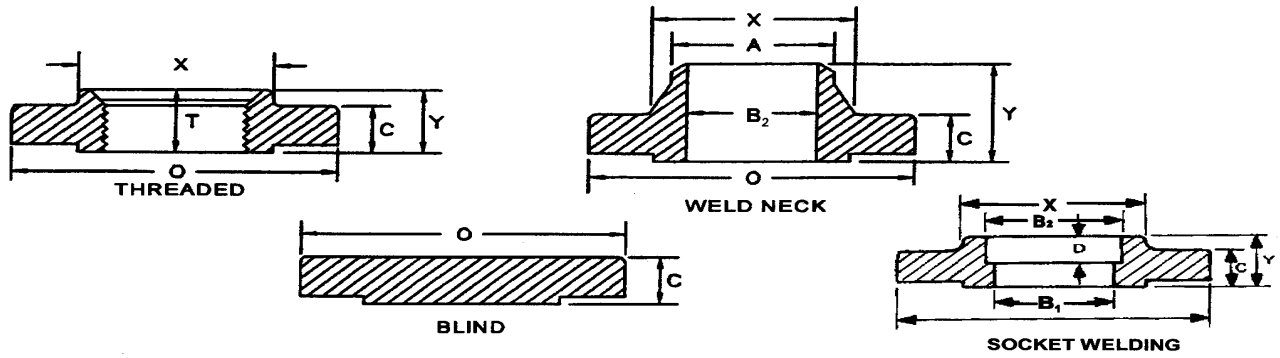
Packaging and package marking shall conform to ASTM A-700, otherwise the distributor will provide the Company with all relevant packaging specifications for approval. The manufacturer/distributor shall follow their company's packaging and loading specification and requirements.

12. STOCK CLASSIFICATION DESCRIPTION

FLANGE; USCFR 192 APPROVED EDITION OF MSS SP-44; STEEL; _____-INCH; (WELD NECK, BLIND, THREADED, SOCKET WELD); ANSI _____ (150, 300, 400 OR 600) (RAISED OR FLAT FACE).

PIPE FITTINGS
Flanges, Steel

APPENDIX A



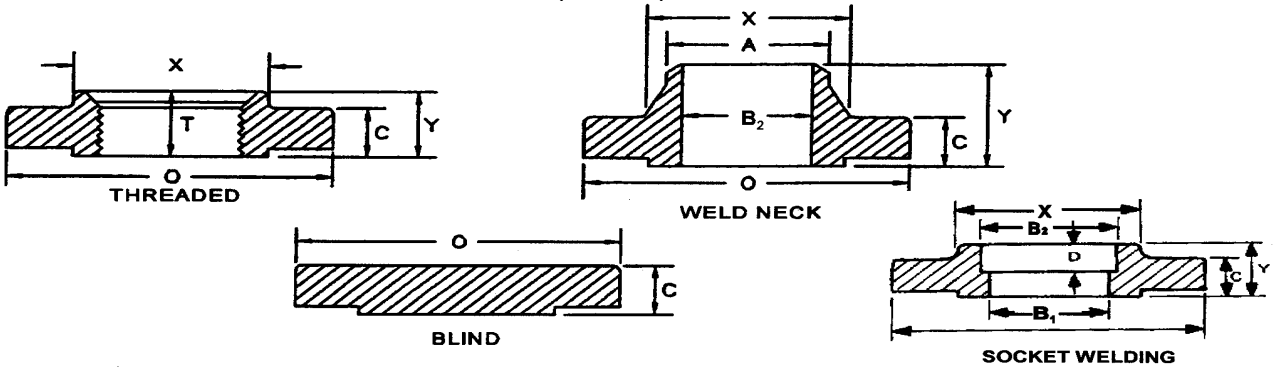
DIMENSIONS OF CLASS 150 FLANGES (in)

Nominal Pipe Size	Outside Diameter of Flange	Thickness of Flange (min.)	Diameter of Hub	Hub Diameter Beginning of Chamfer Welding Neck	Length Through Hub		Thread Length Threaded Flange (min.)	Bore		Depth of Socket
					Threaded Slip-On Socket Welding	Welding* Neck		Socket Welding (min.)	Welding Neck	
	O	C	X	A	Y	Y	T	B_1	B_2	D
½	3.50	0.44	1.19	0.84	0.62	1.88	0.62	0.88	0.62	0.38
¾	3.88	0.50	1.50	1.05	0.62	2.06	0.62	1.09	0.82	0.44
1	4.25	0.56	1.94	1.32	0.69	2.19	0.69	1.36	1.05	0.50
1 ¼	4.62	0.62	2.31	1.66	0.81	2.25	0.81	1.70	1.38	0.56
1 ½	5.00	0.69	2.56	1.90	0.88	2.44	0.88	1.95	1.61	0.62
2	6.00	0.75	3.06	2.38	1.00	2.50	1.00	2.44	2.07	0.69
2 ½	7.00	0.88	3.56	2.88	1.12	2.75	1.12	2.94	2.47	0.75
3	7.50	0.94	4.25	3.50	1.19	2.75	1.19	3.57	3.07	0.81
3 ½	8.50	0.94	4.81	4.00	1.25	2.81	1.25	4.07	3.55	—
4	9.00	0.94	5.31	4.50	1.31	3.00	1.31	4.57	4.03	—
5	10.00	0.94	6.44	5.56	1.44	3.50	1.44	5.66	5.05	—
6	11.00	1.00	7.56	6.63	1.56	3.50	1.56	6.72	6.07	—
8	13.50	1.12	9.69	8.63	1.75	4.00	1.75	8.72	7.98	—
10	16.00	1.19	12.00	10.75	1.94	4.00	1.94	10.88	10.02	—
12	19.00	1.25	14.38	12.75	2.19	4.50	2.19	12.88	12.00	—
14	21.00	1.38	15.75	14.00	2.25	5.00	2.25	14.14	To	—
16	23.50	1.44	18.00	16.00	2.50	5.00	2.50	16.16	Be	—
18	25.00	1.56	19.88	18.00	2.69	5.50	2.69	18.18	Specified	—
20	27.50	1.69	22.00	20.00	2.88	5.69	2.88	20.20	By	—
24	32.00	1.88	26.12	24.00	3.25	6.94	3.19	24.25	Purchaser	—

* The 1/6" raised face is included with the Weld Neck Y dimension.

PIPE FITTINGS
Flanges, Steel

APPENDIX A
(Cont'd)

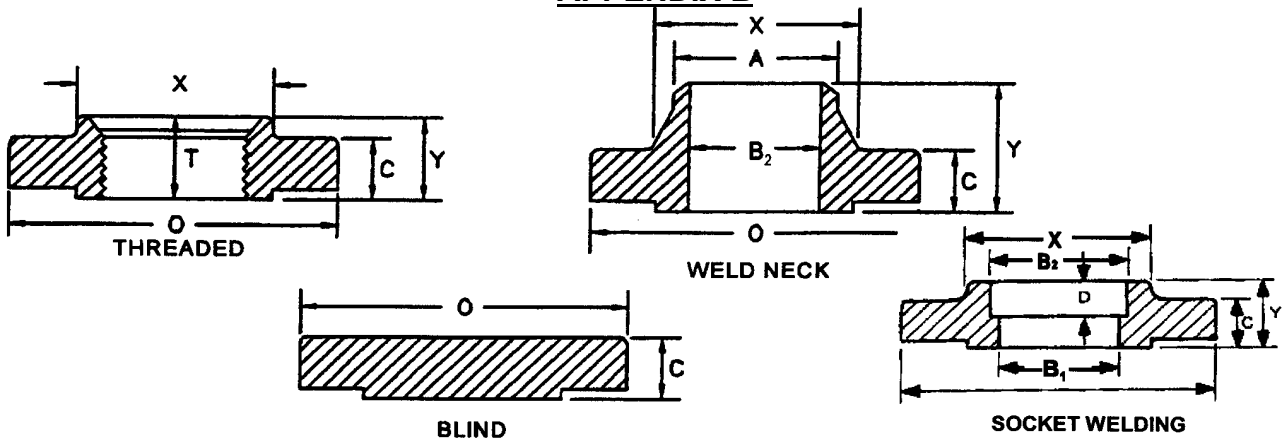


DIMENSIONS OF CLASS 150 FLANGES (mm)										
Nominal Pipe Size	Outside Diameter of Flange	Thickness of Flange (min.)	Diameter of Hub	Hub Diameter Beginning of Chamfer Welding Neck	Length Through Hub		Thread Length Threaded Flange (min.)	Bore		Depth of Socket
					Threaded Slip-On Socket Welding	Welding* Neck		Socket Welding (min.)	Welding Neck	
	O	C	X	A	Y	Y	T	B_1	B_2	D
½	88.90	11.18	30.23	21.34	15.75	47.75	15.75	22.35	15.75	9.652
¾	98.55	12.70	38.10	26.67	15.75	52.32	15.75	27.69	20.83	11.180
1	108.00	14.22	49.28	33.53	17.53	55.63	17.53	35.54	26.67	12.700
1 ¼	117.30	15.75	58.67	42.16	20.57	57.15	20.57	43.18	35.05	14.220
1 ½	127.00	17.53	65.02	48.26	22.35	61.98	22.35	49.53	40.89	15.750
2	152.40	19.05	77.72	60.45	25.40	63.50	25.40	61.98	52.58	17.530
2 ½	177.80	22.35	90.42	73.15	28.45	69.85	28.45	74.68	62.74	19.050
3	190.50	23.88	108.00	88.90	30.23	69.85	30.23	90.68	77.98	20.570
3 ½	215.90	23.88	122.20	101.60	31.75	71.37	31.75	103.40	90.17	—
4	228.60	23.88	134.90	114.30	33.27	76.20	33.27	116.10	102.4	—
5	254.00	23.88	163.60	141.20	36.58	88.90	36.58	143.80	128.3	—
6	279.40	25.40	192.00	168.40	39.62	88.90	39.62	170.70	154.2	—
8	342.90	28.45	246.10	219.20	44.45	101.60	44.45	221.50	202.7	—
10	406.40	30.23	304.80	273.10	49.28	101.60	49.28	276.40	254.5	—
12	482.60	31.75	365.30	323.90	55.63	114.30	55.63	327.20	304.8	—
14	533.40	35.05	400.10	355.60	57.15	127.00	89.90	359.20	To	—
16	596.90	36.58	203.20	406.40	63.50	127.00	88.90	410.50	Be	—
18	635.00	39.62	505.00	457.20	68.33	139.70	101.60	461.80	Specified	—
20	685.80	42.93	558.80	508.00	73.15	144.50	101.60	513.10	By	—
24	812.80	47.75	663.40	609.60	82.55	152.40	114.30	615.90	Purchaser	—

* The 1/6" raised face is included with the Weld Neck Y dimension.

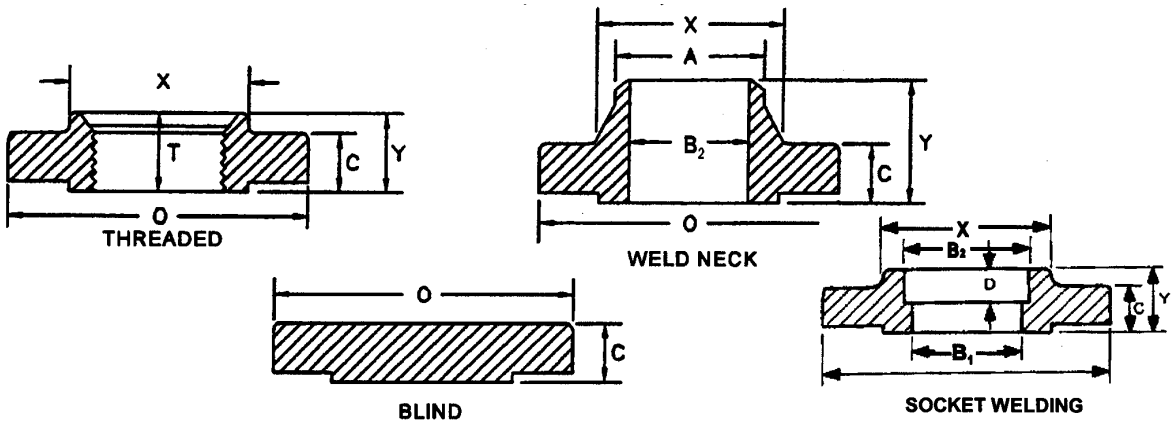
PIPE FITTINGS
Flanges, Steel

APPENDIX B



DIMENSIONS OF CLASS 300 FLANGES (in)										
Nominal Pipe Size	Outside Diameter of Flange	Thickness of Flange (min.)	Dia. of Hub	Hub Dia. Beginning of Chamfer Welding Neck	Length Through Hub		Thread Length Threaded Flange (min.)	Bore		Depth of Socket
					Threaded Slip-On Socket Welding	Welding * Neck		Socket Welding (min.)	Welding Neck	
	O	C	X	A	Y	Y	T	B_1	B_2	D
½	3.75	0.56.	1.50	0.84	0.88	2.06	0.62	0.88	0.62	0.38
¾	4.62	0.62	1.88	1.05	1.00	2.25	0.62	1.09	0.82	0.44
1	4.88	0.69	2.12	1.32	1.06	2.44	0.69	1.36	1.05	0.50
1 ¼	5.25	0.75	2.50	1.66	1.06	2.56	0.81	1.70	1.38	0.56
1 ½	6.12	0.81	2.75	1.90	1.19	2.69	0.88	1.95	1.61	0.62
2	6.50	0.88	3.31	2.38	1.31	2.75	1.12	2.44	2.07	0.69
2 ½	7.50	1.00	3.94	2.88	1.50	3.00	1.25	2.94	2.47	0.75
3	8.25	1.12	4.62	3.50	1.69	3.12	1.25	3.57	3.07	0.81
3 ½	9.00	1.19	5.25	4.00	1.75	3.19	1.44	4.07	3.55	—
4	10.00	1.25	5.75	4.50	1.88	3.38	1.44	4.56	4.03	—
5	11.00	1.38	7.00	5.56	2.00	3.88	1.69	5.66	5.05	—
6	12.50	1.44	8.12	6.63	2.06	3.88	1.81	6.72	6.07	—
8	15.00	1.62	10.25	8.63	2.44	4.38	2.00	8.72	7.98	—
10	17.50	1.88	12.62	10.75	2.62	4.62	2.19	10.88	10.02	—
12	20.50	2.00	14.75	12.75	2.88	5.12	2.38	12.88	12.00	—
14	23.00	2.12	16.75	14.00	3.00	5.62	2.50	14.14	To	—
16	25.50	2.25	19.00	16.00	3.25	5.75	2.69	16.16	Be	—
18	28.00	2.38	21.00	18.00	3.50	6.25	2.75	18.18	Specified	—
20	30.50	2.50	23.12	20.00	3.75	6.38	2.88	20.20	By	—
24	36.00	2.75	27.62	24.00	4.19	6.62	3.25	24.25	Purchaser	—
* The 1/6" raised face is included with the Weld Neck Y dimension.										

APPENDIX B
(Cont'd)

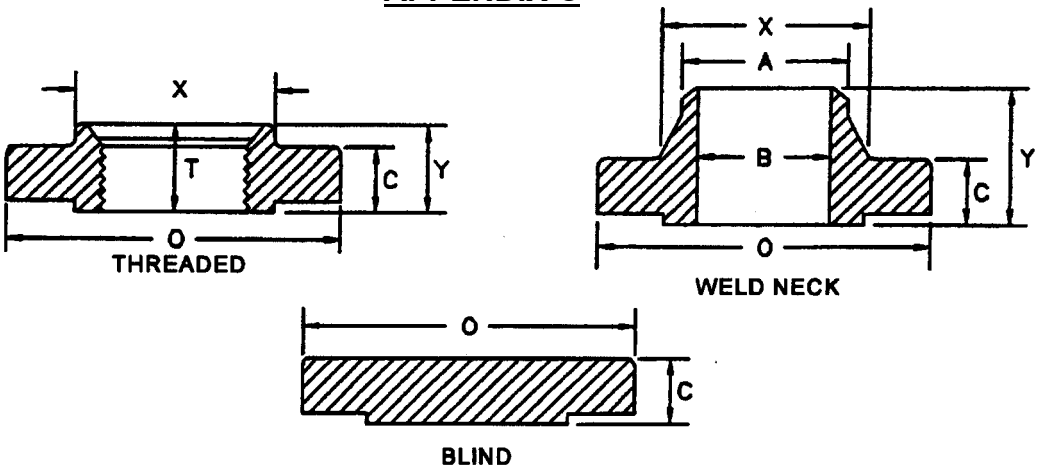


Nominal Pipe Size	DIMENSIONS OF CLASS 300 FLANGES (mm) Outside Diameter of Flange	Thickness of Flange (min.)	Dia. of Hub	Hub Diameter Beginning of Chamfer Welding Neck	Length Through Hub: Threaded Slip-On Socket Welding	Length Through Hub: Welding* Neck	Thread Length Threaded Flange (min.)	Bore: Socket Welding (min.)	Bore: Welding Neck	Depth of Socket
	O	C	X	A	Y	Y	T	B_1	B_2	D
½	95.25	14.22	38.10	21.34	22.35	52.32	15.75	22.35	15.75	9.652
¾	117.30	15.75	47.75	26.67	25.40	57.15	15.75	27.69	20.83	11.180
1	124.00	17.53	53.85	33.53	26.92	61.98	17.53	35.54	26.67	12.700
1 ¼	133.40	19.05	63.50	42.16	26.92	65.02	20.57	43.18	35.05	14.220
1 ½	155.40	20.57	69.85	48.26	30.23	68.33	22.35	49.53	40.89	15.750
2	165.10	22.61	84.07	60.45	33.27	69.85	28.45	61.98	52.58	17.530
2 ½	190.50	25.40	100.1	73.15	38.10	76.20	31.75	74.68	62.74	19.050
3	209.60	28.45	117.3	88.90	42.93	79.25	31.75	90.68	77.98	20.570
3 ½	228.60	30.23	133.4	101.60	44.45	81.03	36.58	103.40	90.17	—
4	254.00	31.75	146.1	114.30	47.75	85.85	36.58	116.10	102.40	—
5	279.40	35.05	177.8	141.20	50.80	98.55	42.93	143.80	128.30	—
6	317.50	36.58	206.2	168.40	52.32	98.55	45.97	170.70	154.20	—
8	381.00	41.15	260.4	219.20	61.98	109.50	50.80	221.50	202.70	—
10	444.50	47.75	320.5	273.10	66.55	117.30	55.63	276.40	254.50	—
12	520.70	50.80	374.7	323.90	73.15	130.00	60.45	327.20	304.80	—
14	584.20	53.85	425.5	355.60	76.20	142.70	63.50	359.20	To	—
16	647.70	57.18	482.6	406.40	82.55	146.10	68.33	410.50	Be	—
18	711.20	60.45	533.4	457.20	88.90	158.80	69.85	461.80	Specified	—
20	774.70	63.50	587.2	508.00	95.25	162.10	73.15	513.10	By	—
24	914.40	69.85	701.5	609.60	106.43	168.10	82.55	615.90	Purchaser	—

* The 1/6" raised face is included with the Weld Neck Y dimension.

PIPE FITTINGS
Flanges, Steel

APPENDIX C



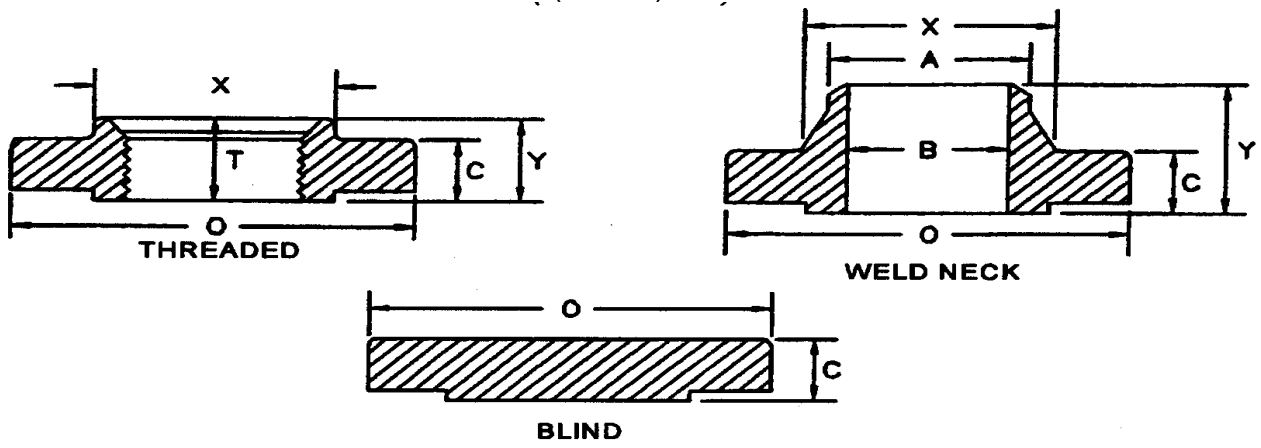
DIMENSIONS OF CLASS 400 FLANGES (in)

Nominal Pipe Size	Outside Diameter of Flange	Thickness of Flange (minimum)	Diameter of Hub	Hub Diameter Beginning of Chamfer Weld Neck	Length Through Hub		Thread Length Threaded Flange (minimum)	Bore Weld Neck Socket Welding
					Threaded Welding	Welding* Neck		
	O	C	X	A	Y	Y	T	B
½	3.75	0.56	1.50	0.84	.88	2.06	0.62	To Be Specified By Purchaser
¾	4.62	0.62	1.88	1.05	1.00	2.25	0.62	
1	4.88	0.69	2.12	1.32	1.06	2.44	0.69	
1 ¼	5.25	0.81	2.50	1.66	1.12	2.62	0.81	
1 ½	6.12	0.88	2.75	1.90	1.25	2.75	0.88	
2	6.50	1.00	3.31	2.38	1.44	2.88	1.12	
2 ½	7.50	1.12	3.94	2.88	1.62	3.12	1.25	
3	8.25	1.25	4.62	3.50	1.81	3.25	1.38	
3 ½	9.00	1.38	5.25	4.00	1.94	3.38	1.56	
4	10.00	1.38	5.75	4.50	2.00	3.50	1.44	
5	11.00	1.50	7.00	5.56	2.12	4.00	1.69	
6	12.50	1.62	8.12	6.63	2.25	4.06	1.81	
8	15.00	1.88	10.25	8.63	2.69	4.62	2.00	
10	17.50	2.12	12.62	10.75	2.88	4.88	2.19	
12	20.50	2.25	14.75	12.75	3.12	5.38	2.38	
14	23.00	2.38	16.75	14.00	3.31	5.88	2.50	
16	25.50	2.50	19.00	16.00	3.69	6.00	2.69	
18	28.00	2.62	21.00	18.00	3.88	6.50	2.75	
20	30.50	2.75	23.12	20.00	4.00	6.62	2.88	
24	36.00	3.00	27.62	24.00	4.50	6.88	3.25	

* The ¼" raised face is not included in the Weld Neck Y dimension.

PIPE FITTINGS
Flanges, Steel

APPENDIX C
(Cont'd)

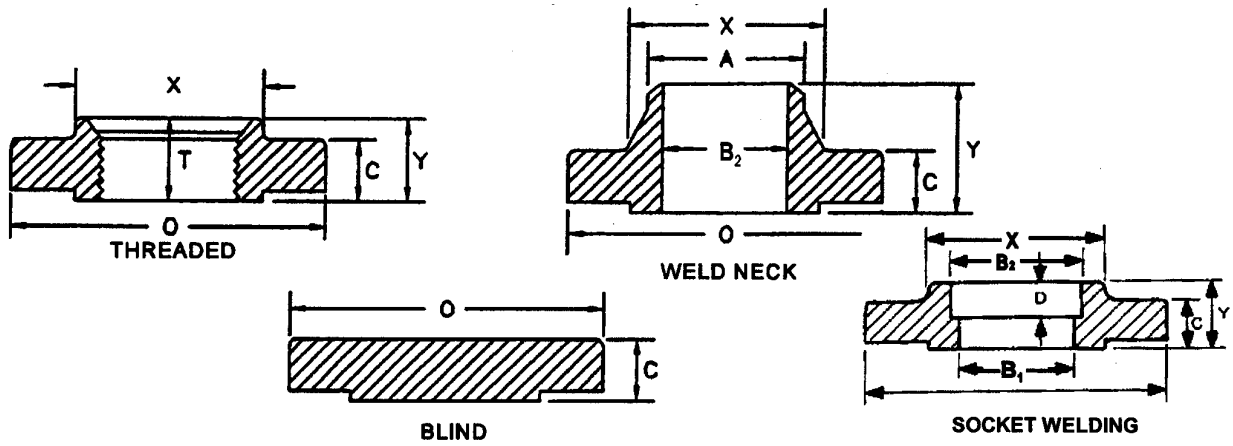


Nominal Pipe Size	DIMENSIONS OF CLASS 400 FLANGES (mm) Outside Diameter of Flange	Thickness of Flange (minimum)	Diameter of Hub	Hub Diameter Beginning of Chamfer Weld Neck	Length Through Hub Threaded Welding	Length Through Hub Welding* Neck	Thread Length Threaded Flange (minimum)	Bore Weld Neck Socket Welding
	O	C	X	A	Y	Y	T	B
½	95.25	14.22	38.10	21.34	22.35	52.32	15.75	To Be Specified By Purchaser
¾	117.30	15.75	47.75	26.67	25.40	57.15	15.75	
1	124.00	17.53	53.85	33.53	26.92	61.98	17.53	
1 ¼	133.40	20.57	63.50		28.45	66.55	20.57	
1 ½	155.40	22.35	69.85	48.26	31.75	69.85	22.35	
2	165.10	25.40	84.07	60.45	36.58	73.15	28.45	
2 ½	190.50	28.45	100.10	73.15	41.15	79.25	37.75	
3	209.60	31.75	117.30	88.90	45.97	82.55	31.75	
3 ½	228.60	35.05	133.40	101.16	49.28	85.85	36.58	
4	254.00	35.08	146.10	114.30	50.80	88.90	36.58	
5	279.40	38.10	177.80	141.20	53.85	101.6	42.93	
6	317.50	41.15	206.20	168.40	57.15	103.1	45.97	
8	381.00	47.75	260.40	219.20	68.33	117.3	50.80	
10	445.50	53.85	320.50	273.10	73.15	124.0	55.63	
12	520.70	57.15	374.70	323.90	79.25	136.7	60.45	
14	584.20	60.45	425.50	355.60	84.07	149.4	63.50	
16	647.70	63.50	482.60	406.40	93.73	152.4	68.33	
18	711.20	66.55	533.40	457.20	98.55	165.1	69.85	
20	774.70	69.85	587.20	508.00	101.60	168.1	73.15	
24	914.40	76.20	701.50	609.60	114.30	174.8	82.55	

* The ¼" raised face is not included in the Weld Neck Y dimension.

PIPE FITTINGS
Flanges, Steel

APPENDIX D



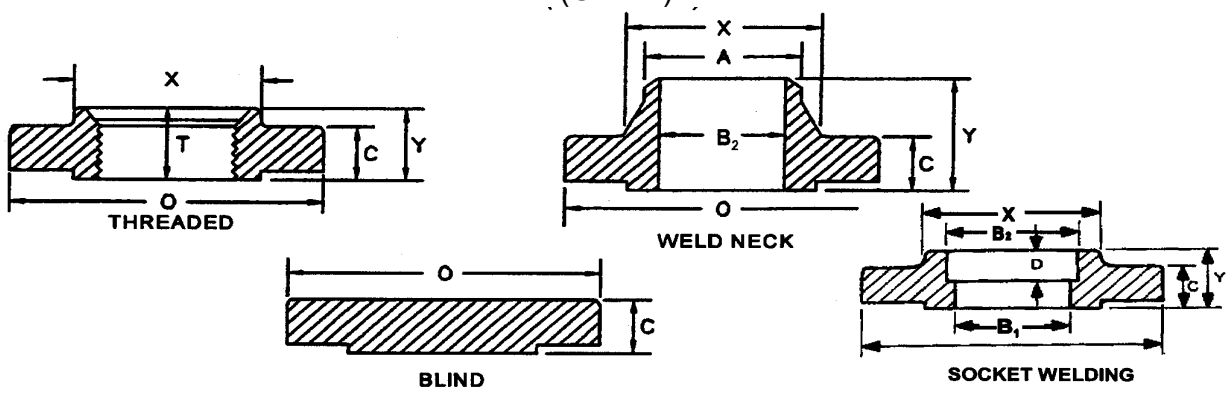
DIMENSIONS OF CLASS 600 FLANGES (in)

Nominal Pipe Size	Outside Diameter of Flange	Thickness of Flange (min.)	Dia. of Hub	Hub Diameter Beginning of Chamfer Welding Neck	Length Through Hub		Thread Length Threaded Flange (min.)	Bore		Depth of Socket
					Threaded Slip-On Socket Welding	Welding * Neck		Socket Welding (min.)	Welding Neck	
	O	C	X	A	Y	Y	T	B_1	B_2	D
½	3.75	0.56	1.50	0.84	0.88	2.06	0.62	0.88	To Be Specified By Purchaser	0.38
¾	4.62	0.62	1.88	1.05	1.00	2.25	0.62	1.09		0.44
1	4.88	0.69	2.12	1.32	1.06	2.44	0.69	1.36		0.50
1 ¼	5.25	0.81	2.50	1.66	1.12	2.62	0.81	1.70		0.56
1 ½	6.12	0.88	2.75	1.90	1.25	2.75	0.88	1.95		0.62
2	6.50	1.00	3.31	2.38	1.44	2.88	1.12	2.44		0.69
2 ½	7.50	1.12	3.94	2.88	1.62	3.12	1.25	2.94		0.75
3	8.25	1.25	4.62	3.50	1.81	3.25	1.38	3.57		0.81
3 ½	9.00	1.38	5.25	4.00	1.94	3.38	1.56	4.07		—
4	10.75	1.50	6.00	4.50	2.12	4.00	1.62	4.57		—
5	13.00	1.75	7.44	5.56	2.38	4.50	1.88	5.66		—
6	14.00	1.88	8.75	6.63	2.62	4.62	2.00	6.72		—
8	16.50	2.19	10.75	8.63	3.00	5.25	2.25	8.72		—
10	20.00	2.50	13.50	10.75	3.38	6.00	2.56	10.88		—
12	22.00	2.62	15.75	12.75	3.62	6.12	2.75	12.88		—
14	23.75	2.75	17.00	14.00	3.69	6.50	2.88	14.14		—
16	27.00	3.00	19.50	16.00	4.19	7.00	3.06	16.16		—
18	29.25	3.25	21.50	18.00	4.62	7.25	3.12	18.18		—
20	32.00	3.50	24.00	20.00	5.00	7.50	2.25	20.20		—
24	37.00	4.00	28.25	24.00	5.50	8.00	3.62	24.25		—

* The 1/6" raised face is included with the Weld Neck Y dimension.

PIPE FITTINGS
Flanges, Steel

APPENDIX D
(Cont'd)

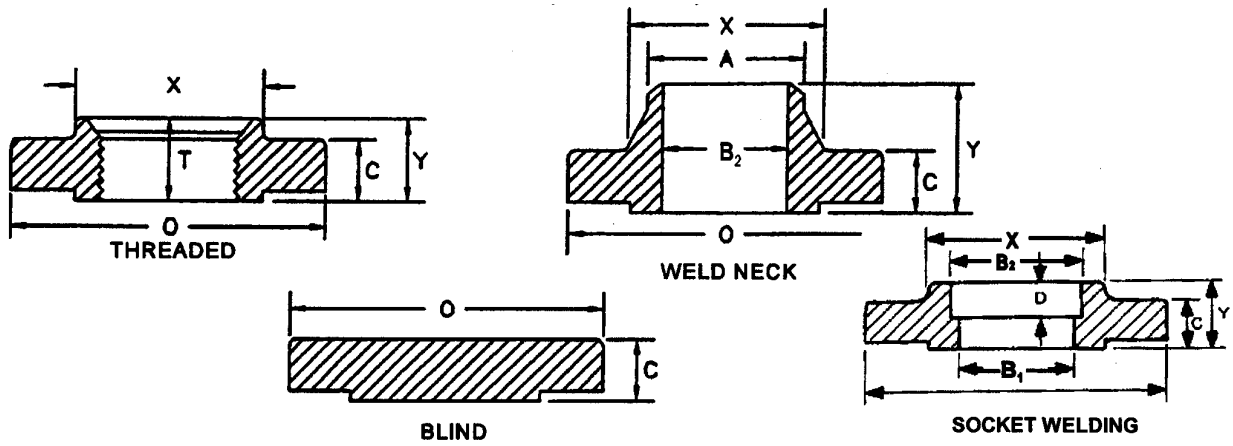


Nominal Pipe Size (inches)	DIMENSIONS OF CLASS 600 FLANGES (mm) Outside Diameter of Flange	Thickness of Flange (min.)	Dia. of Hub	Hub Diameter Beginning of Chamfer Welding Neck	Length Through Hub: Threaded Slip-On Socket Welding	Length Through Hub: Welding* Neck	Thread Length Threaded Flange (min.)	Bore: Socket Welding (min.)	Bore: Welding Neck	Depth of Socket
	O	C	X	A	Y	Y	T	B_1	B_2	D
½	95.25	14.22	38.10	21.34	22.35	52.32	15.75	22.35		9.652
¾	117.3	15.75	47.75	26.67	25.40	57.15	15.75	27.69		11.18
1	124.0	17.53	53.85	33.53	26.92	61.98	17.53	35.54		12.70
1 ¼	133.4	20.57	63.50	42.16	28.45	66.55	20.57	43.18		14.22
1 ½	155.4	22.35	69.85	48.26	31.75	69.85	23.35	49.53		15.75
2	165.1	25.40	84.07	60.45	36.58	73.15	28.45	61.98		17.53
2 ½	190.5	28.45	100.10	73.15	41.15	79.25	31.75	74.68	To	19.05
3	209.6	31.75	117.30	88.90	45.97	82.55	35.05	90.68		20.57
3 ½	228.6	35.05	133.40	101.60	49.28	85.85	39.62	103.40	Be	—
4	273.1	38.10	152.40	114.30	53.85	101.60	41.15	116.10		—
5	330.2	44.45	189.00	141.20	60.45	114.30	47.75	143.80	Specified	—
6	355.6	47.75	222.30	168.40	66.55	117.30	50.80	170.70		—
8	419.1	55.63	273.10	219.20	76.20	133.40	57.15	221.50	By	—
10	508.0	63.50	342.90	273.10	85.85	152.40	65.02	276.40	Purchaser	—
12	558.8	66.55	400.10	323.90	91.95	155.40	69.85	327.20		—
14	603.3	69.85	431.80	355.60	93.73	165.10	73.15	359.20		—
16	685.8	76.20	495.30	406.40	106.40	177.80	77.72	410.50		—
18	743.0	82.55	546.10	457.20	117.30	184.20	79.25	461.80		—
20	812.8	88.90	609.60	508.00	127.00	190.50	57.15	513.10		—
24	939.8	101.60	717.60	609.60	139.70	203.20	91.95	615.90		—

* The 1/6" raised face is included with the Weld Neck Y dimension.

PIPE FITTINGS
Flanges, Steel

APPENDIX E



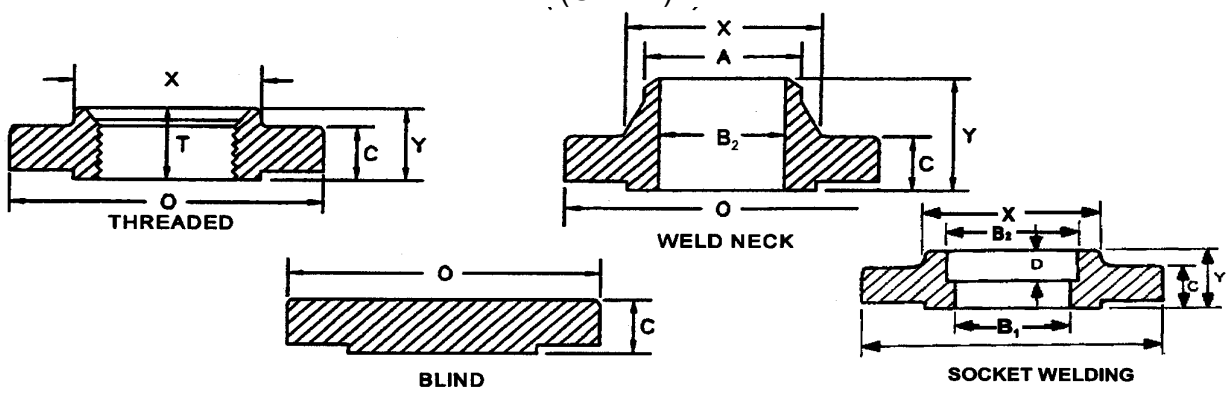
DIMENSIONS OF CLASS 900 FLANGES (in)

Nominal Pipe Size	Outside Diameter of Flange	Thickness of Flange (min.)	Dia. of Hub	Hub Diameter Beginning of Chamfer Welding Neck	Length Through Hub		Thread Length Threaded Flange (min.)	Bore		Depth of Socket
					Threaded Slip-On Socket Welding	Welding * Neck		Socket Welding (min.)	Welding Neck	
	O	C	X	A	Y	Y	T	B_1	B_2	D
½	3.75	0.56	1.50	0.84	0.88	2.06	0.62	0.88		0.38
¾	4.62	0.62	1.88	1.05	1.00	2.25	0.62	1.09		0.44
1	4.88	0.69	2.12	1.32	1.06	2.44	0.69	1.36		0.50
1 ¼	5.25	0.81	2.50	1.66	1.12	2.62	0.81	1.70		0.56
1 ½	6.12	0.88	2.75	1.90	1.25	2.75	0.88	1.95		0.62
2	6.50	1.00	3.31	2.38	1.44	2.88	1.12	2.44		0.69
2 ½	7.50	1.12	3.94	2.88	1.62	3.12	1.25	2.94	To	0.75
3	8.25	1.25	4.62	3.50	1.81	3.25	1.38	3.57		0.81
3 ½	9.00	1.38	5.25	4.00	1.94	3.38	1.56	4.07	Be	—
4	10.75	1.50	6.00	4.50	2.12	4.00	1.62	4.57		—
5	13.00	1.75	7.44	5.56	2.38	4.50	1.88	5.66	Specified	—
6	14.00	1.88	8.75	6.63	2.62	4.62	2.00	6.72		—
8	16.50	2.19	10.75	8.63	3.00	5.25	2.25	8.72	By	—
10	20.00	2.50	13.50	10.75	3.38	6.00	2.56	10.88		—
12	22.00	2.62	15.75	12.75	3.62	6.12	2.75	12.88	Purchaser	—
14	23.75	2.75	17.00	14.00	3.69	6.50	2.88	14.14		—
16	27.00	3.00	19.50	16.00	4.19	7.00	3.06	16.16		—
18	29.25	3.25	21.50	18.00	4.62	7.25	3.12	18.18		—
20	32.00	3.50	24.00	20.00	5.00	7.50	2.25	20.20		—
24	37.00	4.00	28.25	24.00	5.50	8.00	3.62	24.25		—

* The 1/6" raised face is included with the Weld Neck Y dimension.

PIPE FITTINGS
Flanges, Steel

APPENDIX E
(Cont'd)



Nominal Pipe Size (inches)	DIMENSIONS OF CLASS 900 FLANGES (mm) Outside Diameter of Flange	Thickness of Flange (min.)	Dia. of Hub	Hub Diameter Beginning of Chamfer Welding Neck	Length Through Hub: Threaded Slip-On Socket Welding	Length Through Hub: Welding* Neck	Thread Length Threaded Flange (min.)	Bore: Socket Welding (min.)	Bore: Welding Neck	Depth of Socket
	O	C	X	A	Y	Y	T	B_1	B_2	D
½	95.25	14.22	38.10	21.34	22.35	52.32	15.75	22.35		9.652
¾	117.3	15.75	47.75	26.67	25.40	57.15	15.75	27.69		11.18
1	124.0	17.53	53.85	33.53	26.92	61.98	17.53	35.54		12.70
1 ¼	133.4	20.57	63.50	42.16	28.45	66.55	20.57	43.18		14.22
1 ½	155.4	22.35	69.85	48.26	31.75	69.85	23.35	49.53		15.75
2	165.1	25.40	84.07	60.45	36.58	73.15	28.45	61.98		17.53
2 ½	190.5	28.45	100.10	73.15	41.15	79.25	31.75	74.68	To	19.05
3	209.6	31.75	117.30	88.90	45.97	82.55	35.05	90.68		20.57
3 ½	228.6	35.05	133.40	101.60	49.28	85.85	39.62	103.40	Be	—
4	273.1	38.10	152.40	114.30	53.85	101.60	41.15	116.10		—
5	330.2	44.45	189.00	141.20	60.45	114.30	47.75	143.80	Specified	—
6	355.6	47.75	222.30	168.40	66.55	117.30	50.80	170.70		—
8	419.1	55.63	273.10	219.20	76.20	133.40	57.15	221.50	By	—
10	508.0	63.50	342.90	273.10	85.85	152.40	65.02	276.40	Purchaser	—
12	558.8	66.55	400.10	323.90	91.95	155.40	69.85	327.20		—
14	603.3	69.85	431.80	355.60	93.73	165.10	73.15	359.20		—
16	685.8	76.20	495.30	406.40	106.40	177.80	77.72	410.50		—
18	743.0	82.55	546.10	457.20	117.30	184.20	79.25	461.80		—
20	812.8	88.90	609.60	508.00	127.00	190.50	57.15	513.10		—
24	939.8	101.60	717.60	609.60	139.70	203.20	91.95	615.90		—

* The 1/6" raised face is included with the Weld Neck Y dimension.