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SEOK-AM TECH.CO., LTD.

PRESIDENT'S MESSAGE

The continued success and increase of our clients business is the main goal of **SEOK-AM TECH.CO.,LTD.(SATCO)** Our mission is to increase value to our clients business by our high quality products.

SATCO knows the future of our company depends on our clients wants and needs.

For this reason, our performance is based on the following principles and work ethics;

- Added Values
- Through Goods
- Best Quality
- On Time Delivery
- Competitive Price
- Good Communication

SATCO confirms that these principles have always been present in our daily activities.

Believing in the future, we want more than to be just part of it.

SATCO is always studying and researching new technologies and processes continually, investing in all aspects of our shop, reinforcing our partnerships with clients, suppliers and employees, performing all our businesses in a socially responsible manner.



Nominal Wall Thickness											Unit: mm
STD	Sch 40	Sch 60	Sch 80s	X-5	Sch 80	Sch 100	Sch 120	Sch 140	Sch 160	XX-S	Nominal Pipe Size Inch
1.73	1.73	2.20	2.41	2.41	2.41	-	-	-	3.15	4.83	1/8
2.24	2.24	2.40	3.02	3.02	3.02	-	-	-	3.68	6.05	1/4
2.31	2.31	2.80	3.20	3.20	3.20	-	-	-	4.01	6.40	3/8
2.77	2.77	3.20	3.73	3.73	3.73	-	-	-	4.78	7.47	1/2
2.87	2.87	3.40	3.91	3.91	3.91	-	-	-	5.56	7.82	3/4
3.38	3.38	3.90	4.55	4.55	4.55	-	-	-	6.35	9.09	1
3.56	3.56	4.50	4.85	4.85	4.85	-	-	-	6.35	9.70	1 1/4
3.68	3.68	4.50	5.08	5.08	5.08	-	-	-	7.14	10.16	1 1/2
3.91	3.91	4.90	5.54	5.54	5.54	-	-	-	8.74	11.07	2
5.16	5.16	6.00	7.01	7.01	7.01	-	-	-	9.52	14.02	2 1/2
5.49	5.49	6.60	7.62	7.62	7.62	-	-	-	11.12	15.24	3
5.74	5.74	7.00	8.08	8.08	8.08	-	-	-	-	-	3 1/2
6.02	6.02	7.10	8.56	8.56	8.56	-	11.12	-	13.49	17.12	4
6.55	6.55	8.10	9.53	9.53	9.53	-	12.70	-	15.88	19.05	5
7.11	7.11	9.30	10.97	10.97	10.97	-	14.27	-	18.26	21.94	6
8.18	8.18	10.31	12.70	12.70	12.70	15.09	18.26	20.62	23.01	22.22	8
9.27	9.27	12.70	12.70	12.70	15.09	18.26	21.44	25.40	28.58	25.40	10
9.52	10.31	14.27	*12.70	12.70	17.48	21.44	25.40	28.58	33.32	25.40	12
9.52	11.13	15.09	*12.70	12.70	19.05	23.83	27.79	31.75	35.71	-	14
9.52	12.70	16.66	*12.70	12.70	21.44	26.19	30.96	36.52	40.49	-	16
9.52	14.27	19.05	*12.70	12.70	23.82	29.36	34.92	39.67	45.24	-	18
9.52	15.09	20.62	*12.70	12.70	26.19	32.54	38.10	44.45	50.01	-	20
9.52	-	22.22	*12.70	12.70	28.58	34.92	41.28	47.62	53.98	-	22
9.52	17.48	24.61	*12.70	12.70	30.96	38.89	46.02	52.37	59.54	-	24
9.52	-	-	*12.70	12.70	-	-	-	-	-	-	26
9.52	-	-	*12.70	12.70	-	-	-	-	-	-	28
9.52	-	-	*12.70	12.70	-	-	-	-	-	-	30
9.52	17.48	-	*12.70	12.70	-	-	-	-	-	-	32
9.52	17.48	-	*12.70	12.70	-	-	-	-	-	-	34
9.52	19.05	-	*12.70	12.70	-	-	-	-	-	-	36
9.52	-	-	*12.70	12.70	-	-	-	-	-	-	38
9.52	-	-	*12.70	12.70	-	-	-	-	-	-	40
9.52	-	-	*12.70	12.70	-	-	-	-	-	-	42
9.52	-	-	*12.70	12.70	-	-	-	-	-	-	44
9.52	-	-	*12.70	12.70	-	-	-	-	-	-	46
9.52	-	-	*12.70	12.70	-	-	-	-	-	-	48

· Added Values · Through Goods · Best Quality · On Time Delivery · Competitive Price · Good Communication

HISTORY



- Apr. 1999** Established SATCO
- Mar. 2003** Korea Representative of Mousa A. Bahman Est. in Kuwait
- Oct. 2006** Certificated ISO 9001 : 2008
- Mar. 2008** Completed Forging Shop
- Oct. 2008** Certificate of Management INNO-BIZ
- Nov. 2008** Awarded a Medal of USD 5 Million for Export
- Sep. 2009** Completed Machining Shop
- Dec. 2009** Achievement USD 10 Million for Export
- Mar. 2010** Korea Representative of International Development Company in UAE
- May. 2010** Registration on TAKREER, UAE (No. 907221)
- Sep. 2010** Registration on SABIC, Saudi Arabia (No. 504528)
- Sep. 2011** Registration on GEA-BGR, India (No. 200176)
- Oct. 2011** Registration on KNPC, Kuwait (No. 277164)
- Apr. 2012** Registration on BOROUGE, UAE (No. 0000003087)
- Apr. 2012** Certificated ISO 14001 : 2004
- Feb. 2014** Certificated PED
- Aug. 2014** Established Dubai Branch, UAE
- Nov. 2014** Registration on ADMA-OPCO, UAE (No. 1006)
- Feb. 2015** Registration on NIGC (No. GO.112.178254) & NIOC (No. 182749), IRAN
- Apr. 2015** Registration for T/S Forging (HP HEATER) on BHEL-Hyderabad, India (No. 700136)
- Jan. 2016** Registration on KOC, Kuwait (No. VEC-10091502/FL/045/2016)
- Oct. 2016** Registration on ADCO (No. 47576), ADMA-OPCO (No. 11299), UAE
- Oct. 2016** Registration on SABIC, Saudi Arabia (No. CMNJ)

TESTING EQUIPMENTS



SATCO operates accurate quality measuring devices by specialized quality technicians and tests all procedure, from the procurement of raw materials until the delivery of final products to provide our customers with only the most reliable products.



Brinell Hardness Tester



Spectrometer



Electric Furnace



Impact Tester



Universal Test Machine



FORGED STEEL SOCKET-WELDING & THREADED FITTINGS

ASME

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- Weldolet 26
- Sockolet 27
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FORGED STEEL SOCKET-WELDING AND THREADED



1. Pressure Ratings

These fittings shall be designated as pressure class 2000, 3000 and 6000 fittings for threading and pressure class 3000, 6000 and 9000 for socket-welding. This designation identifies the fittings with their ratings as shown as follows, Table 1.

Table 1. : Correlation of Fittings Class With Schedule Number of Wall Designation of Pipe for Calculation of Ratings.

Pressure Class Designation of Fitting	Type of Fitting	Pipe Used for Rating Basic	
		Schedule No.	Wall Designation
2000 lb	Threaded	80	X-S
3000 lb	Threaded	160	-
6000 lb	Threaded	-	XX-S
3000 lb	Socket-Welding	80	X-S
6000 lb	Socket-Welding	160	-
9000 lb	Socket-Welding	-	XX-S

*This table is not intended to restrict the use of pipe of thinner or thicker wall with fittings pipe actually used may be thinner or thicker in nominal wall than that shown in Table 1. When thinner pipe is used its strength may govern the rating. When thicker pipe is used (e.g., for mechanical strength) the strength of the fitting governs the rating.

Table 2. : Nominal wall thickness of Schedule 160 and Double Extra Strong Pipe.

NPS.	Schedule 160		XX-S	
	in	mm	in	mm
1/8	0.124	3.15	0.190	4.83
1/4	0.145	3.68	0.238	6.05
3/8	0.158	4.01	0.252	6.40

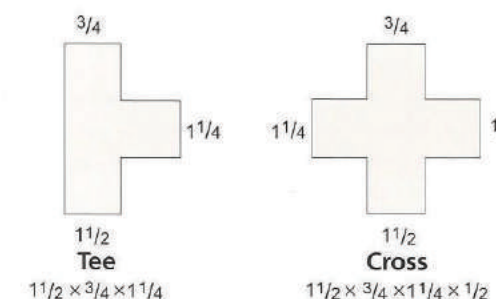
Table 3. : Pressure / Temperature Ratings

Non-shock Working Pressure in Pounds per Square Inch

Service Temperature Degree °F	2000lb Threaded Fittings					3000lb Socket Welding and Threaded Fittings					6000lb Socket Welding and Threaded Fittings				
	Carbon Steel	F304	F316	F22	F5	Carbon Steel	F304	F316	F22	F5	Carbon Steel	F304	F316	F22	F5
100	2000	1715	2000	2000	2000	3000	2570	3000	3000	3000	6000	5145	6000	6000	6000
150	1970	1615	1970	1970	1970	2950	2425	2950	2950	2950	5915	4855	5915	5915	5915
200	1940	1520	1940	1940	1940	2915	2280	2915	2915	2915	5830	4565	5830	5830	5830
250	1915	1445	1915	1915	1915	2875	2170	2875	2875	2875	5750	4340	5750	5750	5750
300	1895	1370	1896	1895	1895	2845	2055	2845	2845	2845	5690	4115	5690	5690	5690
350	1875	1310	1875	1875	1875	2810	1965	2810	2810	2810	5625	3930	5625	5625	5625
400	1850	1245	1850	1850	1850	2775	1870	2775	2775	2775	5550	3745	5550	5550	5550
450	1810	1195	1810	1810	1810	2715	1790	2715	2715	2715	5430	3585	5430	5430	5430
500	1735	1140	1735	1735	1735	2605	1715	2605	2605	2605	5210	3430	5210	5210	5210
550	1640	1100	1640	1640	1640	2460	1650	2460	2460	2460	4925	3305	4925	4925	4925
600	1540	1060	1540	1540	1540	2310	1590	2310	2310	2310	4620	3180	4620	4620	4620
650	1430	1020	1430	1430	1430	2150	1535	2150	2150	2150	4300	3070	4300	4300	4300
700	1305	985	1370	1340	1340	1960	1480	2055	2010	2010	3920	2960	4110	4025	4025
750	1180	950	1305	1245	1245	1775	1425	1960	1870	1870	3550	2580	3920	3745	3745
800	1015	915	1240	1155	1155	1525	1370	1865	1735	1735	3050	2745	3730	3470	3470
850	830	880	1180	1060	1060	1250	1330	1770	1595	1595	2500	2660	3540	3190	3190
900	615	860	1115	970	970	925	1290	1675	1455	1455	1885	2580	3350	2915	2915
950	425	845	1055	880	880	640	1270	1580	1320	1320	1295	2540	3165	2640	2640
1000	235	830	990	740	695	350	1250	1485	1115	1040	715	2500	2975	2230	2085

2. Size Identification

The size of fitting is identified by the nominal pipe size. For reducing fittings, the size of the largest run opening is to be given first, followed by the size of the opening opposite of the same run. The branch size of a Tee is given last. Where the case is a Cross, the largest side-outlet is thirdly given, then the opening opposite.



3. Threads

Unless otherwise specified in inquiry, all threaded fittings are supplied with NPT threads (ASME B1.20.1 American National Standard Taper Pipe Threads) for reference, other available threads are:

- ISO/R7, Pipe Threads for Gas List Tubes and Screwed Fittings where Pressure-tight Joints are made on the threads (BS 2.1 & JIS B0203 PT Thread).
- API 5B, Line Pipe Threads.
- KS B0222 Taper Pipe Threads.

4. Bore Diameter of Fittings

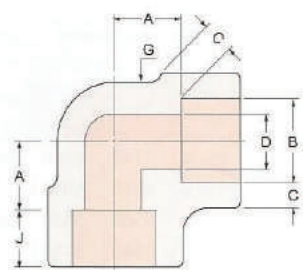
Bore Diameter of fittings(B), (S) are manufactured for conforming with KS, JIS, ASME or MSS dimension.

FORGED STEEL/SOCKET WELDING FITTINGS

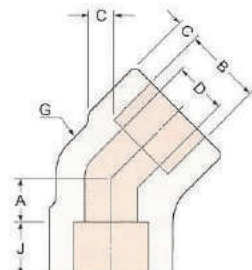


90° Elbow, 45° Elbow

3000# 6000# 9000#



90° Elbow



45° Elbow

ANSI B16.11

Unit : mm

Nom Pipe Size	Socket Bore Dia B	Bore Diameter of Fitting-D			Socket Wall Thickness C(Ave/Min)			Depth of Socket Min-J
		3000	6000	9000	3000	6000	9000	
1/8	10.65 11.15	6.1~7.6	3.2~4.8	-	3.20/3.20	3.95/3.45	-	10
1/4	14.10 14.60	8.5~10.0	5.6~7.1	-	3.80/3.30	4.60/4.00	-	10
3/8	17.55 18.05	11.8~13.3	8.4~9.9	-	4.00/3.50	5.05/4.32	-	10
1/2	21.70 22.20	15.0~16.6	11.0~12.5	5.6~7.2	4.65/4.10	5.95/5.20	9.35/8.20	10
3/4	27.05 27.55	20.2~21.7	14.8~16.3	10.3~11.8	4.90/4.25	6.95/6.05	9.80/8.55	13
1	33.80 34.30	25.9~27.4	19.9~21.5	14.5~16.0	5.70/5.00	7.90/6.95	11.40/9.95	13
1 1/4	42.55 43.05	34.3~35.8	28.7~30.2	22.0~23.5	6.05/5.30	7.90/6.95	12.15/10.60	13
1 1/2	48.65 49.15	40.1~41.7	33.2~34.7	27.2~28.7	6.35/5.55	8.90/7.80	12.70/11.15	13
2	61.10 61.60	51.7~53.5	42.1~43.6	37.4~38.9	6.95/6.05	10.90/9.50	13.85/12.15	16
2 1/2	73.80 74.45	61.2~64.2	-	-	8.75/7.65	-	-	16
3	89.80 90.40	76.4~79.5	-	-	9.50/8.30	-	-	16
4	115.45 116.05	100.7~103.8	-	-	10.70/9.35	-	-	19

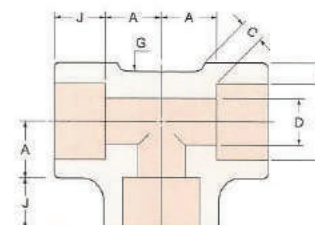
NOTE: 1. Dimensions are in millimeters.
2. Average of socket wall thickness around periphery shall be no less than listed values.
The minimum values are permitted in localized areas.

FORGED STEEL/SOCKET WELDING FITTINGS

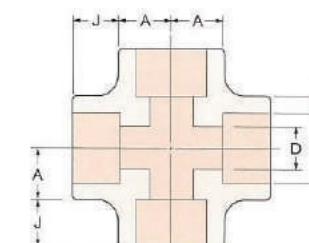


Tee, Cross

3000# 6000# 9000#



Tee



Cross

ANSI B16.11

Unit : mm

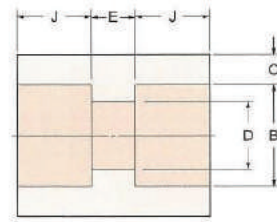
Nom Pipe Size	Body Wall Thickness Min-G			Center to Bottom of Socket-A					
				90° Elbow, Tees and Crosses			45° Elbow		
	3000	6000	9000	3000	6000	9000	3000	6000	9000
1/8	2.40	3.15	-	10~12	10~12	-	7~9	7~9	-
1/4	3.00	3.70	-	10~12	13~17	-	7~9	7~9	-
3/8	3.20	4.00	-	12~15	14~17	-	6~9	10~13	-
1/2	3.75	4.80	7.45	14~17	18~21	24~27	10~13	11~14	14~17
3/4	3.90	5.55	7.80	18~21	21~24	27~30	11~14	13~16	17~21
1	4.55	6.35	9.10	20~24	25~29	30~34	12~16	15~19	19~23
1 1/4	4.85	6.35	9.70	25~29	30~34	33~37	15~19	19~23	20~24
1 1/2	5.10	7.15	10.15	30~34	36~40	36~40	19~23	23~27	23~28
2	5.55	8.75	11.05	36~40	39~43	52~56	23~27	27~31	26~31
2 1/2	7.00	-	-	39~44	-	-	27~31	-	-
3	7.60	-	-	55~60	-	-	29~34	-	-
4	8.55	-	-	64~69	-	-	39~44	-	-

FORGED STEEL/SOCKET WELDING FITTINGS

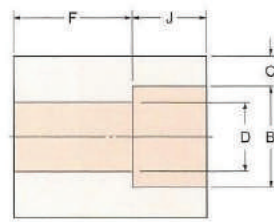


Full Coupling Half Coupling

3000# 6000# 9000#



Full Coupling



Half Coupling

ANSI B16.11

Unit : mm

Nom Pipe Size	Socket Bore Dia B	Bore Diameter of Fitting-D			Socket Wall Thickness C(Ave/Min)			Depth Min J	Laying Lengths		
		3000	6000	9000	3000	6000	9000		F/C	H/C	E
		3000	6000	9000	3000	6000	9000		E	F	
1/8	10.65 11.15	6.1~7.6	3.2~4.8	-	3.20/3.20	3.95/3.45	-	10	5~8	15~17	
1/4	14.10 14.60	8.5~10.0	5.6~7.1	-	3.80/3.30	4.60/4.00	-	10	5~8	15~17	
3/8	17.55 18.05	11.8~13.3	8.4~9.9	-	4.00/3.50	5.05/4.32	-	10	5~9	16~19	
1/2	21.70 22.20	15.0~16.6	11.0~12.5	5.6~7.2	4.65/4.10	5.95/5.20	9.35/8.20	10	6~13	21~24	
3/4	27.05 27.55	20.2~21.7	14.8~16.3	10.3~11.8	4.90/4.25	6.95/6.05	9.80/8.55	13	6~13	22~25	
1	33.80 34.30	25.9~27.4	19.9~21.5	14.5~16.0	5.70/5.00	7.90/6.95	11.40/9.95	13	9~17	27~31	
1 1/4	42.55 43.05	34.3~35.8	28.7~30.2	22.0~23.5	6.05/5.30	7.90/6.95	12.15/10.60	13	9~17	28~32	
1 1/2	48.65 49.15	40.1~41.7	33.2~34.7	27.2~28.7	6.35/5.55	8.90/7.80	12.70/11.15	13	9~17	30~34	
2	61.10 61.60	51.7~53.5	42.1~43.6	37.4~38.9	6.95/6.05	10.90/9.50	13.85/12.15	16	15~23	39~43	
2 1/2	73.80 74.45	61.2~64.2	-	-	8.75/7.65	-	-	16	14~24	40~45	
3	89.80 90.40	76.4~79.5	-	-	9.50/8.30	-	-	16	14~24	42~47	
4	115.45 116.05	100.7~103.8	-	-	10.70/9.35	-	-	19	14~24	45~50	

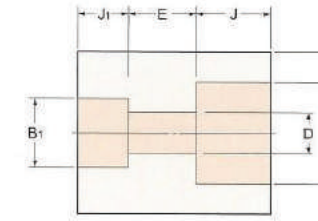
NOTE: 1. Dimensions are in millimeters.
2. Average of socket wall thickness around periphery shall be no less than listed values. The minimum values are permitted in localized areas.

FORGED STEEL/SOCKET WELDING FITTINGS

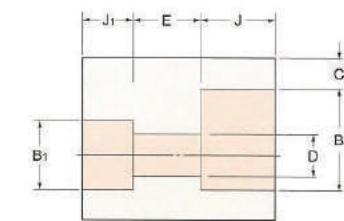


Concentric Reducer Eccentric Reducer

3000# 6000# 9000#



Concentric Reducer



Eccentric Reducer

Unit : mm

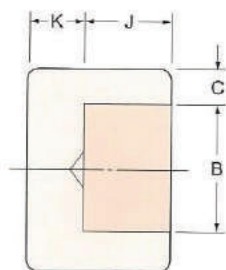
Nom Pipe Size	Socket Bore Dia Min		Bore Diameter of Fitting-D			Socket Wall Thickness C(Ave/Min)			Depth Min		Laying Lengths (Min/Max)
	B	B1	3000	6000	9000	3000	6000	9000	J	J1	
	B	B1	3000	6000	9000	3000	6000	9000	J	J1	
1/4 x 1/8	14.10/14.60	10.65/11.15	6.1/7.6	3.2/4.8	-	3.80/3.30	4.60/4.00	-	10	10	5/8
3/8 x 1/4	17.55/18.05	14.10/14.60	8.5/10.0	5.6/7.1	-	4.00/3.50	5.05/4.35	-	10	10	5/9
1/2 x 1/4	21.70/22.20	14.10/14.60	8.5/10.0	5.6/7.1	-	4.65/4.10	5.95/5.20	9.35/8.20	10	10	6/13
3/4 x 3/8	-	17.55/18.05	11.3/13.3	8.4/9.9	-	-	-	-	10	10	-
1/2 x 3/8	27.05/27.55	14.10/14.60	8.5/10.0	5.6/7.1	-	4.90/4.25	6.95/6.05	9.80/8.55	13	10	6/13
3/4 x 1/2	-	17.55/18.05	11.3/13.3	8.4/9.9	-	-	-	-	13	10	-
1 x 1/2	-	21.70/22.20	15.0/16.6	11.0/12.5	5.6/7.2	-	-	-	13	10	-
1 x 3/4	33.80/34.30	17.55/18.05	11.3/13.3	8.4/9.9	-	5.70/5.00	7.90/6.95	11.40/9.95	13	10	9/17
1 1/4 x 1/2	-	21.70/22.20	15.0/16.6	11.0/12.5	5.6/7.2	-	-	-	13	10	-
1 1/4 x 3/4	-	27.05/27.55	20.2/21.7	14.8/16.3	10.3/11.8	-	-	-	13	13	-
1 1/2 x 1/2	42.55/43.05	21.70/22.20	15.0/16.6	10.2/12.5	5.6/7.2	6.05/7.30	7.90/6.95	12.15/10.60	13	13	9/17
1 1/2 x 3/4	-	27.05/27.55	20.2/21.7	14.8/16.3	10.3/11.8	-	-	-	13	13	-
1 1/2 x 1	-	33.80/34.30	25.9/27.4	19.9/21.5	14.5/16.0	-	-	-	13	13	-
1 3/4 x 3/4	48.65/49.15	27.05/27.55	20.2/21.7	14.8/16.3	14.8/16.3	6.35/5.55	8.90/7.80	12.70/11.15	13	13	9/17
1 3/4 x 1	-	33.80/34.30	25.9/27.4	19.9/21.5	14.5/16.0	-	-	-	13	13	-
2 x 1 1/4	-	42.55/43.05	34.3/35.8	28.7/30.2	22.0/23.5	-	-	-	13	13	-
2 x 1	61.10/61.60	33.80/34.30	25.9/27.4	19.9/21.5	14.5/16.0	6.95/6.05	10.90/9.50	13.85/12.15	16	13	15/23
2 x 1 1/2	-	42.55/43.05	34.3/35.8	28.7/30.2	22.0/23.5	-	-	-	16	13	-
2 x 2	-	48.65/49.15	40.1/41.7	33.2/34.7	27.2/28.7	-	10.90/9.00	-	16	13	-
2 1/2 x 1 1/4	73.80/74.45	42.55/43.05	34.3/35.8	28.7/30.2	22.0/23.5	8.75/7.65	-	-	16	13	14/24
2 1/2 x 1 1/2	-	48.65/49.15	40.1/41.7	33.2/34.7	27.2/28.7	-	-	-	16	13	-
2 1/2 x 2	-	61.10/61.60	51.7/53.5	42.1/43.6	27.4/38.9	-	-	-	16	13	-
3 x 1 1/2	89.30/90.40	48.65/49.15	40.1/41.7	33.2/34.7	-	9.50/8.30	-	-	16	16	14/24
3 x 2	-	61.10/61.60	51.7/53.5	42.1/43.6	-	-	-	-	16	16	-
3 x 2 1/2	-	73.80/74.45	61.2/64.2	-	-	-	-	-	16	16	-
4 x 2	115.45/116.05	61.10/61.60	51.7/53.5	-	-	10.70/9.35	-	-	19	16	14/24
4 x 2 1/2	-	73.80/74.45	61.2/64.2	-	-	-	-	-	19	16	-
4 x 3	-	89.30/90.40	74.4/79.5	-	-	-	-	-	19	16	-

FORGED STEEL/SOCKET WELDING FITTINGS



Cap

3000# 6000# 9000#



ANSI B16.11

Unit : mm

Nom Pipe Size	Socket Bore Dia B	Socket Wall Thickness C(Ave/Min)			Depth Min J	Socket Wall Thickness K(Min)		
		3000	6000	9000		3000	6000	9000
¼	10.65 11.15	3.20/3.20	3.20/3.20	-	10	5.0	6.5	-
¼	14.10 14.60	3.80/3.30	4.60/4.00	-	10	5.0	6.5	-
¾	17.55 18.05	4.00/3.50	5.05/4.32	-	10	5.0	6.5	-
½	21.70 22.20	4.65/4.10	5.95/5.20	9.35/8.20	10	6.5	8.0	11.0
¾	27.05 27.55	4.90/4.25	6.95/6.05	9.80/8.55	13	6.5	8.0	12.5
1	33.80 34.30	5.70/5.00	7.90/6.95	11.40/9.95	13	9.5	11.0	14.0
1¼	42.55 43.05	6.05/5.30	7.90/6.95	12.15/10.60	13	9.5	11.0	14.0
1½	48.65 49.15	6.35/5.55	8.90/7.80	12.70/11.15	13	11.0	12.5	16.0
2	61.10 61.60	6.95/6.05	10.90/9.50	13.85/12.15	16	12.5	16.0	19.0
2½	73.80 74.45	8.75/7.65	-	-	16	16.0	19.0	-
3	89.80 90.40	9.50/8.30	-	-	16	19.0	22.0	-
4	115.45 116.05	10.70/9.35	-	-	19	22.0	28.5	-

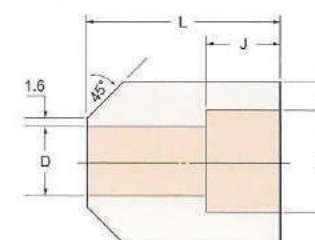
NOTE: 1. Dimensions are in millimeters.
2. Average of socket wall thickness around periphery shall be no less than listed values.
The minimum values are permitted in localized areas.

FORGED STEEL/SOCKET WELDING FITTINGS

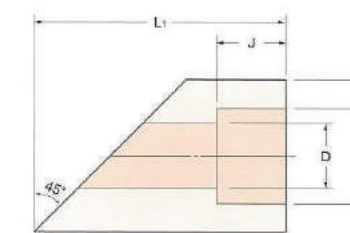


Boss

3000# 6000# 9000#



Type. 1



Type. 2

Unit : mm

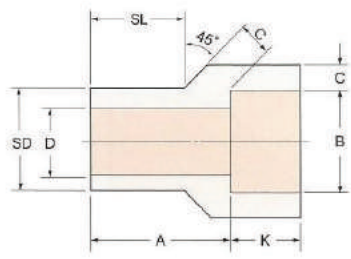
Nom Pipe Size	Socket Bore Dia B	Bore Diameter of Fitting-D			Socket Wall Thickness C(Ave/Min)			Depth Min J	End to End	
		3000	6000	9000	3000	6000	9000		L	L ₁
¼	14.10 14.60	8.5~10.0	5.6~7.1	-	3.80/3.30	4.60/4.00	-	10	25.7	62
¾	17.55 18.05	11.8~13.3	8.4~9.9	-	4.00/3.50	5.05/4.32	-	10	27.5	66
½	21.70 22.20	15.0~16.6	11.0~12.5	5.6~7.2	4.65/4.10	5.95/5.20	9.35/8.20	10	32.4	82
¾	27.05 27.55	20.2~21.7	14.8~16.3	10.3~11.8	4.90/4.25	6.95/6.05	9.80/8.55	13	36.9	88
1	33.80 34.30	25.9~27.4	19.9~21.5	14.5~16.0	5.70/5.00	7.90/6.95	11.40/9.95	13	41.4	96
1¼	42.55 43.05	34.3~35.8	28.7~30.2	22.0~23.5	6.05/5.30	7.90/6.95	12.15/10.60	13	43.2	105
1½	48.65 49.15	40.1~41.7	33.2~34.7	27.2~28.7	6.35/5.55	8.90/7.80	12.70/11.15	13	44.8	112
2	61.10 61.60	51.7~53.5	42.1~43.6	37.4~38.9	6.95/6.05	10.90/9.50	13.85/12.15	16	57.1	125

FORGED STEEL/SOCKET WELDING FITTINGS

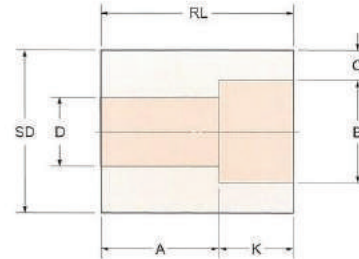


Reducer Insert

3000# 6000#



Type. 1



Type. 2⁽¹⁾

MSS SP-79

Unit: mm

Nominal Pipe Size	Type ⁽²⁾		Socket Min		Shank Dia SD	Laying Length A		Bore D		Wall Thickness Min C		Length Min			
	3M	6M	Dia B	Depth K		3M	6M	3M	6M	3M	6M	SL		RL	
												3M	6M	3M	6M
3/4 x 1/2	1	1	14.22	10	17.15	19	21	9.0	6.5	3.78	4.60	14	16	-	-
1/2 x 3/8	1	1	17.65	10	21.34	21	23	12.5	9.0	4.01	5.03	16	16	-	-
1/2 x 1/4	2	1	14.22	10	21.34	21	21	9.0	6.0	3.78	4.60	16	16	-	-
3/4 x 1/2	1	1	21.84	10	26.67	22	25	16.0	11.5	4.67	5.97	17	19	-	-
1/2 x 3/8	2	1	17.65	10	26.67	16	22	12.5	9.0	4.01	5.03	-	19	21	-
1/2 x 1/4	2	2	14.22	10	26.67	18	22	9.0	6.5	3.78	4.60	-	-	21	32
1 x 3/4	1	1	27.18	13	33.40	24	28	21.0	15.5	4.90	6.96	19	21	-	-
1 x 1/2	2	1	21.84	10	33.40	16	28	16.0	11.5	4.67	5.97	-	21	28	-
1 x 3/8	2	2	17.65	10	33.40	18	22	12.5	9.0	4.01	5.03	-	-	28	33
1 x 1/4	2	2	14.22	10	33.40	19	24	9.0	6.0	3.78	4.60	-	-	28	33
1 1/4 x 1	1	1	33.91	13	42.16	25	60	26.5	20.5	5.69	7.92	21	22	-	-
1 1/4 x 3/4	2	2	27.18	13	42.16	18	21	21.0	15.5	4.90	6.96	-	-	32	35
1 1/4 x 1/2	2	2	21.84	10	42.16	19	22	16.0	11.5	4.67	5.97	-	-	32	35
1 1/4 x 3/8	2	2	17.65	10	42.16	21	24	12.5	9.0	4.01	5.03	-	-	32	35
1 1/4 x 1/4	2	2	14.22	10	42.16	22	25	9.0	6.0	3.78	4.60	-	-	32	35
1 1/2 x 1 1/4	1	1	42.67	13	48.26	28	35	35.0	29.5	6.07	7.92	22	25	-	-
1 1/2 x 1	2	1	33.91	13	48.26	18	29	26.5	20.5	5.69	7.92	-	25	33	-
1 1/2 x 3/4	2	2	27.18	13	48.26	19	25	21.0	15.5	4.90	6.96	-	-	33	40
1 1/2 x 1/2	2	2	21.84	10	48.26	21	27	16.0	11.5	4.67	5.97	-	-	33	40
1 1/2 x 3/8	2	2	17.65	10	48.26	22	28	12.5	9.0	4.01	5.03	-	-	33	40

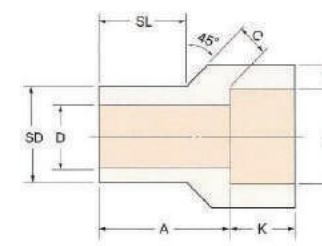
NOTE: 1. At the option of the manufacturer Type 2 Reducers may be furnished in Type 1 configuration.
2. 3M and 6M symbols denote 3000 and 6000 classes.

FORGED STEEL/SOCKET WELDING FITTINGS

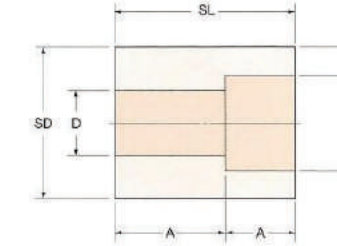


Reducer Insert

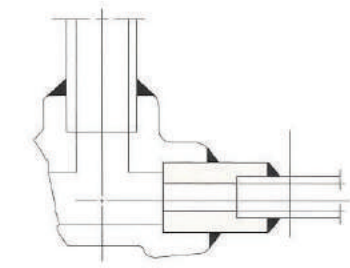
3000# 6000#



Type. 1



Type. 2⁽¹⁾



Application of Reducer Insert

MSS SP-79

Unit: mm

Nominal Pipe Size	Type ⁽²⁾		Socket Min		Shank Dia SD	Laying Length A		Bore D		Wall Thickness Min C		Length Min			
	3M	6M	Dia B	Depth K		3M	6M	3M	6M	3M	6M	SL		RL	
												3M	6M	3M	6M
2 x 1 1/2	1	1	48.77	13	60.32	32	39	41.0	34.0	6.35	8.90	25	28	-	-
2 x 1 1/4	2	2	42.67	13	60.32	21	24	35.0	29.5	6.07	7.92	-	-	38	41
2 x 1	2	2	33.91	13	60.32	22	25	26.5	20.5	5.69	7.92	-	-	38	41
2 x 3/4	2	2	27.18	13	60.32	24	27	21.0	15.5	4.90	6.96	-	-	38	41
2 x 1/2	2	2	21.84	10	60.32	25	28	16.0	11.5	4.67	5.97	-	-	38	41
2 1/2 x 2	1	1	61.24	16	73.02	46	43	52.5	43.0	6.93	10.92	38	32	-	-
2 1/2 x 1 1/2	2	-	48.77	13	73.02	35	-	41.0	-	6.35	-	-	-	54	-
2 1/2 x 1 1/4	2	-	42.67	13	73.02	37	-	35.0	-	6.07	-	-	-	54	-
2 1/2 x 1	2	-	33.91	13	73.02	38	-	26.5	-	5.69	-	-	-	54	-
2 1/2 x 3/4	2	-	27.18	13	73.02	40	-	21.0	-	4.90	-	-	-	54	-
3 x 2 1/2	1	-	74.01	16	88.90	38	-	62.5	-	8.76	-	32	-	-	-
3 x 2	2	-	61.24	16	88.90	25	-	52.5	-	6.93	-	-	-	48	-
3 x 1 1/2	2	-	48.77	13	88.90	29	-	41.0	-	6.35	-	-	-	48	-
3 x 1 1/4	2	-	42.67	13	88.90	30	-	35.0	-	6.07	-	-	-	48	-
3 x 1	2	-	33.91	13	88.90	32	-	26.5	-	5.69	-	-	-	48	-
4 x 3	2	-	89.99	16	114.30	33	-	78.0	-	9.50	-	-	-	60	-
4 x 2 1/2	2	-	74.01	16	114.30	38	-	62.5	-	8.76	-	-	-	60	-
4 x 2	2	-	61.24	16	114.30	38	-	52.5	-	6.93	-	-	-	60	-
4 x 1 1/2	2	-	48.77	13	114.30	42	-	41.0	-	6.35	-	-	-	60	-
4 x 1 1/4	2	-	42.67	13	114.30	43	-	35.0	-	6.07	-	-	-	60	-

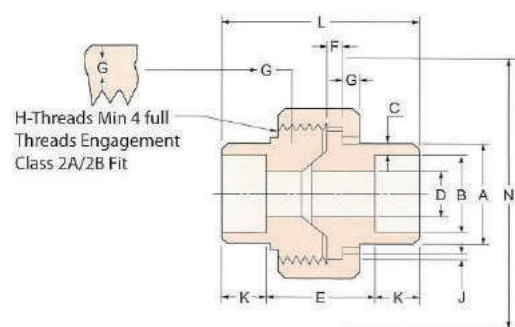
* Laying Length A - Sizes 3/8" thru 2" ±1.50mm
 * Laying Length B - Sizes 1" thru 2 1/2" ±2.00mm
 * Socket Dia SD - Sizes 1/4" thru 4" ±0.13mm
 * Bore D - Sizes 3/8" thru 4" ±0.8mm
 * Wall Thickness Min C - Sizes 1/4" thru 4" ±0.25mm
 * Shank Length SL - Sizes 3/8" thru 4" ±1.5mm
 * Length Min RL - Sizes 1" thru 4" ±2.0mm

FORGED STEEL/SOCKET WELDING FITTINGS



Union

3000#



MSS SP-83

Unit: mm

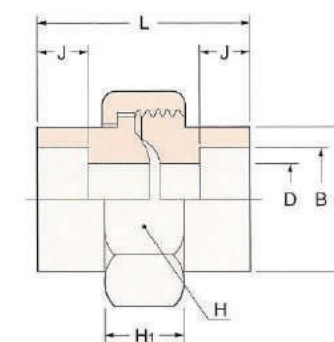
Nom Pipe Size	Pipe End Min	Socket Bore Dia	Socket Wall Min	Water Way Bore	Laying Length	Male Flange Min	Nut Min	Threads Per 25.4 Max	Bearing Min	Depth of Socket Min	Length Ass'y Nominal	Clear Ass'y Nut
	A	B	C	D	E	F	G	H	J	K	L	N
¼	21.8	14.22 13.97	3.30	9.85 9.45	22.4 19.0	3.17	3.17	16	1.24	9.6	41.4	49.0
⅜	25.9	17.78 17.53	3.48	13.92 13.51	26.9 20.6	3.43	3.43	14	1.37	9.6	46.0	55.0
½	31.2	21.84 21.59	4.06	17.47 17.07	26.9 20.6	3.68	3.68	14	1.4	9.6	49.0	57.0
¾	37.1	27.18 26.92	4.27	21.79 21.39	31.8 25.4	4.06	4.06	11	1.68	12.7	56.9	67.0
1	45.5	34.04 33.78	4.95	28.14 27.74	34.3 26.2	4.57	4.44	11	1.85	12.7	62.0	79.0
1¼	54.9	42.67 42.42	5.28	35.76 35.36	40.6 32.5	5.33	5.21	11	2.13	12.7	71.1	94.0
1½	61.5	48.77 48.51	5.54	41.61 41.20	42.2 34.0	5.84	5.59	10	2.31	12.7	76.5	111.0
2	75.2	61.47 61.21	6.05	52.53 52.12	45.5 37.3	6.60	6.35	10	2.69	15.8	86.1	132.0
2½	91.7	74.17 73.66	7.65	64.72 64.31	61.7 52.1	7.49	7.11	8	3.07	15.8	102.4	148.0
3	109.2	90.17 89.66	8.31	77.67 77.27	63.8 53.6	8.25	8.00	8	3.53	15.8	109.0	175.0

FORGED STEEL/SOCKET WELDING FITTINGS



Union

3000# 6000#



Unit: mm

Nom Pipe Size	Socket Bore Dia Min-B	Bore-D		Pipe End-M		Depth Min J	Length Ass'y Nomi-L		Nut-H*		Nut-H1	
		3000	6000	3000	6000		3000	6000	3000	6000	3000	6000
¼	14.10	9.0	6.5	23.0	25	10	45	51	38	38	20	20
⅜	17.55	12.5	9.0	25.9	32	10	51	54	42	48	20	20
½	21.70	16.0	11.5	31.5	38	10	54	57	46	55	20	26
¾	27.05	21.0	15.5	38.0	42	13	57	64	55	60	26	26
1	33.80	26.5	20.5	46.0	49	13	64	72	63	72	26	28
1¼	42.55	35.0	29.5	55.0	59	13	72	80	74	82	30	30
1½	48.65	41.0	34.0	61.5	69	13	78	89	82	91	36	36
2	61.10	52.5	43.0	75.5	90	16	89	110	101	120	38	40
2½	73.80	62.5	54.0	92.0	105	16	110	120	120	150	40	45
3	89.80	78.0	66.8	109.2	125	24	110	140	142	176	42	50
4	115.45	102.3	-	140.0	-	24	128	-	180	-	45	-

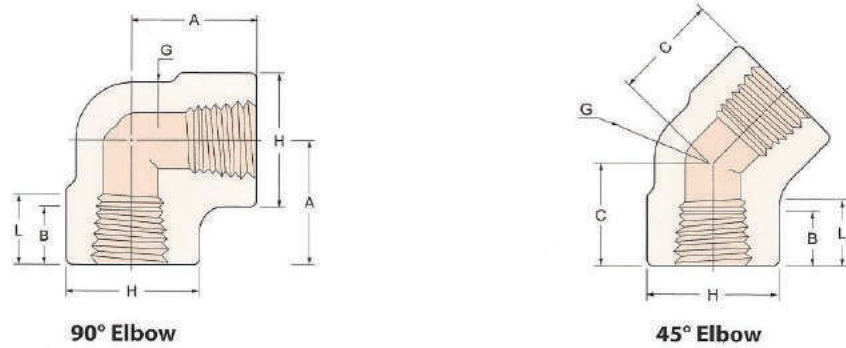
*Nut-H: 3000# Size ¼ ~ 1" Hexagon, 1¼ ~ 4": Octagon
6000# Size ¼ ~ ¾" Hexagon, 1 ~ 3": Octagon

FORGED STEEL THREADED/FITTINGS



90° Elbow, 45° Elbow

2000# 3000# 6000#



ANSI B16.11

Unit : mm

Nom Pipe Size	Center to End Elbows, Tees, Crosses A			Center to End 45° Elbow C			Outside Diameter of Bend H			Minimum Wall Thickness G			Length of thread Min(1)	
	2000	3000	6000	2000	3000	6000	2000	3000	6000	2000	3000	6000	B	L
	1/8	21	21	25	17	17	19	22	22	25	3.0	3.0	6.5	6.35
1/4	21	25	29	17	19	22	22	25	33	3.0	3.5	6.5	8.12	10.20
3/8	25	29	33	19	22	25	25	33	38	3.0	3.5	7.0	9.14	10.36
1/2	29	33	38	22	25	29	33	38	46	3.0	4.0	8.0	10.92	13.55
3/4	33	38	44	25	29	33	38	46	56	3.0	4.5	8.5	12.70	13.86
1	38	44	51	29	33	35	46	56	62	3.5	5.0	10.0	14.73	17.34
1 1/4	44	51	60	33	35	43	56	62	75	4.0	5.5	10.5	17.01	17.95
1 1/2	51	60	64	35	43	44	62	75	84	4.0	5.5	11.0	17.78	18.37
2	60	64	83	43	45	52	75	84	102	4.5	7.0	12.0	19.05	19.21
2 1/2	76	83	95	52	52	64	92	102	121	5.5	7.5	15.5	23.62	28.90
3	86	95	106	64	64	79	110	121	146	6.0	9.0	16.5	25.90	30.48
4	106	114	114	79	79	79	146	152	152	6.5	11.0	18.5	27.68	33.02

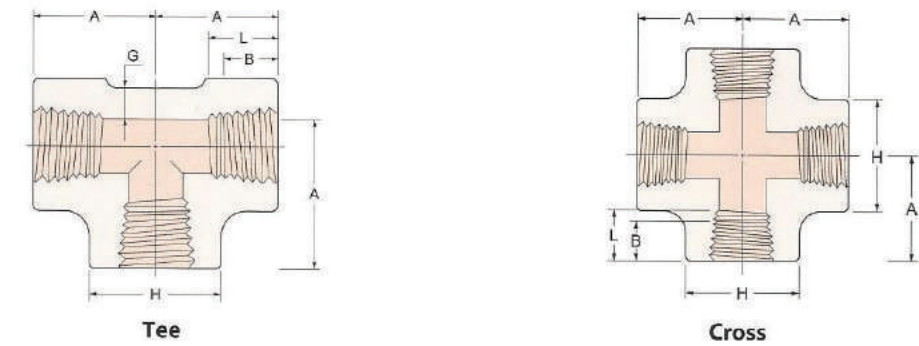
NOTE: 1. Dimensions B is minimum length of perfect thread. The length of useful thread(L plus threads with fully formed roots and crests) shall not be less than L(effective length of external thread) required by American National Standard for Pipe Threads(ASME B1.20.1)

FORGED STEEL THREADED/FITTINGS



Tee, Cross

2000# 3000# 6000#



ANSI B16.11

Unit : mm

Nom Pipe Size	Center to End Elbows, Tees, Crosses A			Min Outside Diameter of H			Minimum Wall Thickness G			Length of thread Min(1)	
	2000	3000	6000	2000	3000	6000	2000	3000	6000	B	L
	1/8	21	21	25	22	22	25	3.0	3.0	6.5	6.35
1/4	21	25	29	22	25	33	3.0	3.5	6.5	8.12	10.20
3/8	25	29	33	25	33	38	3.0	3.5	7.0	9.14	10.36
1/2	29	33	38	33	38	46	3.0	4.0	8.0	10.92	13.55
3/4	33	38	44	38	46	56	3.0	4.5	8.5	12.70	13.86
1	38	44	51	46	56	62	3.5	5.0	10.0	14.73	17.34
1 1/4	44	51	60	56	62	75	4.0	5.5	10.5	17.01	17.95
1 1/2	51	60	64	62	75	84	4.0	5.5	11.0	17.78	18.37
2	60	64	83	75	84	102	4.5	7.0	12.0	19.05	19.21
2 1/2	76	83	95	92	102	121	5.5	7.5	15.5	23.62	28.90
3	86	95	106	110	121	146	6.0	9.0	16.5	25.90	30.48
4	106	114	114	146	152	152	6.5	11.0	18.5	27.68	33.02

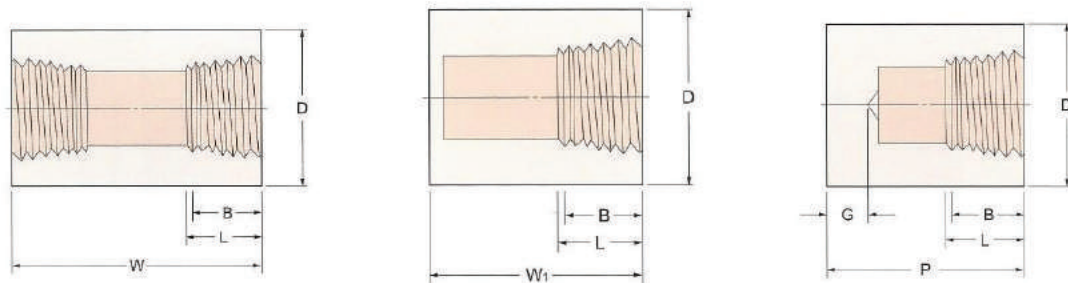
NOTE: 1. Dimensions B is minimum length of perfect thread. The length of useful thread(L plus threads with fully formed roots and crests) shall not be less than L(effective length of external thread) required by American National Standard for Pipe Threads(ASME B1.20.1)

FORGED STEEL THREADED/FITTINGS



Full Coupling Half Coupling, Cap

3000# 6000#



Full Coupling

Half Coupling

Cap

ANSI B16.11

Unit: mm

Nom Pipe Size	Outside Diameter-D		Full Coupling End to End W	Half Coupling End to End W	Cap				Length of thread Min(1)	
	3000	6000			End to End-P		Thickness Min-G		B	L
					3000	6000	3000	6000		
1/8	15.7	22.0	32	16.0	19	-	5.0	-	6.35	6.70
1/4	19.0	25.4	35	17.5	25	27	5.0	6.5	8.12	10.20
3/8	22.3	31.8	38	19.0	25	27	5.0	6.5	9.14	10.35
1/2	28.4	38.1	48	24.0	32	33	6.5	8.0	10.92	13.55
3/4	35.0	44.5	51	25.5	37	38	6.5	8.0	12.70	13.86
1	44.5	57.0	60	30.0	41	43	9.5	11.2	14.73	17.34
1 1/4	57.0	63.5	67	33.5	44	46	9.5	11.2	17.01	17.95
1 1/2	63.5	76.2	80	40.0	44	48	11.2	12.7	17.78	18.37
2	76.2	92.0	86	43.0	48	51	12.7	16.0	19.05	19.21
2 1/2	91.9	108.0	92	46.0	60	64	16.0	19.1	23.62	28.90
3	108.0	127.0	108	54.0	65	68	19.1	22.4	25.90	30.48
4	140.0	160.0	121	60.5	68	75	22.4	28.5	27.68	33.02

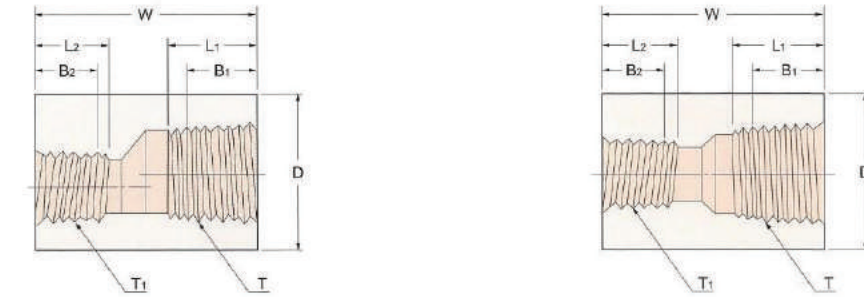
NOTE: 1. Dimensions B is minimum length of perfect thread. The length of useful thread(L plus threads with fully formed roots and crests) shall not be less than L(effective length of external thread) required by American National Standard for Pipe Threads(ASME B1.20.1)
*Class 2000 and NPS 1/8 class 6000 couplings, half couplings, and caps are not included in this standard.

FORGED STEEL THREADED/FITTINGS



Concentric Reducer Eccentric Reducer

3000# 6000#



Concentric Reducer

Eccentric Reducer

Unit: mm

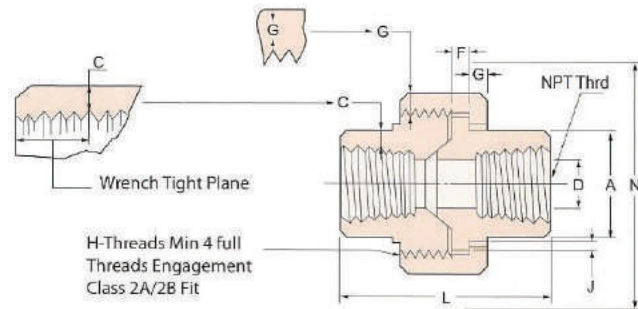
Nom Pipe Size	Min Outside Diameter-D		End to End W	Length of thread Min(1)				Nom Pipe Size	Min Outside Diameter-D		End to End W	Length of thread Min(1)			
	3000	6000		B1	B2	L1	L2		3000	6000		B1	B2	L1	L2
1/4 x 1/4	19.0	25.4	35	8.12	6.35	10.20	6.70	1 1/2 x 1	63.5	76.0	80	17.78	14.73	18.37	17.34
3/8 x 3/8	22.0	31.8	38	9.14	8.12	10.35	10.20	x 1/4	63.5	76.0	80	17.78	17.01	18.37	17.95
1/2 x 1/2	28.5	38.1	48	10.92	8.12	13.55	10.20	2 x 1	76.0	92.0	86	19.05	14.73	19.21	17.34
3/4 x 3/4	28.5	38.1	48	10.92	9.14	13.55	10.35	x 1/4	76.0	92.0	86	19.05	17.01	19.21	17.95
1 x 1	35.0	44.5	51	12.70	8.12	13.86	10.20	x 1/2	76.0	92.0	86	19.05	17.78	19.21	18.37
1 1/4 x 1 1/4	35.0	44.5	51	12.70	9.14	13.86	10.35	2 1/2 x 1/4	92.0	108.0	92	23.62	17.01	28.90	17.95
1 1/2 x 1 1/2	35.0	44.5	51	12.70	10.92	13.86	13.55	x 1/2	92.0	108.0	92	23.62	17.78	28.90	18.37
2 x 2	44.5	57.0	60	14.73	9.14	17.34	10.35	x 2	92.0	108.0	92	23.62	19.05	28.90	19.21
2 1/2 x 2 1/2	44.5	57.0	60	14.73	10.92	17.34	13.55	3 x 1/2	108.0	127.0	108	25.90	17.78	30.48	18.37
3 x 3	44.5	57.0	60	14.73	12.70	17.34	13.86	x 2	108.0	127.0	108	25.90	19.05	30.48	19.21
4 x 4	57.0	63.5	67	17.01	10.92	17.95	13.55	x 2 1/2	108.0	127.0	108	25.90	23.62	30.48	28.90
4 1/2 x 4 1/2	57.0	63.5	67	17.01	12.70	17.95	13.86	4 x 2	140.0	160.0	121	27.68	19.06	33.02	19.21
6 x 6	57.0	63.5	67	17.01	14.73	17.95	17.34	x 2 1/2	140.0	160.0	121	27.68	23.62	33.02	28.90
8 x 8	63.1	76.0	80	17.78	12.70	18.37	13.86	x 3	140.0	160.0	121	27.68	25.90	33.02	30.48

FORGED STEEL THREADED/FITTINGS



Union

3000#



MSS SP-83

Unit: mm

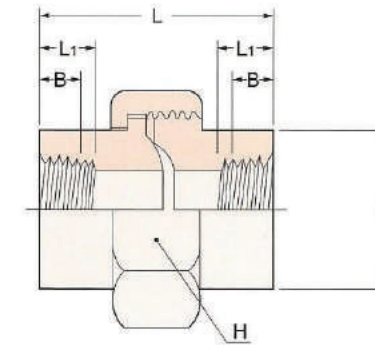
Nom Pipe Size	Pipe End Min	Socket Wall Min	Water Way Bore	Male Flange Min	Nut Min	Threads Per 25.4 Max	Bearing Min	Length Ass'y Nominal	Clear Ass'y Nut
	A	C	D	F	G	H	J	L	N
1/8	14.7	2.41	6.83 6.43	3.17	3.2	16	1.24	41.4	49.0
1/4	19.0	3.02	9.85 9.45	3.17	3.2	16	1.24	41.4	49.03.2
3/8	22.9	3.20	13.92 13.51	3.43	3.4	14	1.37	46.0	55.0
1/2	27.7	3.73	17.47 17.07	3.68	3.7	14	1.4	49.0	57.0
3/4	33.5	3.91	21.79 21.39	4.06	4.1	11	1.68	56.9	67.0
1	41.4	4.55	28.14 27.74	4.57	4.4	11	1.85	62.0	79.0
1 1/4	50.5	4.85	35.76 35.36	5.33	5.2	11	2.13	71.1	94.0
1 1/2	57.2	5.08	41.61 41.20	5.84	5.6	10	2.31	76.5	111.0
2	70.1	5.54	52.53 52.12	6.60	6.4	10	2.69	86.1	132.0
2 1/2	85.3	7.01	64.72 64.31	7.49	7.1	8	3.07	102.4	148.0
3	102.4	7.62	77.67 77.27	8.25	8.0	8	3.53	109.0	175.0

FORGED STEEL THREADED/FITTINGS



Union

3000# 6000#



Unit: mm

Nom Pipe Size	Pipe End-M		Length Ass'y Nomi-L		Nut-H		Length of Thread Min	
	3000	6000	3000	6000	3000	6000	L ₁	B
1/8	23.0	30	45	54	38	46	10.20	8.12
1/4	25.9	36	51	57	42	54	10.35	9.14
3/8	31.5	42	54	64	46	60	13.55	10.92
1/2	38.0	49	57	72	55	72	13.86	12.70
1	46.0	56	69	80	63	80	17.34	14.73
1 1/4	55.0	64	72	89	74	94	17.95	17.01
1 1/2	61.5	76	78	108	82	100	18.37	17.78
2	75.5	90	89	114	101	120	19.21	19.05
2 1/2	92.0	105	110	120	120	150	28.90	23.62
3	109.2	125	110	140	142	180	30.48	25.90
4	140.0	-	128	-	180	-	33.02	27.68

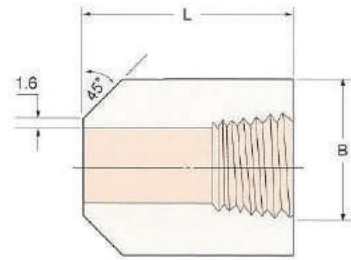
*Nut-H: 3000# Size 1/8 ~ 1" Hexagon, 1 1/4 ~ 4": Octagon
6000# Size 1/8 ~ 3/4" Hexagon, 1 ~ 3": Octagon

FORGED STEEL THREADED/FITTINGS

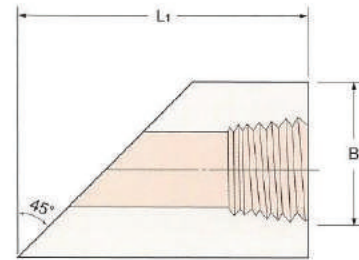


Boss

3000# 6000#



Type. 1



Type. 2

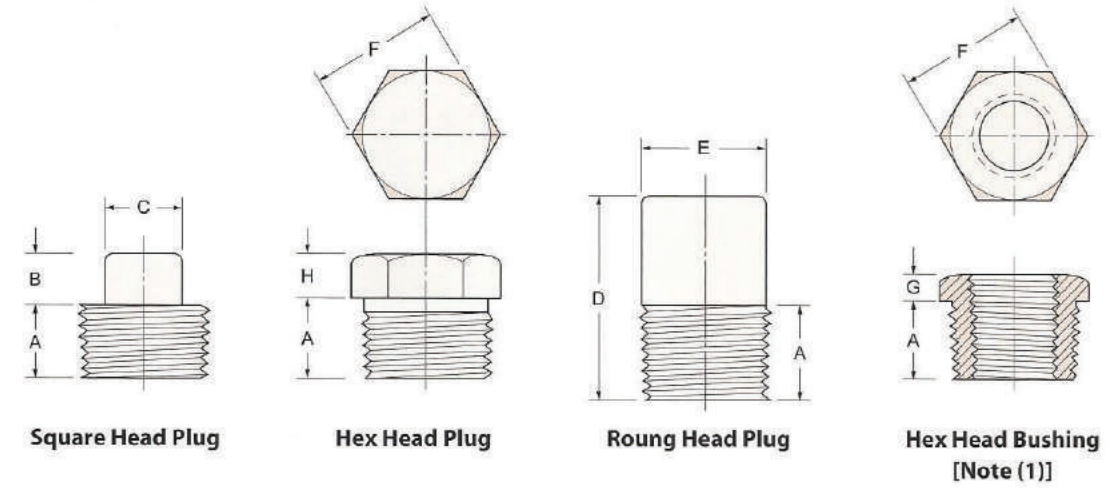
Unit : mm

Nom Pipe Size		Outside Diameter-D		End to End	
B	A	3000	6000	L	L ₁
¼	8	19.0	25.4	17.5	62
⅜	10	22.3	31.8	19.0	66
½	15	28.4	38.1	24.0	82
¾	20	35.0	44.5	25.5	88
1	25	44.5	57.0	30.0	96
1¼	32	57.0	63.5	33.5	105
1½	40	63.5	76.2	39.5	112
2	50	76.2	92.0	43.0	125

FORGED STEEL THREADED/FITTINGS



Plug Bushing



ANSI B16.11

Unit : mm

Nom Pipe Size	Length (Min) A	Plugs Square Head		Plugs Round Head		Hex Plugs & Bushing		
		Height of Square (Min) B	Width Flats (Min) C	Length (Min) D	Nominal Diameter of Head E	Width Flats (Nom) F	Hex Height Min	
							Bushing G	Plug H
¼	9.5	6	7.0	35	10	11.0	-	6
⅜	11.0	6	9.5	41	13	16.0	3	6
½	12.5	8	11.0	41	17	17.5	4	8
¾	14.5	10	14.5	44	21	22.0	5	8
1	16.0	11	16.0	44	27	27.0	6	10
1¼	19.0	13	20.5	51	33	35.0	6	10
1½	20.5	14	24.0	51	43	44.5	7	14
2	20.5	16	28.5	51	48	51.0	8	16
2½	22.0	17	33.5	64	60	63.5	9	17
3	27.0	19	38.0	70	73	76.0	10	19
3½	28.5	21	43.0	70	89	89.0	10	21
4	32.0	25	63.5	76	114	117.5	13	25

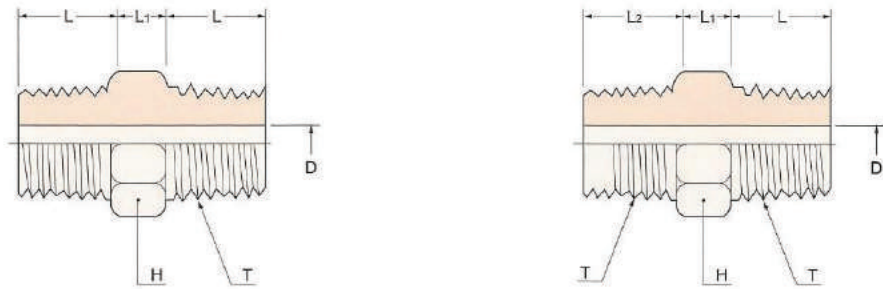
NOTE : 1. CAUTIONARY NOTE REGARDING HEX HEAD BUSHINGS. Hex HEAD Bushings of one-size reduction should not be used in services wherein they might be subject to harmful loads and forces other than internal pressures.

FORGED STEEL THREADED/FITTINGS



Nipple

3000# 6000#



Reducing Nipple

IHARA STD

Unit : mm

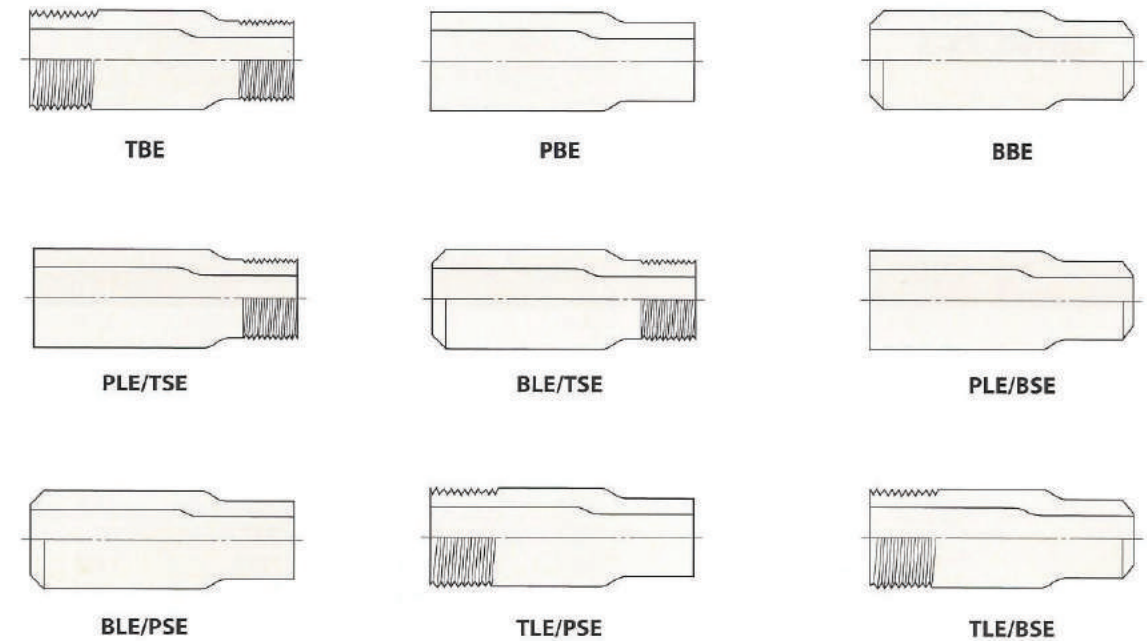
Nom Pipe Size	D	H*	L	L ₁	Nom Pipe Size T x T1	D	H*	L	L ₁	L ₂
3/8	5.5	11.0	10	6	3/8 x 3/8	7	18	14	8	14
					1/2 x 3/8	7	22	19	9	14
					3/4 x 3/8	9	22	19	9	14
1/4	7	16.0	14	8	3/8 x 1/4	7	27	19	10	14
					1/2 x 1/4	9	27	19	10	14
3/8	9	18.0	14	8	3/8 x 1/2	12	27	19	10	19
					1 x 3/8	9	35	24	11	14
1/2	12	22.0	19	9	1 x 1/2	12	35	24	11	19
					1 x 3/4	15	35	24	11	19
3/4	15	27.0	19	10	1 1/4 x 3/4	12	44	24	12	19
					1 1/4 x 1/2	15	44	24	12	19
					1 1/4 x 1	20	44	24	12	24
1	20	35.0	24	11	1 1/2 x 3/4	15	51	25	14	19
					1 1/2 x 1	20	51	25	14	24
					1 1/2 x 1 1/4	28	51	25	14	24
1 1/2	32	51.0	25	14	2 x 1	20	63.5	26	16	24
					2 x 1 1/4	28	63.5	26	16	24
					2 x 1 1/2	32	63.5	26	16	25
2	40	63.5	26	16	2 1/2 x 1 1/4	28	76.2	38	18	24
					2 1/2 x 1 1/2	32	76.2	38	18	25
					2 1/2 x 2	40	76.2	38	18	26
2 1/2	60	76.2	38	18	3 x 1 1/2	32	95	40	20	25
					3 x 2	40	95	40	20	26
					3 x 2 1/2	60	95	40	20	38
3	74	95.0	40	20						

H* : Size 2" and smaller are Hexagonal
Bodies 3" is Octagonal body

FORGED STEEL THREADED/FITTINGS



Swaged Nipple



MSS SP-95

Large and Size	Small end Size	Length (mm)
1/2	3/8 ~ 1/4	70
3/4	1/2 ~ 3/8	76
1	3/4 ~ 1/2	89
1 1/4	1 ~ 3/4	102
1 1/2	1 1/4 ~ 3/4	114
2	1 1/2 ~ 1	165
2 1/2	2 ~ 1 1/2	178
3	2 1/2 ~ 1 1/2	203
3 1/2	3 ~ 1 1/2	203
4	3 1/2 ~ 1 1/2	229
5	4 ~ 1 1/2	279
6	5 ~ 1 1/2	305

BBE : Beveled both end
TBE : Threaded both end
PBE : Plane both end
PLE/TSE : Plane large end-threaded small end
BLE/TSE : Beveled large end-Threaded small end
TLE/PSE : Threaded large end-Plane small end
BLE/PSE : Beveled large end-Plane small end
PLE/BSE : Plane large end-Beveled small end
TLE/BSE : Threaded large end-Beveled small end

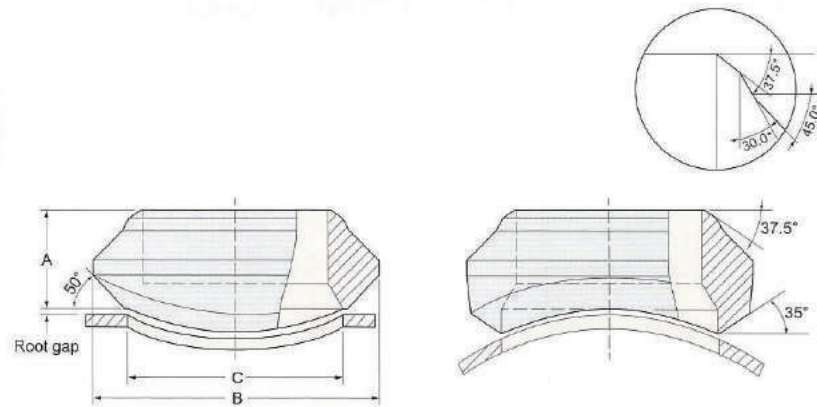
*Pipe schedule numbers and weight designations accordance with ASME B36.10
*Swaged Nipples are from Forged Steel or Pipe

FORGED OUTLET FITTINGS



Weldolet

STD(Sch40),
X-S(SCH80)
Sch160, XX-S



STD, X-S

Outlet Size	A		B		C	
	STD	X-S	STD	X-S	STD	X-S
1/2	19.1	19.1	34.9	34.9	23.8	23.8
3/4	22.2	22.2	44.5	44.5	30.2	30.2
1	27.0	27.0	54.0	54.0	36.5	36.5
1 1/4	31.8	31.8	65.1	65.1	44.5	44.5
1 1/2	33.3	33.3	73.0	73.0	50.8	50.8
2	38.1	38.1	88.9	88.9	65.1	65.1
2 1/2	41.3	41.3	103.2	103.2	76.2	76.2
3	44.5	44.5	122.2	122.2	93.7	93.7
4	50.8	50.8	152.4	152.4	120.7	120.7
5	57.2	57.2	179.4	179.4	141.3	141.3
6	60.3	77.8	215.9	225.4	169.9	169.9
8	69.9	98.5	263.5	292.1	220.7	220.7
10	77.8	93.7	322.3	323.9	274.7	265.1
12	85.7	103.2	377.8	397.4	325.4	317.5
14	88.9	100.0	409.6	431.8	357.2	350.8
16	93.7	106.4	463.6	466.7	408.0	403.2
18	96.8	111.1	520.7	523.9	458.0	455.6
20	101.6	119.1	571.5	582.6	508.0	509.6
24	115.9	139.7	689.0	708.0	614.4	638.2

SCH 160, XX-S

Outlet Size	A		B		C	
	SCH 160	XX-S	SCH 160	XX-S	SCH 160	XX-S
1/2	28.6	28.6	34.9	34.9	14.3	14.3
3/4	31.8	31.8	44.5	44.5	19.1	19.1
1	38.1	38.1	50.8	50.8	25.4	25.4
1 1/4	44.5	44.5	61.9	61.9	33.3	33.3
1 1/2	50.8	50.8	69.9	69.9	38.1	38.1
2	55.6	55.6	81.0	81.0	42.9	42.9
2 1/2	61.9	61.9	96.8	96.8	54.0	54.0
3	73.0	73.0	120.7	120.7	73.0	73.0
4	84.1	84.1	152.4	152.4	98.4	98.4
5	93.7	93.7	187.3	187.3	122.2	122.2
6	104.8	104.8	220.7	220.7	146.1	146.1
8	111.1	111.1	284.2	284.2	173.0	173.0
10	125.4	125.4	312.7	312.7	215.9	215.9

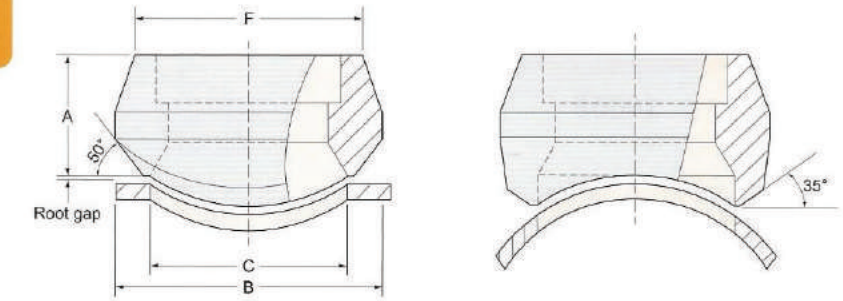
• Dimensions are in millimeters.
• Applicable Run Pipe Sizes are from Out-Let size to 36 inch.

FORGED OUTLET FITTINGS



Socketlet

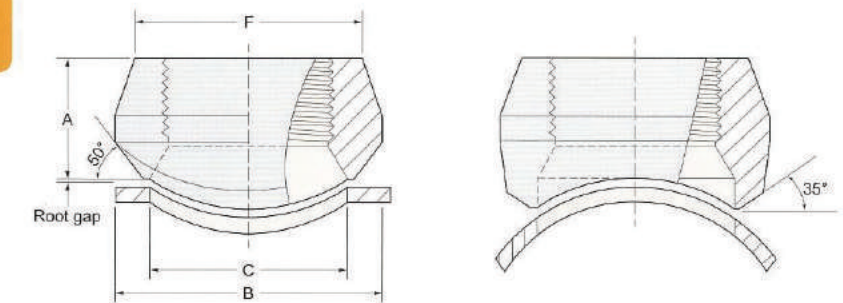
3000# 6000#



Outlet Size	A		B		C		F	
	3000#	6000#	3000#	6000#	3000#	6000#	3000#	6000#
1/2	25.4	31.8	34.9	44.5	23.8	19.1	31.8	39.7
3/4	27.0	36.5	44.5	50.8	30.2	25.4	36.5	45.2
1	33.3	39.7	54.0	61.9	36.5	33.3	46.0	57.2
1 1/4	33.3	41.3	65.1	69.9	44.5	38.1	55.6	65.1
1 1/2	34.9	42.9	73.0	82.6	50.8	49.2	61.9	76.2
2	38.1	58.7	88.9	103.2	65.1	69.9	74.6	92.1
2 1/2	46.0	-	103.2	-	76.2	-	87.3	-
3	50.8	-	122.2	-	93.7	-	104.8	-
4	57.2	-	152.4	-	120.7	-	130.2	-

Threadolet

3000# 6000#



Outlet Size	A		B		C		F	
	3000#	6000#	3000#	6000#	3000#	6000#	3000#	6000#
1/2	25.4	31.8	34.9	44.5	23.8	19.1	31.8	39.7
3/4	27.0	36.5	44.5	50.8	30.2	25.4	36.5	45.2
1	33.3	39.7	54.0	61.9	36.5	33.3	46.0	57.2
1 1/4	33.3	41.3	65.1	69.9	44.5	38.1	55.6	65.1
1 1/2	34.9	42.9	73.0	82.6	50.8	49.2	61.9	76.2
2	38.1	52.4	88.9	103.2	65.1	69.9	74.6	92.1
2 1/2	46.0	-	103.2	-	76.2	-	87.3	-
3	50.8	-	122.2	-	93.7	-	104.8	-
4	57.2	-	152.4	-	120.7	-	130.2	-

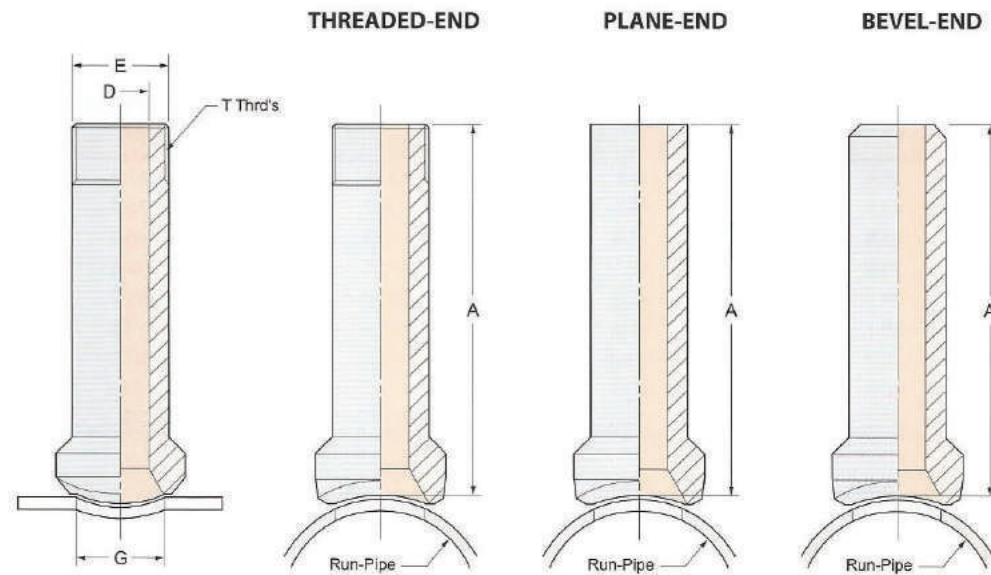
• Dimensions are in millimeters.
• Applicable Run Pipe Sizes are from Out-Let size to 36 inch.
• For the 3000# and 6000# Socketlets and Threadolets, Inside Bore, Thread, Socket Bore and Socket Depth Dimensions are According to ASME B16.11

FORGED OUTLET FITTINGS



Nipplet

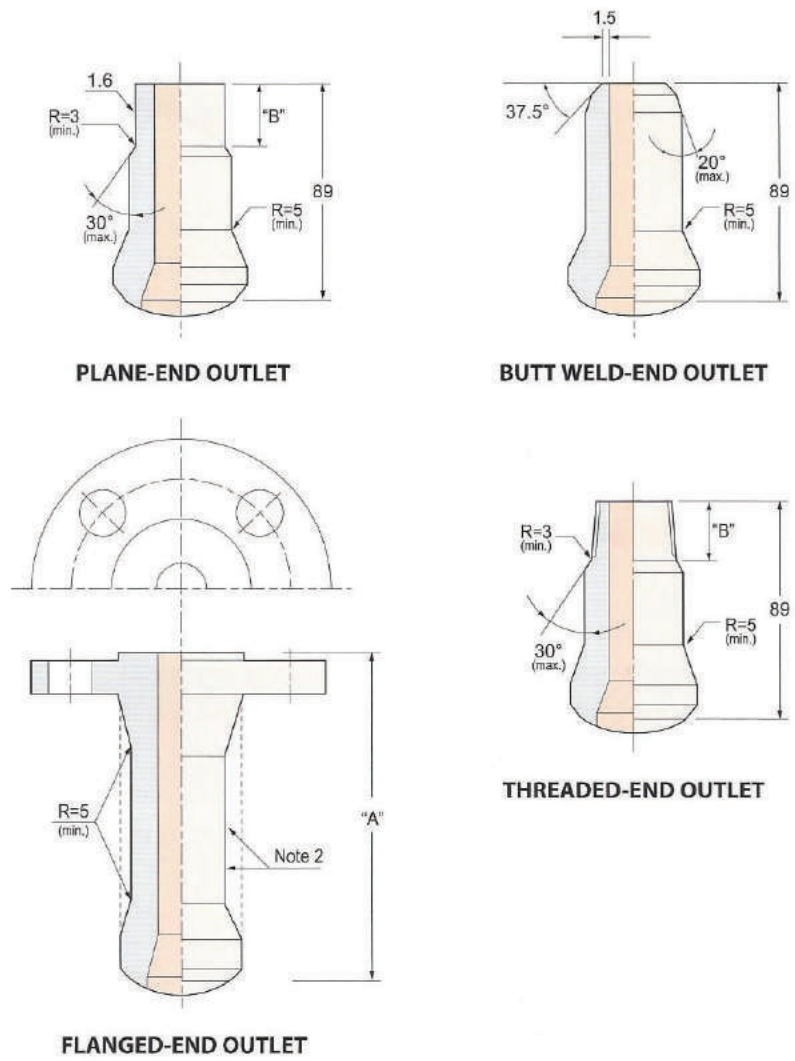
3000#



STD, X-S

Run Pipe Size	Outlet Size T	A	G	D	E	Unit Weight (kg)
36 - 3/4	1/2	88.9	23.9	14.0	21.3	0.36
36 - 1	3/4	88.9	30.2	18.8	26.7	0.56
36 - 1 1/4	1	88.9	36.6	24.4	33.3	0.84
36 - 1 1/2	1 1/4	88.9	44.5	32.5	42.2	1.22
36 - 2	1 1/2	88.9	50.8	38.1	48.3	2.00
36 - 2 1/2	2	88.9	65.0	49.3	60.5	3.12

FLANGED END OUTLET



Nominal Size DN	"A" (Face of flange to crotch) Class					"B" Min (mm)
	150#	300#	600#	1500#	2500#	
15						25
20						
25	150	150	150	150	150	30
40						
50					165	

NOTE: 1. Dimension are in millimeters
2. Shape only indicative, other shape are also acceptable.

SOCKET WELDING FITTINGS/APPROX WEIGHT LIST



Unit: kg

NPS	90° Elbow		45° Elbow		Tee		Cross	
	3000	6000	3000	6000	3000	6000	3000	6000
¼	0.11	0.12	0.09	0.18	0.10	0.17	0.17	0.23
⅜	0.12	0.20	0.17	0.19	0.16	0.19	0.18	0.40
½	0.20	0.30	0.18	0.23	0.28	0.31	0.36	0.66
¾	0.28	0.60	0.23	0.50	0.37	0.86	0.51	1.12
1	0.46	1.05	0.35	0.69	0.57	1.45	0.68	1.73
1¼	0.65	1.40	0.65	0.88	0.87	1.70	1.02	2.38
1½	0.96	2.40	0.80	1.85	1.28	3.04	1.38	3.75
2	1.50	3.65	1.20	2.93	1.80	4.44	2.32	7.86
2½	2.25	-	3.06	-	2.85	-	7.48	-
3	4.00	-	4.76	-	5.50	-	10.43	-
4	9.40	-	8.25	-	12.24	-	18.14	-

Unit: kg

NPS	F/Coupling		H/Coupling		Cap		Boss		Union	
	3000	6000	3000	6000	3000	6000	3000	6000	3000	6000
¼	0.06	0.06	0.06	0.07	0.04	0.04	0.09	0.09	0.23	0.25
⅜	0.06	0.07	0.08	0.08	0.05	0.06	0.14	0.15	0.35	0.42
½	0.11	0.14	0.14	0.30	0.07	0.22	0.24	0.45	0.40	0.85
¾	0.17	0.25	0.20	0.43	0.13	0.35	0.28	0.52	0.50	1.00
1	0.27	0.36	0.34	0.69	0.21	0.55	0.41	0.73	0.70	1.30
1¼	0.35	0.46	0.48	0.96	0.37	0.89	0.44	0.77	1.20	2.00
1½	0.43	0.58	0.51	1.20	0.60	1.15	0.63	1.12	1.50	3.80
2	0.72	1.20	1.00	2.05	0.99	2.05	1.09	1.82	2.58	6.40
2½	1.13	1.60	1.55	3.25	1.50	3.75	-	-	5.14	6.87
3	1.50	2.18	2.13	4.33	2.30	5.10	-	-	7.12	10.85
4	2.50	3.95	3.65	6.45	4.00	8.20	-	-	12.40	-

Unit: kg

NPS	Weldolet				Sockolet		Threadolet	
	S.T.D	XS	SCH160	XXS	3000	6000	3000	6000
¼	0.08	0.09	0.11	0.11	0.14	0.23	0.11	0.20
⅜	0.11	0.14	0.32	0.32	0.15	0.36	0.16	0.34
1	0.23	0.21	0.38	0.38	0.27	0.59	0.28	0.56
1¼	0.36	0.41	0.57	0.57	0.39	0.73	0.41	0.71
1½	0.45	0.50	0.80	0.80	0.47	0.91	0.45	0.89
2	0.80	0.80	1.00	1.00	0.73	2.33	0.80	2.30
2½	1.14	1.20	1.54	1.54	1.25	-	1.36	-
3	1.82	1.90	2.90	2.90	1.73	-	1.98	-
4	2.86	2.90	4.80	4.80	3.30	-	3.22	-
5	4.66	4.70	6.50	6.50	-	-	-	-
6	6.45	10.50	12.70	12.70	-	-	-	-
8	10.68	16.80	20.50	20.50	-	-	-	-
10	17.73	20.90	38.60	38.60	-	-	-	-

THREADED FITTINGS/APPROX WEIGHT LIST



Unit: kg

NPS	90° Elbow		45° Elbow		Tee		Cross	
	2000	3000	2000	3000	2000	3000	2000	3000
¼	0.11	0.17	0.06	0.11	0.11	0.13	0.23	0.17
⅜	0.14	0.29	0.11	0.23	0.14	0.37	0.23	0.45
½	0.25	0.59	0.20	0.34	0.25	0.54	0.40	0.68
¾	0.31	0.63	0.29	0.54	0.43	0.85	0.51	1.13
1	0.51	1.02	0.43	0.85	0.65	1.13	0.77	1.61
1¼	0.77	1.25	0.63	0.97	0.91	1.42	1.13	1.87
1½	1.02	1.59	0.74	1.36	1.25	2.27	1.45	2.95
2	1.59	2.47	1.22	1.93	2.10	3.06	2.38	3.69
2½	2.95	4.85	3.35	3.52	3.94	5.96	7.46	7.60
3	4.76	6.55	5.13	4.76	5.98	9.24	8.85	8.96
4	10.30	13.80	8.65	8.68	12.40	17.90	14.50	14.80

Unit: kg

NPS	F/Coupling		H/Coupling		Cap		Boss	
	3000	6000	3000	6000	3000	6000	3000	6000
¼	0.05	0.12	0.02	0.06	0.05	0.09	0.09	0.13
⅜	0.06	0.18	0.03	0.09	0.08	0.14	0.11	0.24
½	0.14	0.28	0.07	0.14	0.12	0.25	0.24	0.44
¾	0.21	0.45	0.10	0.23	0.20	0.36	0.29	0.55
1	0.41	0.80	0.21	0.37	0.31	0.70	0.42	0.74
1¼	0.72	1.40	0.36	0.70	0.60	0.80	0.61	0.75
1½	1.06	1.95	0.52	0.90	0.73	1.28	0.65	1.17
2	1.40	2.80	0.69	1.22	1.05	2.16	1.13	1.90
2½	2.55	3.80	1.25	1.85	2.27	2.72	-	-
3	3.83	6.00	1.84	2.95	3.83	4.95	-	-
4	6.35	10.70	3.51	5.40	6.35	9.21	-	-

Unit: kg

NPS	Union		Nipple	S/H Plug	H/H Plug	R/H Plug	H/H Bushing	Flush Bushing
	3000	6000						
¼	0.14	0.45	0.04	0.01	0.03	0.05	0.03	0.03
⅜	0.20	0.60	0.05	0.03	0.06	0.08	0.03	0.03
½	0.35	0.85	0.09	0.06	0.09	0.17	0.03	0.03
¾	0.43	1.40	0.15	0.09	0.14	0.17	0.09	0.06
1	0.65	1.75	0.27	0.14	0.23	0.34	0.09	0.06
1¼	0.98	3.00	0.45	0.25	0.51	0.34	0.17	0.06
1½	1.26	4.00	0.62	0.40	0.63	0.71	0.31	0.09
2	2.01	5.50	1.03	0.68	1.02	1.36	0.74	0.17
2½	5.14	6.87	1.51	1.02	1.76	2.15	1.08	0.29
3	7.12	10.85	2.22	1.31	2.67	3.45	1.59	0.45
4	12.40	-	-	3.26	5.90	5.83	3.77	0.91



The Best technology to handle steel!

CARBON STEEL		
ASTM	JIS	DIN
A105	SF490	CK25
A181 CL.60	SFVC1	
A181 CL.70	SFVC2A	
A266 GR.1	SFVC1	
A266 GR.2	SFVC2A	
A266 GR.3		
A266 GR.4	SFVC2B	
A350 LF.1	SFL1	
A350 LF.2	SFL2	
A694 F42		
A694 F50		
A694 F52		
A694 F65		
A765 GR.1		
A765 GR.2		
A765 GR.4		
	S15C	CK15
	S20C	CK20
	S25C	CK25
	S30C	CK30
	S35C	CK35
	S40C	CK40
	S45C	CK45
	S50C	CK50
	S55C	CK55
A668 CL.8	SF 390A	
A668 CL.C	SF 440A	
A105	SF 490A	
A668 CL.D	SF 540A	
	SF 540B	
A668 CL.F	SF 590A	
A668 CL.F	SF 590B	
	SF 640B	
	SM 490A	S 335NL/S335 J2G3
	SM 490B	
FERRITIC AUSTENITIC STAINLESS STEEL		
A182 / F51		X2CrNiMoN22-5-3
A182 / F53		X2CrNiMoCuWN25-7-4
MARTENSITIC STAINLESS STEEL		
A182 F6a	SUS F410	X12Cr13
AUSTENITIC STAINLESS STEEL		
A182 / A336 F304	SUS F304	
A182 / A336 F304L	SUS F304L	X2CrNi19-11
A182 / A336 F304H	SUS F304H	
A182 / A336 F310	SUS F310	X12CrNi25-20
A182 / A336 F316	SUS F316	
A182 / A336 F316L	SUS F316L	X2CrNiMo18-14-3
A182 / A336 F316H	SUS F316H	
A182 / A336 F317	SUS F317	
A182 / A336 F317L	SUS F317L	
A182 / A336 F321	SUS F321	X6CrNiTi18-10
A182 / A336 F347	SUS F347	X6CrNiNb18-10

CARBON STEEL		
ASTM	JIS	DIN
	SCM 415	
	SCM 420	
	SCM 430	
	SCM 440	42CrMo4
	SCM 445	
	SFCM 740S/R/D	
	SFCM 780S/R/D	
	SFCM 83S/R/D	
	SFCM 880S/R/D	
	SFCM 930S/R/D	
	SFCM 980S/R/D	
	SNCM 220	
	SNCM 420	
	SNCM 439	36CrNiMo4
	SNCM 815	
A291 CL. 3A	SFNCM 740S/R/D	
	SFNCM 780S/R/D	
A291 CL.4	SFNCM 830S/R/D	
A291 CL.G	SFNCM 880S/R/D	
	SFNCM 930S/R/D	
A291 CL.1	SFNCM 1030S/R/D	
	SFNCM 1080S/R/D	
LOW ALLOY STEEL		
A182 / A336 F1	SFV F1	15Mo3
A182 / A336 F5	SFVA F5A/B	12Crmo19-5
A182 / A336 F9	SFVA F9	12-Crmo9-1
A182 / A336 F91		
A182 / A336 F11	SFVA F11A/B	13CrMo44
A182 / A336 F12	SFVA F12	16CrMo44
A182 / A336 F22	SFVA F22A/B	10CrNo9-10
A182 / A336 F22V		
A350 LF3	SFL3	
A508 GR.1		
A508 GR.2	SFVQ 2A	
A508 GR.3	SFVQ 1A	
A508 GR.4N	SFVQ 3	
	SFVQ 2B	
A541 GR.1 & 1A	SFVQ 3	
A541 GR.7B		
A541 GR.11		
A541 GR.22		
A541 GR.22V		
A765 GR.3		
SPECIAL STEEL		
	SFT 590	
	SSWR1 / R2 / R3	
	SUS 304N2	
NO FERROUS STEEL		
5083	A5083 FD/FH	
5052	A5052 FD/FH	

REFERENCES

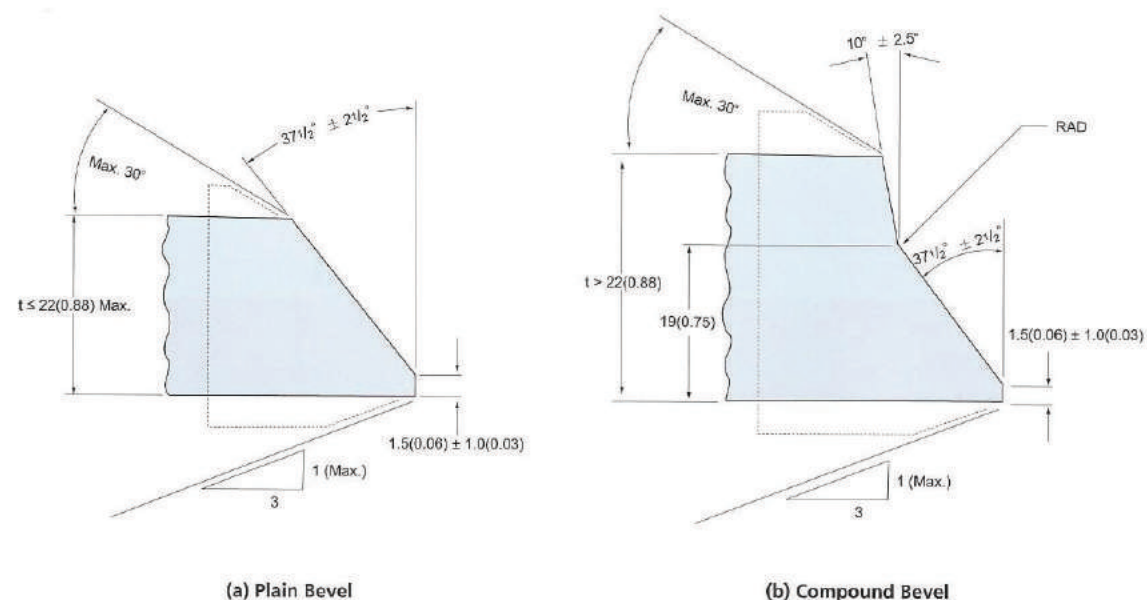
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WELDING END PREPARATIONS



ASME B16.9



Nominal Pipe Wall Thickness (t)	End Preparation
Less than X*	Cut square or slightly chamfer, at mfr's. option
X* to 22(0.88), inclusive	Plain bevel as in sketch "(a)" above
More than 22(0.88)	Compound bevel as in sketch "(b)" above

X* = 5(0.19) for carbon steel, ferritic alloy steel or wrought iron;
3(0.12) for austenitic alloy steel

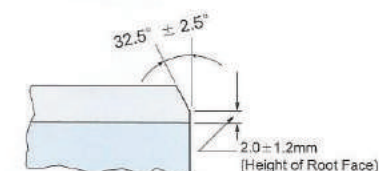
- Notes: 1. End preparations are in accordance with ASME B16.25 Paragraph 4.2
- 2. End preparations conforming to customer specifications will be specially manufactured upon consultation.

WELDING END PREPARATIONS



KS / JIS

1. Steel Butt-Welding Pipe Fittings for Ordinary Use.

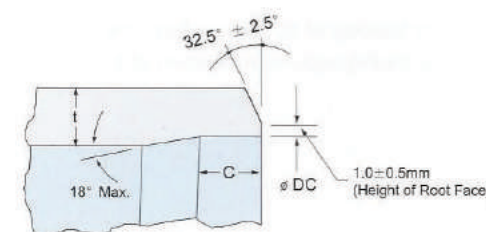


KS B1522
JIS B2311

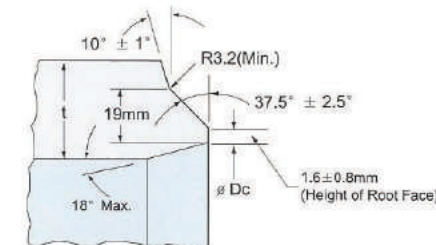
2. Steel Butt-Welding Pipe Fittings for Special Use.

KS B1541
JIS B2312

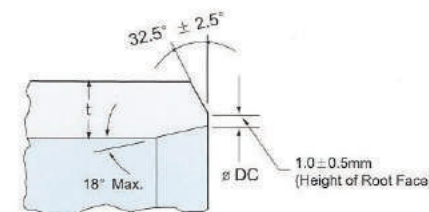
C: In the Case Where t is 22.4mm or Less



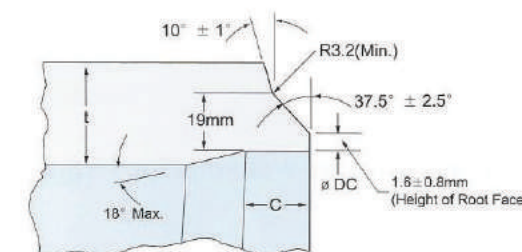
B: In the Case Where t is Over 22.4mm



A: In the Case Where t is 22.4mm or Less



D: In the Case Where t is Over 22.4mm



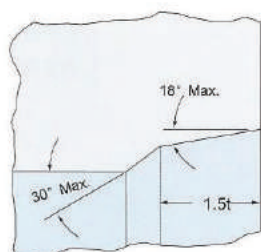
Where t : nominal wall thickness
Dc : diameter of machining bore
C : length of machining bore

Remarks

- Diameter (Dc) and length (C) of machining bore and dimensional tolerances shall be as agreed between parties concerned.
- Relieving of machining bore may be performed by providing an inclination of 18° or less from the end face to the limits of 1.5 times the wall thickness, or after cutting to the cylindrical surface to the length of machining bore, providing an inclination of 18° or less to the limits above-indicated, and beyond that portion machining with an inclination of 45° or less.

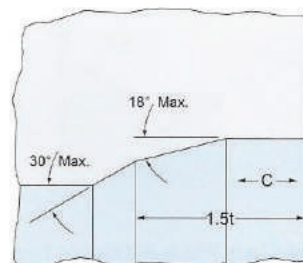


For Types A and B of Bevel Shape



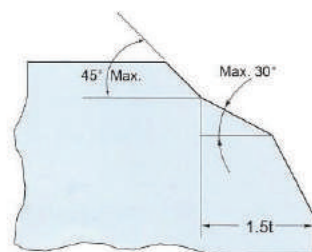
In the figure, t: nominal wall thickness

For Types C and D of Bevel Shape



In the figure, t: nominal wall thickness
c: length of machining bore

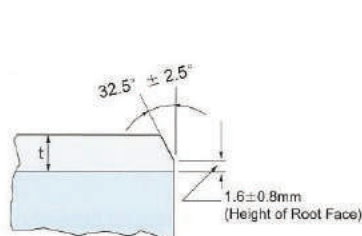
Relieving for outside diameter may be performed by providing an inclination of 30° or less from the end face to the limits of 1.5 times the wall thickness, and beyond that portion machining with an inclination of 45° or less.



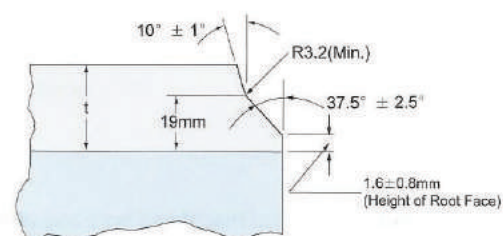
In the figure, t: nominal wall thickness

3. Steel Plate Butt-Welding Pipe Fittings

Where, $t \leq 22.4$ mm



Where, $t > 22.4$ mm



KS B1543
JIS B2313

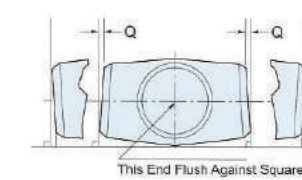
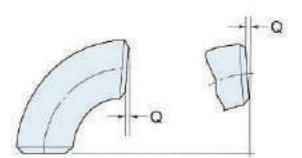
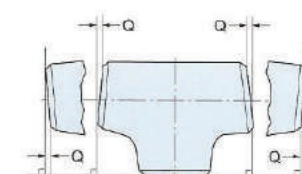
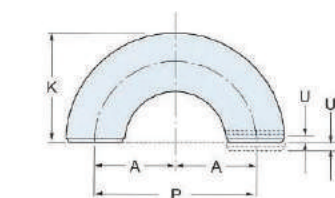
Remarks: The shape and dimensions of the special bevel ends are referred to the reference clause stated in KS B1541, JIS B2312.

DIMENSIONAL TOLERANCES

ASME B16.9

1. Wrought Steel Butt Welding Fittings

Nominal Pipe Size	All Fittings			90° and 45° Elbows	Tees	Reducers	Caps	180° Returns									
	Outside Diameter at Bevel OD	Inside Diameter at End ID	Wall Thickness T	Center-to-End Dimension A, B	Center-to-End Dimension C, M	End to End H	Back to Face E	Center-to-Center Dimension P	Back-to-Face Dimension K	Alignments of Ends K							
1/2 ~ 2 1/2	+0.06 -0.03	±0.03	Not less than 87 1/2% of nominal thickness	±0.06	±0.06	±0.06	±0.12	±0.25	±0.25	±0.03							
3 ~ 4	±0.06	±0.06															
5 ~ 8	±0.09 -0.06	±0.06															
10 ~ 18	+0.16 -0.12	±0.12									±0.09	±0.09	±0.09	±0.25	±0.38	±0.06	
20 ~ 24	+0.25 -0.19	±0.19									±0.12	±0.12	±0.12	±0.38	-	-	-
26 ~ 30											±0.12	±0.12	±0.19	±0.38	-	-	-
32 ~ 48			±0.19	±0.19	-	-	-	-	-								



This End Flush Against Square

Nominal Pipe Size	Angularity Tolerance	
	Off Angle Q	Off Plane P
1/2 ~ 4	0.03	0.06
5 ~ 8	0.06	0.12
10 ~ 12	0.09	0.19
14 ~ 16		0.25
18 ~ 24	0.12	0.38
26 ~ 30	0.19	
32 ~ 42		0.5
44 ~ 48		0.75

* Dimensions are in inches.



2. Forged Socket Welding Fittings

Nominal Pipe Size	All Fittings				Elbow, Tee, Cross	Coupling	Half Coupling
	Socket Bore Dia	Bore Dia. of Fitting	Concentricity of Bore	Concidence of Axis			
1/8 ~ 1/4	+0.012 -0.000	±0.03	Socket and Fitting Bores within ±0.030	Maximum variation in alignment of socket and fitting bores for 1/8 in 12	±0.03	±0.06	±0.03
3/8 ~ 3/4	+0.012 -0.000	±0.03			±0.06	±0.12	±0.06
1 ~ 2	+0.012 -0.000	±0.03			±0.08	±0.16	±0.08
2 1/2 ~ 3	+0.012 -0.000	±0.06			±0.10	±0.20	±0.10

• Dimensions are in inches.
• Above table is followed accordingly to ASME B16.11

DIMENSIONAL TOLERANCES



MSS SP-43

Nominal Pipe Size	All Fittings		90° Elbow 45° Elbow Tee	Reducer Lap Joint Stub End	180° Return		
	Outside(1) Diameter at Welding End	Wall Thickness	Center-to-End Dimension A, B, C, M	Overall Length F, H	Center- to-Center Dimension O	Center- to-Center Dimension K	Alignment of Ends U
1/2 ~ 1 1/2	±0.03	Not less than 87 1/2% of nominal thickness	±0.06	±0.06	±0.25	±0.25	±0.03
2 ~ 3 1/2	±0.03		±0.06	±0.06	±0.25	±0.25	±0.03
4	±0.03		±0.06	±0.06	±0.25	±0.25	±0.03
5 ~ 8	+0.06 -0.03		±0.06	±0.06	±0.25	±0.25	±0.03
10 ~ 18	+0.09 -0.03		±0.09	±0.09	±0.38	±0.25	±0.06
20 ~ 24	+0.12 -0.03		±0.09	±0.09	±0.38	±0.25	±0.06

Nominal Pipe Size	All Fittings		Cap	Lap Joint Stub End	
	Outside(1) Diameter at Welding End	Wall Thickness	Overall Length E	Filte (2) Radius of Lap A	Outside Diameter of Lap G
1/2 ~ 1 1/2	±0.03	Not less than 87 1/2% of nominal thickness	±0.12	+3 -0.03	+0 -0.03
2 ~ 3 1/2	±0.03		±0.12	+0 -0.03	+0 -0.03
4	±0.03		±0.12	+0 -0.06	+0 -0.03
5 ~ 8	+0.06 -0.03		±0.25	+0 -0.06	+0 -0.03
10 ~ 18	+0.09 -0.03		±0.25	+0 -0.06	+0 -0.06
20 ~ 24	+0.12 -0.03		±0.25	+0 -0.06	+0 -0.06

• Notes:
1. Out of roundness is the vector sum of the plus and minus tolerance.
2. Fillet B radius is the maximum

• Dimensions are in inches.

DIMENSIONAL TOLERANCES



KS / JIS

1. Steel Butt-Welding Pipe Fittings for Ordinary Use

{ KS B1522 }
{ JIS B2311 }

Item	Type of Pipe Fitting	Nominal Diameter				
		1/2 ~ 2 1/2	3 ~ 4	5 ~ 8	10 ~ 18	20
Tolerance						
Outside Dia, at end face (OD)	All pipe Fitting	±2	±2.5	±3.5	+5 -4.5	+6.4 -4.8
Inside Dia, at end face (ID)		±2	±2.5	±3.5	±4.5	±4.8
Wall thickness (T)		+Not specified -15%				
Centre-to-end dimension (A,B)	90° Elbow 45° Elbow	±2.0		±3.2	±4.8	
Centre-to-centre dimension (P)	180° Elbow	±6.4		±9.5	-	
Back-to-face dimension (K)		±6.4				
Alignment of ends(Max.) (U)		1.6		3.2		-
End-to-end dimension (H)	Reducer	±2.0		±3.2		
Centre-to-end dimension (C,M)	Tee	±2.0		±3.2		
Back-to-face dimension (E)	CAP	±3.2		±6.4		

2. Steel Butt-Welding Pipe Fittings for Special Use and Steel Plate Butt-Welding Pipe Fittings

{ KS B1541, JIS B 2312 }
{ KS B1543, JIS B 2313 }

Item	Type of Pipe Fitting	Nominal Diameter							
		1/2 ~ 2 1/2	3 ~ 4	5 ~ 8	10 ~ 18	20 ~ 24	26 ~ 30	32 ~ 36	
Tolerance									
Outside Dia, at end face (OD)	All pipe Fitting	+1.6 -0.8	±1.6	+2.4 -1.6	+4 -3.2	+6.4 -4.8			
Inside Dia, at end face (ID)		±0.8	±1.6		±3.2	±4.8			
Wall thickness (T)	+Not specified -12.5%								
Centre-to-end dimension (A,B)	90° Elbow 45° Elbow	±1.6		±2.4	±3.2	±4.8			
Centre-to-centre dimension (P)	180° Elbow	±6.4		±9.5					
Back-to-face dimension (K)		±6.4							
Alignment of ends(Max.) (U)		*±0.8 **±1.6		*±1.6 **±3.2		-			
End-to-end dimension (H)	Reducer	±1.6		±2.4		±4.8			
Centre-to-end dimension (C,M)	Tee	±1.6		±2.4		±3.2	±4.8		
Back-to-face dimension (E)	CAP	±3.2		±6.4					
Outside of end Peripheral length	All pipe Fitting	-					±0.5		

*Application of KS B 1541, JIS B 2312
**Application of KS B 1543, JIS B 2313
- Dimensions are in millimeters.

3. Steel Socket-Welding Pipe Fittings for Special

{ KS B1542 }
{ JIS B2316 }

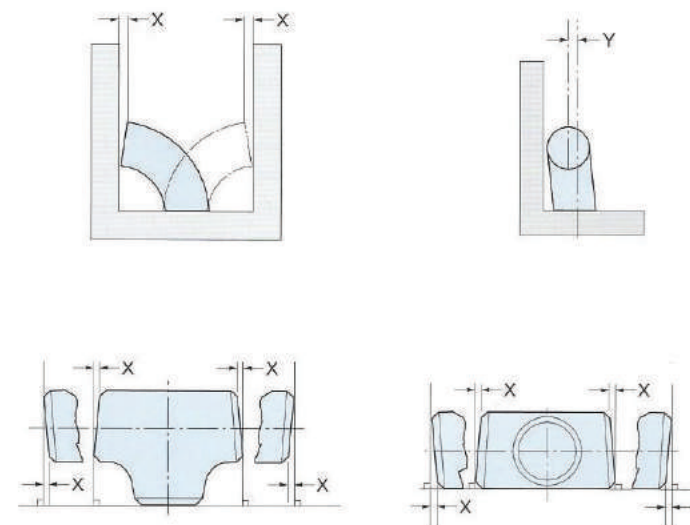
Item	Type of Pipe Fitting	Nominal Diameter				
		1/8 and 1/4	3/8 to 3/4	1 to 2	2 1/2 and 3	
Tolerance						
Inside Diameter of Socket	All pipe Fittings	+0.3 0			+0.4 0	
Bore diameter		±0.4			±0.8	
Eccentricity of inside Diameter of socket to bore diameter		±0.8				
Inclination of socket hole to fitting bore axis		1.5/300 Max.				
Distance from centre to bottom of socket	45° Elbow 90° Elbow cross	±0.8	±1.5	±2	±2.5	
Laying length	Full coupling	±1.5	±3	±4	±5	
Laying length	Half coupling	±0.8	±1.5	±2	±2.5	

{ KS B1522, JIS B 2311 }
{ KS B1541, JIS B 2312 }
{ KS B1543, JIS B 2313 }

4. Right Angle for Shaft-Center of Pipe Fittings

Item	Type of Pipe Fitting	Nominal Diameter							
		1/2 ~ 4	5 ~ 8	10 ~ 12	14 ~ 16	18 ~ 24	26 ~ 30	32 ~ 42	44 ~ 48
Tolerance									
Off Angle (X)	All pipe Fitting	0.8	1.6	2.4	3.2	4.8			
Off Plane (Y)		1.6	3.2	4.8	6.4	9.5	12.7	19.1	

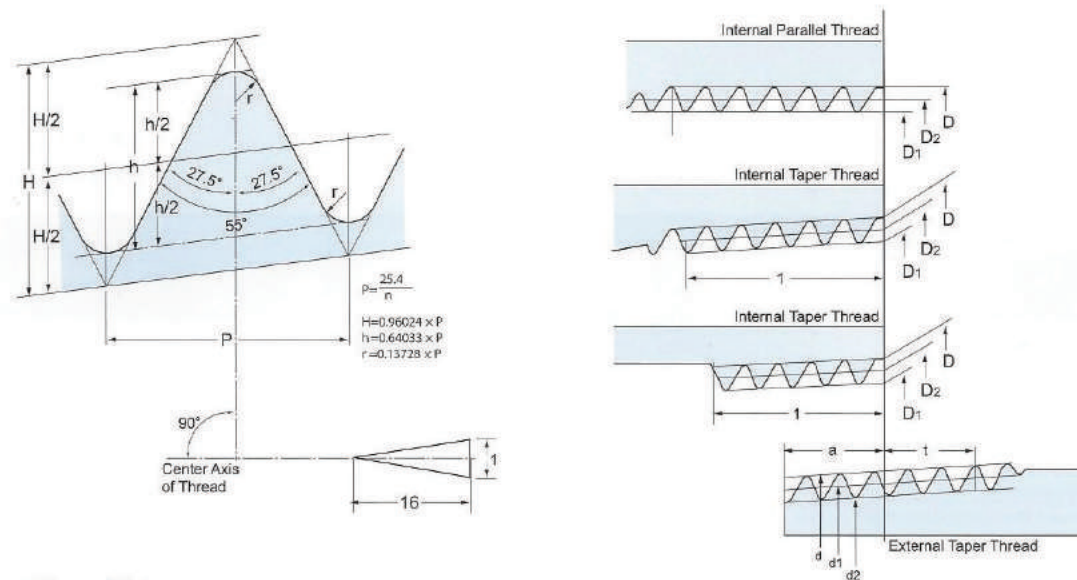
- Dimensions are in millimeters.



STANDARD THREADS SPECIFICATIONS



1. KS B0222 & JIS B0203 Pipe Threads

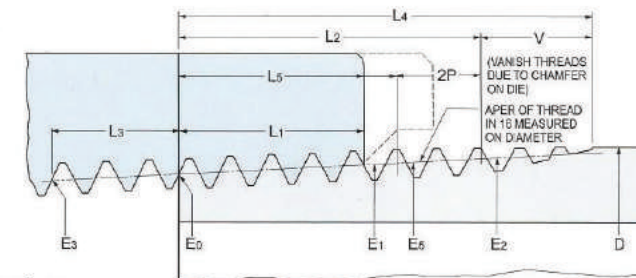


Basic Thread Data

Nominal Size	Screw Thread				Basic Diameter			Position of Basic Diameter		Effective Thread Length (Min.)				Nominal Pipe Size (For Reference)				
	Number of Threads per Inch	Pitch	Height of Thread	Rounding	External Thread			From the End of Pipe	Internal Thread	External Thread	Internal Thread			Outside Diameter	Wall Thickness			
					Major Diameter d	Pitch Diameter d ₂	Major Diameter d ₁				Basic Length	Tolerance Axially	Tolerance Axially			Fitting Allowance	When there is an incomplete thread of more than one thread	When there is no incomplete thread
n	p	h	r	D	D ₂	D ₁	a	±b	±c	±	f	l	l	t				
PT 15(1/2)	14	1.8143	1.162	0.25	20.955	19.793	18.631	8.16	1.81	2.27	0.142	5.00	12.7	15.0	9.1	21.7	2.8	
PT 20(3/4)	14	1.8143	1.162	0.25	26.441	25.279	24.117	9.53	1.81	2.27	0.142	5.60	14.1	16.3	10.2	27.2	2.8	
PT 25(1)	11	2.3091	1.479	0.32	33.249	31.770	30.291	10.39	2.31	2.89	0.180	6.40	16.2	19.0	11.5	34.0	3.2	
PT 32(1 1/4)	11	2.3091	1.479	0.32	41.910	40.431	38.952	12.70	2.31	2.89	0.180	6.40	18.5	21.4	13.4	42.7	3.5	
PT 40(1 1/2)	11	2.3091	1.479	0.32	47.803	46.324	44.845	12.70	2.31	2.89	0.180	6.40	18.5	21.4	13.4	48.6	3.5	
PT 50(2)	11	2.3091	1.479	0.32	59.614	58.135	56.656	15.88	2.31	2.89	0.180	7.50	22.8	25.7	16.9	60.5	3.8	
PT 65(2 1/2)	11	2.3091	1.479	0.32	75.184	73.705	72.226	17.46	3.56	3.46	0.217	9.22	26.7	30.2	18.6	76.3	4.2	
PT 80(3)	11	2.3091	1.479	0.32	87.884	86.405	84.926	20.64	3.46	3.46	0.217	9.22	29.9	33.3	21.1	89.1	4.2	
PT 90(3 1/2)	11	2.3091	1.479	0.32	100.330	98.851	97.372	22.23	3.46	3.46	0.217	9.30	31.5	34.9	22.4	101.6	4.2	
PT100(4)	11	2.3091	1.479	0.32	113.030	111.551	110.072	25.40	3.46	3.46	0.217	10.40	35.9	39.3	25.9	114.3	4.5	
PT125(5)	11	2.3091	1.479	0.32	138.430	136.952	135.472	25.58	3.46	3.46	0.217	11.40	40.1	43.6	29.3	139.8	4.5	
PT150(6)	11	2.3091	1.479	0.32	163.830	162.351	160.872	28.58	3.46	3.46	0.217	11.50	4.01	43.6	29.3	165.2	5.0	

* Dimensions are in millimeters.

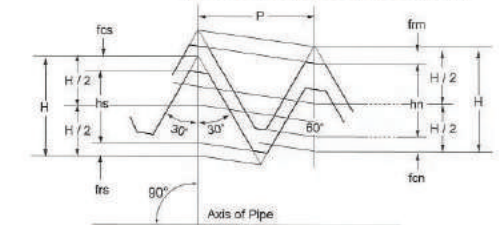
2. ASME B2.1 Taper Pipe Threads. (Except Dryseal)



Thread Height Dimensions

Thread Element	27 Threads per inch P= 0.03704	18 Threads per inch P= 0.05556	14 Threads per inch P= 0.07143	1 1/2 Threads per inch P= 0.08696	8 Threads per inch P= 0.12500
H=0.866p	0.0321	0.4810	0.0619	0.0753	0.1082
hs=hn=0.760p	0.0281	0.0422	0.0543	0.0661	0.0950
frs=frn=0.033p	0.0012	0.0088	0.0024	0.0029	0.0041
fcs=fcn=0.073p	0.0027	0.0041	0.0052	0.0063	0.0091

Taper 1 in 16 on Diameter (Shown Exaggerated in Diagram)



Basic Thread Data

Nominal Pipe Size (NPT)	Outside Diameter of Pipe D	Threads per inch n	Pitch of Thread P	Pitch Diameter at beginning of External Thread	Handtight Engagement		Effective Thread, External			
					Length L ₁		Dia D ₁	Length L ₂		Dia D ₂
					In.	Thds.		In.	Thds.	
1	2	3	4	5	6	7	8	9	10	11
1/8	0.405	27.0	0.03704	0.36351	0.1615	4.36	0.37360	0.2369	7.12	0.38000
1/4	0.540	18.0	0.05556	0.47739	0.2278	4.10	0.49163	0.4018	7.23	0.50250
3/8	0.675	14.0	0.07143	0.61201	0.2400	4.32	0.62701	0.4078	7.34	0.63750
1/2	0.840	11.5	0.08696	0.75843	0.3200	4.48	0.77843	0.5337	7.47	0.79179
3/4	1.050	11.5	0.08696	0.96768	0.4000	4.60	0.98887	0.5457	7.64	1.00179
1	1.315	11.5	0.08696	1.21363	0.4200	4.83	1.23863	0.6828	7.85	1.25630
1 1/4	1.660	11.5	0.08696	1.55713	0.4200	4.83	1.58338	0.7068	8.13	1.60130
1 1/2	1.900	11.5	0.08696	1.79609	0.4200	4.83	1.82234	0.7235	8.32	1.84130
2	2.375	8.0	0.12500	2.26902	0.4360	5.01	2.29627	0.7565	8.70	2.31630
2 1/2	2.875	8.0	0.12500	2.71953	0.6820	5.46	2.76216	1.1375	9.10	2.79062
3	3.500	8.0	0.12500	3.34062	0.7660	6.13	3.38850	1.2000	9.60	3.41562
3 1/2	4.000	8.0	0.12500	3.83750	0.8210	6.57	3.88881	1.2500	10.00	3.91562
4	4.500	8.0	0.12500	4.33438	0.8440	6.75	4.38712	1.3000	10.40	4.41562
5	5.563	8.0	0.12500	5.39073	0.9370	7.50	5.44929	1.4063	11.25	5.47862
6	6.625	8.0	0.12500	6.44609	0.9580	7.66	6.50597	1.5125	12.10	6.54062

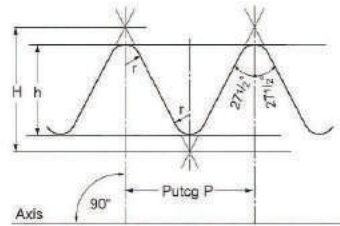
Nominal Pipe Size (NPT)	Wrench Makeup Length for External Thread L ₂ L ₁		Wrench Makeup Length for Internal Thread				Vanish Thread V		Overall Length External Thread L ₄	Nominal, Complete External Threads ⁵		Height of Thread h	Increase in Dia per Thread, 0.0625/n	Basic Minor Dia at Small End of Pipe, K ₀
	In.	Thds.	Length L ₃		Dia ⁷ E ₃	In.	Thds.	Length L ₅		Dia, E ₅				
			In.	Thds.										
1	12	13	14	15	16	17	18	19	20	21	22	23	24	
1/8	0.1024	2.76	0.1111	3	0.35656	0.1285	3.47	0.3924	0.1898	0.37537	0.02963	0.00231	0.3339	
1/4	0.1740	3.13	0.1667	3	0.46697	0.1928	3.47	0.5946	0.2907	0.49556	0.04444	0.00347	0.4329	
3/8	0.1678	3.02	0.1667	3	0.60160	0.1928	3.47	0.6006	0.2967	0.63056	0.04444	0.00347	0.5676	
1/2	0.2137	2.99	0.2143	3	0.74504	0.2478	3.47	0.7815	0.3909	0.78286	0.05714	0.00446	0.7013	
3/4	0.2067	2.89	0.2143	3	0.95429	0.2478	3.47	0.7935	0.4029	0.99286	0.05714	0.00446	0.9105	
1	0.2828	3.25	0.2609	3	1.19733	0.3017	3.47	0.9845	0.5089	1.24543	0.06957	0.00543	1.1441	
1 1/4	0.2868	3.30	0.2609	3	1.54083	0.3017	3.47	1.0085	0.5329	1.59043	0.06957	0.00543	1.4876	
1 1/2	0.3035	3.49	0.2609	3	1.77978	0.3017	3.47	1.0252	0.5496	1.83043	0.06957	0.00543	1.7265	
2	0.3205	3.69	0.2609	3	2.25272	0.3017	3.47	1.0582	0.5826	2.30543	0.06957	0.00543	2.1995	
2 1/2	0.4555	3.64	0.2500	2	2.70391	0.4337	3.47	1.5712	0.8875	2.77500	0.100000	0.00781	2.6195	
3	0.4340	3.47	0.2500	2	3.32500	0.4337	3.47	1.6337	0.9500	3.40000	0.100000	0.00781	3.2406	
3 1/2	0.4290	3.43	0.2500	2	3.82188	0.4337	3.47	1.6837	1.0000	3.90000	0.100000	0.00781	3.7375	
4	0.4560	3.65	0.2500	2	4.31875	0.4337	3.47	1.7337	1.0500	4.40000	0.100000	0.00781	4.2344	
5	0.4693	3.75	0.2500	2	5.37511	0.4337	3.47	1.8400	1.1563	5.46300	0.100000	0.00781	5.2907	
6	0.5545	4.44	0.2500	2	6.43047	0.4337	3.47	1.9462	1.2625	6.52500	0.100000	0.00781	6.3461	

* Dimensions are in inches.



3. BS21-1973 British Standard Taper Pipe Threads. (Except Dryseal)

$H=0.960237 \times P$
 $h=0.460327 \times P$
 $r=0.137278 \times P$



Taper 1 in 16 on Diameter
 (Shown Exaggerated in Diagram)

BSP Size (Nominal Bore of Pipe)	No. of Threads per inch	Pitch		Depth of thread		BASIC-Diameters at Gauge Plane						Gauge Length							
						Major (Gauge Diameter)		Effective		Minor		Basic		Tolerance Plus and Minus		Max.		Min.	
						in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
1/2	14	0.07143	1.814	0.0457	1.162	0.825	20.955	0.7793	19.793	0.7336	18.631	0.3214	8.2	0.0714	1.8	0.3928	10.0	0.2500	6.4
3/4	14	0.07143	1.814	0.0457	1.162	1.041	26.441	0.9953	25.279	0.9496	24.117	0.3750	9.5	0.0714	1.8	0.4464	11.3	0.3036	7.7
1	11	0.09091	2.039	0.0582	1.479	1.309	33.249	1.2508	31.770	1.1926	30.291	0.4091	10.4	0.0909	2.3	0.5000	12.7	0.3182	8.1
1 1/4	11	0.09091	2.039	0.0582	1.479	1.650	41.910	1.5918	40.431	1.5335	38.952	0.5000	12.7	0.0909	2.3	0.5909	15.0	0.4091	10.4
1 1/2	11	0.09091	2.039	0.0582	1.479	1.882	47.803	1.8238	46.324	1.7656	44.845	0.5000	12.7	0.0909	2.3	0.5909	15.0	0.4091	10.4
2	11	0.09091	2.039	0.0582	1.479	2.347	59.614	2.2888	58.135	2.2306	56.656	0.6250	15.9	0.0909	2.3	0.7159	18.2	0.5341	13.6
2 1/2	11	0.09091	2.039	0.0582	1.479	2.960	75.184	2.9018	73.705	2.8436	72.226	0.6875	17.5	0.1364	3.5	0.8239	21.0	0.5511	14.0
3	11	0.09091	2.039	0.0582	1.479	3.460	87.884	3.4018	86.405	3.3436	84.926	0.8125	20.6	0.1364	3.5	0.9486	24.1	0.6761	17.1
4	11	0.09091	2.039	0.0582	1.479	4.450	113.030	4.3918	111.551	4.3336	110.072	1.000	25.4	0.1364	3.5	1.1364	28.9	0.8636	21.9
5	11	0.09091	2.039	0.0582	1.479	5.450	138.430	5.3918	136.951	5.3336	135.472	1.1250	28.6	0.1364	3.5	1.2614	32.1	0.9886	25.1
6	11	0.09091	2.039	0.0582	1.479	6.450	163.830	6.3918	162.351	6.3336	160.872	1.1250	28.6	0.1364	3.5	1.2614	32.1	0.9886	25.1

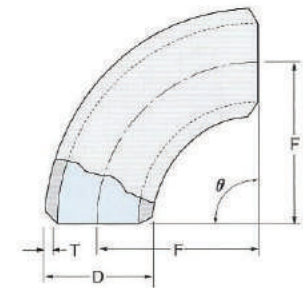
BSP Size (Nominal Bore of Pipe)	No. of Threads per inch	Length of Useful Thread on Pipe End Not Less Than.						Fitting Allowance	Wrenching Allowance	Tolerance of Position of Gauge Plane Relative to Face of Internally Taper Threaded Parts (Plus and Minus)	BSP Size (Nominal Bore of Pipe)			
		For Basic Gauge Length		For Max. Gauge Length		For Min. Gauge Length								
		in.	mm	in.	mm	in.	mm							
1/2	14	0.5178	13.2	0.5892	15.0	0.4464	11.4	0.1964	5.0	0.1071	2.7	0.0893	2.3	1/2
3/4	14	0.5714	14.5	0.6428	16.3	0.5000	12.7	0.1964	5.0	0.1071	2.7	0.0893	2.3	3/4
1	11	0.6591	16.8	0.7500	19.1	0.5682	14.5	0.2500	6.4	0.1364	3.5	0.1136	2.9	1
1 1/4	11	0.7500	19.1	0.8509	21.4	0.6591	16.8	0.2500	6.4	0.1364	3.5	0.1136	2.9	1 1/4
1 1/2	11	0.7200	19.1	0.8409	21.4	0.6591	16.8	0.2500	6.4	0.1364	3.5	0.1136	2.9	1 1/2
2	11	0.9204	23.4	1.0113	25.7	0.8295	21.1	0.2954	7.5	0.1818	4.6	0.1136	2.9	2
2 1/2	11	1.0511	26.7	1.1875	30.2	0.9247	23.2	0.3636	9.2	0.2273	5.8	0.1364	3.5	2 1/2
3	11	1.1761	29.8	1.3125	33.3	1.0397	26.3	0.3636	9.2	0.2273	5.8	0.1364	3.5	3
4	11	1.4091	35.8	1.5455	39.3	1.2727	32.3	0.4091	10.4	0.2727	6.9	0.1364	3.5	4
5	11	1.5795	40.1	1.7159	43.6	1.4431	36.6	0.4545	11.5	0.3182	8.1	0.1364	3.5	5
6	11	1.5795	40.1	1.7159	43.6	1.4431	36.6	0.4545	11.5	0.3182	8.1	0.1364	3.5	6

APPROX WEIGHT EQUATION



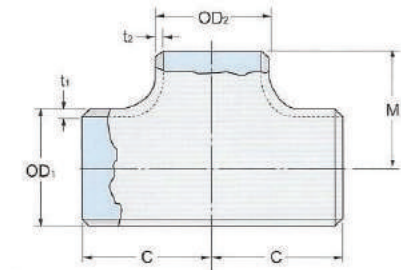
1. ELBOW

$W = 15.4864 \times \theta / 360 \times F \times T \times (D-T) \times 10^{-5}$
 W = Weight (kg)
 F = Center to End (mm)
 D = Outside Diameter (mm)
 T = Wall Thickness (mm)
 θ = Angle



2. TEE

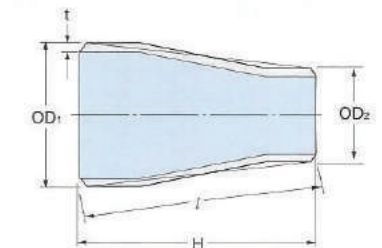
$W = [0.02466(2Ct_1(OD_1-t_1)+t_2(OD_2-t_2) \times (M-OD_1/2))] \times 10^{-3} \times K$
 W = Weight (kg)
 C = Center to End (mm)
 OD₁ = Outside Diameter (mm)
 t₁ = Wall Thickness (mm)
 OD₂ = Outside Diameter (mm)
 t₂ = Wall Thickness (mm)
 M = Center to End (mm)
 K = 1 (PLATE)
 K = 1.363 (PIPE)



3. REDUCER

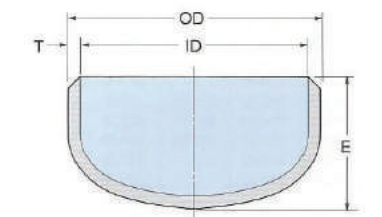
$W = 1.232t_1(OD_1+OD_2-2t_1)l \times 10^{-5}$
 $l = \frac{\sqrt{H^2 + (OD_1 - OD_2)^2}}{2}$

W = Weight (kg)
 H = End to End (mm)
 OD₁ = Large Size Outside Diameter (mm)
 OD₂ = Small Size
 t₁ = Wall Thickness (mm)



4. CAP

$W = 7.85 \times \frac{\pi}{4} (OD + E)^2 \times T \times 10^{-6}$
 W = Weight (kg)
 OD = Outside Diameter (mm)
 T = Wall Thickness (mm)
 E = End to End (mm)



BUTT-WELDING FITTINGS APPROX WEIGHT



• 90° ELBOWS

Nominal Pipe Size	Long							Short							Nominal Pipe Size
	SGP	STD	S 40	X-S	S 80	XX-S	S 160	SGP	STD	S 40	X-S	S 80	XX-S	S 160	
1/2	0.08	0.08	0.08	0.10	0.10	0.15	0.12	-	-	-	-	-	-	-	1/2
3/4	0.10	0.11	0.11	0.14	0.14	0.22	0.13	-	-	-	-	-	-	-	3/4
1	0.15	0.16	0.16	0.20	0.20	0.36	0.25	0.10	0.11	0.11	0.14	0.14	0.22	0.17	1
1 1/4	0.26	0.26	0.26	0.35	0.35	0.64	0.42	0.17	0.18	0.18	0.23	0.23	0.39	0.28	1 1/4
1 1/2	0.35	0.37	0.37	0.50	0.50	0.93	0.65	0.24	0.25	0.25	0.33	0.33	0.57	0.43	1 1/2
2	0.64	0.66	0.66	0.90	0.90	1.69	1.33	0.43	0.44	0.44	0.60	0.60	1.13	0.89	2
2 1/2	1.12	1.29	1.29	1.79	1.79	3.43	2.33	0.75	0.91	0.91	1.19	1.19	2.19	1.46	2 1/2
3	1.58	2.04	2.04	2.74	2.74	5.25	3.83	1.05	1.36	1.36	1.83	1.83	3.49	2.55	3
4	2.91	3.84	3.84	5.36	5.36	10.20	8.02	1.94	2.56	2.56	3.58	3.58	6.79	5.35	4
5	4.49	6.48	6.48	9.13	9.13	17.60	14.70	2.99	4.32	4.32	6.09	6.09	11.80	9.79	5
6	7.09	9.94	9.94	15.00	15.00	29.10	24.20	4.73	6.63	6.63	10.00	10.00	19.50	16.20	6
8	14.40	20.10	20.10	30.50	30.50	51.40	53.20	9.61	13.40	13.40	20.30	20.30	34.30	35.50	8
10	25.40	35.40	35.40	47.70	47.70	92.80	103.00	16.90	23.60	23.60	31.80	31.80	51.00	68.60	10
12	38.10	52.00	52.00	68.70	68.70	134.00	171.00	25.40	34.60	34.60	45.80	45.80	63.00	89.50	12
14	56.70	67.90	67.90	89.90	89.90	133.00	236.00	37.80	45.30	45.30	60.00	60.00	89.00	158.00	14
16	74.30	89.00	89.00	118.00	118.00	195.00	350.00	49.50	59.10	59.10	79.00	79.00	130.00	234.00	16
18	94.20	113.00	113.00	150.00	150.00	275.00	495.00	62.80	75.30	75.30	113.00	113.00	183.00	330.00	18
20	116.00	140.00	140.00	186.00	186.00	373.00	676.00	77.70	93.10	93.10	147.00	147.00	249.00	451.00	20
22	141.00	169.00	169.00	225.00	225.00	493.00	886.00	94.10	113.00	113.00	178.00	178.00	329.00	591.00	22
24	168.00	202.00	202.00	268.00	268.00	636.00	1160.00	112.00	135.00	135.00	244.00	244.00	424.00	773.00	24
26	198.00	237.00	237.00	315.00	315.00	-	-	132.00	158.00	158.00	287.00	287.00	510.00	-	26
28	230.00	276.00	276.00	367.00	367.00	-	-	154.00	184.00	184.00	334.00	334.00	603.00	-	28
30	264.00	316.00	316.00	421.00	421.00	-	-	176.00	211.00	211.00	383.00	383.00	700.00	-	30
32	301.00	361.00	361.00	480.00	480.00	-	-	201.00	241.00	241.00	436.00	436.00	810.00	-	32
34	340.00	408.00	408.00	543.00	543.00	-	-	227.00	272.00	272.00	493.00	493.00	920.00	-	34
36	380.00	457.00	457.00	608.00	608.00	-	-	253.00	304.00	304.00	550.00	550.00	1020.00	-	36
38	425.00	510.00	510.00	679.00	679.00	-	-	283.00	340.00	340.00	610.00	610.00	1130.00	-	38
40	471.00	565.00	565.00	753.00	753.00	-	-	314.00	377.00	377.00	670.00	670.00	1250.00	-	40
42	518.00	622.00	622.00	828.00	828.00	-	-	346.00	416.00	416.00	730.00	730.00	1380.00	-	42
44	570.00	684.00	684.00	912.00	912.00	-	-	380.00	456.00	456.00	800.00	800.00	1500.00	-	44
46	623.00	748.00	748.00	997.00	997.00	-	-	415.00	499.00	499.00	870.00	870.00	1630.00	-	46
48	677.00	814.00	814.00	1085.00	1085.00	-	-	452.00	543.00	543.00	940.00	940.00	1760.00	-	48
50	735.00	884.00	884.00	1178.00	1178.00	-	-	490.00	589.00	589.00	1010.00	1010.00	1890.00	-	50
52	796.00	956.00	956.00	1305.00	1305.00	-	-	530.00	637.00	637.00	1080.00	1080.00	2020.00	-	52
54	857.00	1031.00	1031.00	1375.00	1375.00	-	-	572.00	688.00	688.00	1150.00	1150.00	2150.00	-	54
56	926.00	1109.00	1109.00	1480.00	1480.00	-	-	616.00	740.00	740.00	1220.00	1220.00	2280.00	-	56
58	991.00	1190.00	1190.00	1588.00	1588.00	-	-	661.00	794.00	794.00	1290.00	1290.00	2410.00	-	58
60	1060.00	1274.00	1274.00	1700.00	1700.00	-	-	707.00	849.00	849.00	1360.00	1360.00	2540.00	-	60

• 45° ELBOWS

Nominal Pipe Size	Long							Nominal Pipe Size
	SGP	STD	S 40	X-S	S 80	XX-S	S 160	
1/2	0.04	0.04	0.04	0.05	0.05	-	-	1/2
3/4	0.05	0.06	0.06	0.07	0.07	-	-	3/4
1	0.08	0.08	0.08	0.10	0.10	0.18	0.13	1
1 1/4	0.13	0.13	0.13	0.18	0.18	0.32	0.21	1 1/4
1 1/2	0.18	0.19	0.19	0.25	0.25	0.47	0.33	1 1/2
2	0.32	0.33	0.33	0.45	0.45	0.85	0.67	2
2 1/2	0.60	0.69	0.69	0.90	0.90	1.72	1.17	2 1/2
3	0.79	1.02	1.02	1.37	1.37	2.63	1.92	3
4	1.46	1.92	1.92	2.68	2.68	5.09	4.01	4
5	2.25	3.24	3.24	4.57	4.57	8.80	7.35	5
6	3.55	4.97	4.97	7.50	7.50	14.72	12.10	6
8	7.20	10.10	10.10	15.30	15.30	26.3	26.60	8
10	12.70	17.70	17.70	23.90	23.90	45.09	51.50	10
12	19.00	26.00	26.00	34.40	34.40	66.80	85.50	12
14	28.40	34.00	34.00	45.00	45.00	86.50	118.00	14
16	37.20	44.50	44.50	59.00	59.00	112.50	150.00	16
18	47.10	56.50	56.50	75.50	75.50	141.00	184.00	18
20	58.30	70.00	70.00	93.00	93.00	172.00	222.00	20
22	70.50	84.50	84.50	113.00	113.00	205.00	264.00	22
24	84.10	101.00	101.00	134.00	134.00	240.00	300.00	24
26	99.00	119.00	119.00	158.00	158.00	-	-	26
28	115.00	138.00	138.00	184.00	184.00	-	-	28
30	132.00	158.00	158.00	211.00	211.00	-	-	30
32	150.00	180.00	180.00	240.00	240.00	-	-	32
34	170.00	204.00	204.00	272.00	272.00	-	-	34
36	190.00	228.00	228.00	304.00	304.00	-	-	36
38	212.00	255.00	255.00	339.00	339.00	-	-	38
40	235.00	282.00	282.00	376.00	376.00	-	-	40
42	259.00	311.00	311.00	414.00	414.00	-	-	42
44	285.00	342.00	342.00	456.00	456.00	-	-	44
46	312.00	374.00	374.00	498.00	498.00	-	-	46
48	339.00	407.00	407.00	542.00	542.00	-	-	48

• CAP

Nominal Pipe Size	Long							Nominal Pipe Size
	SGP	STD	S 40	X-S	S 80	XX-S	S 160	
1/2	0.03	0.04	0.04	0.05	0.05	0.10	0.06	1/2
3/4	0.04	0.05	0.05	0.07	0.07	0.13	0.09	3/4
1	0.08	0.11	0.11	0.15	0.15	0.29	0.20	1
1 1/4	0.11	0.14	0.14	0.20	0.20	0.39	0.25	1 1/4
1 1/2	0.15	0.17	0.17	0.24	0.24	0.50	0.35	1 1/2
2	0.23	0.24	0.24	0.33	0.33	0.68	0.54	2
2 1/2	0.34	0.42	0.42	0.57	0.57	1.33	0.77	2 1/2
3	0.51	0.67	0.67	0.92	0.92	2.18	1.40	3
4	0.88	1.17	1.17	1.68	1.68	3.80	2.76	4
5	1.29	1.90	1.90	2.73	2.73	6.22	4.85	5
6	1.99	2.83	2.83	4.38	4.38	9.85	7.81	6
8	3.61	5.11	5.11	7.91	7.91	16.40	15.20	8
10	6.33	8.92	8.92	12.20	12.20	28.35	28.90	10
12	9.43	13.10	13.10	17.40	17.40	39.40	47.70	12
14	13.20	15.90	15.90	21.20	21.20	34.90	61.20	14
16	16.60	20.00	20.00	26.70	26.70	49.00	92.80	16
18	21.20	25.50	25.50	34.10	34.10	69.00	131.00	18
20	26.40	31.80	31.80	42.50	42.50	93.70	179.00	20
22	31.50	38.80	38.80	51.70	51.70	116.00	219.00	22
24	36.60	45.10	45.10	60.10	60.10	140.00	307.00	24
26	41.00	50.50	50.50	67.30	67.30	-	-	26
28	45.50	56.20	56.20	74.90	74.90	-	-	28
30	50.30	62.10	62.10	82.80	82.80	-	-	30
32	55.40	68.40	68.40	91.20	91.20	-	-	32
34	62.30	75.40	75.40	100.00	100.00	-	-	34
36	68.00	81.90	81.90	109.00	109.00	-	-	36
38	79.00	94.70	94.70	126.00	126.00	-	-	38
40	95.00	102.00	102.00	137.00	137.00	-	-	40
42	98.00	110.00	110.00	147.00	147.00	-	-	42
44	103.00	126.00	126.00	167.00	167.00	-	-	44
46	111.00	134.00	134.00	179.00	179.00	-	-	46
48	118.00	143.00	143.00	191.00	191.00	-	-	48

• TEE

Nominal Pipe Size	SGP	STD	S 40	X-S	S 80	XX-S	S 160
1/2 x 1/2	0.09	0.09	0.09	0.11	0.11	0.17	

BUTT-WELDING FITTINGS APPROX WEIGHT



• REDUCER

Nominal Pipe Size	SGP	STD	S 40	X-S	S 80	XX-S	S 160
3/4 x 1/2	0.06	0.06	0.06	0.08	0.08	-	-
1 x 3/4	0.11	0.12	0.12	0.15	0.15	0.25	0.19
1 x 1/2	0.10	0.11	0.11	0.14	0.14	0.22	0.17
1 1/4 x 1	0.16	0.16	0.16	0.21	0.21	0.35	0.25
1 1/4 x 3/4	0.15	0.15	0.15	0.19	0.19	0.31	0.23
1 1/4 x 1/2	0.13	0.14	0.14	0.18	0.18	-	-
1 1/2 x 1 1/4	0.24	0.25	0.25	0.33	0.33	0.57	0.43
1 1/2 x 1	0.21	0.22	0.22	0.30	0.30	0.50	0.38
1 1/2 x 3/4	0.20	0.21	0.21	0.27	0.27	0.45	0.35
1 1/2 x 1/2	0.18	0.18	0.18	0.24	0.24	0.40	0.32
2 x 1 1/2	0.37	0.38	0.38	0.51	0.51	0.91	0.75
2 x 1 1/4	0.35	0.36	0.36	0.48	0.48	0.85	0.70
2 x 1	0.31	0.33	0.33	0.44	0.44	0.77	0.64
2 x 3/4	0.29	0.30	0.30	0.40	0.40	0.69	0.58
2 1/2 x 2	0.60	0.73	0.73	0.95	0.95	1.68	1.20
2 1/2 x 1 1/2	0.55	0.67	0.67	0.87	0.87	1.51	1.08
2 1/2 x 1 1/4	0.52	0.64	0.64	0.83	0.83	1.42	1.02
2 1/2 x 1	0.48	0.56	0.56	0.73	0.73	1.23	0.93
3 x 2 1/2	0.73	0.94	0.94	1.25	1.25	2.25	1.71
3 x 2	0.66	0.85	0.85	1.13	1.13	2.01	1.57
3 x 1 1/2	0.62	0.79	0.79	1.04	1.04	1.83	1.44
3 x 1 1/4	0.59	0.75	0.75	1.00	1.00	1.74	1.37
4 x 3	1.10	1.45	1.45	2.02	2.02	3.65	3.00
4 x 2 1/2	1.04	1.37	1.37	1.90	1.90	3.41	2.76
4 x 2	0.97	1.27	1.27	1.76	1.76	3.11	2.58
4 x 1 1/2	0.91	1.19	1.19	1.64	1.64	2.89	2.41
5 x 4	1.74	2.50	2.50	3.52	3.52	6.47	5.59
5 x 3	1.58	2.27	2.27	3.18	3.18	5.78	5.30
5 x 2 1/2	1.50	2.16	2.16	3.02	3.02	5.46	4.70
5 x 2	1.41	2.03	2.03	2.85	2.85	5.12	4.43
6 x 5	2.55	3.57	3.57	5.38	5.38	9.89	8.63
6 x 4	2.36	3.30	3.30	4.96	4.96	8.98	7.88
6 x 3	2.18	3.04	3.04	4.56	4.56	8.21	7.21
6 x 2 1/2	2.09	2.94	2.94	4.38	4.38	7.88	6.80
8 x 6	4.17	5.71	5.71	8.63	8.63	14.30	15.00
8 x 5	3.87	5.40	5.40	8.14	8.14	13.40	14.00
8 x 4	3.67	5.10	5.10	7.68	7.68	12.60	13.10
10 x 8	6.87	9.58	9.58	12.90	15.40	24.30	27.50
10 x 6	6.32	8.78	8.78	11.80	14.20	22.10	25.10
10 x 5	6.06	8.42	8.42	11.30	14.50	21.10	23.90
10 x 4	5.80	8.20	8.20	11.00	14.00	20.50	22.60
12 x 10	9.97	13.60	14.70	18.00	24.80	35.00	44.60
12 x 8	9.29	12.70	13.70	16.70	22.70	33.00	41.00
12 x 6	8.69	11.80	12.80	15.60	21.40	32.00	38.00
12 x 5	8.39	11.70	12.60	15.30	20.60	31.00	36.40
14 x 12	21.20	25.40	29.50	33.60	49.80	-	88.50
14 x 10	19.70	23.60	27.40	31.20	46.10	-	81.60
14 x 8	18.30	21.80	25.40	28.90	42.20	-	74.70
14 x 6	16.90	20.30	23.60	26.80	39.10	-	68.30
16 x 14	25.90	31.00	41.10	41.10	67.70	-	121.00
16 x 12	24.10	29.60	39.20	39.20	65.00	-	116.00
16 x 10	22.40	27.80	36.80	36.80	60.80	-	108.00
16 x 8	21.70	26.20	34.50	34.50	56.60	-	99.90
18 x 16	31.50	37.80	56.20	50.10	91.40	-	165.00
18 x 14	29.80	35.70	53.00	47.40	86.40	-	155.00
18 x 12	27.70	33.20	51.70	44.00	83.00	-	149.00
18 x 10	27.10	32.70	48.40	43.20	78.50	-	140.00
20 x 18	47.00	56.40	88.40	74.90	150.00	-	-
20 x 16	44.70	53.50	83.90	71.10	142.00	-	-
20 x 14	42.40	50.80	79.60	67.40	136.00	-	233.00
20 x 12	40.80	49.20	76.90	65.10	130.00	-	-

Unit : kg

Nominal Pipe Size	SGP	STD	S 40	X-S	S 80	XX-S	S 160
22 x 20	52.10	62.40	98.00	82.90	181.00	-	-
22 x 18	49.50	59.40	93.20	78.90	172.00	-	-
22 x 16	47.00	56.40	98.40	74.80	164.00	-	-
22 x 14	45.30	54.30	83.60	72.10	156.00	-	-
24 x 22	57.10	68.40	124.00	91.00	215.00	-	-
24 x 20	54.80	65.70	119.00	87.30	206.00	-	-
24 x 18	52.60	63.00	114.00	83.80	197.00	-	-
24 x 16	50.40	60.50	109.00	80.30	189.00	-	-
26 x 24	74.50	89.40	162.00	119.00	-	-	-
26 x 22	71.50	85.80	155.00	114.00	-	-	-
26 x 20	68.50	82.10	148.00	109.00	-	-	-
26 x 18	66.30	79.50	142.00	106.00	-	-	-
28 x 26	80.60	96.60	175.00	129.00	-	-	-
28 x 24	77.50	93.00	168.00	124.00	-	-	-
28 x 22	74.50	89.40	162.00	119.00	-	-	-
28 x 20	72.40	88.80	155.00	115.00	-	-	-
30 x 28	86.60	104.00	188.00	138.00	-	-	-
30 x 26	83.60	100.00	182.00	133.00	-	-	-
30 x 24	80.60	96.60	175.00	129.00	-	-	-
30 x 22	78.50	94.20	168.00	125.00	-	-	-
32 x 30	92.60	111.00	202.00	148.00	-	-	-
32 x 28	89.60	108.00	195.00	143.00	-	-	-
32 x 26	86.60	104.00	188.00	138.00	-	-	-
32 x 24	84.60	102.00	184.00	135.00	-	-	-
34 x 32	98.70	118.00	215.00	158.00	-	-	-
34 x 30	95.60	115.00	208.00	153.00	-	-	-
34 x 28	92.60	111.00	205.00	148.00	-	-	-
34 x 26	90.70	109.00	200.00	145.00	-	-	-
36 x 34	104.60	125.60	250.00	167.30	-	-	-
36 x 32	101.60	122.00	243.00	162.40	-	-	-
36 x 30	98.60	118.40	238.00	157.60	-	-	-
36 x 28	95.60	114.70	234.00	152.80	-	-	-
38 x 36	112.00	133.00	-	177.00	-	-	-
38 x 34	108.00	129.00	-	172.00	-	-	-
38 x 32	105.00	126.00	-	167.00	-	-	-
38 x 30	103.00	124.00	-	165.00	-	-	-
40 x 38	117.00	140.00	-	187.00	-	-	-
40 x 36	114.00	137.00	-	182.00	-	-	-
40 x 34	111.00	133.00	-	177.00	-	-	-
40 x 32	109.00	131.00	-	174.00	-	-	-
42 x 40	123.00	147.00	-	196.00	-	-	-
42 x 38	120.00	144.00	-	192.00	-	-	-
42 x 36	117.00	140.00	-	187.00	-	-	-
42 x 34	115.00	138.00	-	184.00	-	-	-
44 x 42	129.00	155.00	-	206.00	-	-	-
44 x 40	126.00	151.00	-	201.00	-	-	-
44 x 38	123.00	147.00	-	196.00	-	-	-
44 x 36	121.00	146.00	-	194.00	-	-	-
46 x 44	157.00	189.00	-	252.00	-	-	-
46 x 42	154.00	185.00	-	246.00	-	-	-
46 x 40	150.00	180.00	-	241.00	-	-	-
46 x 38	148.00	178.00	-	237.00	-	-	-
48 x 46	164.00	197.00	-	263.00	-	-	-
48 x 44	161.00	193.00	-	257.00	-	-	-
48 x 42	157.00	189.00	-	252.00	-	-	-
48 x 40	155.00	186.00	-	248.00	-	-	-

• STAINLESS STEEL FITTINGS

Unit : kg

Nominal Pipe Size	90° Elbow(L)			90° Elbow(S)			Tee			Reducer			Cap		
	S5s	S10s	S20s	S5s	S10s	S20s	S5s	S10s	S20s	S5s	S10s	S20s	S5s	S10s	S20s
1/2	0.05	0.06	0.07	-	-	-	0.05	0.07	0.08	-	-	-	0.02	0.03	0.03
3/4	0.05	0.06	0.09	-	-	-	0.07	0.10	0.11	0.03	0.04	0.05	0.03	0.04	0.04
1	0.08	0.13	0.14	0.05	0.08	0.09	0.12	0.20	0.22	0.06	0.09	0.10	0.05	0.09	0.10
1 1/4	0.12	0.20	0.22	0.08	0.13	0.15	0.20	0.33	0.36	0.07	0.12	0.13	0.07	0.11	0.12
1 1/2	0.17	0.28	0.30	0.11	0.19	0.20	0.30	0.46	0.50	0.11	0.18	0.20	0.08	0.13	0.14
2	0.29	0.47	0.59	0.19	0.31	0.39	0.38	0.63	0.79	0.16	0.27	0.34	0.10	0.17	0.21
2 1/2	0.55	0.79	0.94	0.37	0.52	0.63	0.71	1.00	1.18	0.30	0.43	0.50	0.16	0.23	0.28
3	0.81	1.16	1.51	0.54	0.77	1.00	0.96	1.38	1.78	0.37	0.52	0.69	0.25	0.37	0.48
4	1.40	2.00	2.60	0.93	1.33	1.74	1.50	2.15	2.80	0.56	0.80	1.04	0.41	0.59	0.78
5	2.83	3.46	4.97	1.89	2.31	3.31	2.85	3.48	5.01	1.09	1.33	1.92	0.81	0.99	1.44
6	4.06	4.96	7.09	2.71	3.31	4.73	3.89	4.75	6.83	1.46	1.78	2.55	1.13	1.39	1.99
8	7.07	9.55	15.90	4.71	6.37	10.70	6.26	8.43	14.30	2.01	2.72	4.56	1.76	2.38	4.05
10	13.50	16.60	25.00	9.01	11.10	16.70	11.50	14.20	21.50	3.66	4.49	6.77	3.35	4.13	6.23
12	22.40	25.80	35.70	15.00	17.20	23.90	18.80	21.60	30.20	5.88	6.78	9.40	5.54	6.39	8.89
14	28.80	34.60	56.90	19.20	23.10	37.80	22.70	27.30	44.80	10.80	13.00	21.20	6.62	7.99	13.20
16	39.80	45.30	74.50	26.50	30.20	49.50	29.60	33.70	55.20	13.90	15.80	25.90	8.82	10.10	16.70
18	50.40	57.40	94.50	33.60	38.30	62.80	37.40	42.70	70.00	17.20	19.20	29.80	11.30	12.90	21.30
20	71.00	82.10	142.00	47.3											

WALL THICKNESS OF WELDED AND SEAMLESS PIPE

Nominal Pipe Size		Outside diameter		Nominal Wall Thickness							
A	B	KS/JIS	ASME	SPP SGP	Sch 5s	Sch 10s	Sch 10	Sch 20s	Sch 20	Sch 30	Sch 40s
6	1/8	10.50	10.29	-	-	1.24	-	1.5	-	-	1.73
8	1/4	13.80	13.72	-	-	1.65	-	2.0	-	-	2.24
10	3/8	17.30	17.14	-	-	1.65	-	2.0	-	-	2.31
15	1/2	21.70	21.34	2.8	1.65	2.11	-	2.5	-	-	2.77
20	3/4	27.20	26.67	2.8	1.65	2.11	-	2.5	-	-	2.87
25	1	34.00	33.40	3.2	1.65	2.77	-	3.0	-	-	3.38
32	1 1/4	42.70	42.16	3.5	1.65	2.77	-	3.0	-	-	3.56
40	1 1/2	48.60	48.26	3.5	1.65	2.77	-	3.0	-	-	3.68
50	2	60.50	60.32	3.8	1.65	2.77	-	3.5	3.20	-	3.91
65	2 1/2	76.30	73.02	4.2	2.11	3.05	-	3.5	4.50	-	5.16
80	3	89.10	88.90	4.2	2.11	3.05	-	4.0	4.50	-	5.49
90	3 1/2	101.60	101.60	4.2	2.11	3.05	-	4.0	4.50	-	5.74
100	4	114.30	114.30	4.5	2.77	3.05	-	4.0	4.90	-	6.02
125	5	139.80	141.30	4.5	2.77	3.40	-	5.0	5.10	-	6.55
150	6	165.20	168.30	5.0	2.77	3.40	-	5.0	5.50	-	7.11
200	8	216.30	219.08	5.8	2.77	3.76	-	6.5	6.35	7.04	8.18
250	10	267.40	273.05	6.6	3.40	4.19	-	6.5	6.35	7.80	9.27
300	12	318.50	323.80	6.9	3.96	4.57	-	6.5	6.35	8.38	9.52
350	14	355.60	355.60	7.9	3.96	4.78	6.35	8.0	7.92	9.52	*9.52
400	16	406.40	406.40	7.9	4.19	4.78	6.35	8.0	7.92	9.52	*9.52
450	18	457.20	457.20	7.9	4.19	4.78	6.35	8.0	7.92	11.12	*9.52
500	20	508.00	508.00	7.9	4.78	5.54	6.35	9.5	9.52	12.70	*9.52
550	22	558.80	558.80	-	4.78	5.54	6.35	-	9.52	12.70	*9.52
600	24	609.60	609.60	-	5.54	6.35	6.35	-	9.52	14.27	*9.52
650	26	660.40	660.40	-	-	*7.92	7.92	-	12.70	-	*9.52
700	28	711.20	711.20	-	-	*7.92	7.92	-	12.70	15.88	*9.52
750	30	762.00	762.00	-	6.35	*7.92	7.92	-	12.70	15.88	*9.52
800	32	812.80	812.80	-	-	*7.92	7.92	-	12.70	15.88	*9.52
850	34	863.60	863.60	-	-	*7.92	7.92	-	12.70	15.88	*9.52
900	36	914.40	914.40	-	-	*7.92	7.92	-	12.70	15.88	*9.52
950	38	965.20	965.20	-	-	*7.92	-	-	-	-	*9.52
1000	40	1016.00	1016.00	-	-	*7.92	-	-	-	-	*9.52
1050	42	1066.80	1066.80	-	-	*7.92	-	-	-	-	*9.52
1100	44	1117.60	1117.60	-	-	*7.92	-	-	-	-	*9.52
1150	46	1168.40	1168.40	-	-	*7.92	-	-	-	-	*9.52
1200	48	1219.20	1219.20	-	-	*7.92	-	-	-	-	*9.52

* Asterisks(*) denote SUNGKWANG Standard as no internationally Recognized Standards for these wall thickness have been established.