



BK METAL

FORGED FITTING



BK METAL CO., LTD.

264, Saenggok-ro, Gangseo-gu Busan, Korea

TEL:+82-51-831-4868

FAX:+82-51-831-4870

www.bokyoungm.com

Trust, Obligation, Challenge and BK METAL

Unstoppable challenging spirit makes BK METAL'S FUTURE!



BK METAL

(주)보경금속

FORGED FITTINGS

www.bokyoungm.com



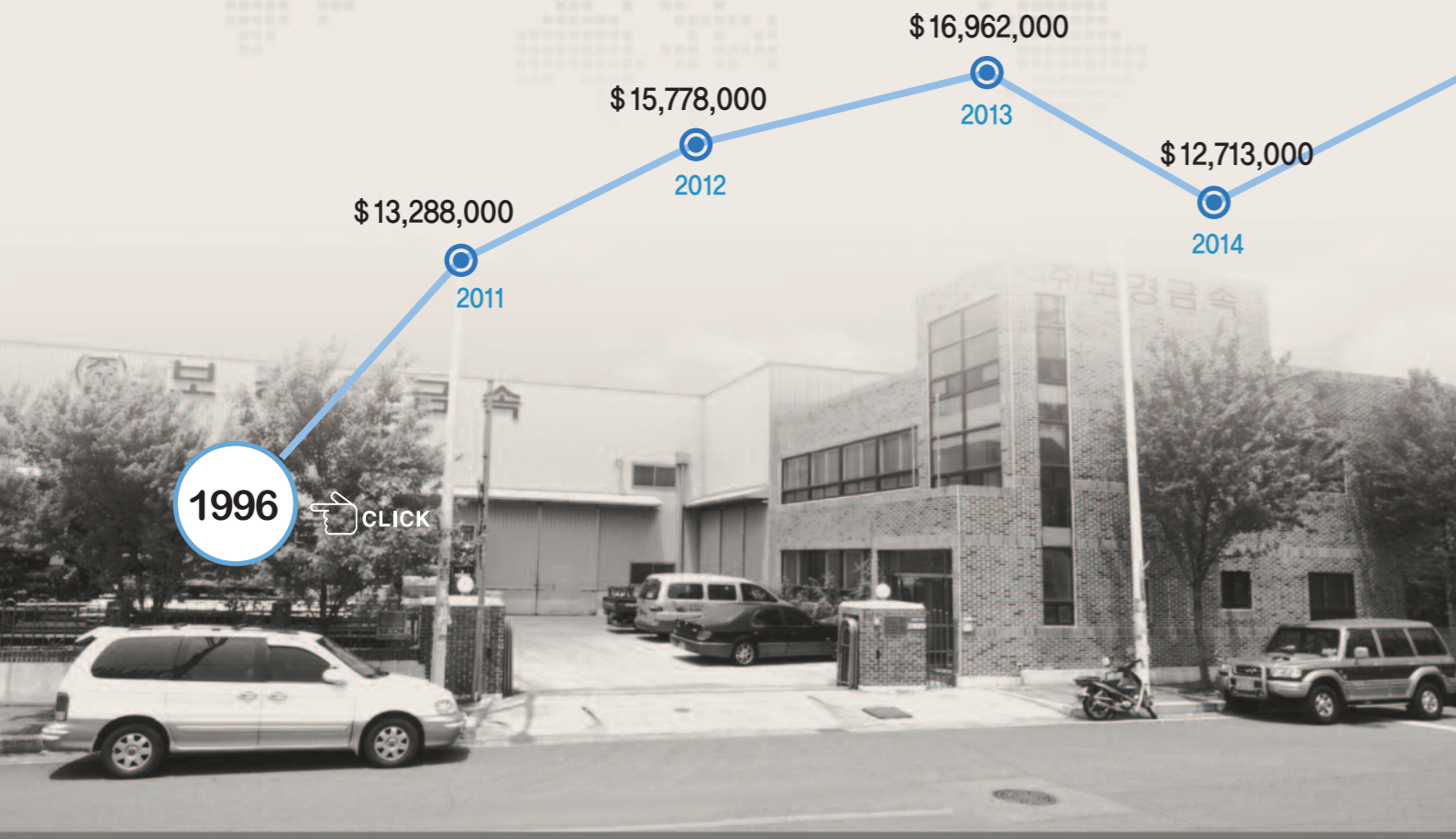
Uastoppable challenging spirit make BK METAL's future!



CONTENTS

- Breif History 6
- CEO Greeting 7
- Manufacturing Facilities, Flow Chart 8
- ERP, R&D, Quality management 10
- Product range, Material 12
- Applicable Code, Forged Fittings 14
- Product information 16
- Sales network 62

BK METAL(BOKYOUNG METAL)



BREIF HISTORY

- 1996**
 - Established BOKYOUNG METAL CO. at #141-1, Gamjeon-dong, Sasang-ku, Busan, Korea
- 2001**
 - Moved to newly constructed at #1640-5, Songjeong-dong, Gangseo-ku, Busan, Korea.
- 2002**
 - Acquired ISO 9001:2000 Quality system certification (KSA-QA)
- 2003**
 - Conversed corporation to BOKYOUNG METAL CO., LTD.
- 2010**
 - Changed ISO 9001:2008 quality system certification (HSB)
 - Approved supplier from SHINGORI #3,4 nuclear power plant
 - Acquired PED 97/23/EC (HSB)

- 2014**
 - Awarded outstanding corporation enterprise of 2014 DOOSAN HEAVY INDUSTRIES AND CONSTRUCTION CO.,LTD.
- 2015**
 - Awarded outstanding corporation enterprise of 2015 DOOSAN HEAVY INDUSTRIES AND CONSTRUCTION CO.,LTD.
- 2016**
 - Moved to newly constructed at 264 saenggok-ro, Gangseo-ku, Busan, Korea.
 - Acquired KEPIC(Korea electric power industry code) quality system certification

CEO Greeting



Energy is the priceless gift from earth that will be regarded even more valuable in the future.

BK METAL has set a goal of improving a standards of living for humanity by contributing to the power generation, oil and gas, shipbuilding and off-shore plant industries by developing it's own unique range of energy-efficient fittings.

Established 1996, We've put our energy into manufacturing and supplying industrial forged fittings.

BK METAL has long held strong position in the Korea forged fitting industry.

From now on, We are thinking even bigger.

On the basis of accumulated experience and creative spirit, BK METAL will be a LEADING EDGE-corporation in the fitting industry.

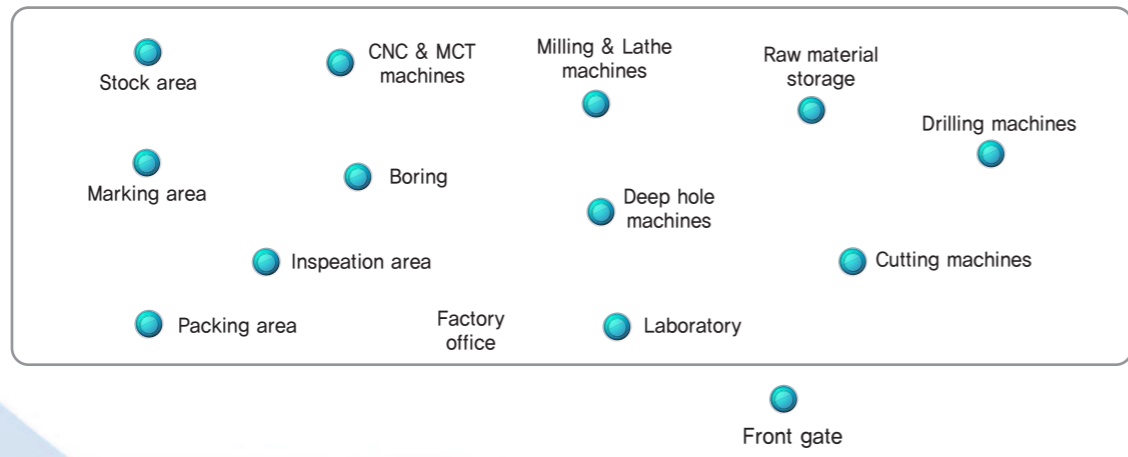
We guarantee to provide high quality, competitve price, short delivery.

If we can be any assistance to you or your customer, Please don't hesitate to contact.

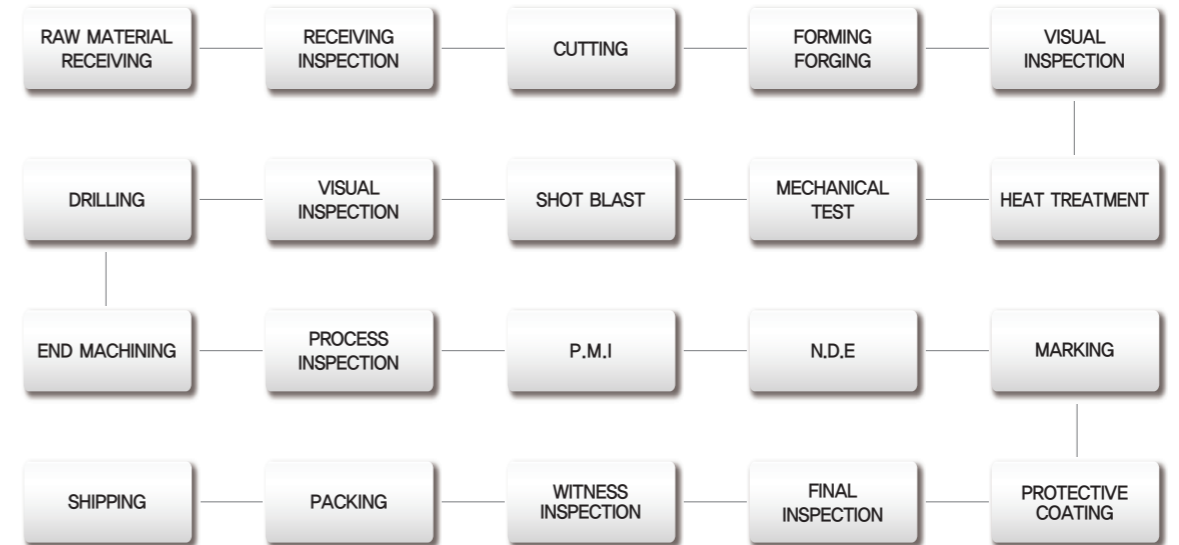
Thank you very much indeed !

CEO Ahn, Sung-IL

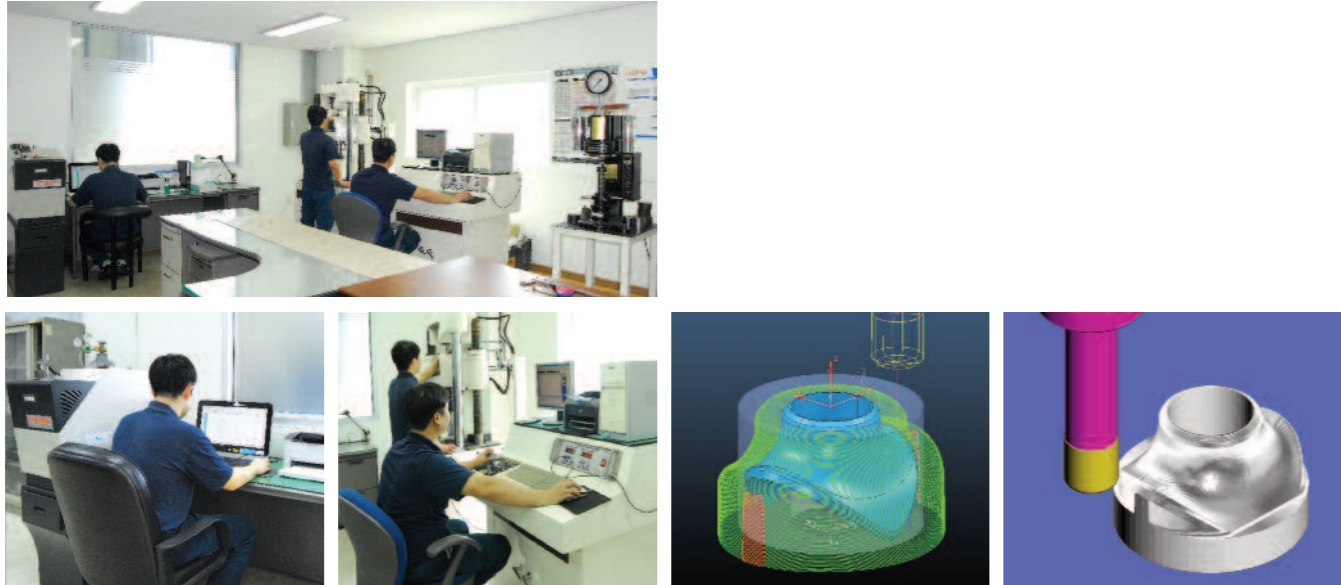
PASSION, PROFESSIONALISM AND BK METAL



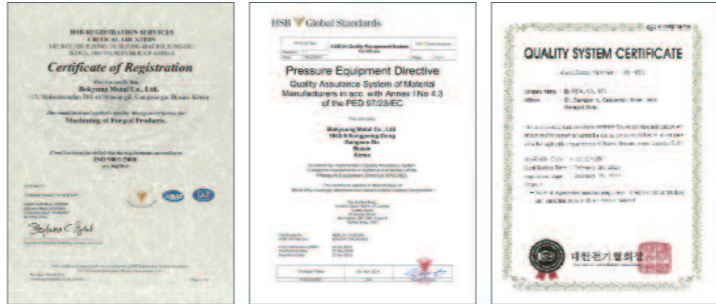
PROCESS



BK METAL has devoted our effort to improve quality and productivity by company-wide control. BK METAL spares no effort and investment for research, development and test equipment to manufacture energy-efficient fittings.



Certificates



- ISO Certification
- PED Certification
- KEPIC Certification



ERP System



BK METAL CO.,LTD.
has established ERP System.

This system allows us to check the present situation of business at any place, on the basis of data input in real time. This makes us manage purchase, production and stock easily, helping us greatly to supply high quality products to meet customers' needs by improving traceability.

1. Forged Fittings

Material		Product name	Production Range	Applicable Specifications
Ferrous Material	Carbon Steel	-Elbow -Tee -Reducer/Insert -Cap -Coupling -Boss -Union	1/2"~4"	ASTM,ASME,KS,JIS MSS,etc
	Low Alloy Steel			
High Alloy Steel (Stainless Steel)				
Non-Ferrous Material	Ni Alloy Steel			
	Cu Alloy Steel Monel			
	-Outlet	1/2"~24"		

2. Seamless Pipe

Material		Product name	Production Range	Applicable Specifications
Ferrous Material	Carbon Steel	-Swage Nipple (CON / ECC) -Nipple	1/2"~8"	ASTM,ASME,KS,JIS MSS,etc
	Low Alloy Steel			
	High Alloy Steel (Stainless Steel)			

3. Drawing Products

Material		Product name	Production Range	Applicable Specifications
Ferrous Material	Carbon Steel	-NOZZE -END CAP -END PLATE -Etc	~100"	ASTM,ASME,KS,JIS MSS,etc
	Low Alloy Steel			
	High Alloy Steel (Stainless Steel)			

*Nomenclature

1.ASTM : American Society for Testing and Materials
2.ASME : American Society of Mechanical Engineers
2.KS : Korea Industrial Standards

4.JIS : Japan Petroleum Institute
5.MSS : Manufacturers Standardization Society

Ferrous Material				
Material Classification		ASTM		
Carbon Steel	Ambient and higher temperature service	A105	Carbon steel forgings for piping Applications	Carbon steel forgings for piping Applications
		A106	Seamless carbon steel pipe for high-temperature service	Grade B,C
	Low temperature service	A350	Carbon and low-alloy steel forgings, requiring notch toughness testing for piping components	LF2, LF3
		A694	Carbon and alloy steel forgings for pipe flanges, fittings, valves, and parts for high-pressure transmission service	F60, F65
Alloy steel (Cr: 1% 이상)	Low alloy (Cr: 1%~9%)	A182	Forged or rolled alloy and stainless steel pipe flanges, forged fittings, and valves and parts for high-temperature service	F5
				F9, F91, F92
				F11, F12
	F22			
	F304, F304L, F304H			
	F316, F316L, F316H			
High Alloy (Cr≥12%): Stainless steel	Austenitic stainless steel	A312	Seamless, welded, and heavily cold worked austenitic stainless steel pipes	F321, F321H
				F347, F347H
	Ferritic/Austenitic (Duplex/Super duplex) High temperature and general corrosive service			TP304, TP304L, TP316, TP316L

Non - Ferrous Material				
Material Classification	ASTM	UNS NO	TRADE MARK	
Ni base	B564	Nickel alloy forgings	N06600	Inconel 600
			N06690	Inconel 690
			N08810 / N08811	Inconel 800H/800HT
			N06625	Inconel 625
			N08825	Incoloy 825
	N04400	Monel 400		
	B462	Forged or rolled Forged fittings for corrosive high-temperature service	N10665	Hastelloy B2
			N10276	Hastelloy C276
N06022			Hastelloy C22	
Cu base	B151	Copper-Nickel-Zinc alloy and Copper-Nickel rod and bar	N08020	Incoloy 020
			C71500	Cu-Ni 70/30
			C70600	Cu-NI 90/10

APPLICABLE CODE

KS:KOREAN INDUSTRIAL STANDARDS

- KS B 1522** Steel Butt-Welding Pipe Fittings for Ordinary use.
- KS B 1541** Steel Butt-Welding Pipe Fittings.
- KS B 1542** Steel Socket-Welding Pipe Fittings.

JIS:JAPANESE INDUSTRIAL STANDARDS

- JIS B 2311** Steel Butt-Welding Pipe Fittings for Ordinary use.
- JIS B 2312** Steel Butt-Welding Pipe Fittings.
- JIS B 2316** Steel Socket-Welding Pipe Fittings.

ANSI:AMERICAN NATIONAL STANDARDS INSTITUTE

- ANSI B 16.5** Pipe Flanges and Flanged Fittings.
- ANSI B 16.9** Factory Made Wrought Steel Butt-Welding Fittings.
- ANSI B 16.11** Forged Steel Fittings, Socket-Welding and Threaded.
- ANSI B 16.25** Butt-Welding Ends.
- ANSI B 36.10** Welded and Seamless Wrought Steel Pipe.
- ANSI B 36.19** Stainless Steel Pipe.

ASTM:AMERICAN SOCIETY FOR TESTING AND MATERIALS

- ASTM A 105** Forging, Carbon Steel for Piping Components.
- ASTM A 182** Forged or Rolled Alloy-Steel Pipe Flanges, Forged Fittings, and Valves and Parts for High-Temperature Service.
- ASTM A 234** Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and Elevated Temperatures.
- ASTM A 350** Forgings Carbon and Low-Alloy Steel, Requiring Notch Toughness Testing for Piping Components.
- ASTM A 403** Wrought Austenitic Stainless Steel Piping Fittings.
- ASTM A 420** Piping Fittings of Wrought Carbon Steel and Alloy Steel for Low-Temperature Service.
- ASTM A 815** Specification for Wrought Ferritic, Ferritic/Austenitic, and Martensitic Stainless Steel Piping Fittings.

MSS:MANUFACTURERS STANDARDIZATION SOCIETY OF THE VALVE AND FITTINGS INDUSTRY

- MSS SP-25** Standard Marking System for Valves, Fittings, Flanges and Unions.
- MSS SP-43** Wrought Stainless Steel Butt-Welding Fittings.
- MSS SP-44** Steel Pipe Line Flanges.
- MSS SP-75** Specification for High Test Wrought Butt-Welding Fittings.
- MSS SP-79** Socket Welding Reducer Inserts.
- MSS SP-83** Carbon Steel Pipe Unions Socket-Welding and Threaded.
- MSS SP-87** Factory-Made Butt-Welding Fittings for Class 1 Nuclear Piping Applications.
- MSS SP-95** Swage(d) Nipples and Bull Plugs.
- MSS SP-97** Integrally Reinforced Forged Branch Outlet Fittings- Socket Welding, Threaded and Butt-Welding Ends.

ASME:AMERICAN SOCIETY OF MECHANICAL ENGINEERS

- ASME SECTION II** Materials.
- ASME SECTION III** Subsection NCA / Division 1 / Division 2
- ASME SECTION V** Nondestructive Examination.
- ASME SECTION VIII** Rules for Construction of Pressure Vessels/ Division 1, Division 2.
- ASME SECTION IX** Welding and Brazing Qualifications.

KEPIC:KOREA ELECTRIC POWER INDUSTRY CODE

- KEPIC MN** Nuclear Components.

API:AMERICAN PETROLEUM INSTITUTE

- API 5L** Line Pipe.
- API 5LX** High Test Line Pipe.
- API 6A** Wellhead and Christmas Tree Equipment.

DRAWANG TYPE

FORGED FITTINGS

• Socket Welding Fittings



• Threaded Fittings



• Outlets



FORGED FITTINGS



CONTENTS

ASME

1.Socket-Welding Type

• 90°, 45° Elbow	20
• Tee, Cross	21
• Coupling, Reducer	22/23
• Cap, Boss	24/25
• Reducer Insert	26/27
• Union	28/29

2.Threaded Type

• 90°, 45° Elbow	30
• Tee, Cross	31
• Full Coupling, Half Coupling, Cap, Reducer	32/33
• Union	34/35
• Boss, Plug, Bushing	36/37
• Nipple & Swaged	38/39

3. Outlet

• Weldolet	40
• Sockolet, Thredolet	41
• Nippolet, Flanged - end outlet	42/43

JIS

1.Socket-Welding Type

• 90°, 45° Elbow, Tee, Cross	44/45
• Full Coupling, Half Coupling	46
• Reducer	47
• Cap	48

INDEX

• Approx weight table	50/51
• Standard threads specifications	52/55
• Comparison ASTM specifications and similar specifications	56/57
• Chemical & mechanical value	58/59
• Wall Thickness of Pipe	60/61

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. (ASME B16.11)

Pressure Class Designation of Fitting	Type of Fitting	Pipe Used for Rating Basic	
		Schedule No.	Wall Designation
2000	Threaded	80	XS
3000	Threaded	160	–
6000	Threaded	–	XXS
3000	Socket–Welding	80	XS
6000	Socket–Welding	160	–
9000	Socket–Welding	–	XXS

*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		XXS	
	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

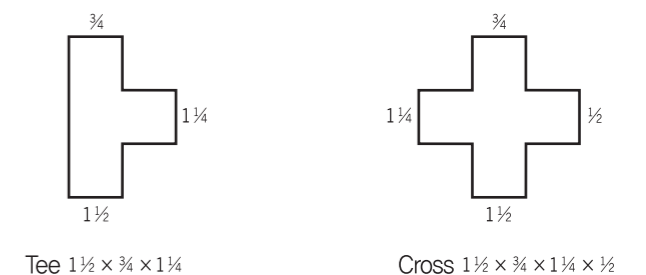
Non-shock Working Pressure in Pounds per Square Inch

Service Temperature Degree F	2000ld Threaded Fittings					3000ld Socket Welding and Threaded Fittings					6000ld 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	1985	1895	2845	2055	2845	2845	2845	5690	4115	5690	5690	5690
350	1875	1310	1875	1875	1875	2810	1965	2810	2810	2810	5625	3930	5690	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	2925	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	2850	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	1855	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. Reducing Fitting size identification

In the case of reducing tees and crosses, the size of the largest run opening shall be given first, followed by the size of the opening at the opposite end of the run.

where the fittings is a tee, the size of the branch is given last. where the fitting is a cross, the largest side-outlet is the third dimension given, followed by the opening opposite.



3. Threads

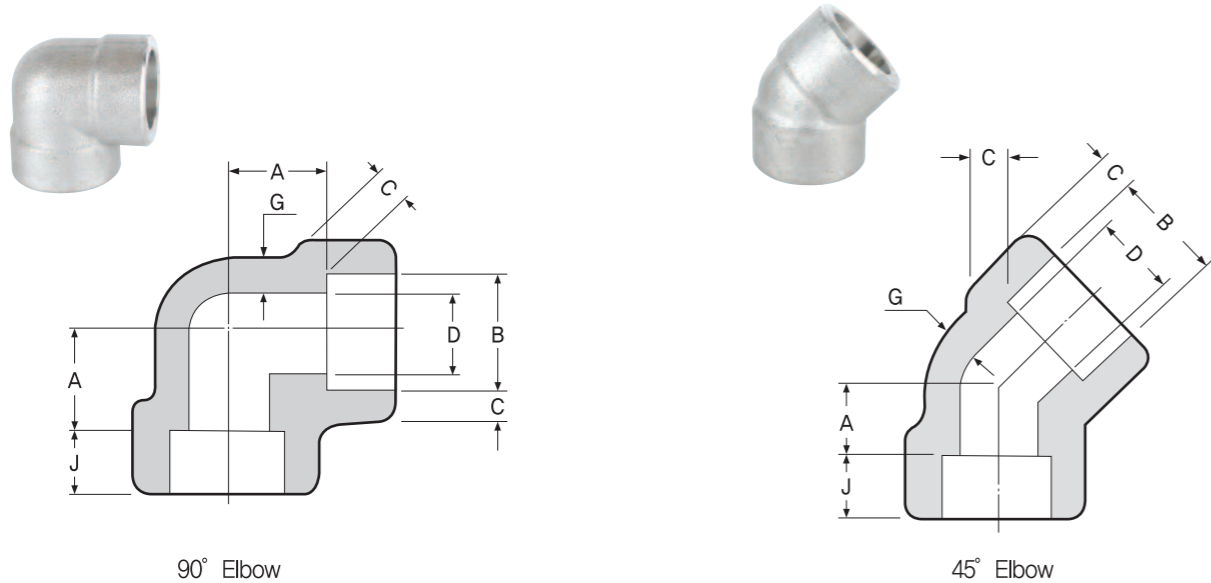
Unless otherwise specified in inquiry, all threaded fittings are supplied with NPT threads (ANSI B2.1 American Standard Taper Pipe Thread) for reference, other available threads are :

- ISO/R7 Pipe Threads for Gas List Tubes and Screwed Fittings where Pressure-tight Joints are made on the threads (BS 21 & JIS B0203 PT Thread).
- API 5B, Line Pipe Threads.
- KS B0222 Taper Pipe Threads.

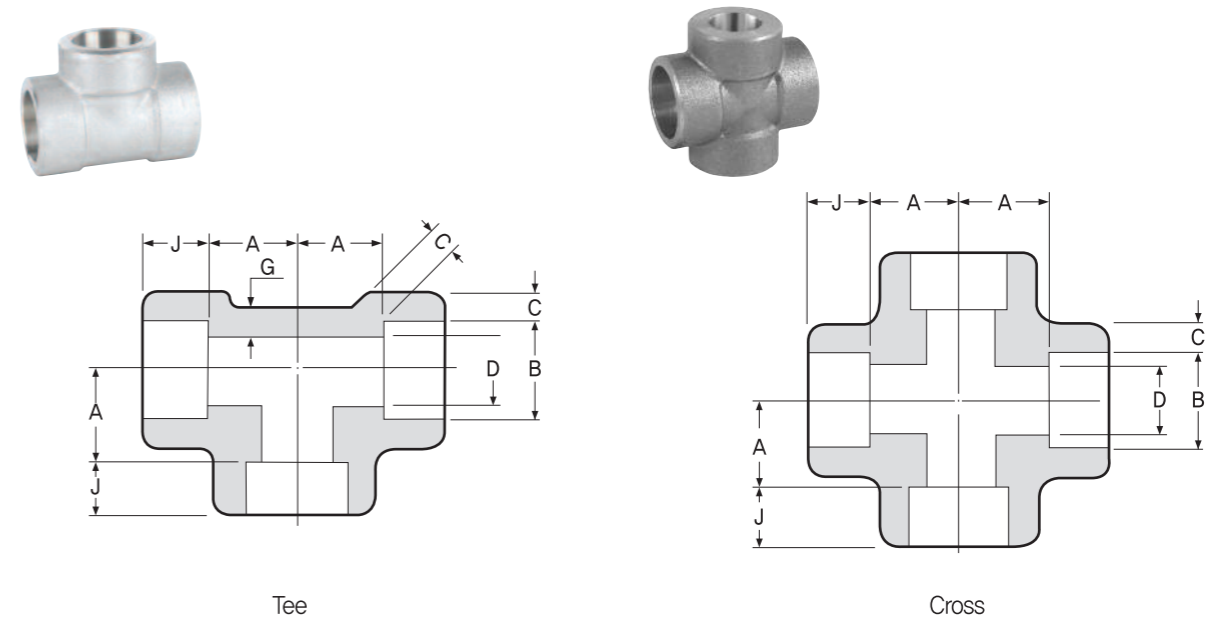
4. Bore Diameter of Fittings

Bore Diameter of fittings are manufactured for conforming with KS, JIS, ANSI or MSS dimension.

90° Elbow, 45° Elbow 3000# 6000# 9000#



Tee, Cross 3000# 6000# 9000#



ASME 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	10.8 11.2	6.1~7.6	3.2~4.8	—	3.18/3.18	3.96/3.43	—	9.5
1/4	14.2 14.6	8.5~10.0	5.6~7.1	—	3.78/3.30	4.60/4.01	—	9.5
3/8	17.6 18.0	11.8~13.3	8.4~9.9	—	4.01/3.50	5.03/4.37	—	9.5
1/2	21.8 22.2	15.0~16.6	11.0~12.5	5.6~7.2	4.67/4.09	5.97/5.18	9.35/8.18	9.5
3/4	27.2 27.6	20.2~21.7	14.8~16.3	10.3~11.8	4.90/4.27	6.96/6.04	9.78/8.56	12.5
1	33.9 34.3	25.9~27.4	19.9~21.5	14.4~16.0	5.69/4.98	7.92/6.93	11.38/9.96	12.5
1 1/4	42.7 43.1	34.3~35.8	28.7~30.2	22.0~23.5	6.07/5.28	7.92/6.93	12.14/10.62	12.5
1 1/2	48.8 49.2	40.1~41.6	33.2~34.7	27.2~28.7	6.35/5.54	8.92/7.80	12.70/11.12	12.5
2	61.2 61.7	51.7~53.3	42.1~43.6	37.4~38.9	6.93/6.04	10.92/9.50	13.84/12.12	16.0
2 1/2	73.9 74.4	61.2~64.2	—	—	8.76/7.67	—	—	16.0
3	89.8 90.3	76.4~79.4	—	—	9.52/8.30	—	—	16.0
4	115.2 115.7	100.7~103.8	—	—	10.69/9.35	—	—	19.0

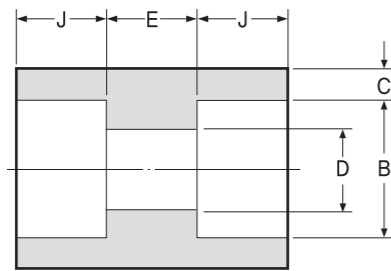
NOTE : 1. Dimension are in millimeters
2. Average of socket wall thickness around periphery shall not be less than listed values, The minimum values are permitted in localized areas.

ASME B16.11

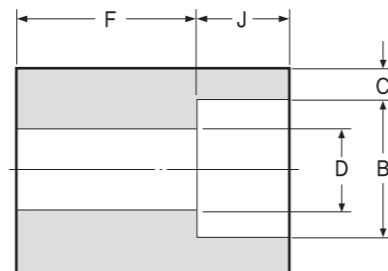
Unit : mm

Nom Pipe Size	Body Wall Thickness Min—G			Center to Bottom of Socket—A					
				90° Elbows, Tees and Crosses			45° Elbows		
	3000	6000	9000	3000	6000	9000	3000	6000	9000
1/8	2.41	3.15	—	10.0~12.0	10.0~12.0	—	7.0~9.0	7.0~9.0	—
1/4	3.02	3.68	—	10.0~12.0	12.5~14.5	—	7.0~9.0	7.0~9.0	—
3/8	3.20	4.01	—	12.0~15.0	14.0~17.0	—	6.5~9.5	9.5~12.5	—
1/2	3.73	4.78	7.47	14.0~17.0	17.5~20.5	24.0~27.0	9.5~12.5	11.0~14.0	14.0~17.0
3/4	3.91	5.56	7.82	17.5~20.5	21.0~24.0	27.0~30.0	11.5~14.5	12.5~15.5	17.5~20.5
1	4.55	6.35	9.09	20.5~24.5	25.0~29.0	30.0~34.0	12.0~16.0	15.5~19.5	18.5~22.5
1 1/4	4.85	6.35	9.70	25.0~29.0	30.0~34.0	33.0~37	15.5~19.5	18.5~22.5	20.5~24.5
1 1/2	5.08	7.14	10.15	30.0~34.0	36.0~40.0	36.0~40.0	18.5~22.5	23.5~27.5	23.5~27.5
2	5.54	8.74	11.07	36.0~40.0	39.0~43.0	52.0~56.0	23.5~27.5	26.5~30.5	26.5~30.5
2 1/2	7.01	—	—	38.5~43.5	—	—	26.0~31.0	—	—
3	7.62	—	—	54.5~59.5	—	—	29.5~34.5	—	—
4	8.56	—	—	64.0~69.0	—	—	38.5~43.5	—	—

Full Coupling, Half Coupling 3000# 6000# 9000#

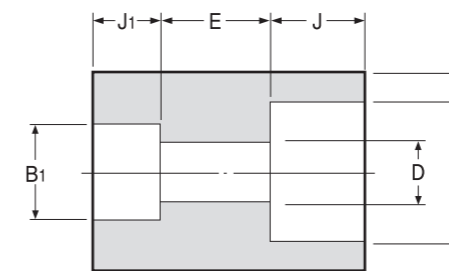


Full Coupling

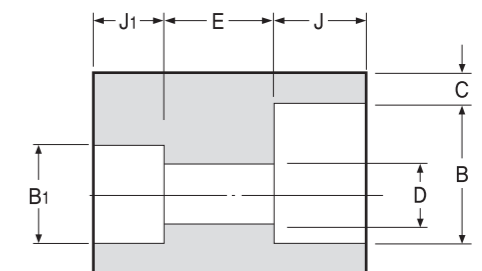


Half Coupling

Concentric Reducer, Eccentric Reducer 3000# 6000# 9000#



Concentric Reducer



Eccentric Reducer

ASME 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	F
1/8	10.8 11.2	6.1~7.6	3.2~4.8	—	3.18/3.18	3.96/3.43	—	9.5	5.0~8.0	15.0~17.0
1/4	14.2 14.6	8.5~10.0	5.6~7.1	—	3.78/3.30	4.60/4.01	—	9.5	5.0~8.0	15.0~17.0
3/8	17.6 18.0	11.8~13.3	8.4~9.9	—	4.01/3.50	5.03/4.37	—	9.5	3.5~9.5	16.0~19.0
1/2	21.8 22.2	15.0~16.6	11.0~12.5	5.6~7.2	4.67/4.09	5.97/5.18	9.35/8.18	9.5	6.5~12.5	21.0~24.0
3/4	27.2 27.6	20.2~21.7	14.8~16.3	10.3~11.8	4.90/4.27	6.96/6.04	9.78/8.56	12.5	6.5~12.5	22.5~25.5
1	33.9 34.3	25.9~27.4	19.9~21.5	14.4~16.0	5.69/4.98	7.92/6.93	11.38/9.96	12.5	8.5~16.5	26.5~30.5
1 1/4	42.7 43.1	34.3~35.8	28.7~30.2	22.0~23.5	6.07/5.28	7.92/6.93	12.14/10.62	12.5	8.5~16.5	28.0~32.0
1 1/2	48.8 49.2	40.1~41.6	33.2~34.7	27.2~28.7	6.35/5.54	8.92/7.80	12.70/11.12	12.5	8.5~16.5	30.0~34.0
2	61.2 61.7	51.7~53.3	42.1~43.6	37.4~38.9	6.93/6.04	10.92/9.50	13.84/12.12	16.0	15.0~23.0	39.0~43.0
2 1/2	73.9 74.4	61.2~64.2	—	—	8.76/7.67	—	—	16.0	14.0~24.0	40.5~45.5
3	89.8 90.3	76.4~79.5	—	—	9.52/8.30	—	—	16.0	14.0~24.0	42.0~47.0
4	115.2 115.7	100.7~103.8	—	—	10.69/9.35	—	—	19.0	14.0~24.0	45.5~50.5

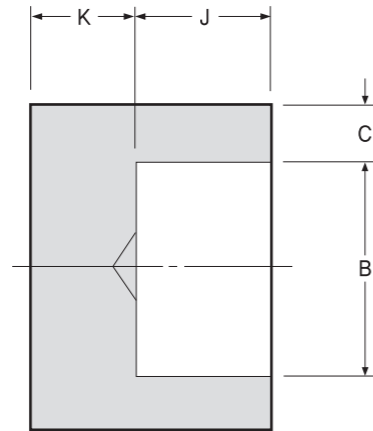
NOTE : 1 .Dimension are in millimeters
2 .Average of socket wall thickness around periphery shall not be less than listed values, The minimum values are permitted in localized areas.

ASME B16.11

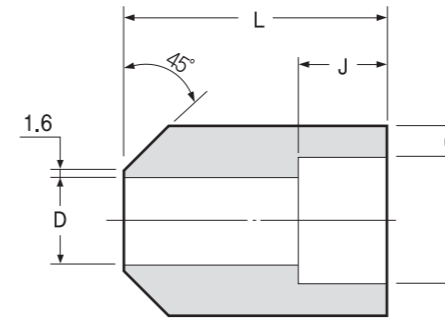
Unit : mm

Nom Pipe Size	Socket Bore Dia Min		Bore Diameter of Fitting—D			Socket Wall Thickness C(Ave/Min)			Depth Min		Laying Lengths (Min/Max) E
	B	B ₁	3000	6000	9000	3000	6000	9000	J	J ₁	
1/4x1/8	14.2/14.6	10.8/11.2	6.1/7.6	3.2/4.8	—	3.78/3.30	4.60/4.01	—	9.5	10.0	5.0/8.0
3/8x1/4	17.6/18.0	14.2/14.6	8.5/10.0	5.6/7.1	—	4.01/3.50	5.03/4.37	—	9.5	10.0	3.5/9.5
1/2x1/4	21.8/22.2	14.2/14.6	8.5/10.0	5.6/7.1	—	4.67/4.09	5.97/5.18	9.35/8.18	9.5	10.0	6.5/12.5
x3/8	21.8/22.2	17.6/18.0	11.8/13.3	8.4/9.9	—	4.67/4.09	5.97/5.18	9.35/8.18	9.5	10.0	6.5/12.5
3/4x1/4	27.2/27.6	14.2/14.6	8.5/10.0	5.6/7.1	—	4.90/4.27	6.96/6.04	9.78/8.56	12.5	10.0	6.5/12.5
x3/8	27.2/27.6	17.6/18.0	11.8/13.3	8.4/9.9	—	4.90/4.27	6.96/6.04	9.78/8.56	12.5	10.0	6.5/12.5
x1/2	27.2/27.6	21.8/22.2	15.0/16.6	11.0/12.5	5.6/7.2	4.90/4.27	6.96/6.04	9.78/8.56	12.5	10.0	6.5/12.5
1x3/8	33.9/34.3	17.6/18.0	11.8/13.3	8.4/9.9	—	5.69/4.98	7.92/6.93	11.38/9.96	12.5	10.0	8.5/16.5
x1/2	33.9/34.3	21.8/22.2	15.0/16.6	11.0/12.5	5.6/7.2	5.69/4.98	7.92/6.93	11.38/9.96	12.5	10.0	8.5/16.5
x3/4	33.9/34.3	27.2/27.6	20.2/21.7	14.8/16.3	10.3/11.8	5.69/4.98	7.92/6.93	11.38/9.96	12.5	13.0	8.5/16.5
1 1/4x1/2	42.7/43.1	21.8/22.2	15.0/16.6	11.0/12.5	5.6/7.2	6.07/5.28	7.92/6.93	12.14/10.62	12.5	13.0	8.5/16.5
x3/4	42.7/43.1	27.2/27.6	20.2/21.7	14.8/16.3	10.3/11.8	6.07/5.28	7.92/6.93	12.14/10.62	12.5	13.0	8.5/16.5
x1	42.7/43.1	33.9/34.3	25.9/27.4	19.9/21.5	14.4/16.0	6.07/5.28	7.92/6.93	12.14/10.62	12.5	13.0	8.5/16.5
1 1/2x3/4	48.8/49.2	27.2/27.6	20.2/21.7	14.8/16.3	10.3/11.8	6.35/5.54	8.92/7.80	12.70/11.12	12.5	13.0	8.5/16.5
x1	48.8/49.2	33.9/34.3	25.9/27.4	19.9/21.5	14.4/16.0	6.35/5.54	8.92/7.80	12.70/11.12	12.5	13.0	8.5/16.5
x1 1/4	48.8/49.2	42.7/43.1	34.3/35.8	28.7/30.2	22.0/23.5	6.35/5.54	8.92/7.80	12.70/11.12	12.5	13.0	8.5/16.5
2x1	61.2/61.7	33.9/34.3	25.9/27.4	19.9/21.5	14.4/16.0	6.93/6.04	10.92/9.50	13.84/12.12	16.0	13.0	15.0/23.0
x1 1/4	61.2/61.7	42.7/43.1	34.3/35.8	28.7/30.2	22.0/23.5	6.93/6.04	10.92/9.50	13.84/12.12	16.0	13.0	15.0/23.0
x1 1/2	61.2/61.7	48.8/49.2	40.1/41.6	33.2/34.7	27.2/28.7	6.93/6.04	10.92/9.50	13.84/12.12	16.0	13.0	15.0/23.0
2 1/2x1 1/4	73.9/74.4	42.7/43.1	34.3/35.8	28.7/30.2	22.0/23.5	8.76/7.67	—	—	16.0	13.0	14.0/24.0
x1 1/2	73.9/74.4	48.8/49.2	40.1/41.6	33.2/34.7	27.2/28.7	8.76/7.67	—	—	16.0	13.0	14.0/24.0
x2	73.9/74.4	61.2/61.7	51.7/53.3	42.1/43.6	37.4/38.9	8.76/7.67	—	—	16.0	13.0	14.0/24.0
3x1 1/2	89.8/90.3	48.8/49.2	40.1/41.6	33.2/34.7	—	9.52/8.30	—	—	16.0	16.0	14.0/24.0
x2	89.8/90.3	61.2/61.7	51.7/53.3	42.1/43.6	—	9.52/8.30	—	—	16.0	16.0	14.0/24.0
x2 1/2	89.8/90.3	73.9/74.4	61.2/64.2	—	—	9.52/8.30	—	—	16.0	16.0	14.0/24.0
4x2	115.2/115.7	61.2/61.7	51.7/53.3	—	—	10.69/9.35	—	—	19.0	16.0	14.0/24.0
x2 1/2	115.2/115.7	73.9/74.4	61.2/64.2	—	—	10.69/9.35	—	—	19.0	16.0	14.0/24.0
x3	115.2/115.7	89.8/90.3	76.4/79.4	—	—	10.69/9.35	—	—	19.0	16.0	14.0/24.0

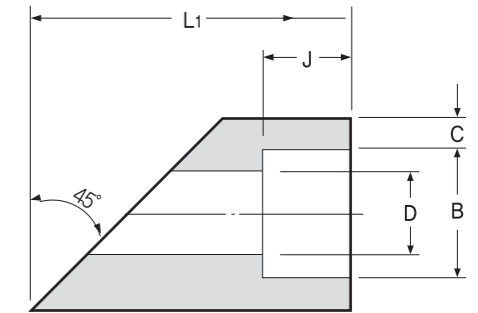
Cap
3000# 6000# 9000#



Boss
3000# 6000# 9000#



Type. 1



Type. 2

ASME 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
1/8	10.8 11.2	3.18/3.18	3.96/3.43	—	9.5	4.8	6.4	—
1/4	14.2 14.6	3.78/3.30	4.60/4.01	—	9.5	4.8	6.4	—
3/8	17.6 18.0	4.01/3.50	5.03/4.37	—	9.5	4.8	6.4	—
1/2	21.8 22.2	4.67/4.09	5.97/5.18	9.35/8.18	9.5	6.4	7.9	11.2
3/4	27.2 27.6	4.90/4.27	6.96/6.04	9.78/8.56	12.5	6.4	7.9	12.7
1	33.9 34.3	5.69/4.98	7.92/6.93	11.38/9.96	12.5	9.6	11.2	14.2
1 1/4	42.7 43.1	6.07/5.28	7.92/6.93	12.14/10.62	12.5	9.6	11.2	14.2
1 1/2	48.8 49.2	6.35/5.54	8.92/7.80	12.70/11.12	12.5	11.2	12.7	15.7
2	61.2 61.7	6.94/6.04	10.92/9.50	13.84/12.12	16.0	12.7	15.7	19.0
2 1/2	73.9 74.4	8.76/7.67	—	—	16.0	15.7	19.0	—
3	89.8 90.3	9.52/8.30	—	—	16.0	19.0	22.4	—
4	115.2 115.7	10.69/9.35	—	—	19.0	22.4	28.4	—

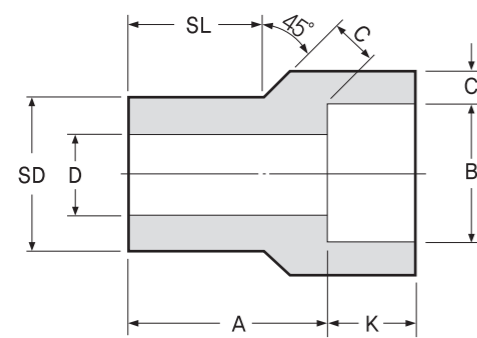
NOTE : 1. Dimension are in millimeters
2. Average of socket wall thickness around periphery shall be no less than listed values, The minimum values are permitted in localized areas.

ASME B16.11

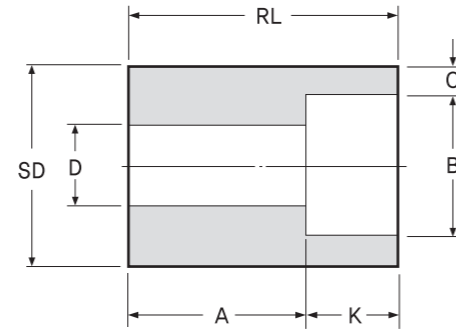
Unit : mm

Nom Pipe Size	Socket Bore Dia B	Bore Diameter of Fitting—D			Socket Wall Thickness C (Ave/Min)			Depth Min J	End to End	
		3000	6000	9000	3000	6000	9000		L	L1
1/4	14.2 14.6	8.5~10.0	5.6~7.1	—	3.78/3.30	4.60/4.01	—	9.5	25.7	62
3/8	17.6 18.0	11.8~13.3	8.4~9.9	—	4.01/3.50	5.03/4.37	—	9.5	27.5	66
1/2	21.8 22.2	15.0~16.6	11.0~12.5	5.6~7.2	4.67/4.10	5.97/5.18	9.35/8.18	9.5	32.4	82
3/4	27.2 27.6	20.2~21.7	14.8~16.3	10.3~11.8	4.90/4.27	6.96/6.04	9.78/8.56	12.5	36.9	88
1	33.9 34.3	25.9~27.4	19.9~21.5	14.6~16.0	5.69/4.98	7.92/6.93	11.38/9.96	12.5	41.4	96
1 1/4	42.7 43.1	34.3~35.8	28.7~30.2	22.0~23.5	6.07/5.28	7.92/6.93	12.14/10.62	12.5	43.2	105
1 1/2	48.8 49.2	40.1~41.6	33.2~34.7	27.2~28.7	6.35/5.54	8.92/7.80	12.70/11.12	12.5	44.8	112
2	61.2 61.7	51.7~53.5	42.1~43.6	37.4~38.9	6.93/6.04	10.92/9.50	13.84/12.12	16.0	57.1	125

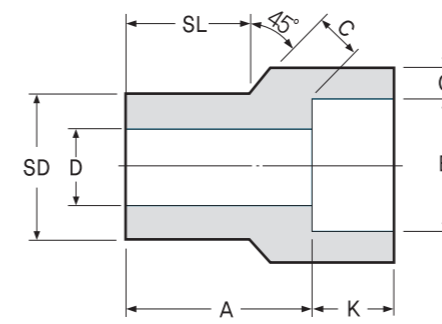
Reducer Insert 3000# 6000#



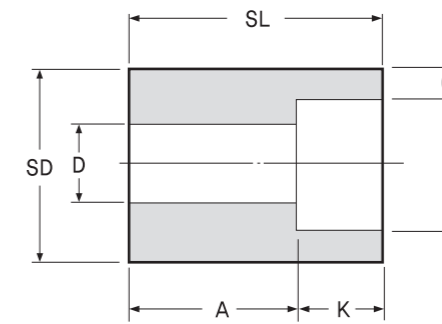
Type. 1



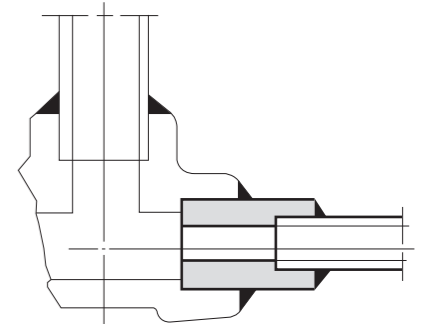
Type. 2⁽¹⁾



Type. 1



Type. 2⁽¹⁾



Application of Reducer Insert

MSS SP-79

Unit : mm

Nom Pipe Size	Type ⁽²⁾		Socket Min		Shank Dia SD	Laying Length A		Bore D		Wall Thickness Min C		Length Min			
			Dia B	Depth K		3M	6M	3M	6M	3M	6M	SL		RL	
	3M	6M			3M							6M	3M	6M	3M
3/8 x 1/4	1	1	14.35	10	17.15	19	21	9.0	6.5	3.78	4.60	14	16	-	-
1/2 x 3/8	1	1	17.78	10	21.34	21	23	12.5	9.0	4.01	5.03	16	16	-	-
x 1/4	1	1	14.35	10	21.34	21	21	9.0	6.0	3.78	4.60	16	16	-	-
3/4 x 1/2	1	1	21.97	10	26.67	22	25	16.0	11.5	4.67	5.97	17	19	-	-
x 3/8	2	1	17.78	10	26.67	16	22	12.5	9.0	4.01	5.03	-	19	27	-
x 1/4	2	2	14.35	10	26.67	18	22	9.0	6.5	3.78	4.60	-	-	27	32
1 x 3/4	1	1	27.31	13	33.40	24	28	21.0	15.5	4.90	6.96	19	21	-	-
x 1/2	2	1	21.97	10	33.40	16	28	16.0	11.5	4.67	5.97	-	21	28	-
x 3/8	2	2	17.78	10	33.40	18	22	12.5	9.0	4.01	5.03	-	-	28	33
x 1/4	2	2	14.35	10	33.40	19	24	9.0	6.0	3.78	4.60	-	-	28	33
1 1/4 x 1	1	1	34.04	13	42.16	25	30	26.5	20.5	5.69	7.92	21	22	-	-
x 3/4	2	2	27.31	13	42.16	18	21	21.0	15.5	4.90	6.96	-	-	32	35
x 1/2	2	2	21.97	10	42.16	19	22	16.0	11.5	4.67	5.97	-	-	32	35
x 3/8	2	2	17.78	10	42.16	21	24	12.5	9.0	4.01	5.03	-	-	32	35
x 1/4	2	2	14.35	10	42.16	22	25	9.0	6.5	3.78	4.60	-	-	32	35
1 1/2 x 1 1/4	1	1	42.80	13	48.26	28	35	35.0	29.5	6.07	7.92	22	25	-	-
x 1	2	1	34.04	13	48.26	18	29	26.5	20.5	5.67	7.92	-	25	33	-
x 3/4	2	2	27.31	13	48.26	19	25	21.0	15.5	4.90	6.96	-	-	33	40
x 1/2	2	2	21.97	10	48.26	21	27	16.0	11.5	4.67	5.97	-	-	33	40
x 3/8	2	2	17.78	10	48.26	22	28	12.5	9.0	4.01	5.03	-	-	33	40

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

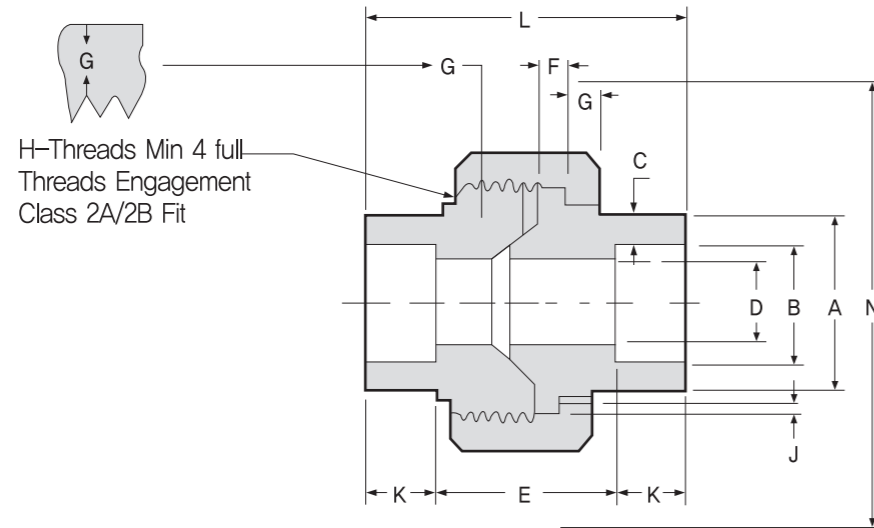
MSS SP-79

Unit : mm

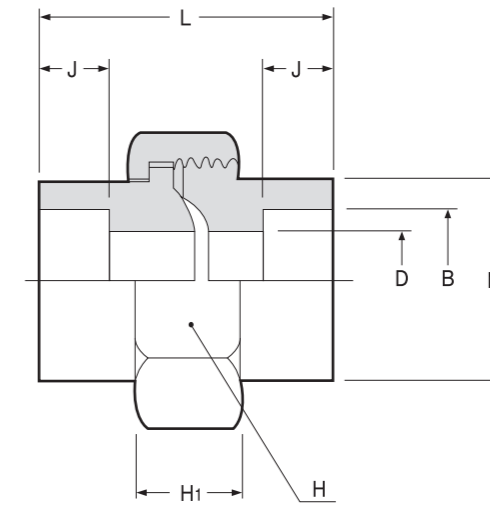
Nom Pipe Size	Type ⁽²⁾		Socket Min		Shank Dia SD	Laying Length A		Bore D		Wall Thickness Min C		Length Min			
			Dia B	Depth K		3M	6M	3M	6M	3M	6M	SL		RL	
	3M	6M			3M							6M	3M	6M	3M
2 x 1 1/2	1	1	48.90	13	60.32	32	39	41.0	34.0	6.35	8.92	25	28	-	-
x 1 1/4	2	2	42.80	13	60.32	21	24	35.0	29.5	6.07	7.92	-	-	38	41
x 1	2	2	34.04	13	60.32	22	25	26.5	21.0	5.69	7.92	-	-	38	41
x 3/4	2	2	27.31	13	60.32	24	27	21.0	15.5	4.90	6.96	-	-	38	41
x 1/2	2	2	21.97	10	60.32	25	28	16.0	11.5	4.67	5.97	-	-	38	41
2 1/2 x 2	1	1	61.37	16	73.02	46	43	52.5	43.0	6.93	10.92	38	32	-	-
x 1 1/2	2	2	48.89	13	73.02	35	-	41.0	-	6.35	-	-	-	54	-
x 1 1/4	2	2	42.79	13	73.02	37	-	35.0	-	6.07	-	-	-	54	-
x 1	2	2	34.04	13	73.02	38	-	26.5	-	5.69	-	-	-	54	-
x 3/4	2	2	27.30	13	73.02	40	-	21.0	-	4.90	-	-	-	54	-
3 x 2 1/2	1	-	74.07	16	88.90	38	-	62.5	-	8.76	-	32	-	-	-
x 2	2	-	61.37	16	88.90	25	-	52.5	-	6.93	-	-	-	48	-
x 1 1/2	2	-	48.89	13	88.90	29	-	41.0	-	6.35	-	-	-	48	-
x 1 1/4	2	-	42.79	13	88.90	30	-	35.0	-	6.07	-	-	-	48	-
x 1	2	-	34.04	13	88.90	32	-	26.5	-	5.69	-	-	-	48	-
4 x 3	2	-	90.04	16	114.30	33	-	78.0	-	9.50	-	-	-	60	-
x 2 1/2	2	-	74.07	16	114.30	38	-	62.5	-	8.76	-	-	-	60	-
x 2	2	-	61.37	16	114.30	38	-	52.5	-	6.93	-	-	-	60	-
x 1 1/2	2	-	48.89	13	114.30	42	-	41.0	-	6.35	-	-	-	60	-
x 1 1/4	2	-	42.79	13	114.30	43	-	35.0	-	6.07	-	-	-	60	-

TOLERANCES *Laying Length A-Sizes 3/8" thru 3/4" : +1.5/-0.0
 Sizes 1" thru 2" : +2.0/-0.0
 Sizes 2 1/2" thru 4" : +2.5/-0.0
 *Socket Dia B-Sizes 1/4" thru 2" : ±0.25
 Sizes 2 1/2" thru 3" : +0.4/-0.25
 *Bore D-Sizes 1/4" thru 2" : ±0.8
 Sizes 2 1/2" thru 3" : ±1.5
 *SD- Sizes 3/8" thru 1 1/2" : ±0.25
 Sizes 2" thru 3" : ±0.5
 Sizes 4" : ±0.75mm
 *SL-Sizes 3/8"~3/4" : +0.0/-1.5
 Sizes 1"~2" : +0.0/-2.0
 Sizes 2 1/2"~4" : +0.0/-2.5

Union 3000#



Union 3000# 6000#



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
1/4	21.8	14.60 14.10	3.30	10.00 8.48	22.4 19.0	3.17	3.17	16	1.24	9.6	41.4	50.8
3/8	25.9	18.03 17.53	3.50	13.28 11.76	26.9 20.6	3.43	3.43	14	1.37	9.6	46.0	55.9
1/2	31.2	22.22 21.72	4.09	16.56 15.04	26.9 20.6	3.68	3.68	14	1.50	9.6	49.0	58.4
3/4	37.1	27.56 27.05	4.27	21.69 20.17	31.8 25.4	4.06	4.06	11	1.68	12.7	56.9	66.0
1	45.5	34.29 33.78	4.98	27.41 25.88	34.3 26.2	4.57	4.44	11	1.85	12.7	62.0	78.7
1 1/4	54.9	43.05 42.55	5.28	35.81 34.29	40.6 32.5	5.33	5.21	10	2.13	12.7	71.1	94.0
1 1/2	61.5	49.15 48.64	5.54	41.66 40.13	42.2 34.0	5.84	5.59	10	2.31	12.7	76.5	111.8
2	75.2	61.62 61.11	6.05	53.26 51.74	45.5 37.3	6.60	6.35	10	2.69	15.8	86.1	132.0
2 1/2	91.7	74.44 73.81	7.67	64.24 61.19	61.7 52.1	7.49	7.11	8	3.07	15.8	102.4	149.9
3	109.2	90.42 89.79	8.31	79.45 76.40	63.8 53.6	8.25	8.00	8	3.53	15.8	109.0	175.3

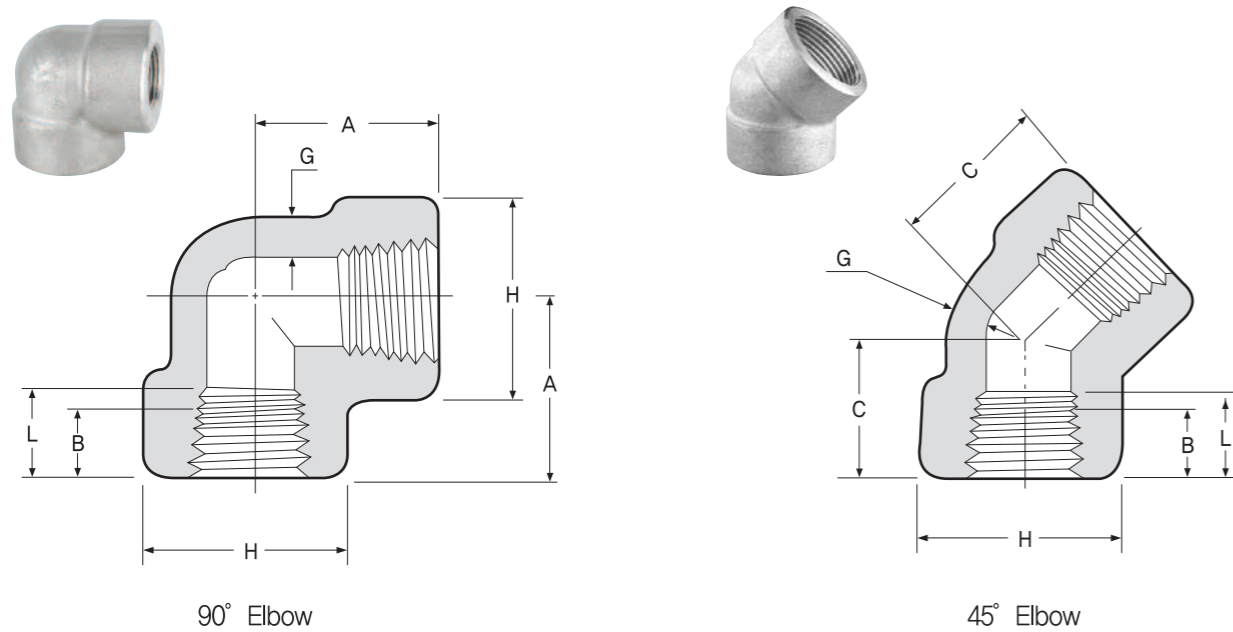
MSS SP-83

Unit : mm

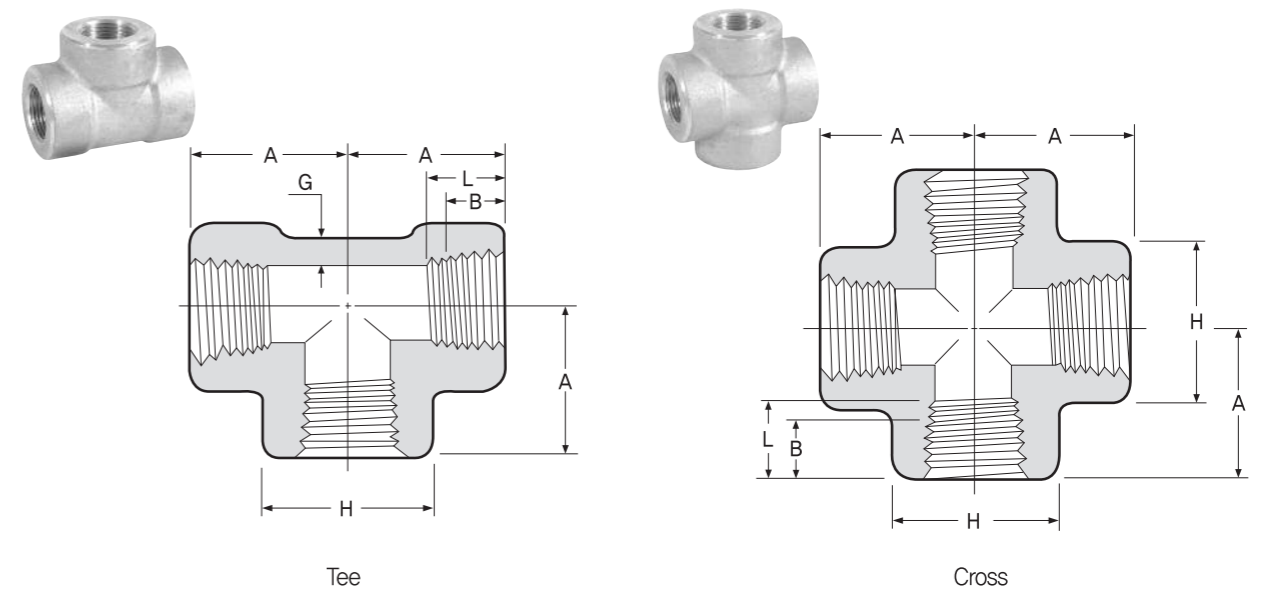
Nom Pipe Size	Socket Bore Dia Min-B	Bore-D		Pipe End-M		Depth Nin J	Length Ass'y Nom-L		Nut-H*		Nut-H1	
		3000	6000	3000	6000		3000	6000	3000	6000		
1/4	14.10	9.0	6.5	23.0	25	10	45	51	38	38	20	20
3/8	17.55	12.5	9.0	25.9	32	10	51	54	42	48	20	20
1/2	21.70	16.0	11.5	31.5	38	10	54	57	46	55	20	26
3/4	27.05	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
1 1/4	42.55	35.0	29.5	55.0	59	13	72	80	74	82	30	30
1 1/2	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
2 1/2	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 1/8~1" Hexagon, 1 1/4~4" : Octagon
6000# Size 1/8~3/4" Hexagon, 1~3" : Octagon

90° Elbow, 45° Elbow 2000# 3000# 6000#



Tee, Cross 2000# 3000# 6000#



ASME B16.11

Unit : mm

Nom Pipe Size	Center to End Elbows, Tees, Crosses A			Center to End 45° Elbows 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	3.18	3.18	6.35	6.4	6.7
1/4	21	25	28	17	19	22	22	25	33	3.18	3.30	6.60	8.1	10.2
3/8	25	29	33	19	22	25	25	33	38	3.18	3.51	6.98	9.1	10.4
1/2	28	33	38	22	25	28	33	38	46	3.18	4.09	8.15	10.9	13.6
3/4	33	38	44	25	28	33	38	46	56	3.18	4.32	8.53	12.7	13.9
1	38	44	51	28	33	35	46	56	62	3.68	4.98	9.93	14.7	17.3
1 1/4	44	51	60	33	35	43	56	62	75	3.89	5.28	10.59	17.0	18.0
1 1/2	51	60	64	35	43	44	62	75	84	4.01	5.56	11.07	17.8	18.4
2	60	64	83	43	44	52	75	84	102	4.27	7.14	12.09	19.0	19.2
2 1/2	76	83	95	52	52	64	92	102	121	5.61	7.65	15.29	23.6	28.9
3	86	95	106	64	64	79	110	121	146	5.99	8.84	16.64	25.9	30.5
4	106	114	114	79	79	79	146	152	152	6.55	11.18	18.67	27.7	33.0

NOTE : 1 .Dimension B is minimum length of perfect thread. The length of useful thread(B plus threads with fully formed roots and flat crests) shall not be less than L2(effective length of external thread) required by American National Standard for Pipe Threads(ASME B1.20.1)

ASME B16.11

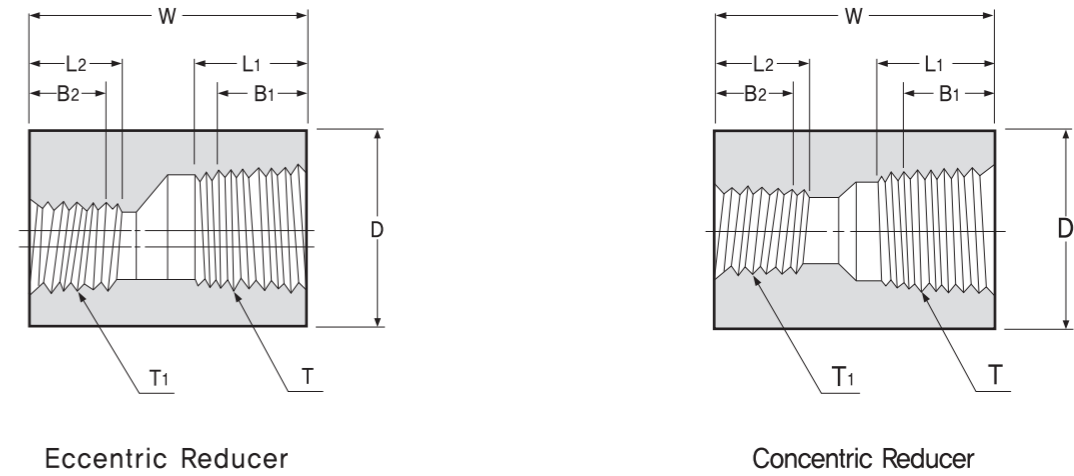
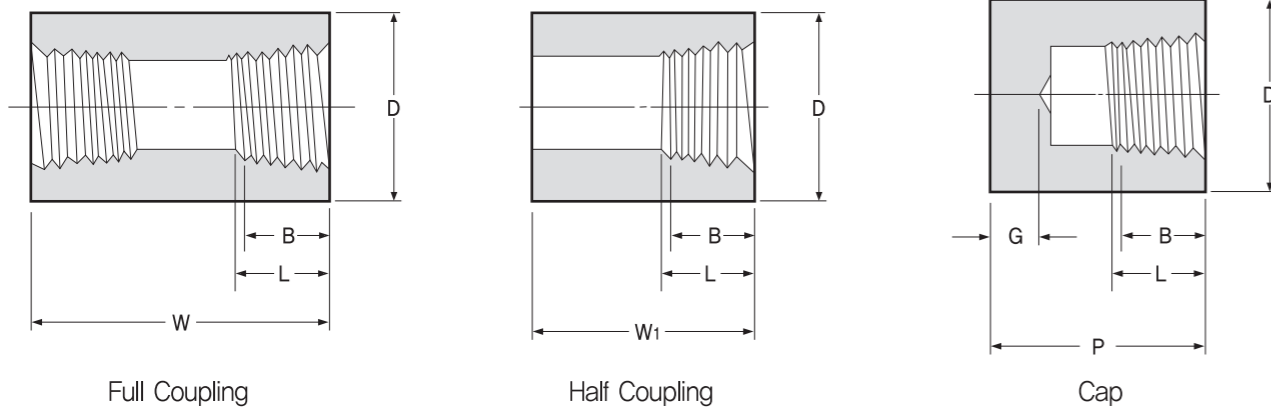
Unit : mm

Nom Pipe Size	Center to End Elbows, Tees, Crosses A			Center to End 45° Elbows 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	3.18	3.18	6.35	6.4	6.7
1/4	21	25	28	17	19	22	22	25	33	3.18	3.03	6.60	8.1	10.2
3/8	25	29	33	19	22	25	25	33	38	3.18	3.51	6.98	9.1	10.4
1/2	28	33	38	22	25	28	33	38	46	3.18	4.09	8.15	10.9	13.6
3/4	33	38	44	25	28	33	38	46	56	3.18	4.32	8.53	12.7	13.9
1	38	44	51	28	33	35	46	56	62	3.68	4.98	9.93	14.7	17.3
1 1/4	44	51	60	33	35	43	56	62	75	3.89	5.28	10.59	17.0	18.0
1 1/2	51	60	64	35	43	44	62	75	84	4.01	5.56	11.07	17.8	18.4
2	60	64	83	43	44	52	75	84	102	4.27	7.14	12.09	19.0	19.2
2 1/2	76	83	95	52	52	64	92	102	121	5.61	7.65	15.29	23.6	28.9
3	86	95	106	64	64	79	110	121	146	5.99	8.84	16.64	25.9	30.5
4	106	114	114	79	79	79	146	152	152	6.55	11.18	18.67	27.7	33.0

NOTE : 1 .Dimension B is minimum length of perfect thread. The length of useful thread(B plus threads with fully formed roots and flat crests) shall not be less than L2(effective length of external thread) required by American National Standard for Pipe Threads(ASME B1.20.1)

Full Coupling, Half Coupling, Cap 3000# 6000#

Concentric Reducer, Eccentric Reducer 3000# 6000#



ASME B16.11

Unit : mm

Nom Pipe Size	Outside Diameter—D		Full Coupling End to End W	Half Coupling End to End W ₁	Cap				Length of Thread Min(1)	
	3000	6000			End to End—P		Thickness Min—G		B	L
					3000	6000	3000	6000		
1/8	16.0	22.0	32	16.0	19	—	4.8	—	6.4	6.7
1/4	19.0	25.0	35	17.5	25	27	4.8	6.4	8.1	10.2
3/8	22.0	32.0	38	19.0	25	27	4.8	6.4	9.1	10.4
1/2	28.0	38.0	48	24.0	32	33	6.4	7.9	10.9	13.6
3/4	35.0	44.0	51	25.5	37	38	6.4	7.9	12.7	13.9
1	44.0	57.0	60	30.0	41	43	9.7	11.2	14.7	17.3
1 1/4	57.0	64.0	67	33.5	44	46	9.7	11.2	17.0	18.0
1 1/2	64.0	76.0	79	39.5	44	48	11.2	12.7	17.8	18.4
2	76.0	92.0	86	43.0	48	51	12.7	15.7	19.0	19.2
2 1/2	92.0	108.0	92	46.0	60	64	15.7	19.0	23.6	28.9
3	108.0	127.0	108	54.0	65	68	19.0	22.4	25.9	30.5
4	140.0	159.0	121	60.5	68	75	22.4	28.4	27.7	33.0

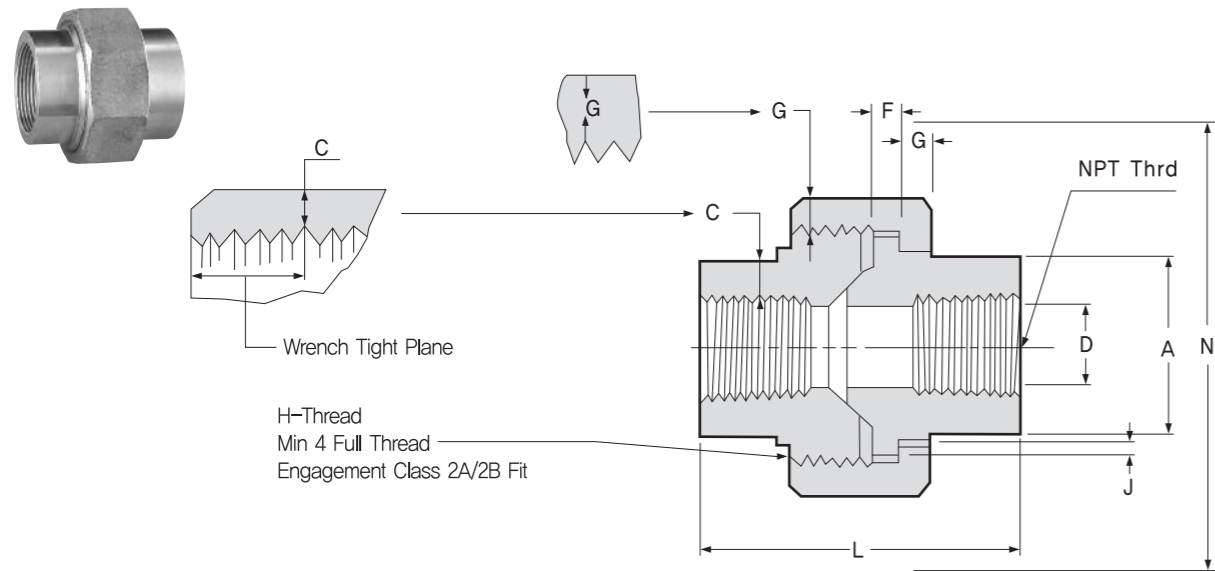
NOTE : 1. Dimension B is minimum length of perfect thread. The length of useful thread (B plus threads with fully formed roots and flat crests) shall not be less than L₂ (effective length of external thread) required by American National Standard for Pipe Threads (ASME B1.20.1)
2. Class 2000 and NPS 1/8 class 6000 couplings, half couplings, and caps are not included in this standard.

ASME B16.11

Unit : mm

Nom Pipe Size	Outside Diameter—D		End to End W	Length of Thread Min(1)			
	3000	6000		B ₁		B ₂	
				L ₁	L ₂	L ₁	L ₂
1 1/2 × 1	64.0	76.0	79	17.8	14.7	18.4	17.3
× 1 1/4	64.0	76.0	79	17.8	17.0	18.4	18.0
2 × 1	76.0	92.0	86	19.0	14.7	19.2	17.3
× 1 1/4	76.0	92.0	86	19.0	17.0	19.2	18.0
× 1 1/2	76.0	92.0	86	19.0	17.8	19.2	18.4
2 1/2 × 1 1/4	92.0	108.0	92	23.6	17.0	28.9	18.0
× 1 1/2	92.0	108.0	92	23.6	17.8	28.9	18.4
× 2	92.0	108.0	92	23.6	19.0	28.9	19.2
3 × 1 1/2	108.0	127.0	108	25.9	17.8	30.5	18.4
× 2	108.0	127.0	108	25.9	19.0	30.5	19.2
× 2 1/2	108.0	127.0	108	25.9	23.6	30.5	28.9
4 × 2	140.0	159.0	121	27.7	19.0	33.0	19.2
× 2 1/2	140.0	159.0	121	27.7	23.6	33.0	28.9
× 3	140.0	159.0	121	27.7	25.9	33.0	30.5

Union 3000#

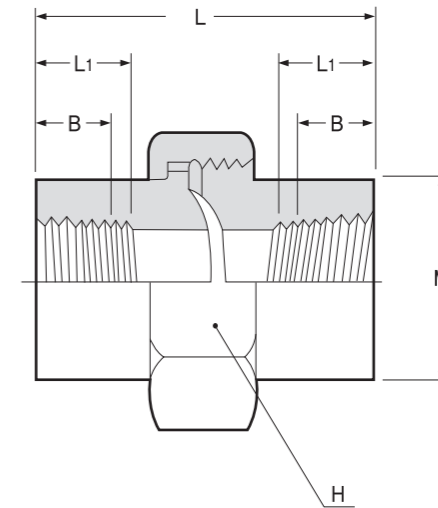


MSS SP-83

Unit : mm

Nom Pipe Size	Pipe End Min	Wall Min	Water Way Bore	Male Flange Min	Nut Min	Thread 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	8.43 6.43	3.17	3.17	16.0	1.24	41.4	50.8
1/4	19.0	3.02	11.12 9.45	3.17	3.17	16.0	1.24	41.4	50.8
3/8	22.9	3.20	14.27 13.51	3.43	3.43	14.0	1.37	46.0	55.9
1/2	27.7	3.73	17.86 17.07	3.68	3.68	14.0	1.50	49.0	58.4
3/4	33.5	3.91	23.01 21.39	4.06	4.06	11.0	1.68	56.9	66.0
1	41.4	4.55	28.98 27.74	4.57	4.45	11.0	1.85	62.0	78.7
1 1/4	50.5	4.85	37.69 35.36	5.33	5.21	11.0	2.13	71.1	94.0
1 1/2	57.2	5.08	43.54 41.20	5.84	5.59	10.0	2.31	76.4	111.8
2	70.1	5.54	55.58 52.12	6.60	6.35	10.0	2.69	86.1	132.1
2 1/2	85.3	7.01	66.27 64.31	7.49	7.49	7.11	3.07	102.4	149.9
3	102.4	7.62	82.55 77.27	8.25	8.26	8.0	3.53	109.0	175.3

Union 3000# 6000#



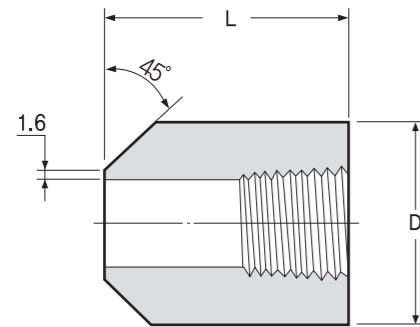
MSS SP-83

Unit : mm

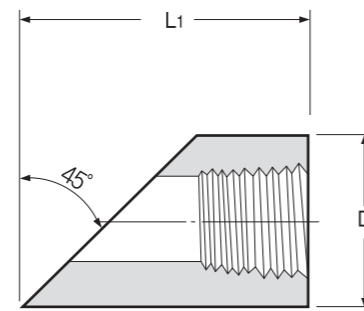
Nom Pipe Size	Pipe End M		Length Ass'y Nominal-L		Nut-H		Length of Thread Min	
	3000	6000	3000	6000	3000	6000	L1	B
1/4	23.0	30	45	54	38	46	10.20	8.12
3/8	25.9	36	51	57	42	54	10.35	9.14
1/2	31.5	42	54	64	46	60	13.55	10.92
3/4	38.0	49	57	72	55	72	13.86	12.70
1	46.0	56	69	80	63	80	17.34	14.73
1 1/4	55.0	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

Boss 3000# 6000#

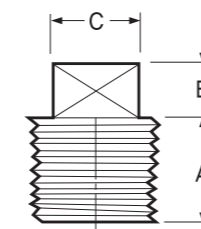


Type. 1

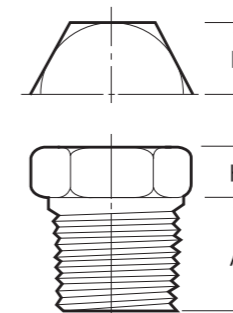


Type. 2

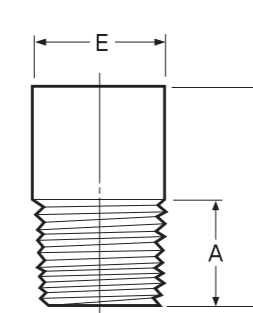
Plug , Bushing



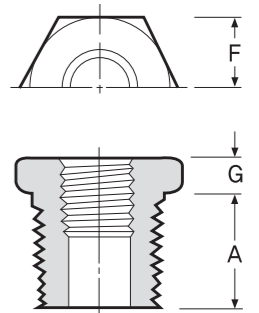
Square Head Plug



Hex Head Plug



Round Head Plug



Hex Head Bushing(1)

IHARA STD

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

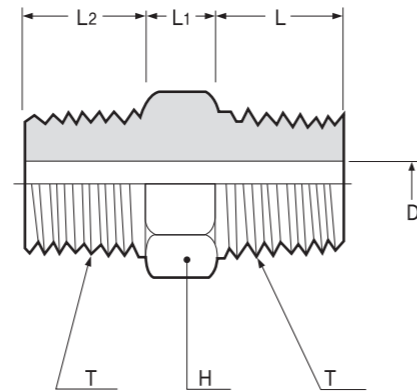
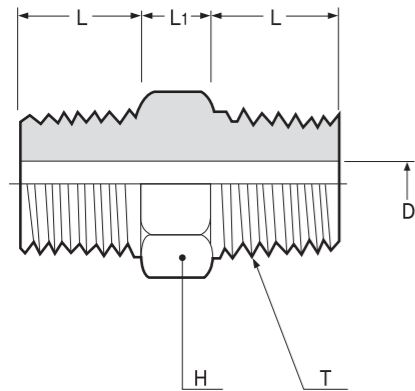
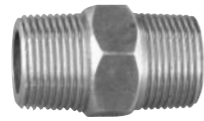
ASME B16.11

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	Hex Height Min Plug H
¼	10.0	6	7.15	35	10	11.11	-	6
¼	11.0	6	9.55	41	14	15.88	3	6
⅜	13.0	8	11.11	41	18	17.46	4	8
½	14.0	10	14.29	44	21	22.23	5	8
¾	16.0	11	15.88	44	27	26.99	6	10
1	19.0	13	20.64	51	33	34.93	6	10
1¼	21.0	14	23.81	51	43	44.45	7	14
1½	21.0	16	28.58	51	48	50.8	8	16
2	22.0	18	33.5	64	60	63.5	9	18
2½	27.0	19	38.1	70	73	76.2	10	19
3	28.0	21	42.86	70	89	88.9	10	21
4	32.0	25	63.5	76	114	117.48	13	25

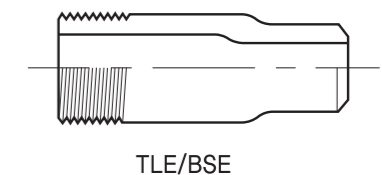
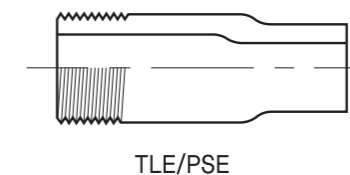
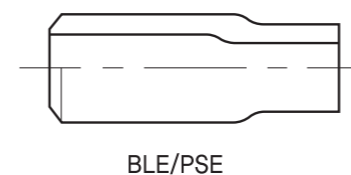
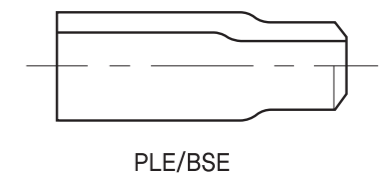
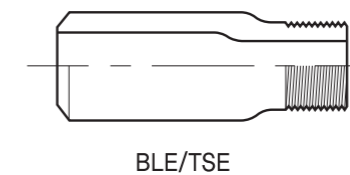
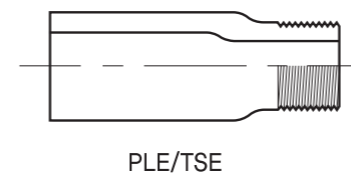
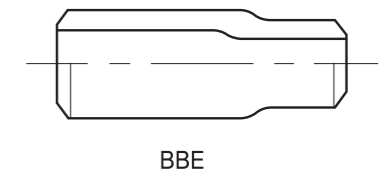
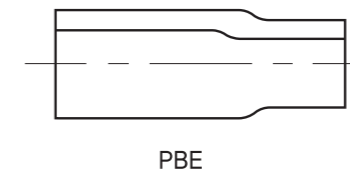
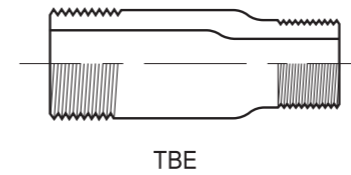
NOTE : 1. Cautionary note regarding hex head bushings: hex head bushings of one-size reduction should not be used in services where they might be subject to harmful loads and forces other than internal pressures

Nipple 3000# 6000#



Reducing Nipple

Swaged Nipple



IHARA STD

Nom Pipe Size	D	H*	L	L1
1/8	5.5	11.0	10	6
1/4	7	16.0	14	8
3/8	9	18.0	14	8
1/2	12	22.0	19	9
3/4	15	27.0	19	10
1	20	35.0	24	11
1 1/4	28	44.0	24	12
1 1/2	32	51.0	25	14
2	40	63.5	26	16
2 1/2	60	76.2	38	18
3	74	95.0	40	20

Unit : mm

Nom Pipe Size T×T1	D	H*	L	L1	L2
3/8×1/4	7	18	14	8	14
1/2×1/4	7	22	19	9	14
1/2×3/8	9	22	19	9	14
3/4×1/4	7	27	19	10	14
3/4×3/8	9	27	19	10	14
3/4×1/2	12	27	19	10	19
1×3/8	9	35	24	11	14
1×1/2	12	35	24	11	19
1×3/4	15	35	24	11	19
1 1/4×1/2	12	44	24	12	19
1 1/4×3/4	15	44	24	12	19
1 1/4×1	20	44	24	12	24
1 1/2×3/4	15	51	25	14	19
1 1/2×1	20	51	25	14	24
1 1/2×1 1/4	28	51	25	14	24
2×1	20	63.5	26	16	24
2×1 1/4	28	63.5	26	16	24
2×1 1/2	32	63.5	26	16	25
2 1/2×1 1/4	28	76.2	38	18	24
2 1/2×1 1/2	32	76.2	38	18	25
2 1/2×2	40	76.2	38	18	26
3×1 1/2	32	95	40	20	25
3×2	40	95	40	20	26
3×2 1/2	60	95	40	20	38

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

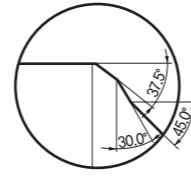
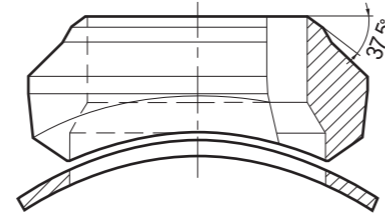
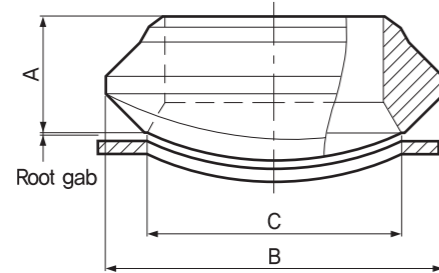
MSS SP-95

Large end Size	Small end Size	Length(mm)
1/2	3/8~1/8	70
3/4	1/2~1/8	76
1	3/4~1/8	89
1 1/4	1~1/8	102
1 1/2	1 1/4~1/8	114
2	1 1/2~1/8	165
2 1/2	2~1/8	178
3	2 1/2~1/8	203
3 1/2	3~1/8	203
4	3 1/2~1/8	229
5	4~1/4	279
6	5~1/2	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 ANSI B36.10
 *Swaged Nipples are from Forged Steel or Pipe

Weldolet STD(Sch40), X-S(Sch80), Sch160, XX-S



STD(Sch 40), X-S(Sch 80)

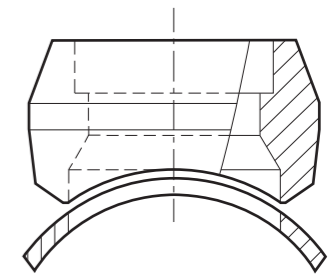
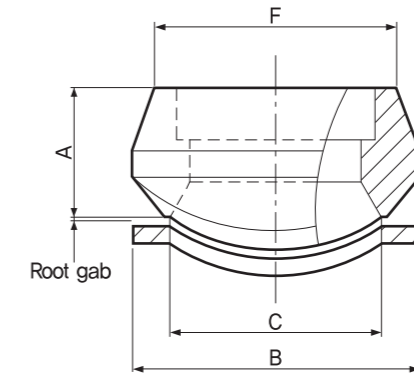
Outlet Size	A		B		C	
	STD	X-S	STD	X-S	STD	X-S
1/2	19.1	19.1	34.9	34.9	23.8	23.8
3/4	22.2	22.2	44.5	44.5	30.2	30.2
1	27.0	27.0	54.0	54.0	36.5	36.5
1 1/4	31.8	31.8	65.1	65.1	44.5	44.5
1 1/2	33.3	33.3	73.0	73.0	50.8	50.8
2	38.1	38.1	88.9	88.9	65.1	65.1
2 1/2	41.3	41.3	103.2	103.2	76.2	76.2
3	44.5	44.5	122.2	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	379.4	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	458.8	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

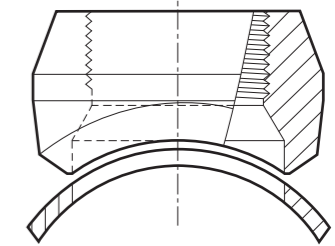
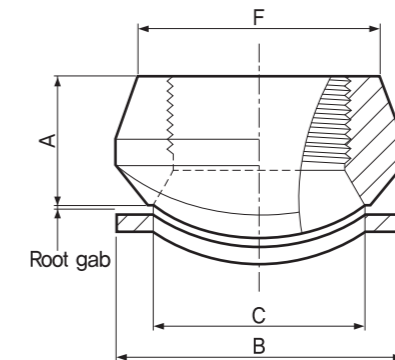
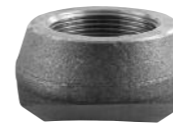
• Dimensions are in millimeters.
• Applicable Run Pipe Sizes are from Out-Let size to 36 inch.

Sockolet 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	69.8	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	-

Thredolet 3000# 6000#

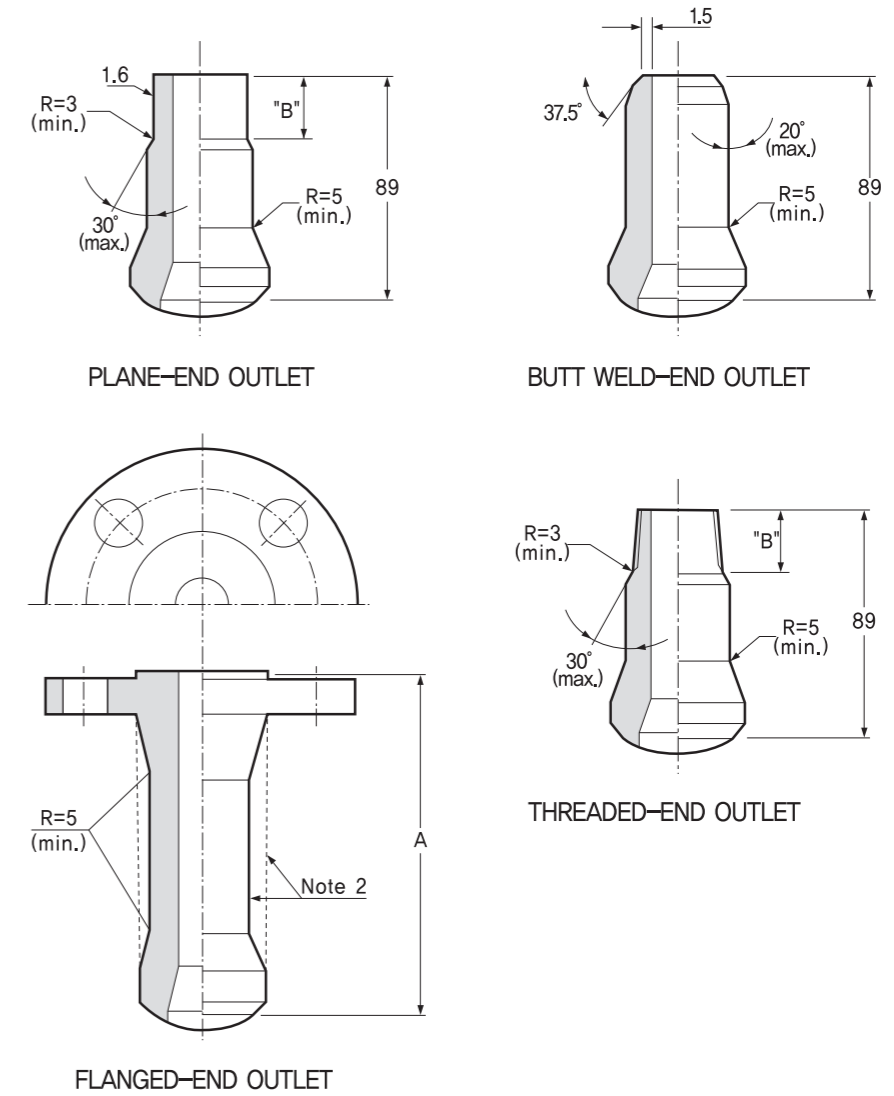
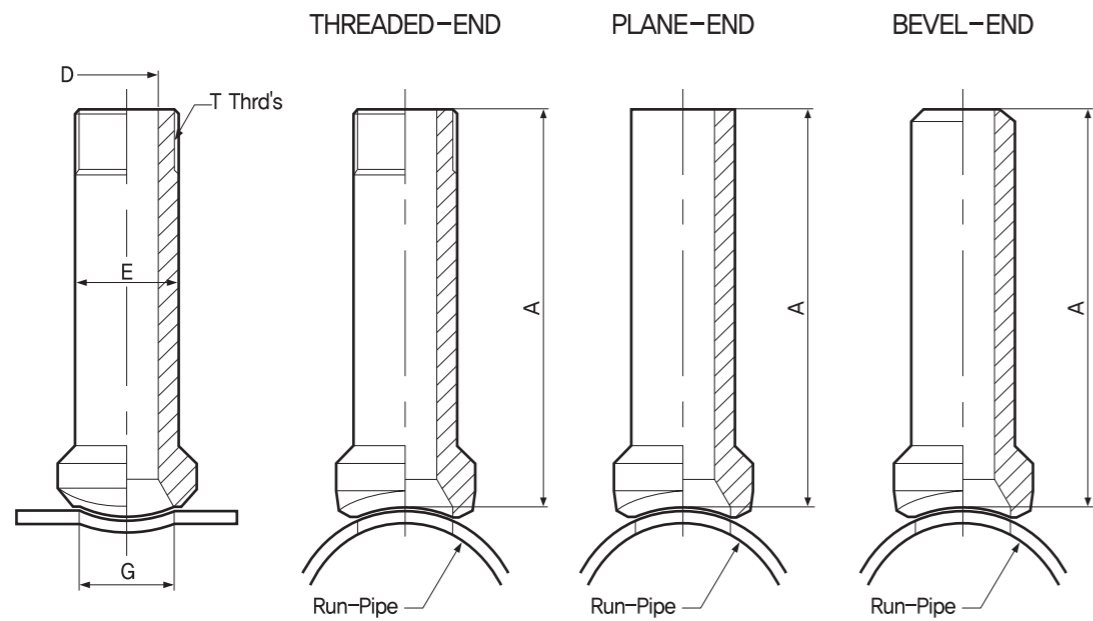


Outlet Size	A		B		C		F	
	3000#	6000#	3000#	6000#	3000#	6000#	3000#	6000#
1/2	25.4	31.8	34.9	44.5	23.8	19.1	31.8	39.7
3/4	27.0	36.5	44.5	50.8	30.2	25.4	36.5	46.6
1	33.3	39.7	54.0	61.9	36.5	33.3	46.0	57.2
1 1/4	33.3	41.3	65.1	69.9	44.5	38.1	55.6	65.1
1 1/2	34.9	42.9	73.0	82.6	50.8	49.2	61.9	76.2
2	38.1	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# Sockolets and Thredolets, Inside Bore, Thread, Socket Bore and Socket Depth Dimensions are According to ASME B16.11

FORGED OUTLET FITTINGS

Nippolet 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

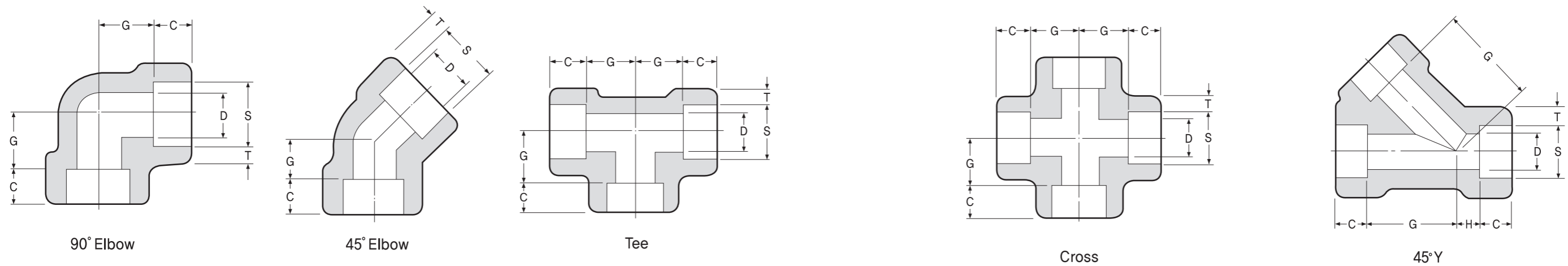
STD, X-S

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

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

FORGED FITTINGS / SOCKET WELDING FITTINGS

90° Elbow, 45° Elbow, Tee, Cross
Sch40, Sch80, Sch160



JIS B2316

Unit : mm

Nom Pipe Size		Socket Bore Dia		Bore Diameter of Fitting—D				Socket Wall Thickness Min—T		Depth of Socket Min—C
A	B	S	TOL	SCH40	SCH80	SCH160	TOL	SCH40,80	SCH160	
6	1/8	11.0	+0.3 -0	7.1	5.7	4.0	±0.4	3.2	3.5	9.6
8	1/4	14.3		9.4	7.8	6.5		3.3	4.0	9.6
10	3/8	17.8		12.7	10.9	9.0		3.5	4.4	9.6
15	1/2	22.2		16.1	14.3	12.3		4.1	5.2	9.6
20	3/4	27.7		21.4	19.4	16.2		4.3	6.1	12.7
25	1	34.5		27.2	25.0	21.2		5.0	7.0	12.7
32	1 1/4	43.2		35.5	32.9	29.9		5.4	7.0	12.7
40	1 1/2	49.1		41.2	38.4	34.4		5.6	7.8	12.7
50	2	61.1	52.7	49.5	43.1	6.1	9.6	15.9		
65	2 1/2	77.1	+0.4 -0	65.9	62.3	57.3	±0.8	7.7	10.4	15.9
80	3	90.0		78.1	73.9	66.9		8.4	12.2	15.9
100	4	115.5		102.3	97.1	87.3		9.4	18.0	19.0

TOL: Tolerances

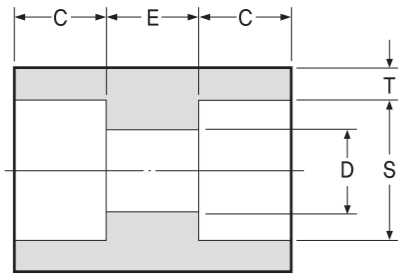
JIS B2316

Unit : mm

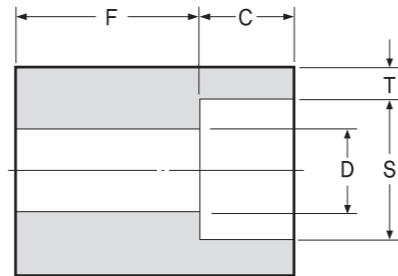
Nom Pipe Size		Center to Bottom of Socket—C								TOL
		90° E, Tee, Cross—G		45° Elbow—G		45° Y—G		45° Y—H		
A	B	SCH40,80	SCH160	SCH40,80	SCH160	CH40,80	CH160	SCH40,80	SCH160	
6	1/8	11.1	—	7.9	—	—	—	—	—	±0.8
8	1/4	11.1	—	7.9	—	31.8	—	7.9	—	
10	3/8	13.5	—	7.9	—	36.5	—	7.9	—	±1.5
15	1/2	15.9	19.1	11.1	12.7	41.3	50.8	11.1	12.7	
20	3/4	19.1	22.2	12.7	14.3	50.8	60.3	12.7	14.3	
25	1	22.2	27.0	14.3	17.5	60.3	71.4	14.3	17.5	±2.0
32	1 1/4	27.0	31.8	17.5	20.6	71.4	81.0	17.5	20.6	
40	1 1/2	31.8	38.1	20.6	25.4	81.0	98.4	20.6	25.4	
50	2	38.1	41.3	25.4	28.6	98.4	120.0	25.4	28.6	±2.5
65	2 1/2	41.3	57.2	28.6	31.8	—	—	—	—	
80	3	57.2	63.5	31.8	34.9	—	—	—	—	
100	4	66.5	—	41.5	—	—	—	—	—	

TOL: Tolerances

**Full coupling , Half coupling
Sch40, Sch80, Sch160**

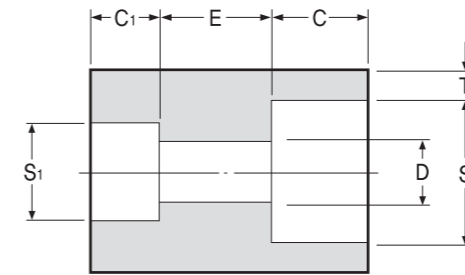


Full Coupling

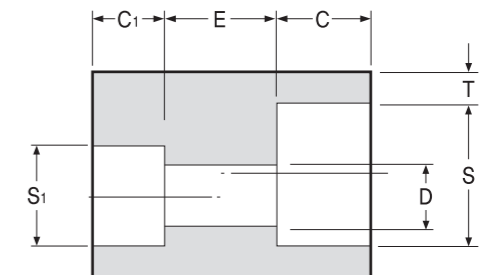


Half Coupling

**Concentric Reducer
Eccentric Reducer
Sch40, Sch80, Sch160**



Concentric Reducer



Eccentric Reducer

JIS B2316

Unit : mm

Nom Pipe Size		Socket Bore Dia		Bore Diameter of Fitting-D				Socket Wall Thickness Min-T		Depth Min C	Laying Lengths				
A	B	S	TOL	SCH40	SCH80	SCH160	TOL	SCH40,80	SCH160		F/C		H/C		
											E	TOL	F	TOL	
6	1/8	11.0	+0.3 -0	7.1	5.7	4.0	±0.4	3.2	3.5	9.6	6.4	±1.5	15.9	±0.8	
8	1/4	14.3		9.4	7.8	6.5		3.3	4.0	9.6	6.4		15.9		
10	3/8	17.8		12.7	10.9	9.0		3.5	4.4	9.6	6.4	17.5			
15	1/2	22.2		16.1	14.3	12.3		4.1	5.2	9.6	9.5	±3.0	22.2		±1.5
20	3/4	27.7		21.4	19.4	16.2		4.3	6.1	12.7	9.5	23.8			
25	1	34.5		27.2	25.0	21.2		5.0	7.0	12.7	12.7	±4.0	28.6		±2.0
32	1 1/4	43.2		35.5	32.9	29.9		5.4	7.0	12.7	12.7		30.2		
40	1 1/2	49.1	41.2	38.4	34.4	5.6	7.8	12.7	12.7	31.8					
50	2	61.1	52.7	49.5	43.1	6.1	9.6	15.9	19.1	41.3	±5.0	42.9	±2.5		
65	2 1/2	77.1	65.9	62.3	57.3	7.7	10.4	15.9	19.1	44.5					
80	3	90.0	78.1	73.9	66.9	8.4	12.2	15.9	19.1	47.7					
100	4	115.5	102.3	97.1	87.3	9.4	18.0								

TOL: Tolerances
F/C: Full Coupling
H/C: Half Coupling

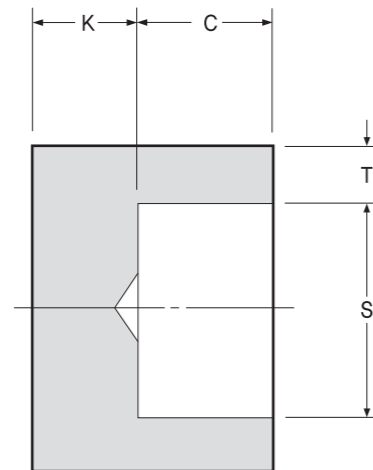
JIS B2316

Unit : mm

Nom Pipe Size(A)	Socket Bore Dia		Bore Diameter of Fitting-D			Socket Wall Thickness Min-T		Depth Min		Laying Lengths E
	S	S1	SCH40	SCH40,80	SCH160	SCH80	SCH160	C	C1	
8x6	14.3	11.0	7.1	5.7	4.0	3.3	4.0	9.6	9.6	6.4
10x8	17.8	14.3	9.4	7.8	6.5	3.5	4.4	9.6	9.6	6.4
15x8	22.2	14.3	9.4	7.8	6.5	4.1	5.2	9.6	9.6	9.5
x10	-	17.8	12.7	10.9	9.0	4.1	5.2	9.6	9.6	9.5
20x8	27.7	14.3	9.4	7.8	6.5	4.3	6.1	12.7	9.6	9.5
x10	-	17.8	12.7	10.9	9.0	4.3	6.1	12.7	9.6	9.5
x15	-	22.2	16.1	14.3	12.3	4.3	6.1	12.7	9.6	9.5
25x10	34.5	17.8	12.7	10.9	9.0	5.0	7.0	12.7	9.6	12.7
x15	-	22.2	16.1	14.3	12.3	5.0	7.0	12.7	9.6	12.7
x20	-	27.7	21.4	19.4	16.2	5.0	7.0	12.7	12.7	12.7
32x15	43.2	22.2	16.1	14.3	12.3	5.4	7.0	12.7	12.7	12.7
x20	-	27.7	21.4	19.4	16.2	5.4	7.0	12.7	12.7	12.7
x25	-	34.5	27.2	25.0	21.2	5.4	7.0	12.7	12.7	12.7
40x20	49.1	27.7	21.4	19.4	16.2	5.6	7.8	12.7	12.7	12.7
x25	-	34.5	27.2	25.0	21.2	5.6	7.8	12.7	12.7	12.7
x32	-	43.2	35.5	32.9	29.9	5.6	7.8	12.7	12.7	12.7
50x25	61.1	34.5	27.2	25.0	21.2	6.1	9.6	15.9	12.7	19.1
x32	-	43.2	35.5	32.9	29.9	6.1	9.6	15.9	12.7	19.1
x40	-	49.1	41.2	38.4	34.4	6.1	9.6	15.9	12.7	19.1
65x32	77.1	43.2	35.5	32.9	29.9	7.7	10.4	15.9	12.7	19.1
x40	-	49.1	41.2	38.4	34.4	7.7	10.4	15.9	12.7	19.1
x50	-	61.1	52.7	49.5	43.1	7.7	10.4	15.9	15.9	19.1
80x40	90.0	49.1	41.2	38.4	34.4	8.4	12.2	15.9	12.7	19.1
x50	-	61.1	52.7	49.5	43.1	8.4	12.2	15.9	15.9	19.1
x65	-	77.1	65.9	62.3	57.3	8.4	12.2	15.9	15.9	19.1
100x50	115.5	61.1	52.7	49.5	43.1	9.4	18.0	19.0	15.9	19.1
x65	-	77.1	65.9	62.3	57.3	9.4	18.0	19.0	15.9	19.1
x80	-	90.0	78.1	73.9	66.9	9.4	18.0	19.0	15.9	19.1

FORGED FITTINGS / SOCKET WELDING FITTINGS

Cap
Sch40, Sch80, Sch160



JIS B2316

Unit : mm

Nom Pipe Size		Socket Bore Dia		Socket Wall Thickness Min-T		Depth Min C	End Thickness Min-K	
A	B	S	TOL	SCH40,80	SCH160		SCH40,80	SCH160
6	1/8	11.0	+0.3 -0	3.2	3.5	9.6	5	-
8	1/4	14.3		3.3	4.0	9.6	5	-
10	3/8	17.8		3.5	4.4	9.6	5	-
15	1/2	22.2		4.1	5.2	9.6	6.5	8.0
20	3/4	27.7		4.3	6.1	12.7	6.5	8.0
25	1	34.5		5.0	7.0	12.7	9.5	11.0
32	1 1/4	43.2		5.4	7.0	12.7	9.5	14.0
40	1 1/2	49.1		5.6	7.8	12.7	11.0	16.0
50	2	61.1	+0.4 -0	6.1	9.6	15.9	12.5	19.0
65	2 1/2	77.1		7.7	10.4	15.9	16.0	19.2
80	3	90.0		8.4	12.2	15.9	19.0	22.5

TOL: Tolerances

Uastoppable challenging spirit make
BK METAL's future!

SOCKET WELDING FITTINGS / APPROX WEIGHT TABLE

THREADED FITTINGS / APPROX WEIGHT TABLE

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	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		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	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	-	-

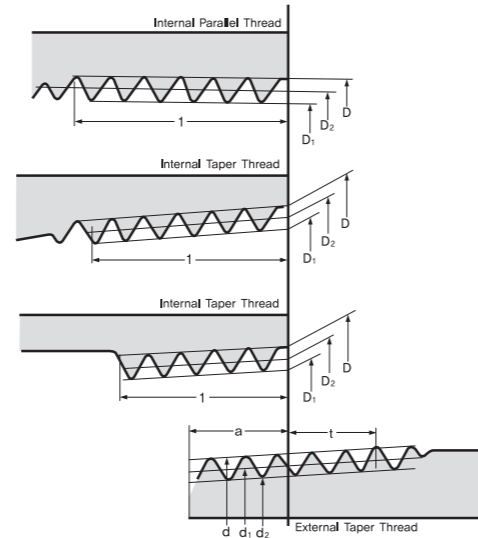
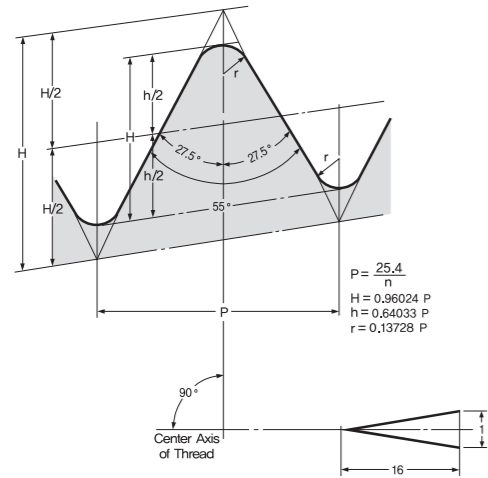
Unit : kg

NPS	Weldolet				Socoklet		Thredolet	
	S.T.D	XS	SCH160	XXS	3000	6000	3000	6000
½	0.08	0.09	0.11	0.11	0.14	0.23	0.11	0.20
¾	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	-	-	-	-

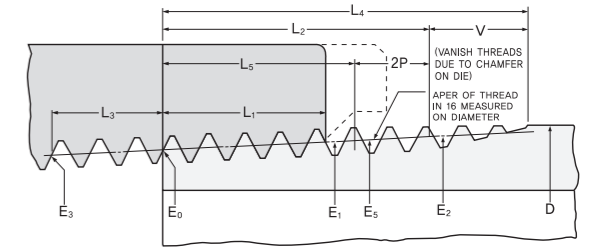
Unit : kg

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

KS B022 & JIS B0203 Pipe Threads

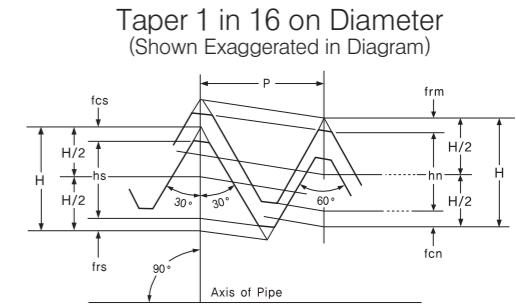


ANSI B2.1 Taper Pipe Threads (Except Dryseal)



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	11½ 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=frm=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



BASIC THREAD DATA

Nominal Size	Number of Threads Per Inch	Screw Thread			Basic Diameter			Position of Basic Diameter			Effective Thread Length (Min.)				Nominal Pipe Size (For Reference)		
		Pitch	Height of Thread	Rounding	External Thread			External Thread	Internal Thread	External Thread	Internal Thread	External Thread	Internal Thread				
					Major Diameter D	Pitch Diameter D ₂	Minor Diameter D ₁						When There is an Incomplete Thread or More	When there is no Incomplete Thread			
					n	p	h	r	D	D ₂	D ₁	a	±b	±c			±
Tolerances on Basic Diameters of Internal Parallel Thread												Fitting Allowance		Outside Diameter		Wall thickness	

PT 15(½)	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(¾)	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(1¼)	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(1½)	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(2½)	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(3½)	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
PT 100(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
PT 125(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
PT 150(6)	11	2.3091	1.479	0.32	163.830	162.351	160.872	28.58	3.46	3.46	0.217	11.50	40.1	43.6	29.3	165.2	5.0

•Dimensions are in millimeters.

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 E ₁	Length L ₂		Dia E ₂
					In.	Thds.		In.	Thds.	
1	2	3	4	5	6	7	8	9	10	11
¼	0.405	27.0	0.03704	0.36351	0.1615	4.36	0.37360	0.2639	7.12	0.38000
½	0.540	18.0	0.05556	0.47739	0.2278	4.10	0.49163	0.4018	7.23	0.50250
¾	0.675	18.0	0.05556	0.61201	0.2400	4.32	0.62701	0.4078	7.34	0.63750
1	0.840	14.0	0.07143	0.75843	0.3200	4.48	0.77843	0.5337	7.47	0.79179
1¼	1.050	14.0	0.07143	0.96768	0.3390	4.75	0.98887	0.5457	7.64	1.00179
2	1.315	11.5	0.08696	1.21363	0.4000	4.60	1.23863	0.6828	7.85	1.25630
2½	1.660	11.5	0.08696	1.55713	0.4200	4.83	1.58338	0.7068	8.13	1.60130
3	1.900	11.5	0.08696	1.79609	0.4200	4.83	1.82234	0.7235	8.32	1.84130
3½	2.375	11.5	0.08696	2.26902	0.4360	5.01	2.29627	0.7565	8.70	2.31630
4	2.875	8.0	0.12500	2.71953	0.6820	5.46	2.76216	1.1375	9.10	2.79062
5	3.500	8.0	0.12500	3.34062	0.7660	6.13	3.38850	1.2000	9.60	3.41562
6	4.000	8.0	0.12500	3.83750	0.8210	6.57	3.88881	1.2500	10.00	3.91562
8	4.500	8.0	0.12500	4.33438	0.8440	6.75	4.38712	1.3000	10.40	4.41562

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 ¹		Height of Thread h	Increase in Dia per Thread, 0.0625/n	Basic Minor Dia at Small End of Pipe, K ₀
	In.	Thds.	In.	Thds.	Dia ⁷ E ₃	In.	Thds.	Length L ₅		Dia, E ₅				
1	12	13	14	15	16	17	18	19	20	21	22	23	24	
¼	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	
½	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	
¾	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	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	
1¼	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	
2	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	
2½	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	
3	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	
3½	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	
4	0.4555	3.64	0.2500 ⁷	2	2.70391	0.4337	3.47	1.5712	0.8875	2.77500	0.100000	0.00781	2.6195	
5	0.4340	3.47	0.2500 ⁷	2	3.32500	0.4337	3.47	1.6337	0.9500	3.40000	0.100000	0.00781	3.2406	
6	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	
8	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	

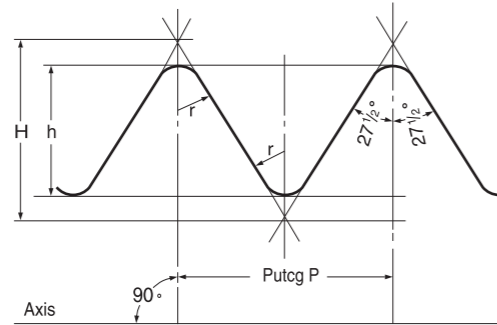
•Dimensions are in inches.

BS21-1973 Britis Standard Taper Threads(Except Dryseal)

$$H = 0.960237 \times P$$

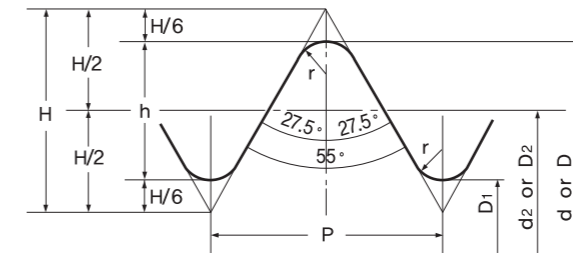
$$h = 0.460327 \times P$$

$$r = 0.137278 \times P$$



Taper 1 in 16 on dia.
(Shown exaggerated in diagram)

Parallel Pipe Therads



$$P = \frac{25.4}{n}$$

$$H = 0.960491 P$$

$$h = 0.640327 P$$

$$r = 0.137329 P$$

$$d_2 = d - h \quad D_2 = d_2$$

$$d_1 = d - 2h \quad D_1 = d_1$$

KS B 0221, JIS B 0202

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	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	2.309	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	2.309	0.0582	1.479	1.650	41.910	1.5918	40.431	1.5335	39.952	0.5000	12.7	0.0909	2.3	0.5909	15.0	0.4091	10.4
1 1/2	11	0.09091	2.309	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	2.309	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	2.309	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	2.309	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	2.309	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	2.309	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	2.309	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.	Minus			
		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

Nominal Size	Number of Threads Per Inch	Thread			Basic Diameter		
		Pitch	Height of Thread	Rounding	External Thread		
					Major Diameter d	Pitch Diameter d ₂	Major Diameter d ₁
		Internal Thread			Major Diameter	Pitch Diameter	Major Diameter
n	p	h	r	D	D ₂	D ₁	
PF 1/8	28	0.9071	0.581	0.12	9.728	9.147	8.566
PF 1/4	19	1.3368	0.581	0.18	13.157	12.301	11.445
PF 3/8	19	1.3368	0.856	0.18	16.662	15.806	14.950
PF 1/2	14	1.8143	1.162	0.25	20.955	19.793	18.631
(PF 5/8)	14	1.8143	1.162	0.25	22.911	21.749	20.587
PF 3/4	14	1.8143	1.162	0.25	26.441	25.279	24.117
(PF 7/8)	14	1.8143	1.162	0.25	30.201	29.039	27.877
PF 1	11	2.3091	1.479	0.32	33.249	31.770	30.291
(PF 1 1/8)	11	2.3091	1.479	0.32	37.897	36.418	34.939
PF 1 1/4	11	2.3091	1.479	0.32	41.910	40.431	38.952
PF 1 1/2	11	2.3091	1.479	0.32	47.803	46.324	44.845
(PF 1 3/4)	11	2.3091	1.479	0.32	53.746	52.267	50.788
PF 2	11	2.3091	1.479	0.32	59.614	58.135	56.656
(PF 2 1/4)	11	2.3091	1.479	0.32	65.710	64.231	62.752
PF 2 1/2	11	2.3091	1.479	0.32	75.184	73.705	72.226
(PF 2 3/4)	11	2.3091	1.479	0.32	81.534	80.055	78.576
PF 3	11	2.3091	1.479	0.32	87.884	86.405	84.926
PF 3 1/2	11	2.3091	1.479	0.32	100.330	98.851	97.372
PF 4	11	2.3091	1.479	0.32	113.030	111.551	110.072
(PF 4 1/2)	11	2.3091	1.479	0.32	125.730	124.251	122.772
PF 5	11	2.3091	1.479	0.32	138.430	136.951	135.472
(PF 5 1/2)	11	2.3091	1.479	0.32	151.130	149.651	148.172
PF 6	11	2.3091	1.479	0.32	163.830	162.351	160.872
PF 7	11	2.3091	1.479	0.32	189.230	187.751	186.272
PF 8	11	2.3091	1.479	0.32	214.630	213.151	211.672
PF 9	11	2.3091	1.479	0.32	240.030	238.551	237.072
PF 10	11	2.3091	1.479	0.32	265.430	263.951	262.472
PF 12	11	2.3091	1.479	0.32	316.230	314.751	313.272

COMPARISON ASTM SPECIFICATIONS AND SIMILAR SPECIFICATIONS

Steel Composition	ASTM Specification and Grade				KS Specification and Grade			JIS Specification and Grade			BS Specification and Grade	DIN Specification and Grade	Steel Composition
	Marking Symbol	Pipe	Plate	Forging	Marking Symbol	Pipe	Plate	Marking Symbol	Pipe	Plate	Pipe	Pipe	
Carbon Steel	-	A120	A283-A	-	SPP	SPP	SB41	FSGP or SGP	SGP(STPY400)	SS400	1387-M	2440-ST33-1	Carbon Steel
	-	A53-B	A284	-	PS38(W), PS38, PT38(W), PT38	SPPS38	SWS41B	PG370(W), PS370(W), PT370(W), PT370	STPG370	SM41B	3602-ERW 23	1626-ST37	Carbon Steel
	-	A53-B	A284	-	PS42(W), PS42, PT42(W), PT42	SPPS42	SWS41B	PG410(W), PS410(W), PT410(W), PT410	STPG410	SM41B	3602-ERW 27	-	Carbon Steel
					HT38, HT38(W)	SPHT38	SBB42	PS370, PT370(W)	STPT370	SB42	3602-Steel 23	17175-ST35.8	Carbon Steel
	WPB	A106-B	A515-60 or 70 A516-60 or 70	A105	HT42, HT42(W)	SPHT42	SBB42	PS410, PT410(W)	STPT410	SB42	3602-Steel 27	17175-ST45.8	Carbon Steel
	WPC	A106-C	A515-70 A516-70	A105	HT49, HT49(W)	SPHT49	SBB49	PS480, PT480(W)	STPT480	SB49	3602-Steel 35	-	Carbon Steel
Low Temperature Steel	WPL6	A333 and A334-6	A516-60	A350-LF2	PL39	STPL39	SLAL39	PL380(W)	STPL380	-	3603-Steel 27 LT 30	-	Carbon Steel
	WPL3	A333 and A334-3	A203-D	A350-LF3	-	-	-	PL450(W)	STPL450	-	3603-Steel 503 LT 100	-	3½% Ni Steel
	WPL9	A333 and A334-9	A203-A	A350-LF9	-	-	-	PL690(W)	STPL690	-	-	-	2% Ni-1% Cu Steel
Alloy Steel	WP1	A335-P1	A204-B	A182-F1	PA12, FA12	SPA12	SBB46M	PA12(W), FA12	STPA12	-	-	17175-15 Mo3	Carbon-Molybdenum Steel
	WP12	A335-P12	A387-12	A182-F12	PA22, FA22	SPA22	SCMV2	PA22(W), FA22	STPA22	-	3603-HF620	17175-13 Cr Mo44	1% Cr-½% Molybdenum Steel
	WP11	A335-P11	A387-11	A182-F11	PA23, FA23	SPA23	SCMV3	PA23(W), FA23	STPA23	-	3603-HF621	-	1¼% Cr-½% Molybdenum Steel
	WP22	A335-P22	A387-22	A182-F22	PA24, FA24	SPA24	SCMV4	PA24(W), FA24	STPA24	SCMV4	3603-HF622,27	17175-10 Cr Mo910	2¼% Cr-1% Molybdenum Steel
	WP5	A335-P5	A387-5	A182-F5	PA25, FA25	SPA25	SCMV5	PA25(W), FA25	STPA25	-	3603-HF625	-	5% Cr-½% Molybdenum Steel
	WP7	A335-P7	A387-7	A182-F7	-	-	-	-	-	-	-	-	7% Cr-½% Molybdenum Steel
	WP9	A335-P9	A387-9	A182-F9	-	-	-	PA26(W), FA26	STPA26	-	-	-	9% Cr-1% Molybdenum Steel
	WP91	A335-P91	A387-91	A182-F91	-	-	-	-	-	-	-	-	9% Cr-1% Mo-0.2%V+Cb+N
Stainless Steel	WP304	A312-TP304	A240-Type 304	A182-F304	STS304, STS304W, STS304F	STS304TP	STS304	SUS304, SUS304W, SUS304F	SUS304TP	SUS304	3605-801	17440-X5 Cr Ni189	18% Cr-8% Ni Steel
	WP304H	A312-TP304H	A240-Type 304H	A182-F304H	-	-	-	SUS304H, SUS304HF	SUS304HTP	-	3605-811	-	18% Cr-8% Ni-(0.04-0.10)% C Steel
	WP304L	A312-TP304L	A240-Type 304L	A182-F304L	STS304L, STS304LW, STS304LF	STS304LTP	STS304L	SUS304L, SUS304LW	SUS304LTP	SUS304L	3605-811L	17440-X2 Cr Ni189	18% Ni-0.035% C Steel
	WP309	A312-TP309	A240-Type 309S	-	STS309S, STS309SW, STS309SF	STS309STP	STS309S	SUS309S, SUS309SW, SUS309SF	SUS309STP	SUS309S	-	-	22% Cr-12% Ni Steel
	WP310	A312-TP310	A240-Type 310S	A182-F310	STS310S, STS310SW, STS310SF	STS310STP	STS310S	SUS310S, SUS310SW, SUS310SF	SUS310STP	SUS310S	3605-805S	-	25% Cr-20% Ni Steel
	WP316	A312-TP316	A240-Type 316	A182-F316	STS316, STS316W, STS316F	STS316TP	STS316	SUS316, SUS316W, SUS316F	SUS316TP	SUS316	3605-845	17440-X5 Cr Ni Mo1810	18% Cr-8% Ni-Mo Steel
	WP316H	A312-TP316H	A240-Type 316H	A182-F316H	STS316H, STS316HF	STS316HTP	-	SUS316H, SUS316HF	SUS316HTP	-	3605-855	-	18% Cr-8% Ni-Mo(0.04-0.10)% C Steel
	WP316L	A312-TP316L	A240-Type 316L	A182-F316L	STS316L, STS316LW, STS316LF	STS316LTP	STS316L	SUS316L, SUS316L	SUS316LTP	SUS316L	3605-845L	17440-X2 Cr Ni Mo1810	18% Cr-8% Ni-Mo-0.035% C Steel
	WP317L	A312-TP317L	A240-Type 317L	A182-F317L	STS317L, STS317LW	STS317LTP	STS317L	SUS317L	SUS317LTP	SUS317L	-	-	18% Cr-8% Ni-3.5% Mo-Low C
	WP321	A312-TP321	A240-Type 321	A182-F321	STS321, STS321W, STS321F	STS321TP	STS321	SUS321, SUS321W, SUS321F	SUS321TP	SUS321	3605-822Ti	17440-X10 Cr Ni Ti189	18% Cr-8% Ni-Ti Steel
	WP321H	A312-TP321H	A240-Type 321H	A182-F321H	-	-	-	SUS321H, SUS321HF	SUS321HTP	-	3605-832Ti	-	18% Cr-8% Ni-Ti-(0.04-0.10)% C Steel
	WP347	A312-TP347	A240-Type 347	A182-F347	STS347, STS347W, STS347F	STS347TP	STS347	SUS347, SUS347W, SUS347F	SUS347TP	SUS347	3605-822Nb	17440-X1 Cr Ni Nb189	18% Cr-8% Ni-Cb+Ta Steel
WP347H	A312-TP347H	A240-Type 347H	A182-F347H	STS347H, STS347HF	STS347HTP	-	SUS347H, SUS347HF	SUS347HTP	-	3605-832Nb	-	18% Cr-8% Ni-Cb+Ta(0.04-0.10)% C Steel	

ASTM

ASTM	Identification symbol	C	Mn	P	S	Si	Ni	Cr	Mo	Ti	Other Elements	T.S. Min ksi(Mpa)	Y.S. Min ksi(Mpa)	EL. Min%	R.A. Min%	HB
A105*		MAX 0.35	0.60~1.05	MAX 0.035	MAX 0.040	0.10~0.35	MAX 0.40	MAX 0.30	MAX 0.12			70(485)	36(250)	30	30	MAX 187
A182	F1	0.28	0.60~0.90	0.045	0.045	0.15~0.35			0.44~0.65			70(485)	40(275)	20	30	143~192
A182	F5	0.15	0.30~0.60	0.030	0.030	0.50	0.50	4.0~6.0	0.44~0.65			70(485)	40(275)	20	35	143~217
A182	F5a	0.25	0.60	0.040	0.030	0.50	0.50	4.0~6.0	0.44~0.65			90(620)	65(450)	22	50	187~248
A182	F9	0.15	0.30~0.60	0.030	0.030	0.50~1.00		8.0~10.0	0.90~1.10			85(585)	55(380)	20	40	179~217
A182**	F91	0.08~0.12	0.30~0.60	0.020	0.010	0.20~0.50	0.40	8.0~9.5	0.85~1.05			85(585)	60(415)	20	40	MAX 248
A182	F92	0.07~0.13	0.30~0.60	0.020	0.010	0.50	MAX 0.40	8.5~9.5	0.3~0.6	0.010		90(620)	64(440)	20	45	MAX 269
A182	F11 CL1	0.05~0.15	0.30~0.60	0.030	0.030	0.50~1.00		1.00~1.50	0.44~0.65			60(415)	30(205)	20	45	121~174
A182	F11 CL2	0.10~0.20	0.30~0.80	0.040	0.040	0.50~1.00		1.00~1.50	0.44~0.65			70(485)	40(275)	20	30	143~207
A182	F11 CL3	0.10~0.20	0.30~0.80	0.040	0.040	0.50~1.00		1.00~1.50	0.44~0.65			75(515)	45(310)	20	30	156~207
A182	F12 CL1	0.05~0.15	0.30~0.60	0.045	0.045	MAX 0.50		0.80~1.25	0.44~0.65			60(415)	32(220)	20	45	121~174
A182	F12 CL2	0.10~0.20	0.30~0.80	0.040	0.040	0.10~0.60		0.80~1.25	0.44~0.65			70(485)	40(275)	20	30	143~207
A182	F22 CL1	0.05~0.15	0.30~0.60	0.040	0.040	0.50		2.00~2.50	0.87~1.13			60(415)	30(205)	20	35	MAX 170
A182	F22 CL3	0.05~0.15	0.30~0.60	0.040	0.040	0.50		2.00~2.50	0.87~1.13			75(515)	45(310)	20	30	156~207
A182	F304	0.08	2.00	0.045	0.030	1.00	8.0~11.0	18.0~20.0				75(515)	30(205)	30	50	
A182	F304L	0.030	2.00	0.045	0.030	1.00	8.0~13.0	18.0~20.0				70(485)	25(170)	30	50	
A182	F316	0.08	2.00	0.045	0.030	1.00	10.0~14.0	16.0~18.0	2.00~3.00			75(515)	30(205)	30	50	
A182	F316L	0.030	2.00	0.045	0.030	1.00	10.0~15.0	16.0~18.0	2.00~3.00			70(485)	25(170)	30	50	
A182	F317	0.08	2.00	0.045	0.030	1.00	11.0~15.0	18.0~20.0	3.0~4.0			75(515)	30(205)	30	50	
A182	F317L	0.030	2.00	0.045	0.030	1.00	11.0~15.0	18.0~20.0				70(485)	25(170)	30	50	
A182	F321	0.08	2.00	0.045	0.030	1.00	9.0~12.0	17.0~19.0		Cx5~0.7		75(515)	30(205)	30	50	
A182	F321H	0.04~0.10	2.00	0.045	0.030	1.00	9.0~12.0	17.0~19.0		Cx4~0.7		75(515)	30(205)	30	50	
A182	F347	0.08	2.00	0.045	0.030	1.00	9.0~12.0	17.0~20.0			Cb~10xC~1.1	75(515)	30(205)	30	50	
A182	F347H	0.04~0.10	2.00	0.045	0.030	1.00	9.0~13.0	17.0~20.0			Cb~8xC~1.1	75(515)	30(205)	30	50	
A182	F51	0.03	2.00	0.030	0.020	1.00	4.5~6.5	21.0~23.0	2.5~3.5		N 0.08~0.20	90(620)	65(450)	25	45	
A182	F53	0.03	1.2	0.035	0.020	0.8	6.0~8.0	24.0~26.0	3.0~5.0		N 0.24~0.32 Cu 0.5	116(800)	80(550)	15		MAX 310
A182	F55	0.03	1.0	0.030	0.010	1.0	6.0~8.0	24.0~26.0	3.0~4.0		N 0.2~0.3 Cu 0.5~1.0	109~130 (750~895)	80(550)	25	45	
A350*	LF1	0.30	0.60~1.35	0.035	0.040	0.15~0.30	MAX 0.40	MAX 0.30	MAX 0.12			60~85 (415~585)	30(205)	25	38	
A350*	LF2	0.30	0.60~1.35	0.035	0.040	0.15~0.30	MAX 0.40	MAX 0.30	MAX 0.12			70~95 (485~655)	36(250)	22	30	
A350*	LF3	0.20	MAX 0.90	0.035	0.040	0.20~0.35	3.3~3.7	MAX 0.30	MAX 0.12			70~95 (485~655)	37.5(260)	22	35	

1. All values are maximum unless otherwise stated
 2. A182F91 : Cb 0.06~0.10, N 0.03~0.07, V 0.18~0.25, Al 0.02max, Ti 0.01max, Zr 0.01max
 A182F92 : Cb 0.04~0.09, N 0.03~0.07, V 0.15~0.25, Al 0.02max, W 1.5~2.0, B 0.001~0.006, Zr 0.01max

JIS

JIS (Spec No)	Identification symbol	CHEMISTRY(%)—Max										MECHANICAL PROPERTIES				
		C	Mn	P	S	Si	Ni	Cr	Mo	The Others	T.S. Min N/mm ²	Y.S. Min N/mm ²	EL. Min %	R.A. Min %	HB	
G3202	SFVC 2A	0.35	0.40~1.10	0.03	0.03	0.35	—	—	—	—	—	490~640	245	18	33	—
G4051	S20C	0.18~0.23	0.30~0.60	0.03	0.035	0.15~0.35	—	—	—	—	—	400	245	28	—	116~174
G4051	S25C	0.22~0.28	0.30~0.60	0.03	0.035	0.15~0.35	—	—	—	—	—	440	265	27	—	123~183
G4051	S45C	0.42~0.48	0.60~0.90	0.03	0.035	0.15~0.35	—	—	—	—	—	570	345	20	—	167~229
G3101	SS400	—	—	0.05	0.05	—	—	—	—	—	—	400~510	245 235 215	Ø17 Ø21 Ø23	—	—
G3201	SF440A	0.60	0.30~1.20	0.03	0.035	0.15~0.50	—	—	—	—	—	440~540	225	24	45	Min 121
G3203	SFVA F1	0.30	0.60~0.90	0.03	0.03	0.35	—	—	0.45~0.65	—	—	480~660	275	18	35	—
G3203	SFVA F5B	0.15	0.30~0.60	0.03	0.03	0.50	—	4.0~6.0	0.45~0.65	—	—	480~660	275	18	35	—
G3203	SFVA F9	0.15	0.30~0.60	0.03	0.03	0.5~1.0	—	8.0~10.0	0.9~1.1	—	—	590~760	380	18	40	—
G3203	SFVA F11A	0.20	0.30~0.80	0.03	0.03	0.5~1.0	—	1.0~1.5	0.45~0.65	—	—	480~660	275	18	35	—
G3203	SFVA F22B	0.15	0.30~0.60	0.03	0.03	0.50	—	2.0~2.5	0.9~1.1	—	—	520~690	315	18	35	—
G3214	SUS F304	0.08	2.00	0.04	0.03	1.00	8.0~11.0	18.0~20.0	—	—	—	520	205	43	50	Max 187
G3214	SUS F304L	0.03	2.00	0.04	0.03	1.00	9.0~13.0	18.0~20.0	—	—	—	480	175	29	50	Max 187
G3214	SUS F316	0.08	2.00	0.04	0.03	1.00	10.0~14.0	16.0~18.0	2.0~3.0	—	—	520	205	43	50	Max 187
G3214	SUS F316L	0.03	2.00	0.04	0.03	1.00	12.0~15.0	16.0~18.0	2.0~3.0	—	—	480	175	29	50	Max 187
G3214	SUS F317	0.08	2.00	0.04	0.03	1.00	11.0~15.0	18.0~20.0	3.0~4.0	—	—	520	205	29	50	Max 187
G3214	SUS F317L	0.03	2.00	0.04	0.03	1.00	11.0~15.0	18.0~20.0	3.0~4.0	—	—	480	175	29	50	Max 187
G3214	SUS F321	0.08	2.00	0.04	0.03	1.00	9.0~12.0	Min 17	—	Ti 5×C ~0.6	—	520	205	43	50	Max 187
G3214	SUS F347	0.08	2.00	0.04	0.03	1.00	9.0~13.0	17.0~20.0	—	Nb 10×C ~1.0	—	520	205	43	50	Max 187
G4303	SUS 410	0.15	1.00	0.04	0.03	1.00	0.60	11.5~13.5	—	—	—	540	345	25	55	Min 159
G4303	SUS 440C	0.95~1.20	1.00	0.04	0.03	1.00	0.60	16.0~18.0	0.75	—	—	—	—	—	—	[HRC] Min 58

WALL THICKNESS OF PIPE

Nominal Pipe Size		Outside Diameter		Nominal Wall Thickness										Nominal Wall Thickness								Nominal Pipe Size Inch	
A	B	KS/JIS	ANSI	SPP SGP	Sch 5s	Sch 10s	Sch 10	Sch 20s	Sch 20	Sch 30	Sch 40s	STD	Sch 40	Sch 60	Sch 80s	X-S	Sch 80	Sch 100	Sch 120	Sch 140	Sch 160	XX-S	Unit : mm
6	1/8	10.50	10.29	-	-	1.24	-	1.5	-	-	1.73	1.73	1.73	2.20	2.41	2.41	2.41	-	-	-	3.15	4.83	1/8
8	1/4	13.80	13.72	-	-	1.65	-	2.0	-	-	2.24	2.24	2.24	2.40	3.02	3.02	3.02	-	-	-	3.68	6.05	1/4
10	3/8	17.30	17.14	-	-	1.65	-	2.0	-	-	2.31	2.31	2.31	2.80	3.20	3.20	3.20	-	-	-	4.01	6.40	3/8
15	1/2	21.70	21.34	2.8	1.65	2.11	-	2.5	-	-	2.77	2.77	2.77	3.20	3.73	3.73	3.73	-	-	-	4.78	7.47	1/2
20	3/4	27.20	26.67	2.8	1.65	2.11	-	2.5	-	-	2.87	2.87	2.87	3.40	3.91	3.91	3.91	-	-	-	5.56	7.82	3/4
25	1	34.00	33.40	3.2	1.65	2.77	-	3.0	-	-	3.38	3.38	3.38	3.90	4.55	4.55	4.55	-	-	-	6.35	9.09	1
32	1 1/4	42.70	42.16	3.5	1.65	2.77	-	3.0	-	-	3.56	3.56	3.56	4.50	4.85	4.85	4.85	-	-	-	6.35	9.70	1 1/4
40	1 1/2	48.60	48.26	3.5	1.65	2.77	-	3.0	-	-	3.68	3.68	3.68	4.50	5.08	5.08	5.08	-	-	-	7.14	10.16	1 1/2
50	2	60.50	60.32	3.8	1.65	2.77	-	3.5	3.20	-	3.91	3.91	3.91	4.90	5.54	5.54	5.54	-	-	-	8.74	11.07	2
65	2 1/2	76.30	73.02	4.2	2.11	3.05	-	3.5	4.50	-	5.16	5.16	5.16	6.00	7.01	7.01	7.01	-	-	-	9.52	14.02	2 1/2
80	3	89.10	88.90	4.2	2.11	3.05	-	4.0	4.50	-	5.49	5.49	5.49	6.60	7.62	7.62	7.62	-	-	-	11.12	15.24	3
90	3 1/2	101.60	101.60	4.2	2.11	3.05	-	4.0	4.50	-	5.74	5.74	5.74	7.00	8.08	8.08	8.08	-	-	-	-	-	3 1/2
100	4	114.30	114.30	4.5	2.11	3.05	-	4.0	4.90	-	6.02	6.02	6.02	7.10	8.56	8.56	8.56	-	11.12	-	13.49	17.12	4
125	5	139.80	141.30	4.5	2.77	3.40	-	5.0	5.10	-	6.55	6.55	6.55	8.10	9.53	9.53	9.53	-	12.70	-	15.88	19.05	5
150	6	165.20	168.30	5.0	2.77	3.40	-	5.0	5.50	-	7.11	7.11	7.11	9.30	10.97	10.97	10.97	-	14.27	-	18.26	21.94	6
200	8	216.30	219.08	5.8	2.77	3.76	-	6.5	6.35	7.04	8.18	8.18	8.18	10.31	12.70	12.70	12.70	15.09	18.26	20.62	23.01	22.22	8
250	10	267.40	273.05	6.6	3.40	4.19	-	6.5	6.35	7.80	9.27	9.27	9.27	12.70	12.70	12.70	15.09	18.26	21.44	25.40	28.58	25.40	10
300	12	318.50	323.80	6.9	3.96	4.57	-	6.5	6.35	8.38	9.52	9.52	10.31	14.27	12.70	12.70	17.48	21.44	25.40	28.58	33.32	25.40	12
350	14	355.60	355.60	7.9	3.96	4.78	6.35	8.0	7.92	9.52	*9.52	9.52	11.13	15.09	*12.70	12.70	19.05	23.83	27.79	31.75	35.71	-	14
400	16	406.40	406.40	7.9	4.19	4.78	6.35	8.0	7.92	9.52	*9.52	9.52	12.70	16.66	*12.70	12.70	21.44	26.19	30.96	36.52	40.49	-	16
450	18	457.20	457.20	7.9	4.19	4.78	6.35	8.0	7.92	11.12	*9.52	9.52	14.27	19.05	*12.70	12.70	23.82	29.36	34.92	39.67	45.24	-	18
500	20	508.00	508.00	7.9	4.78	5.54	6.35	9.5	9.52	12.70	*9.52	9.52	15.09	20.62	*12.70	12.70	26.19	32.54	38.10	44.45	50.01	-	20
550	22	558.80	558.80	-	4.78	5.54	6.35	-	9.52	12.70	*9.52	9.52	-	22.22	*12.70	12.70	28.58	34.92	41.28	47.62	53.98	-	22
600	24	609.60	609.60	-	5.54	6.35	6.35	-	9.52	14.27	*9.52	9.52	17.48	24.61	*12.70	12.70	30.96	38.89	46.02	52.37	59.54	-	24
650	26	660.40	660.40	-	-	*7.92	7.92	-	12.70	-	*9.52	9.52	-	-	*12.70	12.70	-	-	-	-	-	-	26
700	28	711.20	711.20	-	-	*7.92	7.92	-	12.70	15.88	*9.52	9.52	-	-	*12.70	12.70	-	-	-	-	-	-	28
750	30	762.00	762.00	-	6.35	*7.92	7.92	-	12.70	15.88	*9.52	9.52	-	-	*12.70	12.70	-	-	-	-	-	-	30
800	32	812.80	812.80	-	-	*7.92	7.92	-	12.70	15.88	*9.52	9.52	17.48	-	*12.70	12.70	-	-	-	-	-	-	32
850	34	863.60	863.60	-	-	*7.92	7.92	-	12.70	15.88	*9.52	9.52	17.48	-	*12.70	12.70	-	-	-	-	-	-	34
900	36	914.40	914.40	-	-	*7.92	7.92	-	12.70	15.88	*9.52	9.52	19.05	-	*12.70	12.70	-	-	-	-	-	-	36
950	38	965.20	965.20	-	-	*7.92	-	-	-	-	*9.52	9.52	-	-	*12.70	12.70	-	-	-	-	-	-	38
1000	40	1016.00	1016.00	-	-	*7.92	-	-	-	-	*9.52	9.52	-	-	*12.70	12.70	-	-	-	-	-	-	40
1050	42	1066.80	1066.80	-	-	*7.92	-	-	-	-	*9.52	9.52	-	-	*12.70	12.70	-	-	-	-	-	-	42
1100	44	1117.60	1117.60	-	-	*7.92	-	-	-	-	*9.52	9.52	-	-	*12.70	12.70	-	-	-	-	-	-	44
1150	46	1168.40	1168.40	-	-	*7.92	-	-	-	-	*9.52	9.52	-	-	*12.70	12.70	-	-	-	-	-	-	46
1200	48	1219.20	1219.20	-	-	*7.92	-	-	-	-	*9.52	9.52	-	-	*12.70	12.70	-	-	-	-	-	-	48

* Asterisks(*) denote BK METAL Standards (not internationally recognized)

Global Network

Global Marketing BK METAL Around the World

BK METAL has long held strong position in the Korea Forged Fitting Industry and is now accelerating to make inroads into the world market.



Approved Company



Agency List

Area	Company Name	TELL
Seoul	TAE-KYOUNG PIPING	+82-2-547-4107
Gyeonggi	SUNG-DO METAL	+82-2-809-6644
	SUNG-WOO STEEL	+82-31-432-5050
Ulsan	IN-KWANG	+82-52-296-6315
	SUNG-KWANG EMTC	+82-52-246-6622
Jeonnam	DONG-SAN VALVE	+82-61-691-7783
	YU-JIN ENG	+82-61-691-7807
	HO-SAN	+82-61-691-7783
Busan	SUNG-KWANG ENG	+82-51-319-0011
	SUNG-KWANG PF	+82-51-313-4201
	IL-HWA	+82-51-323-4011
	SD E&C	+82-51-316-6810
	SIN-AN FITTING	+82-51-831-8212
	SUNG-KWANG PIPING	+82-51-322-8501
	SKB PACIFIC	+82-51-714-1951