

March 22, 2023

**Attention:** Thomas Watson  
APCO MG INTERNATIONAL INC  
88 CRANSTON GATE SE  
CALGARY, AB T3M 0Z5

The design submission, Tracking Number 2023-00586, originally received on January 30, 2023 was surveyed and accepted for registration as follows:

**CRN :** 0A23059.2 **Accepted on:** March 22, 2023

**Reg Type:** NEW DESIGN **Expiry Date:** March 22, 2033

**Drawing No. :** See Notes for Registration Scope

**Fitting type:** B16.11 Fittings, Reducers, Unions, Nipples

Design registered in the name of : PETROLEUM EQUIPMENT(THAILAND)CO LTD

**The registration is conditional on your compliance with the following notes:**

*Only the items from the Petroleum Equipment (Thailand) Co. Ltd Product Brochure 2021 that are listed in the "List of Dimension Standards, Material Standards, Pressure Rating" document are included in this registration. Materials are limited to those specified.*

*As indicated on AB-41 Statutory Declaration or AB-351 Declaration of Conformity form and submitted documentation, the code of construction are B16.11 and other engineering analysis.*

*- It is our understanding that the fitting(s), included as the scope of this submission, that is(are) subject to the Safety Codes Act shall comply with the requirements of the indicated Standard or Code of Construction on the AB-41 Statutory Declaration or AB-351 Declaration of Conformity as supported by the attached data which identifies the dimensions, materials of construction, press./temp. ratings and the basis for such ratings, and the identification marking of the fittings.*

*- This registration is valid only for fittings fabricated at the location(s) covered by the QC certificate attached to the accepted AB-41 Statutory Declaration or AB-351 Declaration of Conformity form.*

*- This registration is valid only until the indicated expiry date and only if the Manufacturer maintains a valid quality management system approved by an acceptable third-party agency, and maintains a valid Certification of Authorization Permit if required by the jurisdiction where manufacturing takes place, until that date.*

*- Should the approval of the quality management system lapse before the expiry date indicated above, this registration shall become void.*

An invoice covering survey and registration fees will be forwarded from our Revenue Accounts.

If you have any question don't hesitate to contact me by phone at (780) 433-0281 ext 3340 or fax (780) 437-7787 or e-mail [Tabbert@absa.ca](mailto:Tabbert@absa.ca).

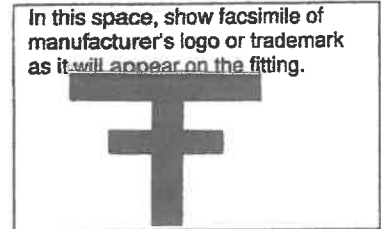
Sincerely,



TABBERT, SARAH, P. Eng.  
DOP Cert. No. D00009915

**STATUTORY DECLARATION  
Registration of Fittings**  
Single or Multiple Fitting Designs within one Fitting Category

I, Thomas J. Watson, Director of Quality Assurance  
(name of applicant) (position title) (must be in a position of authority)  
of Petroleum Equipment (Thailand) Co. Ltd.  
(name of manufacturer)  
located at 7/522 Moo.6 Mabyangporn, Pluakdaeng Rayong 21140 Thailand  
(plant address)



do solemnly declare that the fittings listed hereunder, which are subject to the Safety Codes Act (select only one)

- comply with the requirements of see list attached which specifies the dimensions, materials of construction, pressure/temperature ratings and identification marking of the fittings, or  
(title of recognized North American Standard)
- are not covered by the provisions of a recognized North American standard and are therefore manufactured to comply with \_\_\_\_\_ as supported by the attached data which identifies the dimensions, materials of construction, pressure/temperature ratings and the basis for such ratings, and the identification marking of the fittings.  
(title of code of construction or other applicable document)

I further declare that the manufacture of these fittings is controlled by a quality control program which has been verified as described in the below Table as being suitable for the manufacturing of these fittings to the stated standard, regulation, code, guideline or other applicable document. The fittings covered by the declaration for which I seek registration are as provided in the Supplementary Sheet(s) attached.

**Quality Program Verification and Manufacturing Sites**

A copy of the Quality Certificate from each manufacturing site must be included

Item #	Product Description, Model or Series	Quality Program	Scope of Certification	Expiry Date	Verifying Organization	Location(s) Plant Name and address
1.	Forged Steel Fittings	ISO 9001: 2015	Forged Steel Fittings	2023-05-23	ASR/ANSI/API	same name & address as above
2.						

In support of this application, the following information, calculations and/or test data are attached:

Product Brochure 2021, list of dimension standards, material standards, pressure rating, ASR Certificate,

API Certificates, Hydraulic Burst Test Report of Pipe Fittings

[Signature] (Signature of the Declarer)

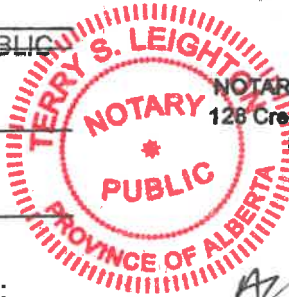
JANUARY 25, 2023 (Date)

DECLARED before me at CALGARY in the PROVINCE of ALBERTA this 25 day of JANUARY, 2023

(print) TERRY LEIGHTON - NOTARY PUBLIC (a Commissioner of Oaths or Notary Public)

(sign) [Signature] (a Commissioner of Oaths or Notary Public)

(expiry date (mm/dd/yy)) 12/31/24



TERRY S. LEIGHTON NOTARY PUBLIC in and for THE PROVINCE OF ALBERTA 126 Creekside Drive SW, Calgary, Alberta, Canada T2X 4A8 My Commission Expires December 31, 2024 PH: 403-389-2234 NO LEGAL ADVICE GIVEN OR OFFERED

Commissioner of Oaths / Notary Public in and for: ALBERTA (province, territory, or state)

For ABSA Office Use Only:

NOTES:

To the best of my knowledge and belief, the application meets the requirements of the Safety Codes Act and CSA Standard B51, Part 1, Clause 4.2, and is accepted for registration in Category \_\_\_\_\_

CRN: \_\_\_\_\_

Registered Date: \_\_\_\_\_

Expiry Date: 2033-03-22

Signature: \_\_\_\_\_ (Signature of the Administrator/SCO)

The information you provide is necessary only for the administration of the programs as required by the Alberta Safety Codes Act and Regulations in the Pressure Equipment Discipline

2023-00586 ABSA SAFETY CODES ACT - PROVINCE OF ALBERTA ACCEPTED: OA23059.2 See acceptance letter for conditions of registration. Date: 2023-03-22 By: S.J. Tabbert SARAH TABBERT, P. Eng DOP: D00009915

This stamp and signature have been affixed electronically to this registered design as required by Section 20(1) of the Pressure Equipment Safety Regulation, in accordance with the Electronic Transactions Act.

2023-00586

Tracking #: \_\_\_\_\_



# Petroleum Equipment (Thailand) Co. Ltd

## LIST OF DIMENSION STANDARDS, MATERIAL STANDARDS, PRESSURE RATING

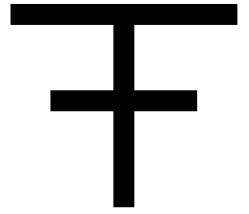
ITEM	PRESSURE CLASS	DIMENSION STANDARD	MATERIAL STANDARD
FORGED STEEL FITTINGS – SW	3000	ASME B16.11 – 2021.	ASTM A105 – 2017
FORGED STEEL FITTINGS – SW	6000	ASME B16.11 – 2021.	ASTM A105 – 2017
FORGED STEEL FITTINGS – SW	9000	ASME B16.11 – 2021.	ASTM A105 – 2017
FORGED STEEL FITTINGS – THREADED	2000	ASME B16.11 – 2021.	ASTM A105 – 2017
FORGED STEEL FITTINGS – THREADED	3000	ASME B16.11 – 2021.	ASTM A105 – 2017
FORGED STEEL FITTINGS – THREADED	6000	ASME B16.11 – 2021.	ASTM A105 – 2017
FORGED STEEL FITTINGS – SW	3000	ASME B16.11 – 2021.	ASTM A350 LF2 CL1 – 2018
FORGED STEEL FITTINGS – SW	6000	ASME B16.11 – 2021.	ASTM A350 LF2 CL1 – 2018
FORGED STEEL FITTINGS – SW	9000	ASME B16.11 – 2021.	ASTM A350 LF2 CL1 – 2018
FORGED STEEL FITTINGS – THREADED	2000	ASME B16.11 – 2021.	ASTM A350 LF2 CL1 – 2018
FORGED STEEL FITTINGS – THREADED	3000	ASME B16.11 – 2021.	ASTM A350 LF2 CL1 – 2018
FORGED STEEL FITTINGS – THREADED	6000	ASME B16.11 – 2021.	ASTM A350 LF2 CL1 – 2018
FORGED STEEL FITTINGS – THREADED	2000	ASME B16.11 – 2021.	ASTM A182 F304L,316L – 2010
FORGED STEEL FITTINGS – THREADED	3000	ASME B16.11 – 2021.	ASTM A182 F304L,316L – 2010
FORGED STEEL FITTINGS – THREADED	6000	ASME B16.11 – 2021	ASTM A182 F304L,316L – 2010
F.S.INSERT REDUCER	3000	MSS-SP-79 – 2018.	ASTM SA105 – 2017
F.S.INSERT REDUCER	6000	MSS-SP-79 – 2018.	ASTM SA105 – 2017
F.S.INSERT REDUCER	3000	MSS-SP-79 – 2018.	ASTM A350 LF2 CL1 – 2018
F.S.INSERT REDUCER	6000	MSS-SP-79 – 2018.	ASTM A350 LF2 CL1 – 2018
FORGED STEEL UNION	3000	MSS-SP-83 – 2018.	ASTM A105 – 2017
FORGED STEEL UNION	6000	MSS-SP-83 – 2018.	ASTM A105 – 2017
FORGED STEEL UNION	3000	MSS-SP-83 – 2018.	ASTM A350 LF2 CL1 – 2018
FORGED STEEL UNION	6000	MSS-SP-83 – 2018.	ASTM A350 LF2 CL1 – 2018
FORGED STEEL UNION	3000	MSS-SP-83 – 2018.	ASTM A182 F304L,316L – 2010
FORGED STEEL UNION	6000	MSS-SP-83 – 2018.	ASTM A182 F304L,316L – 2010
SWAGED NIPPLE	SCH 40	MSS SP 95 – 2018.	ASTM A234, A403, A420, A105,
SWAGED NIPPLE	SCH 80	MSS SP 95 – 2018.	ASTM A234, A403, A420, A105,
SWAGED NIPPLE	SCH 160	MSS SP 95 – 2018.	ASTM A234, A403, A420, A105,
SWAGED NIPPLE	SCH XXS	MSS SP 95 – 2018.	ASTM A234, A403, A420, A105,

By Thomas Watson



This stamp and signature have been affixed electronically to this registered design as required by Section 20(1) of the Pressure Equipment Safety Regulation, in accordance with the Electronic Transactions Act

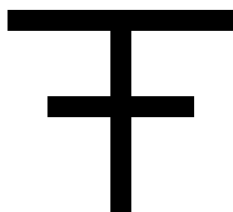
# PRODUCT BROCHURE 2021



CRN APPLICATION  
PETROLEUM EQUIPMENT (THAILAND) CO. LTD.  
7/522 MOO.6 MABYANGPORN, PLUAKDAENG, RAYONG 21140, THAILAND

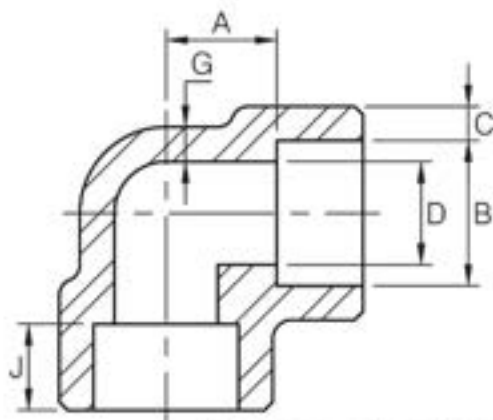


PETROLEUM EQUIPMENT (THAILAND) CO. LTD.  
7/522 MOO.6 MABYANGPORN, PLUAKDAENG, RAYONG 21140, THAILAND

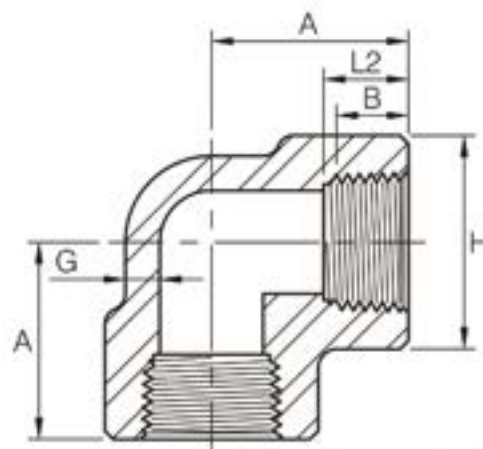


# 90° ELBOW

ASME B16.11-2016(Revision of ASME B16.11-2011)



Dimensions are in millimeters.



Dimensions are in millimeters.

Socket Welding								
DN	Nom. Pipe Size	B <sup>(2)</sup>	C <sup>(1)</sup>		D <sup>(2)</sup>	A <sup>(2)</sup>	G (Min)	J (Min)
			(Avg)	(Min)				

### 3000Lb

6	1/8	10.8	3.18	3.18	6.9	11.0	2.41	9.5
8	1/4	14.2	3.78	3.30	9.3	11.0	3.02	9.5
10	3/8	17.6	4.01	3.50	12.6	13.5	3.20	9.5
15	1/2	21.8	4.67	4.09	15.8	15.5	3.73	9.5
20	3/4	27.2	4.90	4.27	21.0	19.0	3.91	12.5
25	1	33.9	5.69	4.98	26.7	22.5	4.55	12.5
32	1-1/4	42.7	6.07	5.28	35.1	27.0	4.85	12.5
40	1-1/2	48.8	6.35	5.54	40.9	32.0	5.08	12.5
50	2	61.2	6.93	6.04	52.5	38.0	5.54	16.0
65	2-1/2	73.9	8.76	7.67	62.7	41.0	7.01	16.0
80	3	89.8	9.52	8.30	78.0	57.0	7.62	16.0
100	4	115.2	10.69	9.35	102.3	66.5	8.56	19.0

### 6000Lb

6	1/8	10.8	3.96	3.43	4.0	11.0	3.15	9.5
8	1/4	14.2	4.60	4.01	6.4	13.5	3.68	9.5
10	3/8	17.6	5.03	4.37	9.2	15.5	4.01	9.5
15	1/2	21.8	5.97	5.18	11.8	19.0	4.78	9.5
20	3/4	27.2	6.96	6.04	15.6	22.5	5.56	12.5
25	1	33.9	7.92	6.93	20.7	27.0	6.35	12.5
32	1-1/4	42.7	7.92	6.93	29.5	32.0	6.35	12.5
40	1-1/2	48.8	8.92	7.80	34.0	38.0	7.14	12.5
50	2	61.2	10.92	9.50	42.9	41.0	8.74	16.0

### 9000Lb

15	1/2	21.8	9.35	8.18	6.4	25.5	7.47	9.5
20	3/4	27.2	9.78	8.56	11.1	28.5	7.82	12.5
25	1	33.9	11.38	9.96	15.2	32.0	9.09	12.5
32	1-1/4	42.7	12.14	10.62	22.8	35.0	9.70	12.5
40	1-1/2	48.8	12.70	11.12	28.0	38.0	10.15	12.5
50	2	61.2	13.84	12.12	38.2	54.0	11.07	16.0

(1) Average of socket wall thickness around periphery shall be no less than listed values. The minimum values are permitted in localized areas.

(2) Tolerance see page 21.

Threaded						
DN	Nom. Pipe Size	Length of Thread (Min)		A	G (Min)	H
		B <sup>(*)</sup>	L2 <sup>(*)</sup>			

### 2000Lb

6	1/8	6.4	6.7	21	3.18	22
8	1/4	8.1	10.2	21	3.18	22
10	3/8	9.1	10.4	25	3.18	25
15	1/2	10.9	13.6	28	3.18	33
20	3/4	12.7	13.9	33	3.18	38
25	1	14.7	17.3	38	3.68	46
32	1-1/4	17.0	18.0	44	3.89	56
40	1-1/2	17.8	18.4	51	4.01	62
50	2	19.0	19.2	60	4.27	75
65	2-1/2	23.6	28.9	76	5.61	92
80	3	25.9	30.5	86	5.99	109
100	4	27.7	33.0	106	6.55	146

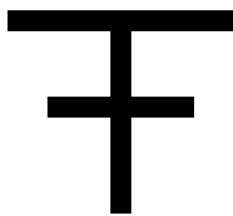
### 3000Lb

6	1/8	6.4	6.7	21	3.18	22
8	1/4	8.1	10.2	25	3.30	25
10	3/8	9.1	10.4	28	3.51	33
15	1/2	10.9	13.6	33	4.09	38
20	3/4	12.7	13.9	38	4.32	46
25	1	14.7	17.3	44	4.98	56
32	1-1/4	17.0	18.0	51	5.28	62
40	1-1/2	17.8	18.4	60	5.56	75
50	2	19.0	19.2	64	7.14	84
65	2-1/2	23.6	28.9	83	7.65	102
80	3	25.9	30.5	95	8.84	121
100	4	27.7	33.0	114	11.18	152

### 6000Lb

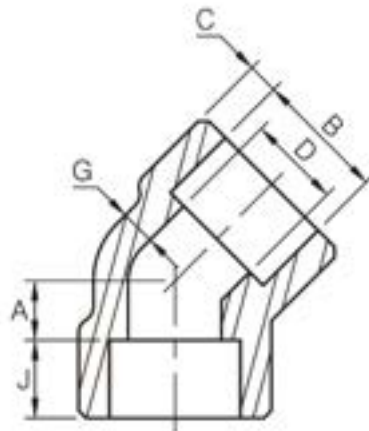
6	1/8	6.4	6.7	25	6.35	25
8	1/4	8.1	10.2	28	6.60	33
10	3/8	9.1	10.4	33	6.98	38
15	1/2	10.9	13.6	38	8.15	46
20	3/4	12.7	13.9	44	8.53	56
25	1	14.7	17.3	51	9.93	62
32	1-1/4	17.0	18.0	60	10.59	75
40	1-1/2	17.8	18.4	64	11.07	84
50	2	19.0	19.2	83	12.09	102
65	2-1/2	23.6	28.9	95	15.29	121
80	3	25.9	30.5	106	16.64	146
100	4	27.7	33.0	114	18.67	152

(\*) 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 (ANSI / ASME B1.20.1).



# 45° ELBOW

ASME B16.11-2016(Revision of ASME B16.11-2011)



Dimensions are in millimeters.

Socket Welding								
DN	Nom. Pipe Size	B <sup>(2)</sup>	C <sup>(1)</sup>		D <sup>(2)</sup>	A <sup>(2)</sup>	G (Min)	J (Min)
			(Avg)	(Min)				

### 3000Lb

6	1/8	10.8	3.18	3.18	6.9	8.0	2.41	9.5
8	1/4	14.2	3.78	3.30	9.3	8.0	3.02	9.5
10	3/8	17.6	4.01	3.50	12.6	8.0	3.20	9.5
15	1/2	21.8	4.67	4.09	15.8	11.0	3.73	9.5
20	3/4	27.2	4.90	4.27	21.0	13.0	3.91	12.5
25	1	33.9	5.69	4.98	26.7	14.0	4.55	12.5
32	1-1/4	42.7	6.07	5.28	35.1	17.5	4.85	12.5
40	1-1/2	48.8	6.35	5.54	40.9	20.5	5.08	12.5
50	2	61.2	6.93	6.04	52.5	25.5	5.54	16.0
65	2-1/2	73.9	8.76	7.67	62.7	28.5	7.01	16.0
80	3	89.8	9.52	8.30	78.0	32.0	7.62	16.0
100	4	115.2	10.69	9.35	102.3	41.0	8.56	19.0

### 6000Lb

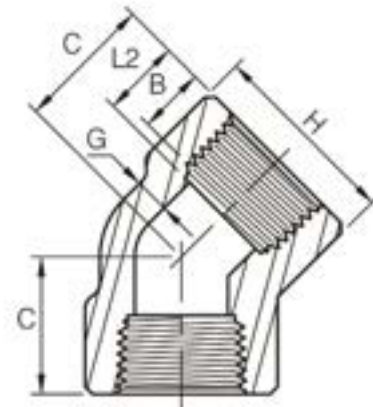
6	1/8	10.8	3.96	3.43	4.0	8.0	3.15	9.5
8	1/4	14.2	4.60	4.01	6.4	8.0	3.68	9.5
10	3/8	17.6	5.03	4.37	9.2	11.0	4.01	9.5
15	1/2	21.8	5.97	5.18	11.8	12.5	4.78	9.5
20	3/4	27.2	6.96	6.04	15.6	14.0	5.56	12.5
25	1	33.9	7.92	6.93	20.7	17.5	6.35	12.5
32	1-1/4	42.7	7.92	6.93	29.5	20.5	6.35	12.5
40	1-1/2	48.8	8.92	7.80	34.0	25.5	7.14	12.5
50	2	61.2	10.92	9.50	42.9	28.5	8.74	16.0

### 9000Lb

15	1/2	21.8	9.35	8.18	6.4	15.5	7.47	9.5
20	3/4	27.2	9.78	8.56	11.1	19.0	7.82	12.5
25	1	33.9	11.38	9.96	15.2	20.5	9.09	12.5
32	1-1/4	42.7	12.14	10.62	22.8	22.5	9.70	12.5
40	1-1/2	48.8	12.70	11.12	28.0	25.5	10.15	12.5
50	2	61.2	13.84	12.12	38.2	28.5	11.07	16.0

(1) Average of socket Wall Thickness around periphery shall be no less than listed values. The minimum values are permitted in localized areas.

(2) Tolerance see page 21.



Dimensions are in millimeters.

Threaded						
DN	Nom. Pipe Size	Length of Thread (Min)		C	G (Min)	H
		B <sup>(*)</sup>	L2 <sup>(*)</sup>			

### 2000Lb

6	1/8	6.4	6.7	17	3.18	22
8	1/4	8.1	10.2	17	3.18	22
10	3/8	9.1	10.4	19	3.18	25
15	1/2	10.9	13.6	22	3.18	33
20	3/4	12.7	13.9	25	3.18	38
25	1	14.7	17.3	28	3.68	46
32	1-1/4	17.0	18.0	33	3.89	56
40	1-1/2	17.8	18.4	35	4.01	62
50	2	19.0	19.2	43	4.27	75
65	2-1/2	23.6	28.9	52	5.61	92
80	3	25.9	30.5	64	5.99	109
100	4	27.7	33.0	79	6.55	146

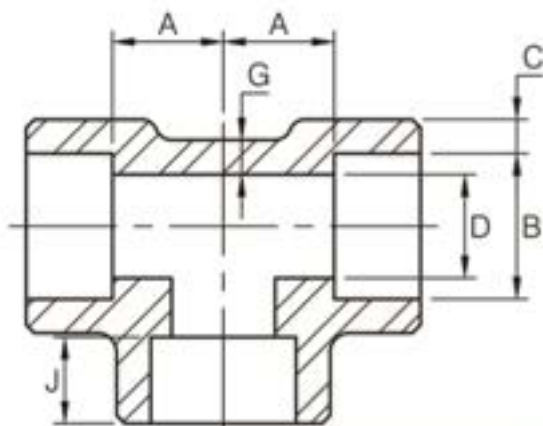
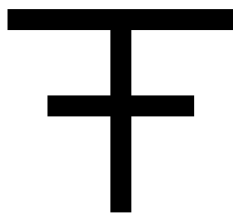
### 3000Lb

6	1/8	6.4	6.7	17	3.18	22
8	1/4	8.1	10.2	19	3.30	25
10	3/8	9.1	10.4	22	3.51	33
15	1/2	10.9	13.6	25	4.09	38
20	3/4	12.7	13.9	28	4.32	46
25	1	14.7	17.3	33	4.98	56
32	1-1/4	17.0	18.0	35	5.28	62
40	1-1/2	17.8	18.4	43	5.56	75
50	2	19.0	19.2	44	7.14	84
65	2-1/2	23.6	28.9	52	7.65	102
80	3	25.9	30.5	64	8.84	121
100	4	27.7	33.0	79	11.18	152

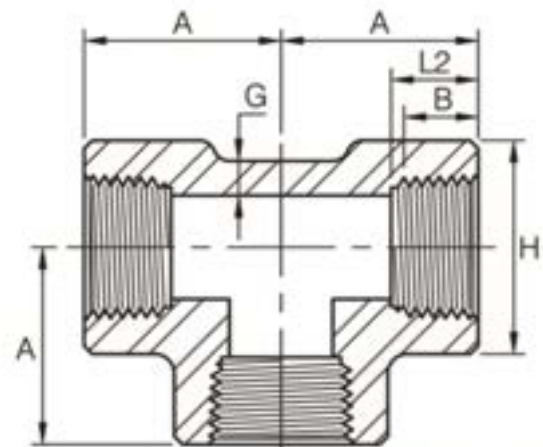
### 6000Lb

6	1/8	6.4	6.7	19	6.35	25
8	1/4	8.1	10.2	22	6.60	33
10	3/8	9.1	10.4	25	6.98	38
15	1/2	10.9	13.6	28	8.15	46
20	3/4	12.7	13.9	33	8.53	56
25	1	14.7	17.3	35	9.93	62
32	1-1/4	17.0	18.0	43	10.59	75
40	1-1/2	17.8	18.4	44	11.07	84
50	2	19.0	19.2	52	12.09	102
65	2-1/2	23.6	28.9	64	15.29	121
80	3	25.9	30.5	79	16.64	146
100	4	27.7	33.0	79	18.67	152

(\*) 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 (ANSI / ASME B1.20.1).



Dimensions are in millimeters.



Dimensions are in millimeters.

Socket Welding								
DN	Nom. Pipe Size	B <sup>(2)</sup>	C <sup>(1)</sup>		D <sup>(2)</sup>	A <sup>(2)</sup>	G (Min)	J (Min)
			(Avg)	(Min)				

3000Lb								
6	1/8	10.8	3.18	3.18	6.9	11.0	2.41	9.5
8	1/4	14.2	3.78	3.30	9.3	11.0	3.02	9.5
10	3/8	17.6	4.01	3.50	12.6	13.5	3.20	9.5
15	1/2	21.8	4.67	4.09	15.8	15.5	3.73	9.5
20	3/4	27.2	4.90	4.27	21.0	19.0	3.91	12.5
25	1	33.9	5.69	4.98	26.7	22.5	4.55	12.5
32	1-1/4	42.7	6.07	5.28	35.1	27.0	4.85	12.5
40	1-1/2	48.8	6.35	5.54	40.9	32.0	5.08	12.5
50	2	61.2	6.93	6.04	52.5	38.0	5.54	16.0
65	2-1/2	73.9	8.76	7.67	62.7	41.0	7.01	16.0
80	3	89.8	9.52	8.30	78.0	57.0	7.62	16.0
100	4	115.2	10.69	9.35	102.3	66.5	8.56	19.0

6000Lb								
6	1/8	10.8	3.96	3.43	4.0	11.0	3.15	9.5
8	1/4	14.2	4.60	4.01	6.4	13.5	3.68	9.5
10	3/8	17.6	5.03	4.37	9.2	15.5	4.01	9.5
15	1/2	21.8	5.97	5.18	11.8	19.0	4.78	9.5
20	3/4	27.2	6.96	6.04	15.6	22.5	5.56	12.5
25	1	33.9	7.92	6.93	20.7	27.0	6.35	12.5
32	1-1/4	42.7	7.92	6.93	29.5	32.0	6.35	12.5
40	1-1/2	48.8	8.92	7.80	34.0	38.0	7.14	12.5
50	2	61.2	10.92	9.50	42.9	41.0	8.74	16.0

9000Lb								
15	1/2	21.8	9.35	8.18	6.4	25.5	7.47	9.5
20	3/4	27.2	9.78	8.56	11.1	28.5	7.82	12.5
25	1	33.9	11.38	9.96	15.2	32.0	9.09	12.5
32	1-1/4	42.7	12.14	10.62	22.8	35.0	9.70	12.5
40	1-1/2	48.8	12.70	11.12	28.0	38.0	10.15	12.5
50	2	61.2	13.84	12.12	38.2	54.0	11.07	16.0

Threaded						
DN	Nom. Pipe Size	Length of Thread. (Min)		A	G (Min)	H
		B <sup>(*)</sup>	L2 <sup>(*)</sup>			

2000Lb						
6	1/8	6.4	6.7	21	3.18	22
8	1/4	8.1	10.2	21	3.18	22
10	3/8	9.1	10.4	25	3.18	25
15	1/2	10.9	13.6	28	3.18	33
20	3/4	12.7	13.9	33	3.18	38
25	1	14.7	17.3	38	3.68	46
32	1-1/4	17.0	18.0	44	3.89	56
40	1-1/2	17.8	18.4	51	4.01	62
50	2	19.0	19.2	60	4.27	75
65	2-1/2	23.6	28.9	76	5.61	92
80	3	25.9	30.5	86	5.99	109
100	4	27.7	33.0	106	6.55	146

3000Lb						
6	1/8	6.4	6.7	21	3.18	22
8	1/4	8.1	10.2	25	3.30	25
10	3/8	9.1	10.4	28	3.51	33
15	1/2	10.9	13.6	33	4.09	38
20	3/4	12.7	13.9	38	4.32	46
25	1	14.7	17.3	44	4.98	56
32	1-1/4	17.0	18.0	51	5.28	62
40	1-1/2	17.8	18.4	60	5.56	75
50	2	19.0	19.2	64	7.14	84
65	2-1/2	23.6	28.9	83	7.65	102
80	3	25.9	30.5	95	8.84	121
100	4	27.7	33.0	114	11.18	152

6000Lb						
6	1/8	6.4	6.7	25	6.35	25
8	1/4	8.1	10.2	28	6.60	33
10	3/8	9.1	10.4	33	6.98	38
15	1/2	10.9	13.6	38	8.15	46
20	3/4	12.7	13.9	44	8.53	56
25	1	14.7	17.3	51	9.93	62
32	1-1/4	17.0	18.0	60	10.59	75
40	1-1/2	17.8	18.4	64	11.07	84
50	2	19.0	19.2	83	12.09	102
65	2-1/2	23.6	28.9	95	15.29	121
80	3	25.9	30.5	106	16.64	146
100	4	27.7	33.0	114	18.67	152

(1) Average of socket Wall Thickness around periphery shall be no less than listed values. The minimum values are permitted in localized areas.

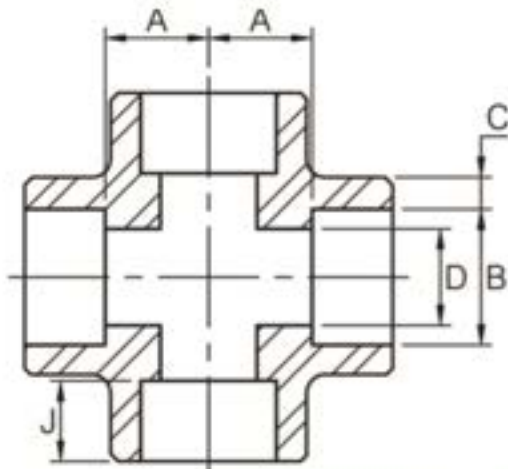
(2) Tolerance see page 21.

(\*) 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 (ANSI / ASME B1.20.1).

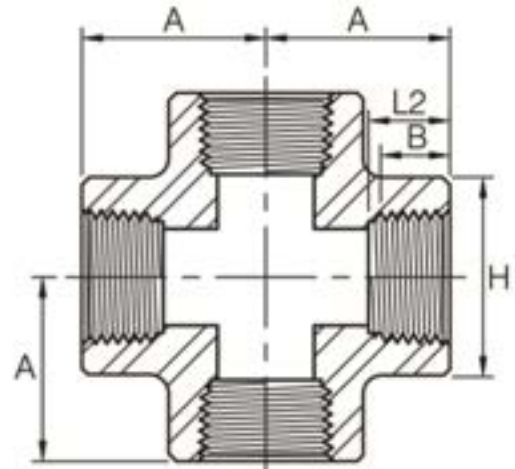


# CROSS

ASME B16.11-2016(Revision of ASME B16.11-2011)



Dimensions are in millimeters.



Dimensions are in millimeters.

Socket Welding							
DN	Nom. Pipe Size	B <sup>(2)</sup>	C <sup>(1)</sup>		D <sup>(2)</sup>	A <sup>(2)</sup>	J <sup>(Min)</sup>
			(Avg)	(Min)			

**3000Lb**

6	1/8	10.8	3.18	3.18	6.9	11.0	9.5
8	1/4	14.2	3.78	3.30	9.3	11.0	9.5
10	3/8	17.6	4.01	3.50	12.6	13.5	9.5
15	1/2	21.8	4.67	4.09	15.8	15.5	9.5
20	3/4	27.2	4.90	4.27	21.0	19.0	12.5
25	1	33.9	5.69	4.98	26.7	22.5	12.5
32	1-1/4	42.7	6.07	5.28	35.1	27.0	12.5
40	1-1/2	48.8	6.35	5.54	40.9	32.0	12.5
50	2	61.2	6.93	6.04	52.5	38.0	16.0
65	2-1/2	73.9	8.76	7.67	62.7	41.0	16.0
80	3	89.8	9.52	8.30	78.0	57.0	16.0
100	4	115.2	10.69	9.35	102.3	66.5	19.0

**6000Lb**

6	1/8	10.8	3.96	3.43	4.0	11.0	9.5
8	1/4	14.2	4.60	4.01	6.4	13.5	9.5
10	3/8	17.6	5.03	4.37	9.2	15.5	9.5
15	1/2	21.8	5.97	5.18	11.8	19.0	9.5
20	3/4	27.2	6.96	6.04	15.6	22.5	12.5
25	1	33.9	7.92	6.93	20.7	27.0	12.5
32	1-1/4	42.7	7.92	6.93	29.5	32.0	12.5
40	1-1/2	48.8	8.92	7.80	34.0	38.0	12.5
50	2	61.2	10.92	9.50	42.9	41.0	16.0

**9000Lb**

15	1/2	21.8	9.35	8.18	6.4	25.5	9.5
20	3/4	27.2	9.78	8.56	11.1	28.5	12.5
25	1	33.9	11.38	9.96	15.2	32.0	12.5
32	1-1/4	42.7	12.14	10.62	22.8	35.0	12.5
40	1-1/2	48.8	12.70	11.12	28.0	38.0	12.5
50	2	61.2	13.84	12.12	38.2	54.0	16.0

(1) Average of socket Wall Thickness around periphery shall be no less than listed values. The minimum values are permitted in localized areas.

(2) Tolerance see page 21.

Threaded					
DN	Nom. Pipe Size	Length of Thread. (Min)		A	H
		B <sup>(*)</sup>	L2 <sup>(*)</sup>		

**2000Lb**

6	1/8	6.4	6.7	21	22
8	1/4	8.1	10.2	21	22
10	3/8	9.1	10.4	25	25
15	1/2	10.9	13.6	28	33
20	3/4	12.7	13.9	33	38
25	1	14.7	17.3	38	46
32	1-1/4	17.0	18.0	44	56
40	1-1/2	17.8	18.4	51	62
50	2	19.0	19.2	60	75
65	2-1/2	23.6	28.9	76	92
80	3	25.9	30.5	86	109
100	4	27.7	33.0	106	146

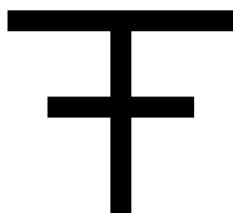
**3000Lb**

6	1/8	6.4	6.7	21	22
8	1/4	8.1	10.2	25	25
10	3/8	9.1	10.4	28	33
15	1/2	10.9	13.6	33	38
20	3/4	12.7	13.9	38	46
25	1	14.7	17.3	44	56
32	1-1/4	17.0	18.0	51	62
40	1-1/2	17.8	18.4	60	75
50	2	19.0	19.2	64	84
65	2-1/2	23.6	28.9	83	102
80	3	25.9	30.5	95	121
100	4	27.7	33.0	114	152

**6000Lb**

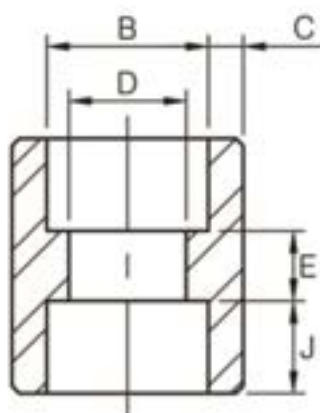
6	1/8	6.4	6.7	25	25
8	1/4	8.1	10.2	28	33
10	3/8	9.1	10.4	33	38
15	1/2	10.9	13.6	38	46
20	3/4	12.7	13.9	44	56
25	1	14.7	17.3	51	62
32	1-1/4	17.0	18.0	60	75
40	1-1/2	17.8	18.4	64	84
50	2	19.0	19.2	83	102
65	2-1/2	23.6	28.9	95	121
80	3	25.9	30.5	106	146
100	4	27.7	33.0	114	152

(\*) 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 (ANSI / ASME B1.20.1).

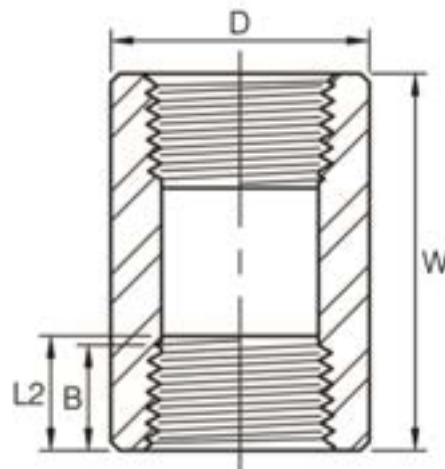


# FULL COUPLING

ASME B16.11-2016 (Revision of ASME B16.11-2011)



Dimensions are in millimeters.



Dimensions are in millimeters.

Socket Welding							
DN	Nom. Pipe Size	B <sup>(2)</sup>	C <sup>(1)</sup>		D <sup>(2)</sup>	E <sup>(2)</sup>	J (Min)
			(Avg)	(Min)			

3000Lb							
6	1/8	10.8	3.18	3.18	6.9	6.5	9.5
8	1/4	14.2	3.78	3.30	9.3	6.5	9.5
10	3/8	17.6	4.01	3.50	12.6	6.5	9.5
15	1/2	21.8	4.67	4.09	15.8	9.5	9.5
20	3/4	27.2	4.90	4.27	21.0	9.5	12.5
25	1	33.9	5.69	4.98	26.7	12.5	12.5
32	1-1/4	42.7	6.07	5.28	35.1	12.5	12.5
40	1-1/2	48.8	6.35	5.54	40.9	12.5	12.5
50	2	61.2	6.93	6.04	52.5	19.0	16.0
65	2-1/2	73.9	8.76	7.67	62.7	19.0	16.0
80	3	89.8	9.52	8.30	78.0	19.0	16.0
100	4	115.2	10.69	9.35	102.3	19.0	19.0

6000Lb							
6	1/8	10.8	3.96	3.43	4.0	6.5	9.5
8	1/4	14.2	4.60	4.01	6.4	6.5	9.5
10	3/8	17.6	5.03	4.37	9.2	6.5	9.5
15	1/2	21.8	5.97	5.18	11.8	9.5	9.5
20	3/4	27.2	6.96	6.04	15.6	9.5	12.5
25	1	33.9	7.92	6.93	20.7	12.5	12.5
32	1-1/4	42.7	7.92	6.93	29.5	12.5	12.5
40	1-1/2	48.8	8.92	7.80	34.0	12.5	12.5
50	2	61.2	10.92	9.50	42.9	19.0	16.0

9000Lb							
15	1/2	21.8	9.35	8.18	6.4	9.5	9.5
20	3/4	27.2	9.78	8.56	11.1	9.5	12.5
25	1	33.9	11.38	9.96	15.2	12.5	12.5
32	1-1/4	42.7	12.14	10.62	22.8	12.5	12.5
40	1-1/2	48.8	12.70	11.12	28.0	12.5	12.5
50	2	61.2	13.84	12.12	38.2	19.0	16.0

- (1) Average of socket Wall Thickness around periphery shall be no less than listed values. The minimum values are permitted in localized areas.
- (2) Tolerance see page 21.
- (3) Reducer : "C, J, E" in accordance with large size.  
"D" in accordance with small size.  
The others in accordance with each size.

Threaded					
DN	Nom. Pipe Size	Length of Thread. (Min)		W	D
		B <sup>(*)</sup>	L2 <sup>(*)</sup>		

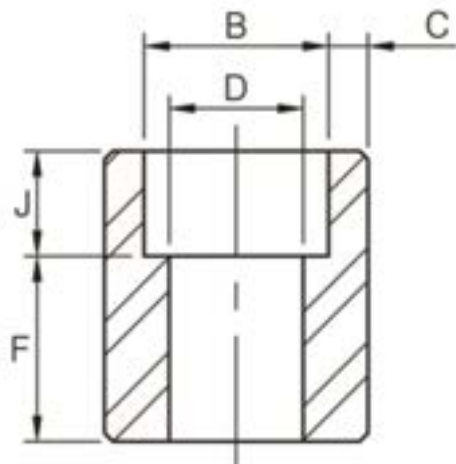
3000Lb					
6	1/8	6.4	6.7	32	16
8	1/4	8.1	10.2	35	19
10	3/8	9.1	10.4	38	22
15	1/2	10.9	13.6	48	28
20	3/4	12.7	13.9	51	35
25	1	14.7	17.3	60	44
32	1-1/4	17.0	18.0	67	57
40	1-1/2	17.8	18.4	79	64
50	2	19.0	19.2	86	76
65	2-1/2	23.6	28.9	92	92
80	3	25.9	30.5	108	108
100	4	27.7	33.0	121	140

6000Lb					
6	1/8	6.4	6.7	32	22
8	1/4	8.1	10.2	35	25
10	3/8	9.1	10.4	38	32
15	1/2	10.9	13.6	48	38
20	3/4	12.7	13.9	51	44
25	1	14.7	17.3	60	57
32	1-1/4	17.0	18.0	67	64
40	1-1/2	17.8	18.4	79	76
50	2	19.0	19.2	86	92
65	2-1/2	23.6	28.9	92	108
80	3	25.9	30.5	108	127
100	4	27.7	33.0	121	159

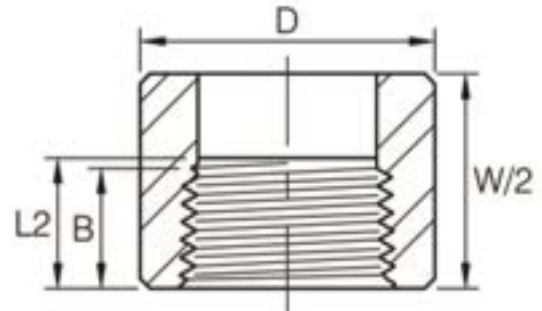
- (\*) Dimension B is minimum length of perfect thread. The length of useful thread (B plus threads with fully formed roots and flat crests) shall not be less than L2 (effective length of external thread) required by American National Standard for pipe threads (ANSI / ASME B1.20.1).

# HALF COUPLING

ASME B16.11-2016(Revision of ASME B16.11-2011)



Dimensions are in millimeters.



Dimensions are in millimeters.

Socket Welding							
DN	Nom. Pipe Size	B <sup>(2)</sup>	C <sup>(1)</sup>		D <sup>(2)</sup>	F <sup>(2)</sup>	J (Min)
			(Avg)	(Min)			

3000Lb

6	1/8	10.8	3.18	3.18	6.9	16.0	9.5
8	1/4	14.2	3.78	3.30	9.3	16.0	9.5
10	3/8	17.6	4.01	3.50	12.6	17.5	9.5
15	1/2	21.8	4.67	4.09	15.8	22.5	9.5
20	3/4	27.2	4.90	4.27	21.0	24.0	12.5
25	1	33.9	5.69	4.98	26.7	28.5	12.5
32	1-1/4	42.7	6.07	5.28	35.1	30.0	12.5
40	1-1/2	48.8	6.35	5.54	40.9	32.0	12.5
50	2	61.2	6.93	6.04	52.5	41.0	16.0
65	2-1/2	73.9	8.76	7.67	62.7	43.0	16.0
80	3	89.8	9.52	8.30	78.0	44.5	16.0
100	4	115.2	10.69	9.35	102.3	48.0	19.0

6000Lb

6	1/8	10.8	3.96	3.43	4.0	16.0	9.5
8	1/4	14.2	4.60	4.01	6.4	16.0	9.5
10	3/8	17.6	5.03	4.37	9.2	17.5	9.5
15	1/2	21.8	5.97	5.18	11.8	22.5	9.5
20	3/4	27.2	6.96	6.04	15.6	24.0	12.5
25	1	33.9	7.92	6.93	20.7	28.5	12.5
32	1-1/4	42.7	7.92	6.93	29.5	30.0	12.5
40	1-1/2	48.8	8.92	7.80	34.0	32.0	12.5
50	2	61.2	10.92	9.50	42.9	41.0	16.0

9000Lb

15	1/2	21.8	9.35	8.18	6.4	22.5	9.5
20	3/4	27.2	9.78	8.56	11.1	24.0	12.5
25	1	33.9	11.38	9.96	15.2	28.5	12.5
32	1-1/4	42.7	12.14	10.62	22.8	30.0	12.5
40	1-1/2	48.8	12.70	11.12	28.0	32.0	12.5
50	2	61.2	13.84	12.12	38.2	41.0	16.0

(1) Average of socket Wall Thickness around periphery shall be no less than listed values. The minimum values are permitted in localized areas.

(2) Tolerance see page 21.

Threaded					
DN	Nom. Pipe Size	Length of Thread. (Min)		W	D
		B <sup>(*)</sup>	L2 <sup>(*)</sup>		

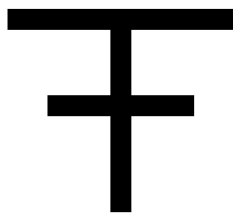
3000Lb

6	1/8	6.4	6.7	32	16
8	1/4	8.1	10.2	35	19
10	3/8	9.1	10.4	38	22
15	1/2	10.9	13.6	48	28
20	3/4	12.7	13.9	51	35
25	1	14.7	17.3	60	44
32	1-1/4	17.0	18.0	67	57
40	1-1/2	17.8	18.4	79	64
50	2	19.0	19.2	86	76
65	2-1/2	23.6	28.9	92	92
80	3	25.9	30.5	108	108
100	4	27.7	33.0	121	140

6000Lb

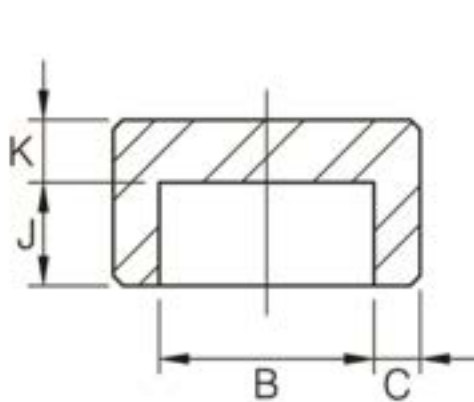
6	1/8	6.4	6.7	32	22
8	1/4	8.1	10.2	35	25
10	3/8	9.1	10.4	38	32
15	1/2	10.9	13.6	48	38
20	3/4	12.7	13.9	51	44
25	1	14.7	17.3	60	57
32	1-1/4	17.0	18.0	67	64
40	1-1/2	17.8	18.4	79	76
50	2	19.0	19.2	86	92
65	2-1/2	23.6	28.9	92	108
80	3	25.9	30.5	108	127
100	4	27.7	33.0	121	159

(\*) 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 (ANSI / ASME B1.20.1).

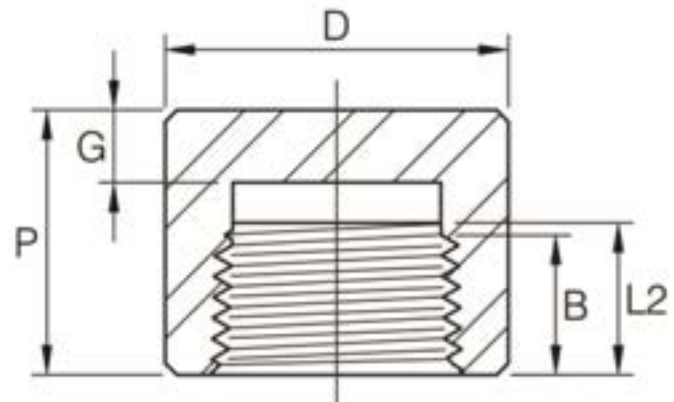


# CAP

ASME B16.11-2016 (Revision of ASME B16.11-2011)



Dimensions are in millimeters.



Dimensions are in millimeters.

Socket Welding						
DN	Nom. Pipe Size	B <sup>(2)</sup>	C <sup>(1)</sup>		K (Min)	J (Min)
			(Avg)	(Min)		

Threaded						
DN	Nom. Pipe Size	Length of Thread. (Min)		P	D	G (Min)
		B <sup>(*)</sup>	L2 <sup>(*)</sup>			

**3000Lb**

6	1/8	10.8	3.18	3.18	4.8	9.5
8	1/4	14.2	3.78	3.30	4.8	9.5
10	3/8	17.6	4.01	3.50	4.8	9.5
15	1/2	21.8	4.67	4.09	6.4	9.5
20	3/4	27.2	4.90	4.27	6.4	12.5
25	1	33.9	5.69	4.98	9.6	12.5
32	1-1/4	42.7	6.07	5.28	9.6	12.5
40	1-1/2	48.8	6.35	5.54	11.2	12.5
50	2	61.2	6.93	6.04	12.7	16.0
65	2-1/2	73.9	8.76	7.67	15.7	16.0
80	3	89.8	9.52	8.30	19.0	16.0
100	4	115.2	10.69	9.35	22.4	19.0

**3000Lb**

6	1/8	6.4	6.7	19	16	4.8
8	1/4	8.1	10.2	25	19	4.8
10	3/8	9.1	10.4	25	22	4.8
15	1/2	10.9	13.6	32	28	6.4
20	3/4	12.7	13.9	37	35	6.4
25	1	14.7	17.3	41	44	9.7
32	1-1/4	17.0	18.0	44	57	9.7
40	1-1/2	17.8	18.4	44	64	11.2
50	2	19.0	19.2	48	76	12.7
65	2-1/2	23.6	28.9	60	92	15.7
80	3	25.9	30.5	65	108	19.0
100	4	27.7	33.0	68	140	22.4

**6000Lb**

6	1/8	10.8	3.96	3.43	6.4	9.5
8	1/4	14.2	4.60	4.01	6.4	9.5
10	3/8	17.6	5.03	4.37	6.4	9.5
15	1/2	21.8	5.97	5.18	7.9	9.5
20	3/4	27.2	6.96	6.04	7.9	12.5
25	1	33.9	7.92	6.93	11.2	12.5
32	1-1/4	42.7	7.92	6.93	11.2	12.5
40	1-1/2	48.8	8.92	7.80	12.7	12.5
50	2	61.2	10.92	9.50	15.7	16.0

**6000Lb**

6	1/8	6.4	6.7	22	22	6.4
8	1/4	8.1	10.2	27	25	6.4
10	3/8	9.1	10.4	27	32	6.4
15	1/2	10.9	13.6	33	38	7.9
20	3/4	12.7	13.9	38	44	7.9
25	1	14.7	17.3	43	57	11.2
32	1-1/4	17.0	18.0	46	64	11.2
40	1-1/2	17.8	18.4	48	76	12.7
50	2	19.0	19.2	51	92	15.7
65	2-1/2	23.6	28.9	64	108	19.0
80	3	25.9	30.5	68	127	22.4
100	4	27.7	33.0	75	159	28.4

**9000Lb**

15	1/2	21.8	9.35	8.18	11.2	9.5
20	3/4	27.2	9.78	8.56	12.7	12.5
25	1	33.9	11.38	9.96	14.2	12.5
32	1-1/4	42.7	12.14	10.62	14.2	12.5
40	1-1/2	48.8	12.70	11.12	15.7	12.5
50	2	61.2	13.84	12.12	19.0	16.0

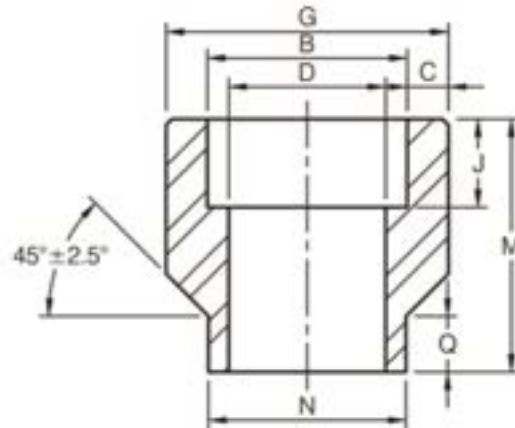
(1) Average of socket wall thickness around periphery shall be no less than listed values. The minimum values are permitted in localized areas.

(2) Tolerance see page 21.

(\*) 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 (ANSI / ASME B1.20.1).

# COUPLET

ASME B16.11-2016(Revision of ASME B16.11-2011)



Dimensions are in millimeters.

Socket Welding										
DN	Nom. Pipe Size	B <sup>(2)</sup>	C <sup>(1)</sup>		D <sup>(2)</sup>	J (Min)	N	Q	M	G
			(Avg)	(Min)						

### 3000Lb

8	1/4	14.2	3.78	3.30	9.3	9.5	17.5	9.5	30.2	23.8
10	3/8	17.6	4.01	3.50	12.6	9.5	20.7	9.5	30.2	27.0
15	1/2	21.8	4.67	4.09	15.8	9.5	23.8	9.5	33.4	33.4
20	3/4	27.2	4.90	4.27	21.0	12.5	27.0	9.5	34.9	38.1
25	1	33.9	5.69	4.98	26.7	12.5	33.4	9.5	42.9	46.1
32	1-1/4	42.7	6.07	5.28	35.1	12.5	42.9	9.5	47.6	55.6
40	1-1/2	48.8	6.35	5.54	40.9	12.5	49.2	9.5	50.8	63.5
50	2	61.2	6.93	6.04	52.5	16.0	61.9	9.5	57.2	79.4
65	2-1/2	73.9	8.76	7.67	62.7	16.0	73.0	9.5	63.5	92.1
80	3	89.8	9.52	8.30	78.0	16.0	88.9	9.5	69.9	111.1
100	4	115.2	10.69	9.35	102.3	19.0	114.3	9.5	76.2	141.3

### 6000Lb

8	1/4	14.2	4.60	4.01	6.4	9.5	17.5	9.5	30.2	25.4
10	3/8	17.6	5.03	4.37	9.2	9.5	20.7	9.5	30.2	31.8
15	1/2	21.8	5.97	5.18	11.8	9.5	23.8	9.5	33.4	38.1
20	3/4	27.2	6.96	6.04	15.6	12.5	27.0	9.5	34.9	44.5
25	1	33.9	7.92	6.93	20.7	12.5	33.4	9.5	42.9	57.2
32	1-1/4	42.7	7.92	6.93	29.5	12.5	42.9	9.5	47.6	63.5
40	1-1/2	48.8	8.92	7.80	34.0	12.5	49.2	9.5	50.8	76.2
50	2	61.2	10.92	9.50	42.9	16.0	61.9	9.5	57.2	92.1

### DIMENSIONAL TOLERANCE OF ASME B16.11

ASME B16 11-2016

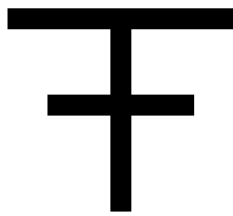
Unit:mm

Item	N	Q	M	E
1/4"-1-1/2"	+1.5/-0.0	±0.8	+0.8/-0.0	+1.5/-0.0
2"-4"	+1.5/-0.0	±0.8	+1.5/-0.0	+1.5/-0.0

(1) Average of socket Wall Thickness around periphery shall be no less than listed values.

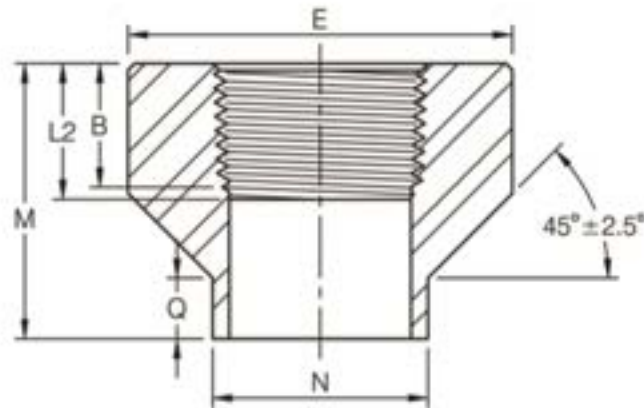
The minimum values are permitted in localized areas.

(2) Tolerance see page 21.



# COUPLET

ASME B16.11-2016(Revision of ASME B16.11-2011)



Dimensions are in millimeters.

Threaded							
DN	Nom. Pipe Size	Length of Thread. (Min)		N	Q	M	E
		B <sup>(*)</sup>	L2 <sup>(*)</sup>				

**3000Lb**

8	1/4	8.1	10.2	17.5	9.5	30.2	23.8
10	3/8	9.1	10.4	20.7	9.5	30.2	27.0
15	1/2	10.9	13.6	23.8	9.5	33.4	33.4
20	3/4	12.7	13.9	27.0	9.5	34.9	38.1
25	1	14.7	17.3	33.4	9.5	42.9	46.1
32	1-1/4	17.0	18.0	42.9	9.5	47.6	55.6
40	1-1/2	17.8	18.4	49.2	9.5	50.8	63.5
50	2	19.0	19.2	61.9	9.5	57.2	79.4
65	2-1/2	23.6	28.9	73.0	9.5	63.5	92.1
80	3	25.9	30.5	88.9	9.5	69.9	111.1
100	4	27.7	33.0	114.3	9.5	76.2	141.3

**6000Lb**

8	1/4	8.1	10.2	17.5	9.5	30.2	25.4
10	3/8	9.1	10.4	20.7	9.5	30.2	31.8
15	1/2	10.9	13.6	23.8	9.5	33.4	38.1
20	3/4	12.7	13.9	27.0	9.5	34.9	44.5
25	1	14.7	17.3	33.4	9.5	42.9	57.2
32	1-1/4	17.0	18.0	42.9	9.5	47.6	63.5
40	1-1/2	17.8	18.4	49.2	9.5	50.8	76.2
50	2	19.0	19.2	61.9	9.5	57.2	92.1
65	2-1/2	23.6	28.9	73.0	9.5	63.5	108.0
80	3	25.9	30.5	88.9	9.5	69.9	127.0
100	4	27.7	33.0	114.3	9.5	76.2	158.8

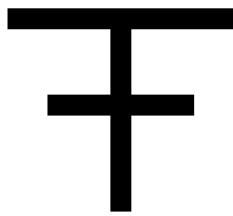
ASME B16.11-2016

**DIMENSIONAL TOLERANCE OF ASME B16.11**

Unit:mm

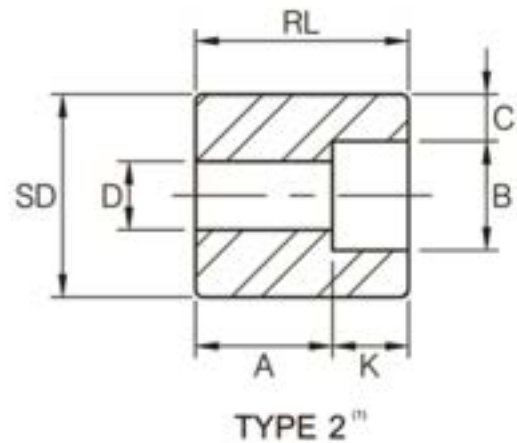
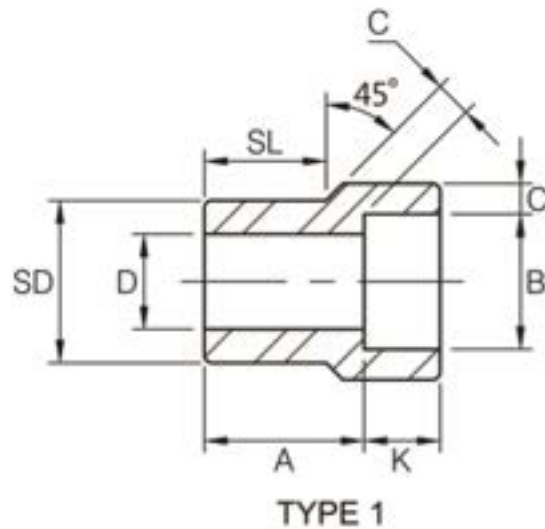
Item	N	Q	M	E
1/4"~1-1/2"	+1.5/-0.0	±0.8	+0.8/-0.0	+1.5/-0.0
2"~4"	+1.5/-0.0	±0.8	+1.5/-0.0	+1.5/-0.0

(\*) 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 (ANSI / ASME B1.20.1).



# REDUCER INSERT

MSS SP-79-2011

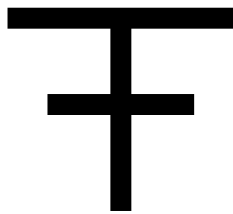


Dimensions are in millimeters.

Nom. Pipe Size	Type <sup>(2)</sup>		Socket		Shank Dia. SD	Laying Length A		Bore D		Wall (Min) C		Length			
			Dia. B	Depth (Min) K		3M	6M	3M	6M	3M	6M	SL		RL (Min)	
	3M	6M									3M	6M	3M	6M	
3/8 x 1/4	1	1	14.4	9.5	17.1	19.0	21.3	9.2	6.3	3.78	4.60	14.2	15.7	-	-
1/2 x 3/8	1	1	17.8	9.5	21.3	20.6	23.1	12.5	9.1	4.01	5.03	15.7	15.7	-	-
1/2 x 1/4	1	1	14.4	9.5	21.3	20.6	20.6	9.2	6.3	3.78	4.60	15.7	15.7	-	-
3/4 x 1/2	1	1	22.0	9.5	26.7	22.4	25.4	15.8	11.7	4.67	5.97	17.5	19.0	-	-
3/4 x 3/8	2	1	17.8	9.5	26.7	15.7	22.4	12.5	9.1	4.01	5.03	-	19.0	26.9	-
3/4 x 1/4	2	2	14.4	9.5	26.7	17.5	22.4	9.2	6.3	3.78	4.60	-	-	26.9	32.0
1 x 3/4	1	1	27.4	12.5	33.4	23.9	28.4	20.9	15.5	4.90	6.96	19.0	20.6	-	-
1 x 1/2	2	1	22.0	9.5	33.4	15.7	28.4	15.8	11.7	4.67	5.97	-	20.6	28.4	-
1 x 3/8	2	2	17.8	9.5	33.4	17.5	22.4	12.5	9.1	4.01	5.03	-	-	28.4	33.2
1 x 1/4	2	2	14.4	9.5	33.4	19.0	23.9	9.2	6.3	3.78	4.60	-	-	28.4	33.2
1-1/4 x 1	1	1	34.1	12.5	42.2	25.4	30.2	26.6	20.7	5.69	7.92	20.6	22.4	-	-
1-1/4 x 3/4	2	2	27.4	12.5	42.2	17.5	20.6	20.9	15.5	4.90	6.96	-	-	31.7	34.7
1-1/4 x 1/2	2	2	22.0	9.5	42.2	19.0	22.4	15.8	11.7	4.67	5.97	-	-	31.7	34.7
1-1/4 x 3/8	2	2	17.8	9.5	42.2	20.6	23.9	12.5	9.1	4.01	5.03	-	-	31.7	34.7
1-1/4 x 1/4	2	2	14.4	9.5	42.2	22.4	25.4	9.2	6.3	3.78	4.60	-	-	31.7	34.7
1-1/2 x 1-1/4	1	1	42.9	12.5	48.2	28.4	35.0	35.0	29.4	6.07	7.92	22.4	25.4	-	-
1-1/2 x 1	2	1	34.1	12.5	48.2	17.5	29.2	26.6	20.7	5.69	7.92	-	25.4	33.2	-
1-1/2 x 3/4	2	2	27.4	12.5	48.2	19.0	25.4	20.9	15.5	4.90	6.96	-	-	33.2	39.6
1-1/2 x 1/2	2	2	22.0	9.5	48.2	20.6	26.9	15.8	11.7	4.67	5.97	-	-	33.2	39.6
1-1/2 x 3/8	2	2	17.8	9.5	48.2	22.4	28.4	12.5	9.1	4.01	5.03	-	-	33.2	39.6
2 x 1-1/2	1	1	49.0	12.5	60.3	31.8	38.9	40.8	33.9	6.35	8.92	25.4	28.7	-	-
2 x 1-1/4	2	2	42.9	12.5	60.3	20.6	23.9	35.0	29.4	6.07	7.92	-	-	38.1	41.1
2 x 1	2	2	34.1	12.5	60.3	22.4	25.4	26.6	20.7	5.69	7.92	-	-	38.1	41.1
2 x 3/4	2	2	27.4	12.5	60.3	23.9	26.9	20.9	15.5	4.90	6.96	-	-	38.1	41.1
2 x 1/2	2	2	22.0	9.5	60.3	25.4	28.4	15.8	11.7	4.67	5.97	-	-	38.1	41.1

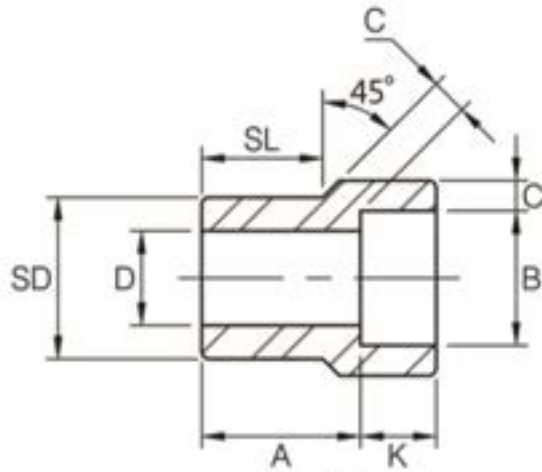
(1) At the option of the manufacturer Type 2 Reducers may be furnished in Type 1 configuration.

(2) 3M & 6M symbols denote 3000 and 6000 classes.

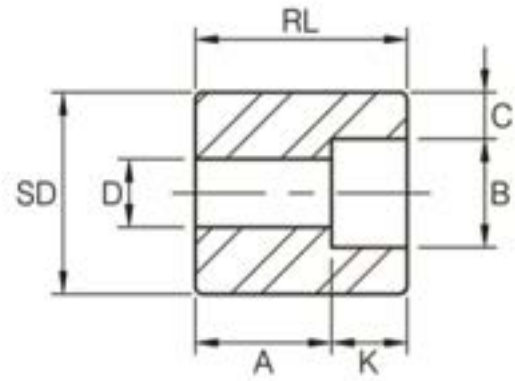


# REDUCER INSERT

MSS SP-79-2011



TYPE 1



TYPE 2<sup>™</sup>

(Continued)

Dimensions are in millimeters.

Nom. Pipe Size	Type <sup>(2)</sup>		Socket		Shank Dia. SD	Laying Length A		Bore D		Wall (Min) C		Length			
	3M	6M	Dia. B	Depth (Min) K		3M	6M	3M	6M	3M	6M	SL		RL (Min)	
												3M	6M	3M	6M
2-1/2 × 2	1	1	61.4	16.0	73.0	46.0	42.7	52.4	42.8	6.93	10.92	38.1	31.8	—	—
2-1/2 × 1-1/2	2	2	49.0	12.5	73.0	35.0	35.0	40.8	33.9	6.35	8.92	—	—	53.8	53.8
2-1/2 × 1-1/4	2	2	42.9	12.5	73.0	36.6	36.6	35.0	29.4	6.07	7.92	—	—	53.8	53.8
2-1/2 × 1	2	2	34.1	12.5	73.0	38.1	38.1	26.6	20.7	5.69	7.92	—	—	53.8	53.8
2-1/2 × 3/4	2	2	27.4	12.5	73.0	39.6	38.1	20.9	15.5	4.90	6.96	—	—	53.8	53.8
3 × 2-1/2	1	1	74.1	16.0	88.9	38.1	57.2	62.7	54.0	8.76	11.91	31.8	44.4	—	—
3 × 2	2	2	61.4	16.0	88.9	25.4	31.8	52.4	42.8	6.93	10.92	—	—	47.4	53.8
3 × 1-1/2	2	2	49.0	12.5	88.9	28.4	31.8	40.8	33.9	6.35	8.92	—	—	47.4	53.8
3 × 1-1/4	2	2	42.9	12.5	88.9	30.2	31.8	35.0	29.4	6.07	7.92	—	—	47.4	53.8
3 × 1	2	2	34.1	12.5	88.9	31.8	31.8	26.6	20.7	5.69	7.92	—	—	47.4	53.8
4 × 3	2	—	90.0	16.0	114.3	33.3	—	77.9	—	9.52	—	—	—	60.4	—
4 × 2-1/2	2	—	74.1	16.0	114.3	38.1	—	62.7	—	8.76	—	—	—	60.4	—
4 × 2	2	—	61.4	16.0	114.3	38.1	—	52.4	—	6.93	—	—	—	60.4	—
4 × 1-1/2	2	—	49.0	12.5	114.3	41.1	—	40.8	—	6.35	—	—	—	60.4	—
4 × 1-1/4	2	—	42.9	12.5	114.3	42.9	—	35.0	—	6.07	—	—	—	60.4	—

(1) At the option of the manufacturer Type 2 Reducers may be furnished in Type 1 configuration.

(2) 3M & 6M symbols denote 3000 and 6000 classes.

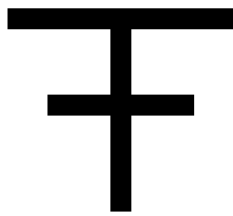
## DIMENSIONAL TOLERANCES OF REDUCER INSERT

MSS SP-79-2011

Unit : mm

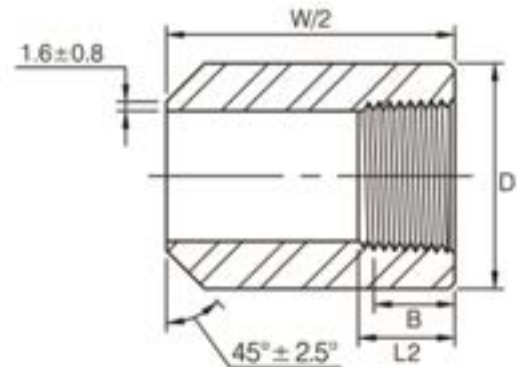
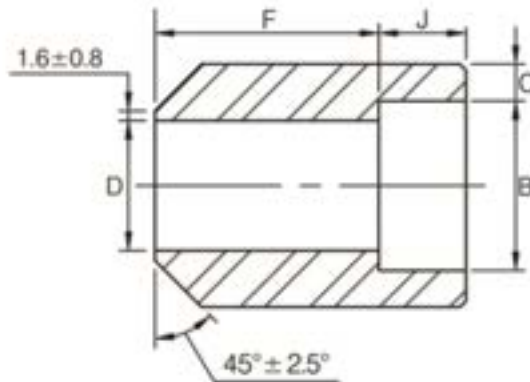
	1/4	3/8	1/2	3/4	1	1-1/4	1-1/2	2	2-1/2	3	4
Laying Length (A)	×		+1.5 -0.0			+2.0 -0.0				+2.5 -0.0	
Socket Dia (B)				±0.20						+0.3 -0.2	×
Bore (D)				±0.8						±1.5	×
Shank Dia (SD)	×			±0.25					±0.50		±0.8
Shank Length (SL)	×		+0.0 -1.5			+0.0 -2.0				+0.0 -2.5	





# BOSS

ASME B16.11-2016(Revision of ASME B16.11-2011)



Dimensions are in millimeters.

Dimensions are in millimeters.

Socket Welding							
DN	Nom. Pipe Size	B <sup>(2)</sup>	C <sup>(1)</sup>		D <sup>(2)</sup>	F <sup>(2)</sup>	J (Min)
			(Avg)	(Min)			

Threaded					
DN	Nom. Pipe Size	Length of Thread. (Min)		W	D
		B <sup>(1)</sup>	L2 <sup>(1)</sup>		

### 3000Lb

6	1/8	10.8	3.18	3.18	6.9	16.0	9.5
8	1/4	14.2	3.78	3.30	9.3	16.0	9.5
10	3/8	17.6	4.01	3.50	12.6	17.5	9.5
15	1/2	21.8	4.67	4.09	15.8	22.5	9.5
20	3/4	27.2	4.90	4.27	21.0	24.0	12.5
25	1	33.9	5.69	4.98	26.7	28.5	12.5
32	1-1/4	42.7	6.07	5.28	35.1	30.0	12.5
40	1-1/2	48.8	6.35	5.54	40.9	32.0	12.5
50	2	61.2	6.93	6.04	52.5	41.0	16.0
65	2-1/2	73.9	8.76	7.67	62.7	43.0	16.0
80	3	89.8	9.52	8.30	78.0	44.5	16.0
100	4	115.2	10.69	9.35	102.3	48.0	19.0

### 3000Lb

6	1/8	6.4	6.7	32	16
8	1/4	8.1	10.2	35	19
10	3/8	9.1	10.4	38	22
15	1/2	10.9	13.6	48	28
20	3/4	12.7	13.9	51	35
25	1	14.7	17.3	60	44
32	1-1/4	17.0	18.0	67	57
40	1-1/2	17.8	18.4	79	64
50	2	19.0	19.2	86	76
65	2-1/2	23.6	28.9	92	92
80	3	25.9	30.5	108	108
100	4	27.7	33.0	121	140

### 6000Lb

6	1/8	10.8	3.96	3.43	4.0	16.0	9.5
8	1/4	14.2	4.60	4.01	6.4	16.0	9.5
10	3/8	17.6	5.03	4.37	9.2	17.5	9.5
15	1/2	21.8	5.97	5.18	11.8	22.5	9.5
20	3/4	27.2	6.96	6.04	15.6	24.0	12.5
25	1	33.9	7.92	6.93	20.7	28.5	12.5
32	1-1/4	42.7	7.92	6.93	29.5	30.0	12.5
40	1-1/2	48.8	8.92	7.80	34.0	32.0	12.5
50	2	61.2	10.92	9.50	42.9	41.0	16.0

### 6000Lb

6	1/8	6.4	6.7	32	22
8	1/4	8.1	10.2	35	25
10	3/8	9.1	10.4	38	32
15	1/2	10.9	13.6	48	38
20	3/4	12.7	13.9	51	44
25	1	14.7	17.3	60	57
32	1-1/4	17.0	18.0	67	64
40	1-1/2	17.8	18.4	79	76
50	2	19.0	19.2	86	92
65	2-1/2	23.6	28.9	92	108
80	3	25.9	30.5	108	127
100	4	27.7	33.0	121	159

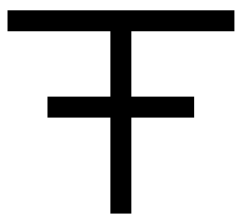
### 9000Lb

15	1/2	21.8	9.35	8.18	6.4	22.5	9.5
20	3/4	27.2	9.78	8.56	11.1	24.0	12.5
25	1	33.9	11.38	9.96	15.2	28.5	12.5
32	1-1/4	42.7	12.14	10.62	22.8	30.0	12.5
40	1-1/2	48.8	12.70	11.12	28.0	32.0	12.5
50	2	61.2	13.84	12.12	38.2	41.0	16.0

(1) Average of socket Wall Thickness around periphery shall be no less than listed values. The minimum values are permitted in localized areas.

(2) Tolerance see page 21.

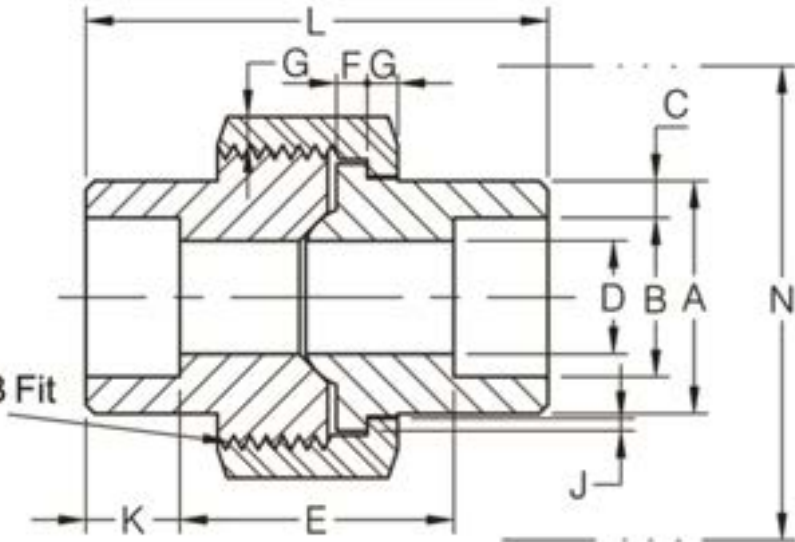
(1) Dimension B is minimum length of perfect thread. The length of useful thread ( B plus threads with fully formed roots and flat crests ) shall not be less than L2 (effective length of external thread) required by American National Standard for pipe threads (ANSI / ASME B1.20.1).



# SOCKET WELD END UNION

MSS SP-83-2014

H-Thrd's  
Minimum 4 Full Thrd's  
Engagement Class 2A / 2B Fit  
ANSI B1.1

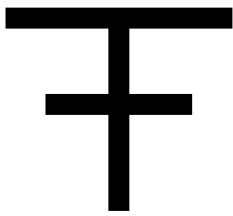


6000Lb

Dimensions are in millimeters.

Nom. Pipe Size	Pipe End (Min) A	Socket Bore Dia. B <sup>(1)</sup>	Socket Wall (Min) C	Water Way Bore D <sup>(1)</sup>	Laying Length E <sup>(1)</sup>	Male Flange (Min) F	Nut (Min) G	Thrds. Per 25.4mm H	Beaming (Min) J	Depth of Socket (Min) K	Length Assem. Nom. L	Clear Assem. Nut N
1/8	21.8	11.18 10.67	3.43	4.80 3.20	22.4 19.1	3.18	3.18	16	1.24	9.7	41.4	50.8
1/4	25.9	14.61 14.10	4.01	7.11 5.59	26.9 20.6	3.43	3.43	14	1.37	9.7	46.0	55.9
3/8	31.2	18.03 17.53	4.37	9.88 8.36	26.9 20.6	3.68	3.68	14	1.50	9.7	49.0	58.4
1/2	37.1	22.23 21.72	5.18	12.55 11.02	31.8 25.4	4.06	4.06	11	1.68	9.7	56.9	66.0
3/4	45.5	27.56 27.05	6.05	16.31 14.78	34.3 26.2	4.57	4.45	11	1.85	12.7	62.0	78.7
1	54.9	34.29 33.78	6.93	21.46 19.94	40.6 32.5	5.33	5.21	10	2.13	12.7	71.1	94.0
1-1/4	61.5	43.05 42.55	6.93	30.23 28.70	42.2 34.0	5.84	5.59	10	2.31	12.7	76.5	111.8
1-1/2	75.2	49.15 48.64	7.80	34.75 33.22	45.5 37.3	6.60	6.35	10	2.69	12.7	86.1	132.1
2	91.7	61.62 61.11	9.50	43.61 42.09	61.7 52.1	7.49	7.11	8	3.07	15.7	102.4	149.9
2-1/2	109.2	74.45 73.81	10.39	54.74 53.21	63.8 53.6	8.26	8.00	8	3.53	15.7	109.0	175.3

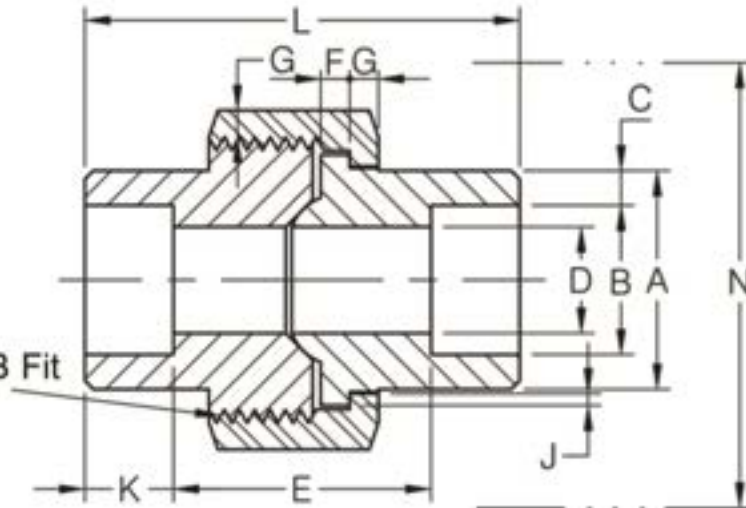
(1) Upper and lower values for each size are the respective maximum and minimum dimensions.



# SOCKET WELD END UNION

MSS SP-83-2014

H-Thrd's  
Minimum 4 Full Thrd's  
Engagement Class 2A/2B Fit  
ANSI B1.1

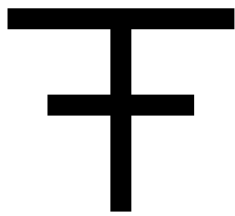


3000Lb

Dimensions are in millimeters.

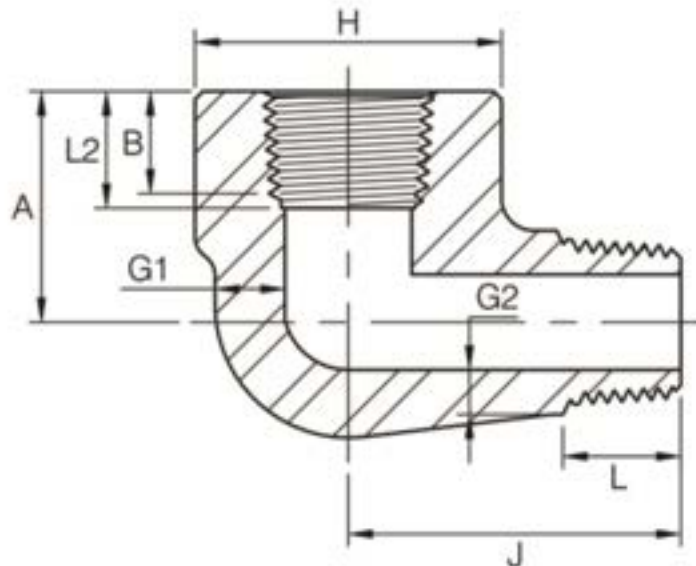
Nom. Pipe Size	Pipe End (Min) A	Socket Bore Dia. B <sup>(1)</sup>	Socket Wall (Min) C	Water Way Bore D <sup>(1)</sup>	Laying Length E <sup>(1)</sup>	Male Flange (Min) F	Nut (Min) G	Thrds. Per 25.4mm H	Bearing (Min) J	Depth of Socket (Min) K	Length Assem. Nom. L	Clear Assem. Nut N
1/8	21.8	11.18 10.67	3.18	7.59 6.07	22.4 19.1	3.18	3.18	16	1.24	9.7	41.4	50.8
1/4	21.8	14.61 14.10	3.30	10.01 8.48	22.4 19.1	3.18	3.18	16	1.24	9.7	41.4	50.8
3/8	25.9	18.03 17.53	3.51	13.28 11.76	26.9 20.6	3.43	3.43	14	1.37	9.7	46.0	55.9
1/2	31.2	22.23 21.72	4.09	16.56 15.04	26.9 20.6	3.68	3.68	14	1.50	9.7	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	4.45	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	15.7	86.1	132.1
2-1/2	91.7	74.45 73.81	7.67	64.24 61.19	61.7 52.1	7.49	7.11	8	3.07	15.7	102.4	149.9
3	109.2	90.42 89.79	8.31	79.45 76.40	63.8 53.6	8.26	8.00	8	3.53	15.7	109.0	175.3

(1) Upper and lower values for each size are the respective maximum and minimum dimensions.



# STREET ELBOW

ASME B16.11-2016(Revision of ASME B16.11-2011)



Dimensions are in millimeters.

DN	Nom. Pipe Size	H	A	J	G1 (Min)	G2 <sup>(1)</sup> (Min)	B <sup>(2)</sup> (Min)	L2 <sup>(2)</sup> (Min)	L (Min)
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### 3000Lb

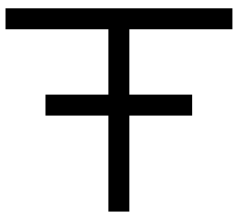
6	1/8	19	19	25	3.18	2.74	6.4	6.7	10.0
8	1/4	25	22	32	3.30	3.22	8.1	10.2	11.0
10	3/8	32	25	38	3.51	3.50	9.1	10.4	13.0
15	1/2	38	28	41	4.09	4.16	10.9	13.6	14.0
20	3/4	44	35	48	4.32	4.88	12.7	13.9	16.0
25	1	51	44	57	4.98	5.56	14.7	17.3	19.0
32	1-1/4	62	51	66	5.28	5.56	17.0	18.0	21.0
40	1-1/2	70	54	71	5.56	6.25	17.8	18.4	21.0
50	2	84	64	84	7.14	7.64	19.0	19.0	22.0

### 6000Lb

6	1/8	25	22	32	5.08	4.22	6.4	6.7	10.0
8	1/4	32	25	38	5.66	5.28	8.1	10.2	11.0
10	3/8	38	28	41	6.98	5.59	9.1	10.4	13.0
15	1/2	44	35	48	8.15	6.53	10.9	13.6	14.0
20	3/4	51	44	57	8.53	6.86	12.7	13.9	16.0
25	1	62	51	66	9.93	7.95	14.7	17.3	19.0
32	1-1/4	70	54	71	10.59	8.48	17.0	18.0	21.0
40	1-1/2	84	64	84	11.07	8.89	17.8	18.4	21.0
50	2	102	83	105	12.09	9.70	19.0	19.0	22.0

(1) Wall thickness before threading.

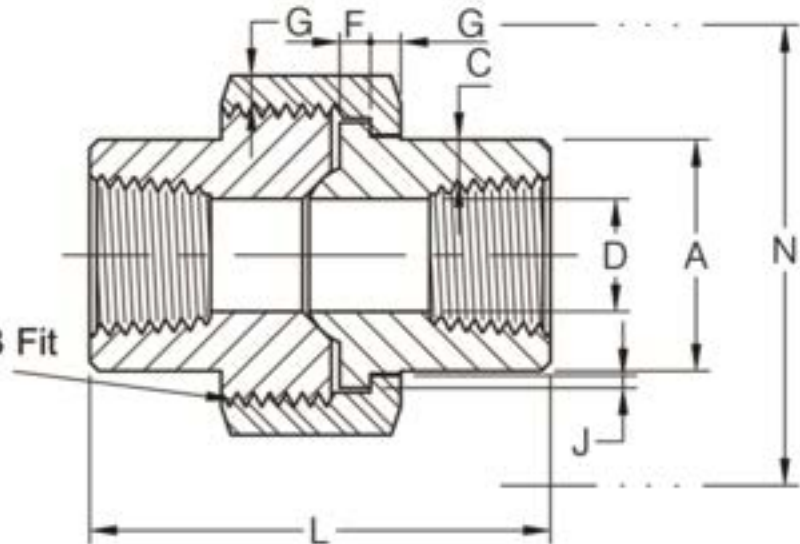
(2) Dimension B is minimum length of perfect thread. The length of useful thread (B plus threads with fully formed roots and flat crests) shall not be less than L2 (effective length of external thread) required by American National Standard for pipe threads (ANSI / ASME B1.20.1).



# THREADED END UNION

MSS SP-83-2014

H-Thrd's  
Minimum 4 Full Thrd's  
Engagement Class 2A / 2B Fit  
ANSI B1.1

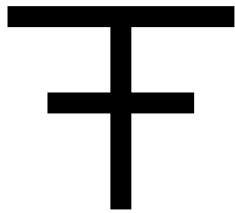


3000 Lb

Dimensions are in millimeters.

Nom. Pipe Size	Pipe End (Min) A	Wall (Min) C	Water Way Bore D <sup>(1)</sup>	Male Flange (Min) F	Nut (Min) G	Thrds. Per 25.4mm H	Bearing (Min) J	Length Assem. Nom. L	Clear Assem. Nut N
1/8	14.7	2.41	8.43 6.43	3.18	3.18	16	1.24	41.4	50.8
1/4	19.0	3.02	11.13 9.45	3.18	3.18	16	1.24	41.4	50.8
3/8	22.9	3.20	14.27 13.51	3.43	3.43	14	1.37	46.0	55.9
1/2	27.7	3.73	17.86 17.07	3.68	3.68	14	1.50	49.0	58.4
3/4	33.5	3.91	23.01 21.39	4.06	4.06	11	1.68	56.9	66.0
1	41.4	4.55	28.98 27.74	4.57	4.45	11	1.85	62.0	78.7
1-1/4	50.5	4.85	37.69 35.36	5.33	5.21	10	2.13	71.1	94.0
1-1/2	57.2	5.08	43.54 41.20	5.84	5.59	10	2.31	76.5	111.8
2	70.1	5.54	55.58 52.12	6.60	6.35	10	2.69	86.1	132.1
2-1/2	85.3	7.01	66.27 64.31	7.49	7.11	8	3.07	102.4	149.9
3	102.4	7.62	82.55 77.27	8.26	8.00	8	3.53	109.0	175.3

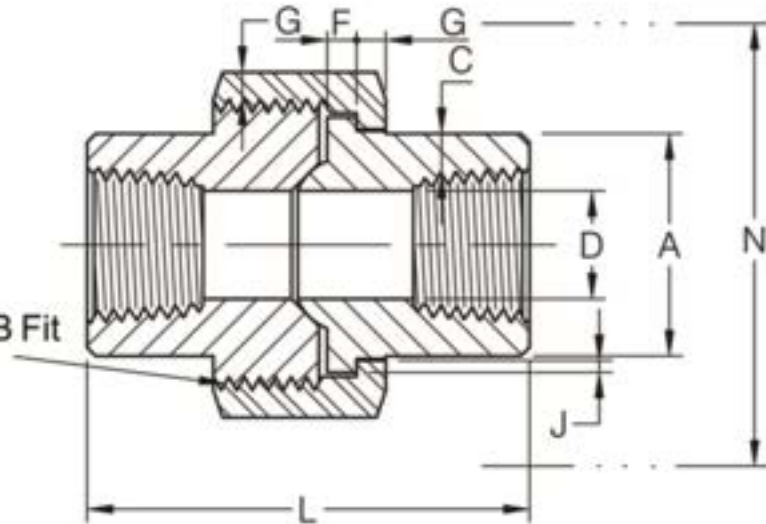
(1) Upper and lower values for each size are the respective maximum and minimum dimensions.



# THREADED END UNION

MSS SP-83-2014

H-Thrd's  
Minimum 4 Full Thrd's  
Engagement Class 2A / 2B Fit  
ANSI B1.1



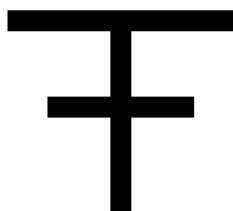
6000 Lb

Dimensions are in millimeters.

Nom. Pipe Size	Pipe End (Min) A	Wall (Min) C	Water Way Bore D <sup>(1)</sup>	Male Flange (Min) F	Nut (Min) G	Thrds. Per 25.4mm H	Bearing (Min) J	Length Assem. Nom. L	Clear Assem. Nut N
1/8	16.5	3.15	8.43 3.20	3.18	3.18	16	1.24	41.4	50.8
1/4	21.1	3.68	11.13 5.59	3.43	3.43	14	1.37	46.0	55.9
3/8	25.1	4.01	14.27 8.36	3.68	3.68	14	1.50	49.0	58.4
1/2	31.0	4.78	17.86 11.02	4.06	4.06	11	1.68	56.9	66.0
3/4	37.8	5.56	23.01 14.78	4.57	4.45	11	1.85	62.0	78.7
1	46.2	6.35	28.98 19.94	5.33	5.21	10	2.13	71.1	94.0
1-1/4	54.9	6.35	37.69 28.70	5.84	5.59	10	2.31	76.5	111.8
1-1/2	62.5	7.14	43.54 33.22	6.60	6.35	10	2.69	86.1	132.1
2	77.7	8.74	55.58 42.09	7.49	7.11	8	3.07	102.4	149.9
2-1/2	92.2	9.53	66.27 53.21	8.26	8.00	8	3.53	109.0	175.3
3	111.3	11.13	82.55 65.89	10.19	10.19	8	4.06	158 <sup>(2)</sup>	200.7

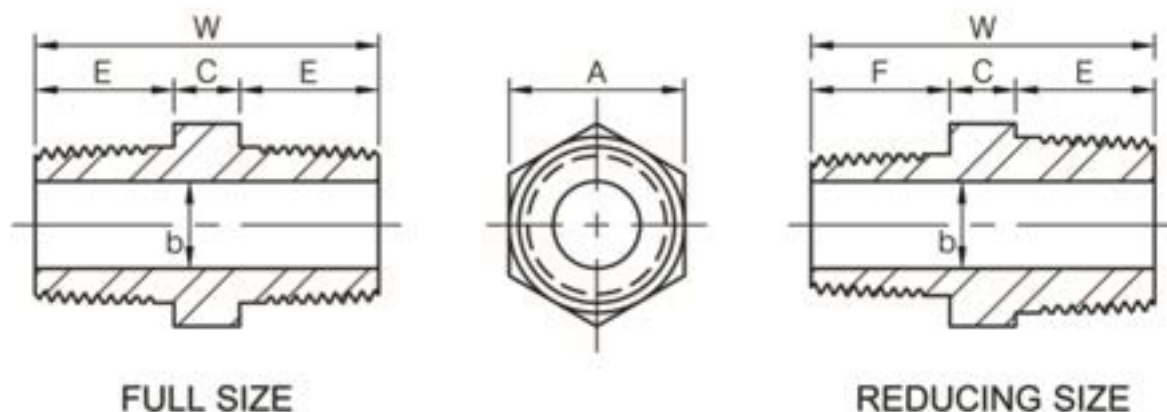
(1) Upper and lower values for each size are the respective maximum and minimum dimensions.

(2) This length size is 158mm by BothWell standards, and the actual length is 190.5mm from MSS SP-83 2014.



# HEX NIPPLE

BS3799-1974



FULL SIZE

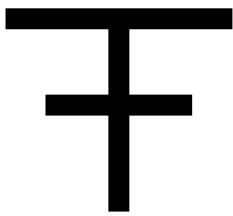
REDUCING SIZE

Dimensions are in millimeters.

Nominal Size				A (Min)	W (Min)	E (Min)	b <sup>(1)</sup>		C (Min)	F (Min)
Equal		Reducing					3M <sup>(2)</sup>	6M <sup>(2)</sup>		
In	DN	In	DN							
1/8	(6)	—	—	11	26	10	5	2	6	—
1/4	(8)	—	—	15	36	15	8	6	6	—
—	—	1/4 x 1/8	(8 x 6)	15	31	15	5	2	6	10
3/8	(10)	—	—	18	40	16	11	8	8	—
—	—	3/8 x 1/4	(10 x 8)	18	39	16	8	6	8	15
1/2	(15)	—	—	22	48	20	14	11	8	—
—	—	1/2 x 3/8	(15 x 10)	22	44	20	11	8	8	16
—	—	1/2 x 1/4	(15 x 8)	22	43	20	8	6	8	15
3/4	(20)	—	—	27	52	21	19	13	10	—
—	—	3/4 x 1/2	(20 x 15)	27	50	21	14	11	9	20
—	—	3/4 x 3/8	(20 x 10)	27	46	21	11	8	9	16
1	(25)	—	—	35	60	25	24	17	10	—
—	—	1 x 3/4	(25 x 20)	35	56	25	19	13	10	21
—	—	1 x 1/2	(25 x 15)	35	55	25	14	11	10	20
1-1/2	(40)	—	—	50	68	26	38	30	16	—
—	—	1-1/2 x 1	(40 x 25)	50	67	26	24	17	16	25
—	—	1-1/2 x 3/4	(40 x 20)	50	63	26	19	13	16	21
—	—	1-1/2 x 1/2	(40 x 15)	50	62	26	14	11	16	20
2	(50)	—	—	62	71	27	49	39	17	—
—	—	2 x 1-1/2	(50 x 40)	62	70	27	38	30	17	26
—	—	2 x 1	(50 x 25)	62	70	27	24	17	18	25
—	—	2 x 3/4	(50 x 20)	62	65	27	19	13	17	21
—	—	2 x 1/2	(50 x 15)	62	65	27	14	11	18	20

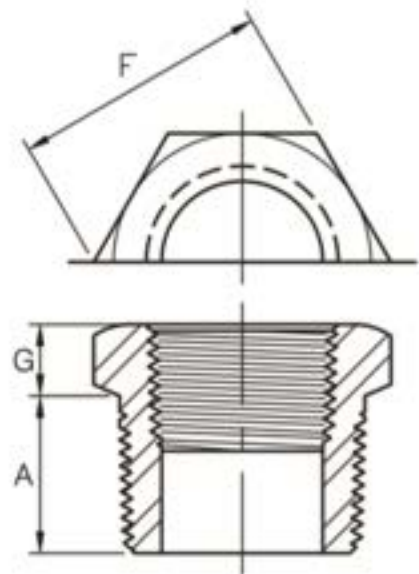
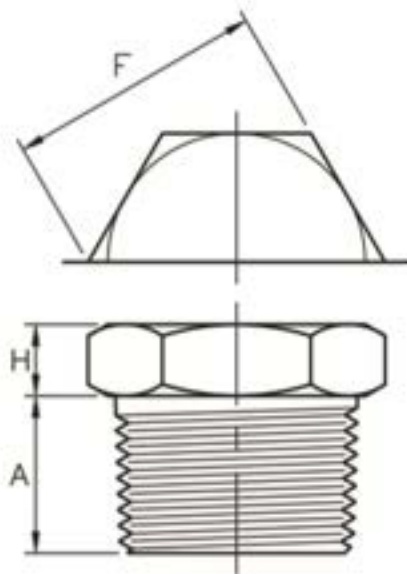
(1) Tolerance see page 27.

(2) 3M & 6M symbols denote 3000 & 6000 classes.



# HEX HEAD PLUG & BUSHING

ASME B16.11-2016(Revision of ASME B16.11-2011)



Dimensions are in millimeters.

Dimensions are in millimeters.

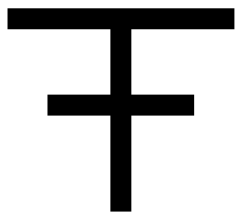
Hex Head Plug				
DN	Nom. Pipe Size	A (Min)	F (Nom.)	H (Min)
6	1/8	10	11.11	6
8	1/4	11	15.88	6
10	3/8	13	17.46	8
15	1/2	14	22.23	8
20	3/4	16	26.99	10
25	1	19	34.93	10
32	1-1/4	21	44.45	14
40	1-1/2	21	50.80	16
50	2	22	63.50	18
65	2-1/2	27	76.20	19
80	3	28	88.90	21
100	4	32	117.48	25

Hex Head Bushing				
DN	Nom. Pipe Size	A (Min)	F (Nom.)	G (Min)
8	1/4	11	15.88	3
10	3/8	13	17.46	4
15	1/2	14	22.23	5
20	3/4	16	26.99	6
25	1	19	34.93	6
32	1-1/4	21	44.45	7
40	1-1/2	21	50.80	8
50	2	22	63.50	9
65	2-1/2	27	76.20	10
80	3	28	88.90	10
100	4	32	117.48	13

(1) CAUTIONARY NOTE REGARDING HEX BUSHINGS.

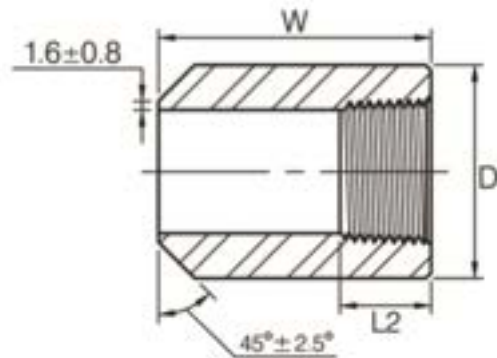
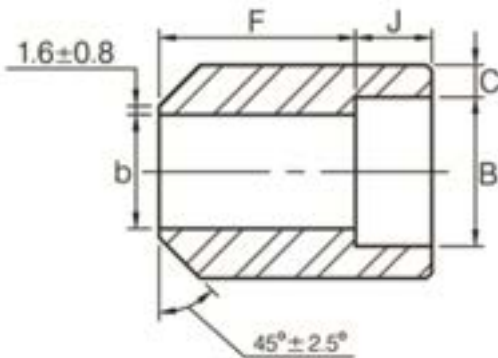
Hex Head Bushings of one-size reduction should not be used in services where they might be subject to harmful loads and forces than internal pressures.





# BOSS

BS3799-1974



Dimensions are in millimeters.

Dimensions are in millimeters.

Socket Welding						
Nom. Pipe Size	DN	B (Min)	b	J (Min)	F	C (Min)

Threaded				
Nom. Pipe Size	DN	D	W	L2 (Min)

3000Lb						
1/8	6	10.7	6.8	10.0	28.0	3.2
1/4	8	14.1	9.2	10.0	32.0	3.3
3/8	10	17.6	12.5	11.0	34.0	3.5
1/2	15	21.8	15.5	13.0	38.0	4.1
3/4	20	27.4	21.0	13.0	38.0	4.3
1	25	34.1	26.5	16.0	35.0	5.0
1-1/2	40	49.0	40.5	19.0	32.0	5.6
2	50	61.0	52.0	22.0	29.0	6.1
2-1/2	65	73.8	62.0	22.0	29.0	7.7
3	80	89.7	78.0	22.0	29.0	8.3

3000Lb				
1/8	6	16.0	38.0	6.70
1/4	8	19.0	41.0	10.21
3/8	10	22.0	45.0	10.36
1/2	15	29.0	51.0	13.56
3/4	20	35.0	51.0	13.86
1	25	45.0	51.0	17.34
1-1/2	40	64.0	51.0	18.38
2	50	76.0	51.0	19.22
2-1/2	65	95.0	51.0	28.89
3	80	110.0	57.0	30.48
4	100	140.0	64.0	33.02

6000Lb						
1/2	15	21.8	11.8	13.0	38.0	5.2
3/4	20	27.4	15.5	13.0	38.0	6.1
1	25	34.1	20.7	16.0	35.0	7.0
1-1/2	40	49.0	34.0	19.0	32.0	7.8
2	50	61.0	43.0	22.0	29.0	9.5
2-1/2	65	73.8	54.0	22.0	29.0	10.4
3	80	89.7	66.0	22.0	29.0	12.2

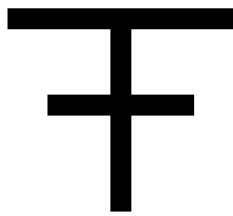
6000Lb				
1/8	6	22.0	38.0	6.70
1/4	8	26.0	41.0	10.21
3/8	10	32.0	45.0	10.36
1/2	15	38.0	51.0	13.56
3/4	20	45.0	51.0	13.86
1	25	60.0	51.0	17.34
1-1/2	40	76.0	51.0	18.38
2	50	95.0	51.0	19.22

## DIMENSIONAL TOLERANCE OF BS3799

BS3799-1974

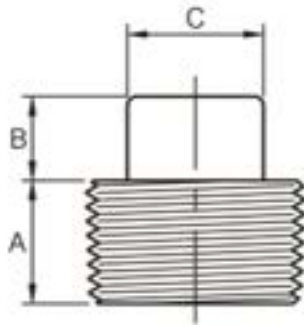
Unit: mm

Item	Type of pipe fitting	DN	6~8	10~20	25~50	65~80
		NPS	1/8"~1/4"	3/8"~3/4"	1"~2"	2-1/2"~3"
Concentricity of bore (X)	All fittings	±0.8				
Coincidence of axes (Y)		±1/200				
Bore diameter of fitting (b)	Boss & Hex Nipple	±0.4				±0.8
Bottom of socket to opposite face	Boss	±0.8	±1.5	±2.0	±2.5	

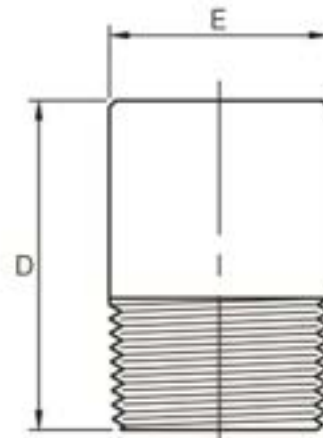


# SQUARE HEAD & ROUND HEAD PLUG

ASME B16.11-2016(Revision of ASME B16.11-2011)



Dimensions are in millimeters.



Dimensions are in millimeters.

Square Head Plug				
DN	Nom. Pipe Size	A (Min)	B (Min)	C (Min)
6	1/8	10	6	7.15
8	1/4	11	6	9.55
10	3/8	13	8	11.11
15	1/2	14	10	14.29
20	3/4	16	11	15.88
25	1	19	13	20.64
32	1-1/4	21	14	23.81
40	1-1/2	21	16	28.58
50	2	22	18	33.27
65	2-1/2	27	19	38.10
80	3	28	21	42.86
100	4	32	25	63.50

Round Head Plug			
DN	Nom. Pipe Size	E (Nom.)	D (Min)
6	1/8	10	35
8	1/4	14	41
10	3/8	18	41
15	1/2	21	44
20	3/4	27	44
25	1	33	51
32	1-1/4	43	51
40	1-1/2	48	51
50	2	60	64
65	2-1/2	73	70
80	3	89	70
100	4	114	76

## DIMENSIONAL TOLERANCE OF ASME B16.11

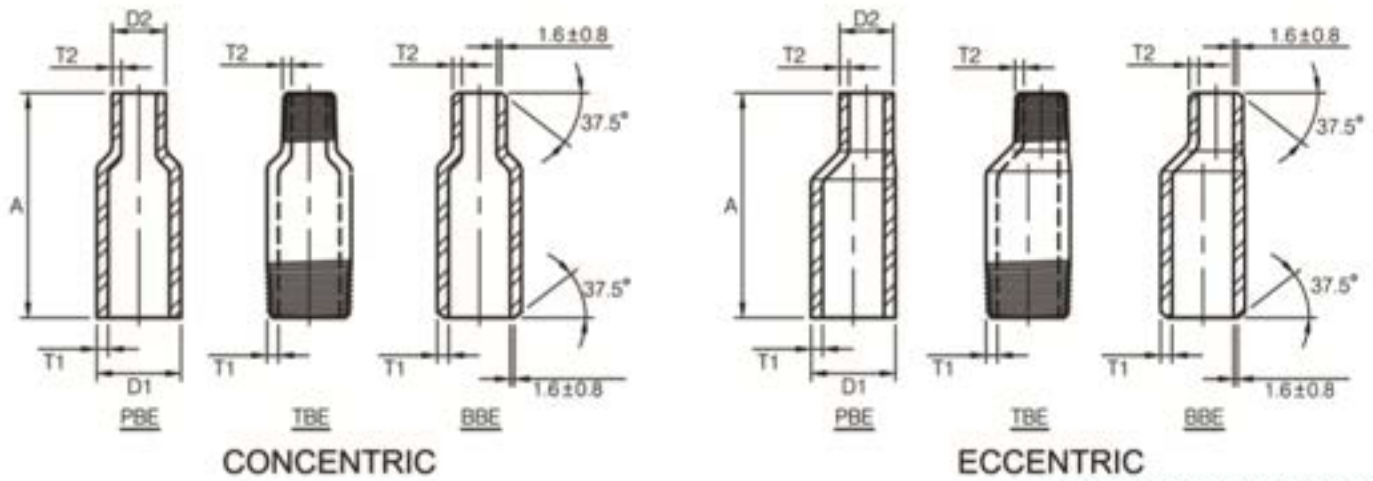
ASME B16.11-2016

Unit : mm

Item	Type of pipe fitting	Size				
		DN	6 to 8	10 to 20	25 to 50	65 to 100
		NPS	1/8 to 1/4	3/8 to 3/4	1 to 2	2-1/2 to 4
Bore diameter of socket (B)	All types of pipe fittings	+0.4	+0.4	+0.4	+0.5	
Bore diameter of fitting (D)		-0.0	-0.0	-0.0	-0.0	
Concentricity of bore (X)		±0.7	±0.7	±0.7	±1.4	
Coincidence of axes (Y)		± 0.8				
Center to bottom of socket (A)	45° 90° Elbow Tee, Cross	±1.0	±1.5	± 2.0	± 2.5	
Bottom to bottom of socket (E)	Full Coupling	±1.5	± 3.0	± 4.0	± 5.0	
Bottom to socket to opposite face (F)	Half Coupling	±1.0	±1.5	± 2.0	± 2.5	

# SWAGED NIPPLE

MSS SP-95-2014



Dimensions are in millimeters.

Nom. Pipe Size	Outside Diameter		End to End "A"	Wall Thickness							
	Large End D1	Small End D2		T1				T2			
				Sch40 (STD)	Sch80 (XS)	Sch160	XXS	Sch40 (STD)	Sch80 (XS)	Sch160	XXS
1/4 x 1/8	13.7	10.3	57	2.2	3.0	3.7	6.1	1.7	2.4	-	-
3/8 x 1/8	17.1	10.3	64	2.3	3.2	4.0	6.4	1.7	2.4	-	-
3/8 x 1/4	17.1	13.7	64	2.3	3.2	4.0	6.4	2.2	3.0	-	-
1/2 x 1/8	21.3	10.3	70	2.8	3.7	4.8	7.5	1.7	2.4	-	-
1/2 x 1/4	21.3	13.7	70	2.8	3.7	4.8	7.5	2.2	3.0	-	-
1/2 x 3/8	21.3	17.1	70	2.8	3.7	4.8	7.5	2.3	3.2	-	-
3/4 x 1/8	26.7	10.3	76	2.9	3.9	5.6	7.8	1.7	2.4	-	-
3/4 x 1/4	26.7	13.7	76	2.9	3.9	5.6	7.8	2.2	3.0	-	-
3/4 x 3/8	26.7	17.1	76	2.9	3.9	5.6	7.8	2.3	3.2	-	-
3/4 x 1/2	26.7	21.3	76	2.9	3.9	5.6	7.8	2.8	3.7	4.8	7.5
1 x 1/8	33.4	10.3	89	3.4	4.5	6.4	9.1	1.7	2.4	-	-
1 x 1/4	33.4	13.7	89	3.4	4.5	6.4	9.1	2.2	3.0	-	-
1 x 3/8	33.4	17.1	89	3.4	4.5	6.4	9.1	2.3	3.2	-	-
1 x 1/2	33.4	21.3	89	3.4	4.5	6.4	9.1	2.8	3.7	4.8	7.5
1 x 3/4	33.4	26.7	89	3.4	4.5	6.4	9.1	2.9	3.9	5.6	7.8
1-1/4 x 1/8	42.2	10.3	102	3.6	4.9	6.4	9.7	1.7	2.4	-	-
1-1/4 x 1/4	42.2	13.7	102	3.6	4.9	6.4	9.7	2.2	3.0	-	-
1-1/4 x 3/8	42.2	17.1	102	3.6	4.9	6.4	9.7	2.3	3.2	-	-
1-1/4 x 1/2	42.2	21.3	102	3.6	4.9	6.4	9.7	2.8	3.7	4.8	7.5
1-1/4 x 3/4	42.2	26.7	102	3.6	4.9	6.4	9.7	2.9	3.9	5.6	7.8
1-1/4 x 1	42.2	33.4	102	3.6	4.9	6.4	9.7	3.4	4.5	6.4	9.1
1-1/2 x 1/8	48.3	10.3	114	3.7	5.1	7.1	10.2	1.7	2.4	-	-
1-1/2 x 1/4	48.3	13.7	114	3.7	5.1	7.1	10.2	2.2	3.0	-	-
1-1/2 x 3/8	48.3	17.1	114	3.7	5.1	7.1	10.2	2.3	3.2	-	-
1-1/2 x 1/2	48.3	21.3	114	3.7	5.1	7.1	10.2	2.8	3.7	4.8	7.5
1-1/2 x 3/4	48.3	26.7	114	3.7	5.1	7.1	10.2	2.9	3.9	5.6	7.8
1-1/2 x 1	48.3	33.4	114	3.7	5.1	7.1	10.2	3.4	4.5	6.4	9.1
1-1/2 x 1-1/4	48.3	42.2	114	3.7	5.1	7.1	10.2	3.6	4.9	6.4	9.7
2 x 1/8	60.3	10.3	165	3.9	5.5	8.7	11.1	1.7	2.4	-	-
2 x 1/4	60.3	13.7	165	3.9	5.5	8.7	11.1	2.2	3.0	-	-
2 x 3/8	60.3	17.1	165	3.9	5.5	8.7	11.1	2.3	3.2	-	-
2 x 1/2	60.3	21.3	165	3.9	5.5	8.7	11.1	2.8	3.7	4.8	7.5
2 x 3/4	60.3	26.7	165	3.9	5.5	8.7	11.1	2.9	3.9	5.6	7.8
2 x 1	60.3	33.4	165	3.9	5.5	8.7	11.1	3.4	4.5	6.4	9.1
2 x 1-1/4	60.3	42.2	165	3.9	5.5	8.7	11.1	3.6	4.9	6.4	9.7
2 x 1-1/2	60.3	48.3	165	3.9	5.5	8.7	11.1	3.7	5.1	7.1	10.2
2-1/2 x 1/8	73.0	10.3	178	5.2	7.0	9.5	14.0	1.7	2.4	-	-
2-1/2 x 1/4	73.0	13.7	178	5.2	7.0	9.5	14.0	2.2	3.0	-	-
2-1/2 x 3/8	73.0	17.1	178	5.2	7.0	9.5	14.0	2.3	3.2	-	-
2-1/2 x 1/2	73.0	21.3	178	5.2	7.0	9.5	14.0	2.8	3.7	4.8	7.5
2-1/2 x 3/4	73.0	26.7	178	5.2	7.0	9.5	14.0	2.9	3.9	5.6	7.8
2-1/2 x 1	73.0	33.4	178	5.2	7.0	9.5	14.0	3.4	4.5	6.4	9.1

# SWAGED NIPPLE

MSS SP-95-2014

(Continued)

Dimensions are in millimeters.

Nom. Pipe Size	Outside Diameter		End to End "A"	Wall Thickness							
	Large End D1	Small End D2		T1				T2			
				Sch40 (STD)	Sch80 (XS)	Sch160	XXS	Sch40 (STD)	Sch80 (XS)	Sch160	XXS
2-1/2 × 1-1/4	73.0	42.2	178	5.2	7.0	9.5	14.0	3.6	4.9	6.4	9.7
2-1/2 × 1-1/2	73.0	48.3	178	5.2	7.0	9.5	14.0	3.7	5.1	7.1	10.2
2-1/2 × 2	73.0	60.3	178	5.2	7.0	9.5	14.0	3.9	5.5	8.7	11.1
3 × 1/8	88.9	10.3	203	5.5	7.6	11.1	15.2	1.7	2.4	—	—
3 × 1/4	88.9	13.7	203	5.5	7.6	11.1	15.2	2.2	3.0	—	—
3 × 3/8	88.9	17.1	203	5.5	7.6	11.1	15.2	2.3	3.2	—	—
3 × 1/2	88.9	21.3	203	5.5	7.6	11.1	15.2	2.8	3.7	4.8	7.5
3 × 3/4	88.9	26.7	203	5.5	7.6	11.1	15.2	2.9	3.9	5.6	7.8
3 × 1	88.9	33.4	203	5.5	7.6	11.1	15.2	3.4	4.5	6.4	9.1
3 × 1-1/4	88.9	42.2	203	5.5	7.6	11.1	15.2	3.6	4.9	6.4	9.7
3 × 1-1/2	88.9	48.3	203	5.5	7.6	11.1	15.2	3.7	5.1	7.1	10.2
3 × 2	88.9	60.3	203	5.5	7.6	11.1	15.2	3.9	5.5	8.7	11.1
3 × 2-1/2	88.9	73.0	203	5.5	7.6	11.1	15.2	5.2	7.0	9.5	14.0
3-1/2 × 1/8	101.6	10.3	203	5.7	8.1	—	—	1.7	2.4	—	—
3-1/2 × 1/4	101.6	13.7	203	5.7	8.1	—	—	2.2	3.0	—	—
3-1/2 × 3/8	101.6	17.1	203	5.7	8.1	—	—	2.3	3.2	—	—
3-1/2 × 1/2	101.6	21.3	203	5.7	8.1	—	—	2.8	3.7	4.8	7.5
3-1/3 × 3/4	101.6	26.7	203	5.7	8.1	—	—	2.9	3.9	5.6	7.8
3-1/2 × 1	101.6	33.4	203	5.7	8.1	—	—	3.4	4.5	6.4	9.1
3-1/2 × 1-1/4	101.6	42.2	203	5.7	8.1	—	—	3.6	4.9	6.4	9.7
3-1/2 × 1-1/2	101.6	48.3	203	5.7	8.1	—	—	3.7	5.1	7.1	10.2
3-1/2 × 2	101.6	60.3	203	5.7	8.1	—	—	3.9	5.5	8.7	11.1
3-1/2 × 2-1/2	101.6	73.0	203	5.7	8.1	—	—	5.2	7.0	9.5	14.0
3-1/2 × 3	101.6	88.9	203	5.7	8.1	—	—	5.5	7.6	11.1	15.2
4 × 1/4	114.3	13.7	229	6.0	8.6	13.5	17.1	2.2	3.0	—	—
4 × 3/8	114.3	17.1	229	6.0	8.6	13.5	17.1	2.3	3.2	—	—
4 × 1/2	114.3	21.3	229	6.0	8.6	13.5	17.1	2.8	3.7	4.8	7.5
4 × 3/4	114.3	26.7	229	6.0	8.6	13.5	17.1	2.9	3.9	5.6	7.8
4 × 1	114.3	33.4	229	6.0	8.6	13.5	17.1	3.4	4.5	6.4	9.1
4 × 1-1/4	114.3	42.2	229	6.0	8.6	13.5	17.1	3.6	4.9	6.4	9.7
4 × 1-1/2	114.3	48.3	229	6.0	8.6	13.5	17.1	3.7	5.1	7.1	10.2
4 × 2	114.3	60.3	229	6.0	8.6	13.5	17.1	3.9	5.5	8.7	11.1
4 × 2-1/2	114.3	73.0	229	6.0	8.6	13.5	17.1	5.2	7.0	9.5	14.0
4 × 3	114.3	88.9	229	6.0	8.6	13.5	17.1	5.5	7.6	11.1	15.2
4 × 3-1/2	114.3	101.6	229	6.0	8.6	13.5	17.1	5.7	8.1	—	—

(1) Wall Thickness (T1, T2) in accordance with ASME B36.10M.

PBE: PLAIN BOTH ENDS  
PSE: PLAIN SMALL END  
PLE: PLAIN LARGE END

BBE: BEVEL BOTH ENDS  
BSE: BEVEL SMALL END  
BLE: BEVEL LARGE END

TBE: THREAD BOTH ENDS  
TSE: THREAD SMALL END  
TLE: THREAD LARGE END

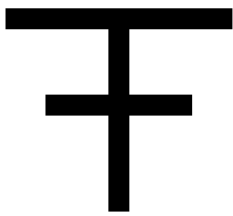
## DIMENSIONAL TOLERANCES OF SWAGED NIPPLES

MSS SP-95-2014

Unit : mm

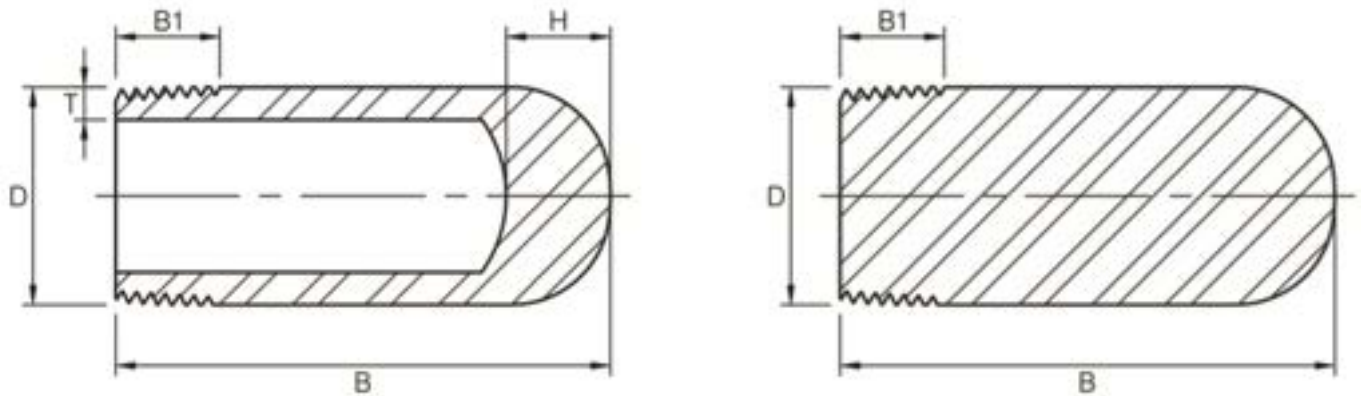
Nominal Pipe Size (Inch)	Overall Length	Outside Diameter at End		Fitting Wall Thickness (see Note 1)
		Square Cut Ends	Other End Connections	
1/8 ~ 3/8	± 1.5	+0.4 -0.8	± 0.8	Not less than 87.5% of Nominal Wall Thickness
1/2 ~ 1-1/2	± 1.5	+0.4 -0.8	+1.5 -0.8	
2 ~ 2-1/2	± 3.0	± 0.8	+1.5 -0.8	
3 ~ 4	± 3.0	± 0.8	± 1.5	

Note 1 : Prior to threading or grooving.



# BULL PLUG

MSS SP-95-2014

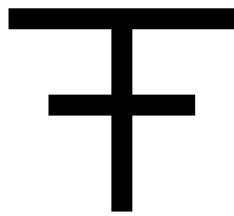


Dimensions are in millimeters.

Nom. Pipe Size	D	B	B1	T (Min)				H
				Sch 40/STD	Sch 80/XS (3M)	Sch 160 (6M)	XXS	
1/8	10.3	51	9.5	1.73	2.41	—	—	14
1/4	13.7	51	11.0	2.24	3.02	—	—	14
3/8	17.1	57	12.5	2.31	3.20	—	—	14
1/2	21.3	64	14.5	2.77	3.73	4.78	7.47	14
3/4	26.7	70	16.0	2.87	3.91	5.56	7.82	18
1	33.4	76	19.0	3.38	4.55	6.35	9.09	18
1-1/4	42.2	83	20.5	3.56	4.85	6.35	9.70	18
1-1/2	48.3	89	20.5	3.68	5.08	7.14	10.15	18
2	60.3	102	22.0	3.91	5.54	8.74	11.07	20
2-1/2	73.0	127	27.0	5.16	7.01	9.53	14.02	20
3	88.9	152	28.5	5.49	7.62	11.13	15.24	20
4	114.3	178	32.0	6.02	8.56	13.49	17.12	20

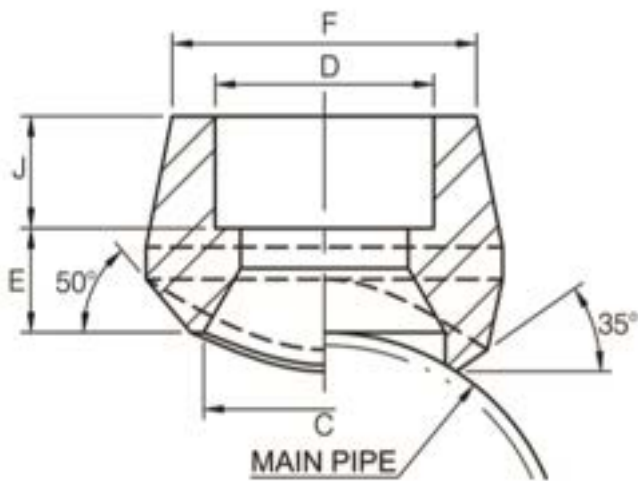
(1) Thread in accordance with ASME B1.20.1.

(2) Wall Thickness (T Min.) in accordance with ASME B36.10M.

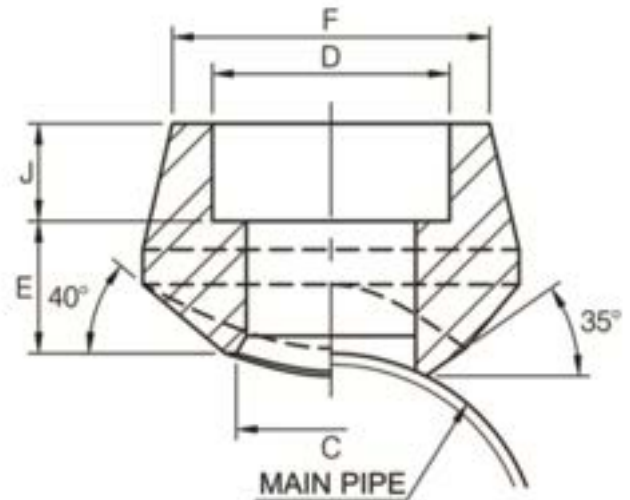


# SOCKET WELDING END 90° BRANCH OUTLET

MSS SP-97-2012



**REDUCING WAY**



**STRAIGHT WAY**

Dimensions are in millimeters.

Reducing way					
OutLet Pipe (in)	C	D	F	J (Min)	E (Max)

3000Lb

1/8	13.7	10.8	22.0	9.5	11.0
1/4	13.7	14.2	22.0	9.5	11.0
3/8	19.1	17.6	25.9	9.5	13.0
1/2	21.3	21.8	31.4	9.5	16.0
3/4	26.7	27.2	37.1	12.5	16.0
1	33.4	33.9	45.5	12.5	23.0
1-1/4	42.2	42.7	57.0	12.5	23.0
1-1/2	48.3	48.8	64.0	12.5	24.0
2	60.3	61.2	76.0	16.0	24.0
2-1/2	73.2	73.9	92.0	16.0	26.0
3	88.9	89.8	109.2	16.0	31.0
4	114.3	115.2	140.0	19.0	31.0

6000Lb

1/2	16.6	21.8	38.0	9.5	24.0
3/4	21.2	27.2	44.0	12.5	26.0
1	27.0	33.9	57.0	12.5	29.0
1-1/4	35.8	42.7	64.0	12.5	31.0
1-1/2	41.2	48.8	76.0	12.5	32.0
2	51.6	61.2	92.0	16.0	37.0

(1) Socket in accordance with ASME B16.11.

(2) 3000LB Outlet size 4 and less fit a number of run pipe sizes and the fitting are marked accordingly. See page 42 for conventional run pipe size combination.

Dimensions are in millimeters.

Straight way					
OutLet Pipe (in)	C	D	F	J (Min)	E (Max)

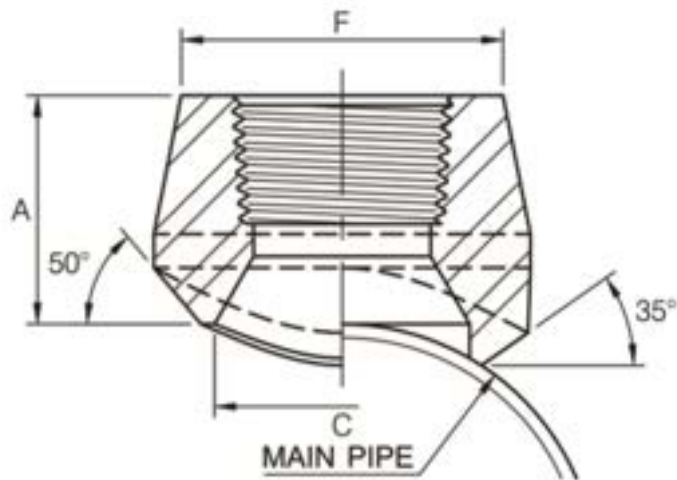
3000Lb

1/4	11.5	14.2	22.0	9.5	11.0
3/8	14.5	17.6	25.9	9.5	13.0
1/2	16.5	21.8	31.4	9.5	16.0
3/4	21.5	27.2	37.1	12.5	16.0
1	27.2	33.9	45.5	12.5	23.0
1-1/4	36.0	42.7	57.0	12.5	23.0
1-1/2	42.0	48.8	64.0	12.5	24.0
2	53.0	61.2	76.0	16.0	24.0
2-1/2	65.0	73.9	92.0	16.0	26.0
3	80.0	89.8	109.2	16.0	31.0
4	104.0	115.2	140.0	19.0	31.0

(1) Socket in accordance with ASME B16.11.

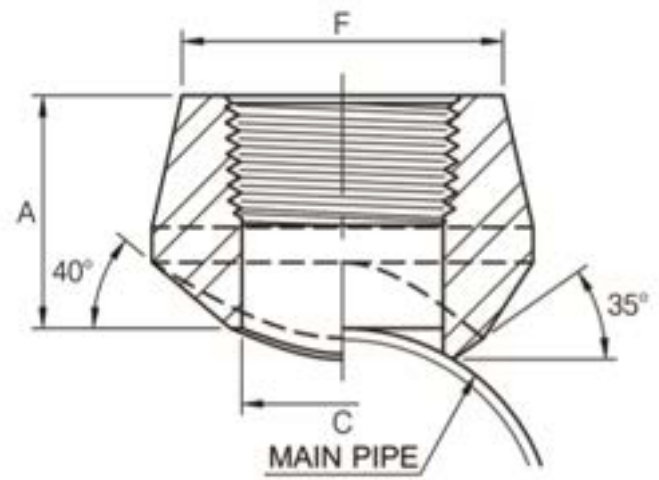
# THREADED END 90° BRANCH OUTLET

MSS SP-97-2012



**REDUCING WAY**

Dimensions are in millimeters.



**STRAIGHT WAY**

Dimensions are in millimeters.

Reducing way			
OutLet Pipe (in)	A	C	F

3000Lb

1/8	19.0	13.7	17.3
1/4	19.0	13.7	22.0
3/8	20.6	17.1	25.9
1/2	25.4	21.3	31.4
3/4	26.9	26.7	37.1
1	33.3	33.4	45.5
1-1/4	33.3	42.2	57.0
1-1/2	35.0	48.3	64.0
2	38.1	60.3	76.0
2-1/2	46.0	73.0	92.0
3	50.8	88.9	109.2
4	57.2	114.3	140.0

6000Lb

1/2	31.8	16.6	33.9
3/4	36.6	21.2	41.2
1	39.6	27.0	49.9
1-1/4	41.1	35.8	58.6
1-1/2	42.3	41.2	66.7
2	52.3	51.6	83.2

(1) Thread in accordance with ASME B1.20.1.

(2) 3000LB outlet size 4 and less fit a number of run pipe sizes and the fitting are marked accordingly.

See page 42 for conventional run pipe size combination.

Straight way			
OutLet Pipe (in)	A	C	F

3000Lb

1/4	19.0	11.5	22.0
3/8	20.6	14.5	25.9
1/2	25.4	16.5	31.4
3/4	26.9	21.5	37.1
1	33.3	27.2	45.5
1-1/4	33.3	36.0	57.0
1-1/2	35.0	42.0	64.0
2	38.1	53.0	76.0
2-1/2	46.0	65.0	92.0
3	50.8	80.0	109.2
4	57.2	104.0	140.0

(1) Thread in accordance with ASME B1.20.1.

## DIMENSIONAL TOLERANCE

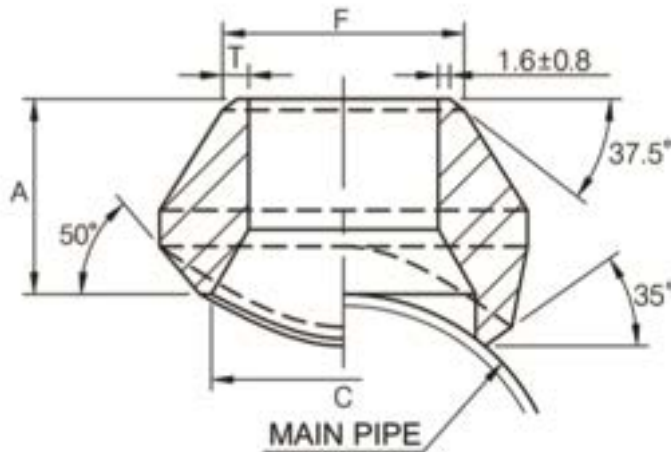
MSS SP-97-2012

Unit : mm

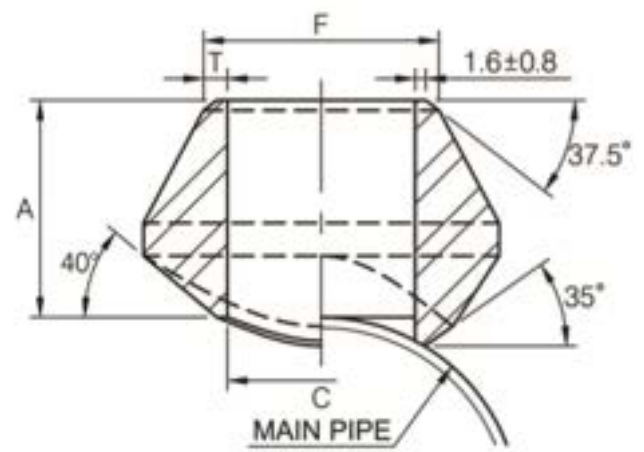
Item	1/8"~3/4"	1"~4"
Face of fitting to crotch (A)	±0.8	±1.6

# BUTT WELDING END 90° BRANCH OUTLET

MSS SP-97-2012



**REDUCING WAY**



**STRAIGHT WAY**

## STANDARD

Dimensions are in millimeters.

Reducing way				
OutLet Pipe (in)	A	C	F	T
1/8	15.7	13.7	10.3	1.73
1/4	15.7	13.7	13.7	2.24
3/8	19.1	17.1	17.1	2.31
1/2	19.1	21.3	21.3	2.77
3/4	22.4	26.7	26.7	2.87
1	26.9	33.4	33.4	3.38
1-1/4	31.8	42.2	42.2	3.56
1-1/2	33.3	48.3	48.3	3.68
2	38.1	60.3	60.3	3.91
2-1/2	41.1	73.0	73.0	5.16
3	44.4	88.9	88.9	5.49
3-1/2	47.8	101.6	101.6	5.74
4	50.8	114.3	114.3	6.02
5	57.2	141.3	141.3	6.55
6	60.4	168.3	168.3	7.11
8	69.8	219.3	219.3	8.11
10	77.7	273.1	273.1	9.27
12	85.9	323.9	323.9	9.53
14	88.9	355.6	355.6	9.53
16	93.7	406.4	406.4	9.53
18	96.8	457.2	457.2	9.53
20	101.6	508.0	508.0	9.53
24	115.8	609.6	609.6	9.53

Dimensions are in millimeters.

Straight way				
OutLet Pipe (in)	A	C	F	T
1/4	15.7	11.5	13.7	2.24
3/8	19.1	14.5	17.1	2.31
1/2	19.1	16.5	21.3	2.77
3/4	22.4	21.5	26.7	2.87
1	26.9	27.2	33.4	3.38
1-1/4	31.8	36.0	42.2	3.56
1-1/2	33.3	42.0	48.3	3.68
2	38.1	53.0	60.3	3.91
2-1/2	41.1	65.0	73.0	5.16
3	44.4	80.0	88.9	5.49
4	50.8	104.0	114.3	6.02

(1) Weld Bevel in accordance with ASME B16.25.

## DIMENSIONAL TOLERANCE

MSS SP-97-2012

Unit : mm

Item	1/8"~3/4"	1"~4"	5"~12"	14"~24"
Face of fitting to crotch (A)	±0.8	±1.6	±3.2	±4.8

(1) Weld Bevel in accordance with ASME B16.25.

(2) Outlet size 4 and less fit a number of run pipe sizes and the fittings are marked accordingly.

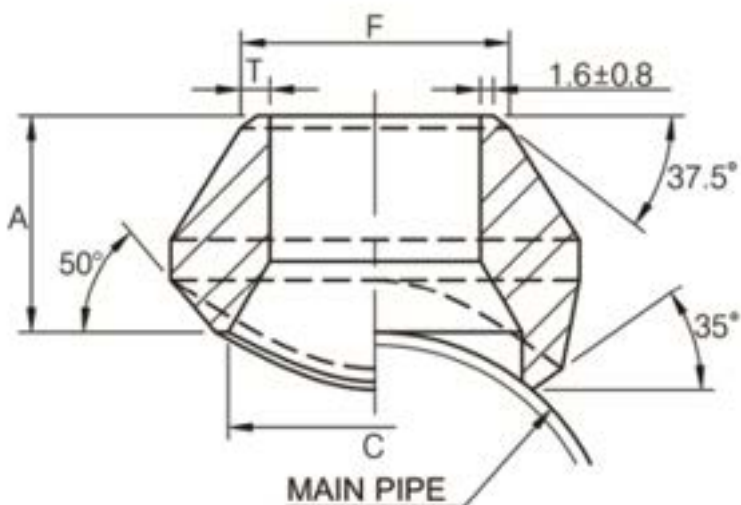
See page 42 for conventional run pipe size combination.

(3) Outlet sizes 5 and up order to specific size combination.

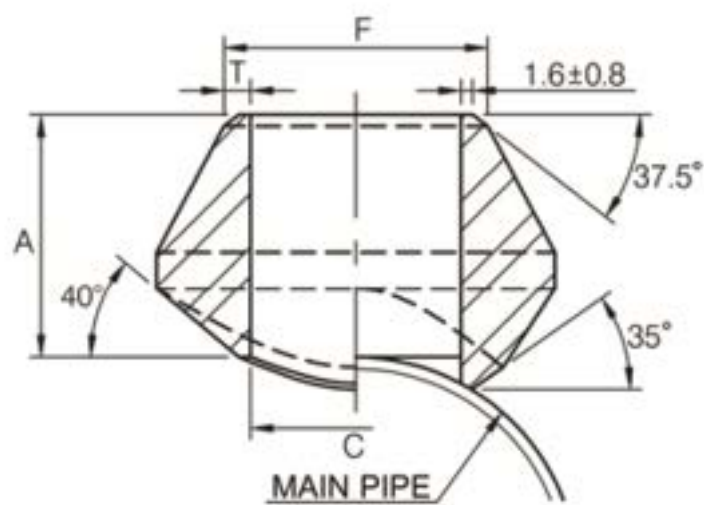


# BUTT WELDING END 90° BRANCH OUTLET

MSS SP-97-2012



**REDUCING WAY**



**STRAIGHT WAY**

**EXTRA STRONG**

Dimensions are in millimeters.

Reducing way				
OutLet Pipe (in)	A	C	F	T
1/8	15.7	13.7	10.3	2.41
1/4	15.7	13.7	13.7	3.02
3/8	19.1	17.1	17.1	3.20
1/2	19.1	21.3	21.3	3.73
3/4	22.4	26.7	26.7	3.91
1	26.9	33.4	33.4	4.55
1-1/4	31.8	42.2	42.2	4.85
1-1/2	33.3	48.3	48.3	5.08
2	38.1	60.3	60.3	5.54
2-1/2	41.1	73.0	73.0	7.01
3	44.4	88.9	88.9	7.62
3-1/2	47.8	101.6	101.6	8.56
4	50.8	114.3	114.3	8.56
5	57.2	141.3	141.3	9.53
6	77.7	168.3	168.3	10.97
8	98.6	219.3	219.3	12.70
10	93.7	273.1	273.1	12.70
12	103.1	323.9	323.9	12.70
14	100.1	355.6	355.6	12.70
16	106.2	406.4	406.4	12.70
18	111.2	457.2	457.2	12.70
20	119.1	508.0	508.0	12.70
24	139.7	609.6	609.6	12.70

- (1) Weld Bevel in accordance with ASME B16.25.
- (2) Outlet size 4 and less fit a number of run pipe sizes and the fittings are marked accordingly.  
See page 42 for conventional run pipe size combination.
- (3) Outlet sizes 5 and up order to specific size combination.

Dimensions are in millimeters.

Straight way				
OutLet Pipe (in)	A	C	F	T
1/4	15.7	11.5	13.7	3.02
3/8	19.1	14.5	17.1	3.20
1/2	19.1	16.5	21.3	3.73
3/4	22.4	21.5	26.7	3.91
1	26.9	27.2	33.4	4.55
1-1/4	31.8	36.0	42.2	4.85
1-1/2	33.3	42.0	48.3	5.08
2	38.1	53.0	60.3	5.54
2-1/2	41.1	65.0	73.0	7.01
3	44.4	80.0	88.9	7.62
4	50.8	104.0	114.3	8.56

(1) Weld Bevel in Accordance with ASME B16.25.

## DIMENSIONAL TOLERANCE

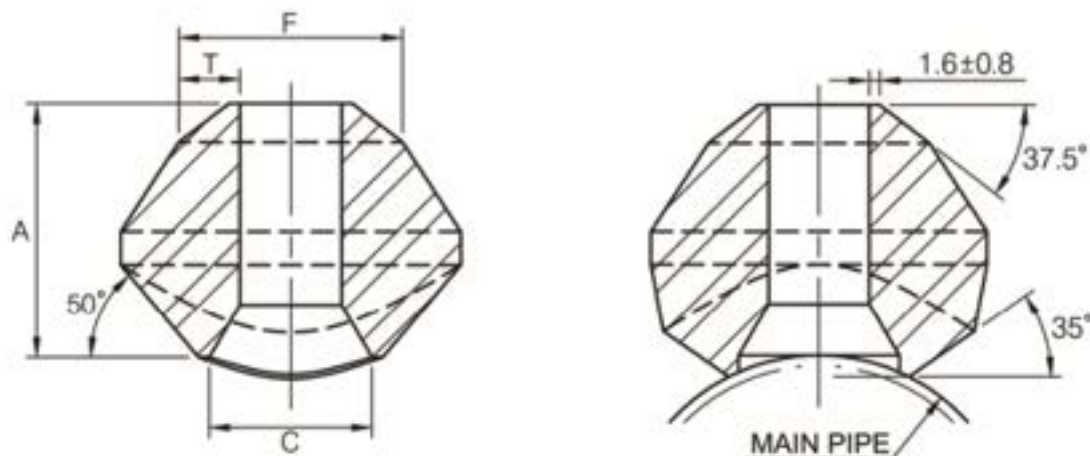
MSS SP-97-2012

Unit : mm

Item	1/8"-3/4"	1"-4"	5"-12"	14"-24"
Face of fitting to crotch (A)	±0.8	±1.6	±3.2	±4.8

# BUTT WELDING END 90° BRANCH OUTLET

MSS SP-97-2012



SCHEDULE 160 & DOUBLE EXTRA STRONG

Dimensions are in millimeters.

Outlet Pipe (in)	Reducing way				
	A	C	F	T	
				S160	XXS
1/2	28.4	13.8	21.3	4.78	7.47
3/4	31.8	18.9	26.7	5.56	7.82
1	38.1	24.3	33.4	6.35	9.09
1-1/4	44.4	32.5	42.2	6.35	9.70
1-1/2	50.8	38.1	48.3	7.14	10.15
2	55.4	49.2	60.3	8.74	11.07
2-1/2	62.0	59.0	73.0	9.53	14.02
3	73.2	73.7	88.9	11.13	15.24
4	84.1	97.2	114.3	13.49	17.12
5	93.7	122.2	141.3	15.88	19.05
6	104.6	146.4	168.3	18.26	21.95

(1) Weld bevel in accordance with ASME B16.25.

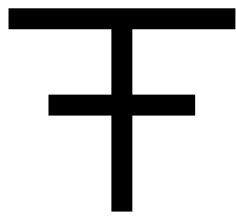
(2) Outlet size by order to specific size combination.

## CONVENTIONAL RUN PIPE SIZE COMBINATIONS

3000lb THREAD/SOCKET-WELD END STD/XXS BUTT WELDING END

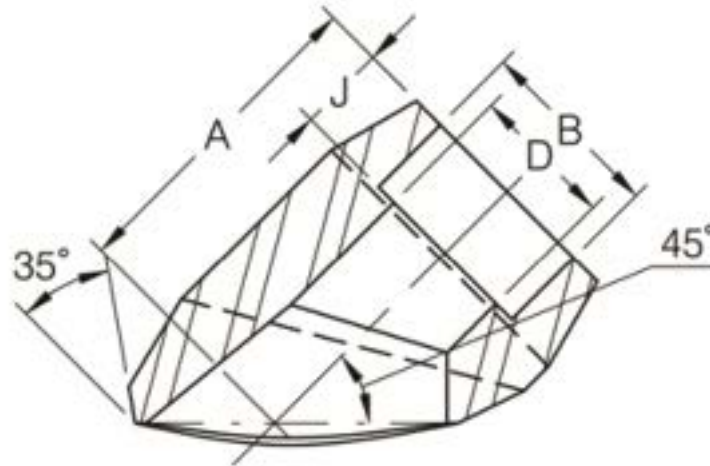
		OUTLET SIZE											
		1/4"	3/8"	1/2"	3/4"	1"	1-1/4"	1-1/2"	2"	2-1/2"	3"	4"	
RUN SIZE (MAIN PIPE)	Reducing way	3/8"~3/4" 1"~36"	1/2" 3/4"~1-1/4" 1-1/2"~36"	3/4" 1" 1-1/4" 1-1/2"~3" 3-1/2"~36"	1" 1-1/4" 1-1/2" 2"~3" 3-1/2"~6" 8"~36"	1-1/4" 1-1/2" 2" 2-1/2" 3"~4" 5"~10" 12"~36"	1-1/2" 2" 2-1/2" 3" 3-1/2"~5" 6"~8" 10"~36"	2" 2-1/2" 3" 3-1/2" 4"~5" 6"~10" 12"~36"	2-1/2" 3" 3-1/2" 4" 5"~6" 8"~10" 12"~18" 20"~36"	3" 3-1/2" 4" 5" 6" 8" 10"~14" 16"~36"	3-1/2" 4" 5" 6" 8" 10" 12"~16" 18"~36"	4" 5" 6" 8" 10" 12"~16" 20"~24" 26"~36"	5" 6" 8" 10" 12"~14" 16"~18" 20"~24" 26"~36"
	Straight way	3/8"~36"	1/2"~36"	3/4"~36"	1"~36"	1-1/4"~1-1/2" 2"~36"	1-1/2" 2"~3" 3-1/2"~36"	2" 2-1/2"~4" 5"~36"	2-1/2" 3"~3-1/2" 4"~6" 8"~36"	3" 3-1/2"~4" 5"~8" 10"~36"	3-1/2" 4" 5" 6" 8"~12" 14"~36"	4" 5" 6" 8" 10" 12"~16" 18"~36"	5" 6" 8" 10" 12"~16" 18"~36"

Each charted outlet size is designed to fit a number of run pipe sizes.



# SOCKET WELDING 45° BRANCH OUTLET

MSS SP-97-2012



Dimensions are in millimeters.

45° Branch Outlet						
Outlet Pipe		A		B <sup>(3)</sup>	D <sup>(3)</sup>	J (Min)
DN	IN	Min	Max			

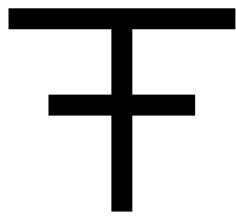
### 3000Lb

8	1/4	38.1	42.9	14.2	9.3	9.5
10	3/8	38.1	42.9	17.6	12.6	9.5
15	1/2	38.1	44.5	21.8	15.8	9.5
20	3/4	46.0	50.8	27.2	21.0	12.5
25	1	54.0	63.5	33.9	26.7	12.5
32	1-1/4	61.1	76.2	42.7	35.1	12.5
40	1-1/2	63.5	76.2	48.8	40.9	12.5
50	2	76.2	84.1	61.2	52.5	16.0

### 6000Lb

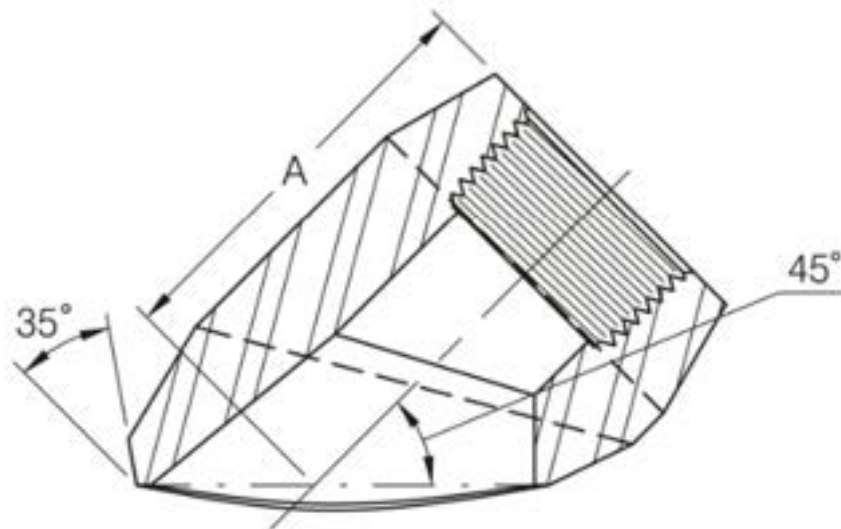
8	1/4	38.9	47.6	14.2	6.4	9.5
10	3/8	38.9	47.6	17.6	9.2	9.5
15	1/2	46.0	55.6	21.8	11.8	9.5
20	3/4	54.0	63.5	27.2	15.6	12.5
25	1	61.1	73.0	33.9	20.7	12.5
32	1-1/4	65.1	77.8	42.7	29.5	12.5
40	1-1/2	78.6	85.7	48.8	34.0	12.5
50	2	78.6	104.8	61.2	42.9	16.0

- (1) Socket weld in accordance with ASME B16.11.
- (2) Dimensions may vary in according to the customer and manufacturer requirements.
- (3) Tolerance see page 21.



# THREADED END 45° BRANCH OUTLET

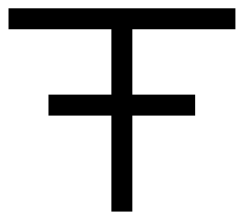
MSS SP-97-2012



Dimensions are in millimeters.

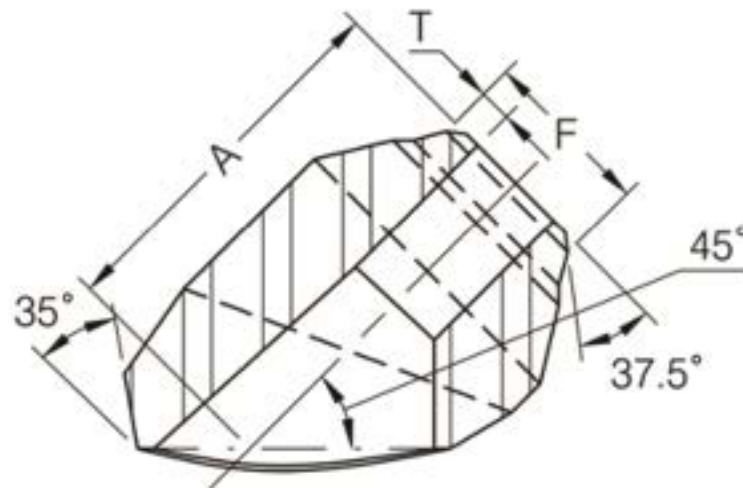
45° Branch Outlet					
Outlet Pipe		A			
DN	IN	Min	Max	Min	Max
		3000Lb		6000Lb	
8	1/4	38.1	42.9	38.9	47.6
10	3/8	38.1	42.9	38.9	47.6
15	1/2	38.1	44.5	46.0	55.6
20	3/4	46.0	50.8	54.0	63.5
25	1	54.0	63.5	61.1	73.0
32	1-1/4	61.1	76.2	65.1	77.8
40	1-1/2	63.5	76.2	78.6	85.7
50	2	76.2	84.1	78.6	104.8

(1) Thread in accordance with ASME B1.20.1.



# BUTT WELDING END 45° BRANCH OUTLET

MSS SP-97-2012



## STANDARD WEIGHT & EXTRA STRONG

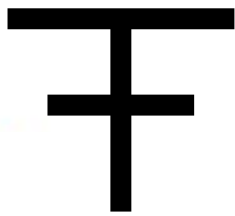
Dimensions are in millimeters.

45° Branch Outlet						
Outlet Pipe		A		T		F
DN	IN	Min	Max	Sch 40/STD	Sch 80/XS	
8	1/4	38.1	42.9	2.24	3.02	13.7
10	3/8	38.1	42.9	2.31	3.20	17.1
15	1/2	38.1	42.9	2.77	3.73	21.3
20	3/4	44.5	50.8	2.87	3.91	26.7
25	1	54.0	65.1	3.38	4.55	33.4
32	1-1/4	54.0	65.1	3.56	4.85	42.2
40	1-1/2	63.5	69.9	3.68	5.08	48.3
50	2	73.0	88.9	3.91	5.54	60.3

(1) Weld bevel in accordance with ASME B16.25.

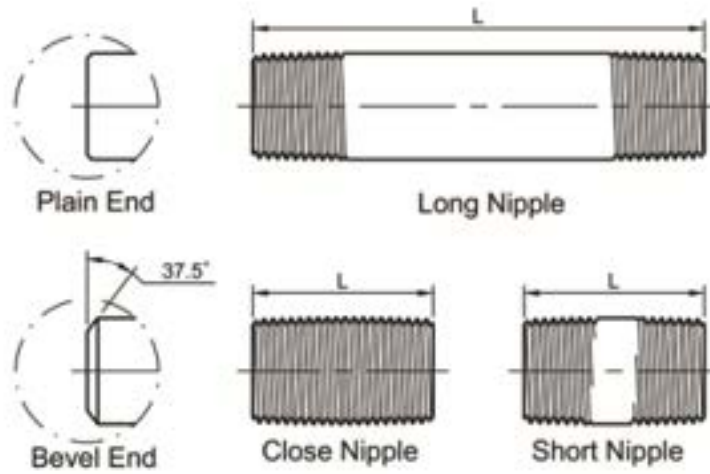
(2) Dimensions may vary in according to the customer and manufacturer requirements.

(3) Wall thickness (T) in accordance with ASME B36.10M, ASME B36.19M, see page 56.



# NIPPLE

ASTM A733-2016



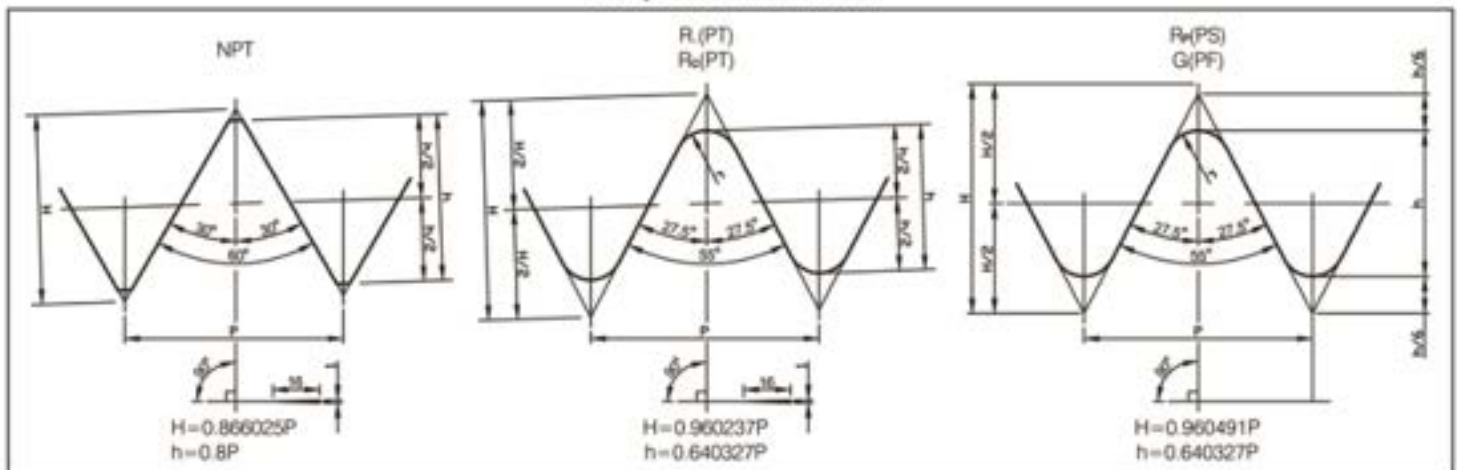
Dimensions in Inch.

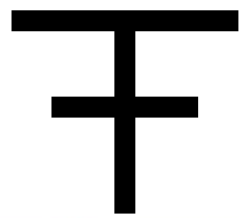
Plain End Weight (Kg)per meter

Nom. Pipe Size	L			Weight			
	Close Nipple	Short Nipple	Long Nipple	Sch 40/STD	Sch 80/XS	Sch 160	XXS
1/8	3/4	1-1/2	2-12	0.37	0.47	-	-
1/4	7/8	1-1/2	2-12	0.63	0.80	-	-
3/8	1	1-1/2	2-12	0.84	1.10	-	-
1/2	1-1/8	1-1/2	2-12	1.27	1.62	1.95	2.55
3/4	1-3/8	1-1/2	2-12	1.69	2.20	2.90	3.64
1	1-1/2	2	2-1/2-12	2.50	3.24	4.24	5.45
1-1/4	1-5/8	2	2-1/2-12	3.39	4.47	5.61	7.77
1-1/2	1-3/4	2	2-1/2-12	4.05	5.41	7.25	9.56
2	2	2-1/2	3-12	5.44	7.48	11.11	13.44
2-1/2	2-1/2	3	3-1/2-12	8.63	11.41	14.92	20.39
3	2-5/8	3	3-1/2-12	11.29	15.27	21.35	27.68
3-1/2	2-3/4	4	4-1/2-12	13.57	18.64	-	-
4	2-7/8	4	4-1/2-12	16.07	22.32	33.54	41.03
5	3	4-1/2	5-12	21.77	30.97	49.12	57.43
6	3-1/8	4-1/2	5-12	28.26	42.56	67.56	79.22

- (1) Thread in accordance with ASME B1.20.1.
- (2) Weld bevel in accordance with ASME B16.25.
- (3) Weight in accordance with ASME B36.10M Table 1.

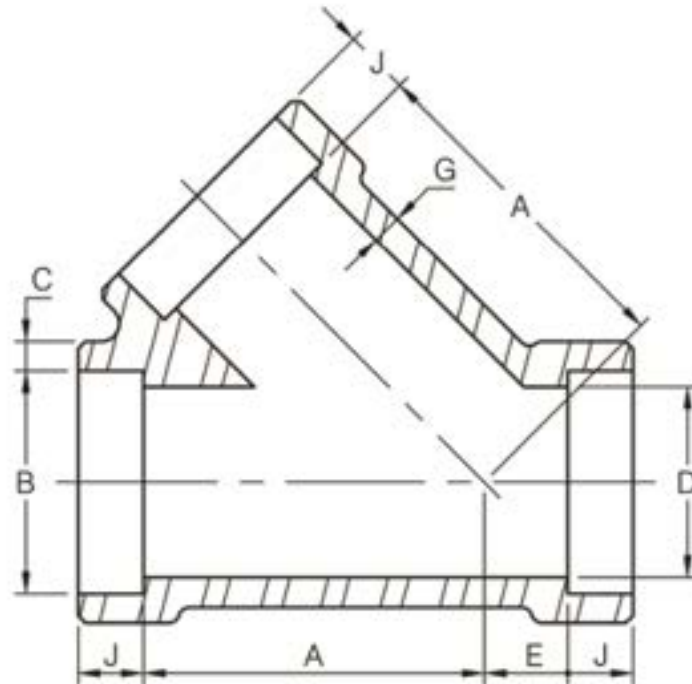
## Shape of Threaded





SPECIAL PRODUCT

# SOCKET-WELDING 45° LATERAL TEE



Dimensions are in millimeters.

Socket Welding									
DN	Nom. Pipe Size	B <sup>(1)</sup>	C <sup>(1)</sup>		D <sup>(1)</sup>	A	E	G <sup>(1)</sup> (Min)	J <sup>(1)</sup> (Min)
			(Avg)	(Min)					

**3000Lb**

15	1/2	21.8	4.67	4.09	15.8	35	9	3.75	9.5
20	3/4	27.2	4.90	4.27	21.0	41	9	3.95	12.5
25	1	33.9	5.69	4.98	26.7	51	12	4.55	12.5
32	1-1/4	42.7	6.07	5.28	35.1	59	17	4.85	12.5
40	1-1/2	48.8	6.35	5.54	40.9	68	21	5.10	12.5
50	2	61.2	6.93	6.04	52.5	95	24	5.55	16.0
65	2-1/2	73.9	8.76	7.67	62.7	118	38	7.05	16.0

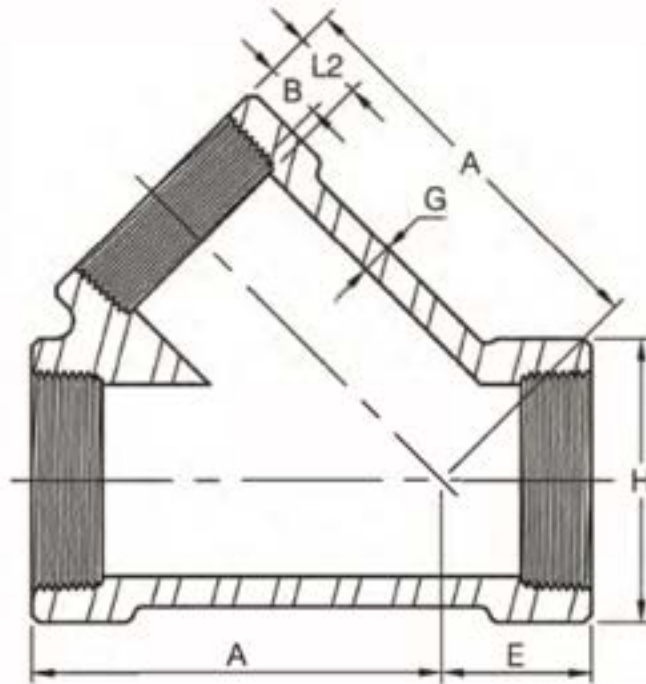
**6000Lb**

15	1/2	21.8	5.97	5.18	11.8	41	9	4.78	9.5
20	3/4	27.2	6.96	6.04	15.6	51	12	5.56	12.5
25	1	33.9	7.92	6.93	20.7	59	17	6.35	12.5
32	1-1/4	42.7	7.92	6.93	29.5	68	21	6.35	12.5
40	1-1/2	48.8	8.92	7.80	34.0	95	24	7.14	12.5
50	2	61.2	10.92	9.50	42.9	106	31	8.74	16.0

(1) Dimensions refer to ANSI B16.11 for class 3M, socket welding fittings.

(2) Dimensions may vary in according to the customer and manufacturer requirements.

# SPECIAL PRODUCT THREADED 45° LATERAL TEE



Dimensions are in millimeters.

DN	Nom. Pipe Size	Threaded		A	E	G <sup>(1)</sup> (Min)	H <sup>(1)</sup>
		Length of Thread (Min)					
		B <sup>(2)</sup>	L2 <sup>(2)</sup>				

### 2000Lb

15	1/2	10.9	13.6	46	20	3.18	33
20	3/4	12.7	13.9	55	23	3.18	38
25	1	14.7	17.3	65	26	3.68	46
32	1-1/4	17.0	18.0	73	31	3.89	56
40	1-1/2	17.8	18.4	82	35	4.01	62
50	2	19.0	19.2	113	42	4.27	75
65	2-1/2	23.6	28.9	136	56	5.61	92

### 3000Lb

15	1/2	10.9	13.6	55	23	4.09	38
20	3/4	12.7	13.9	65	26	4.32	46
25	1	14.7	17.3	73	31	4.98	56
32	1-1/4	17.0	18.0	82	35	5.28	62
40	1-1/2	17.8	18.4	113	42	5.56	75
50	2	19.0	19.2	124	49	7.14	84

(1) Dimensions refer to ANSI B16.11, forged threaded fittings.

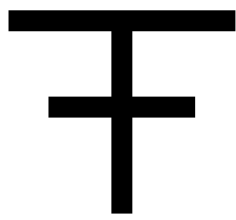
(2) Dimension B is minimum length of perfect thread.

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 (ANSI/ASME B1.20.1).

(3) Dimensions of BSP and PT are available if required.

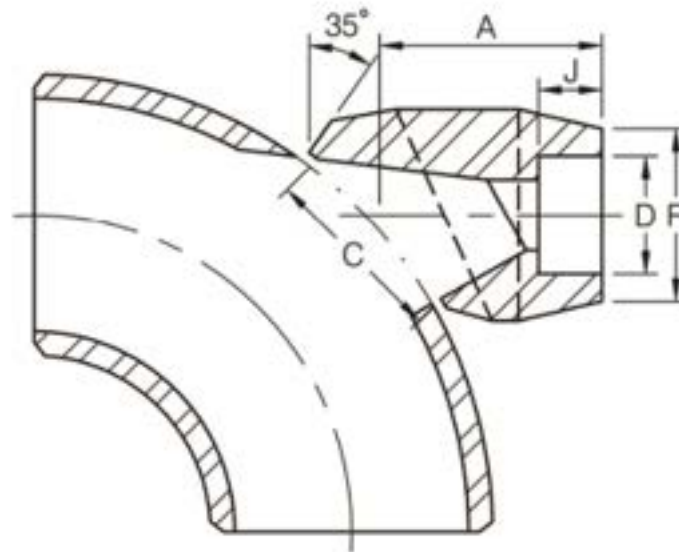
(4) Dimensions may vary in according to the customer and manufacturer requirements.





SPECIAL PRODUCT

# SOCKET WELDING END 90° ELBOW OUTLET



Dimensions are in millimeters.

90° ELBOW OUTLET						
Outlet Pipe		A	C	F	D	J
DN	IN					

**3000Lb**

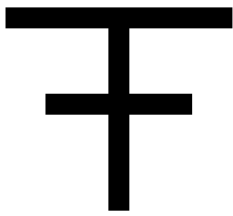
8	1/4	40.5	35.2	22.0	14.35	10.0
10	3/8	40.5	35.2	25.9	17.80	10.0
15	1/2	40.5	35.2	31.4	21.95	11.1
20	3/4	47.6	43.6	37.1	27.30	12.7
25	1	55.6	54.0	45.5	34.05	13.5
32	1-1/4	60.3	67.5	57.0	42.80	15.1
40	1-1/2	66.7	76.2	64.0	48.90	15.9
50	2	81.0	104.8	76.0	61.35	17.5
65	2-1/2	82.6	106.4	92.0	74.15	23.8
80	3	96.8	125.4	109.2	90.10	28.6
100	4	114.3	163.5	140.0	115.75	29.4

**6000Lb**

8	1/4	40.5	35.2	26.0	14.35	10.0
10	3/8	40.5	35.2	33.0	17.80	10.0
15	1/2	47.6	35.2	38.0	21.95	10.0
20	3/4	55.6	43.6	44.0	27.30	14.3
25	1	60.3	54.0	57.0	34.05	15.9
32	1-1/4	66.7	67.5	64.0	42.80	20.6
40	1-1/2	85.7	76.2	76.0	48.90	20.6

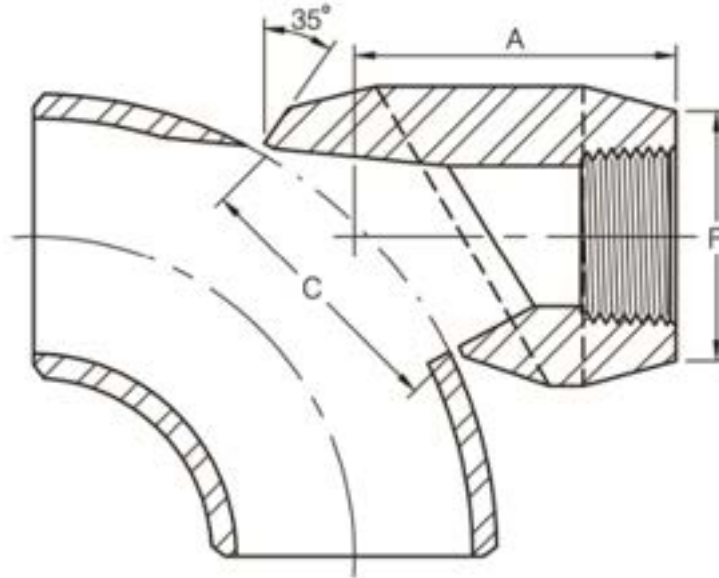
(1) Socket weld in accordance with ASME B16.11.

(2) Dimensions may vary in according to the customer and manufacturer requirements.



SPECIAL PRODUCT

# THREADED END 90° ELBOW OUTLET



Dimensions are in millimeters.

90° ELBOW OUTLET				
Outlet Pipe		A	C	F
DN	IN			

**3000Lb**

8	1/4	40.5	35.2	22.0
10	3/8	40.5	35.2	25.9
15	1/2	40.5	35.2	31.4
20	3/4	47.6	43.6	37.1
25	1	55.6	54.0	45.5
32	1-1/4	60.3	67.5	57.0
40	1-1/2	66.7	76.2	64.0
50	2	81.0	104.8	76.0
65	2-1/2	82.6	106.4	92.0
80	3	96.8	125.4	109.2
100	4	114.3	163.5	140.0

**6000Lb**

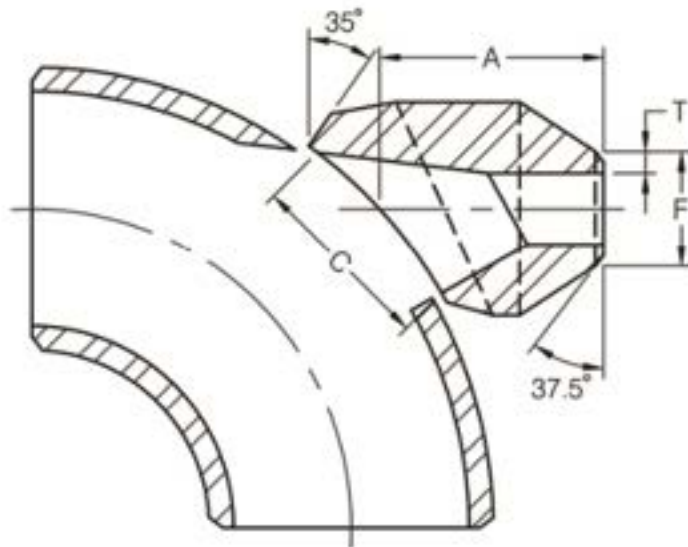
8	1/4	40.5	35.2	26.0
10	3/8	40.5	35.2	33.0
15	1/2	47.6	35.2	38.0
20	3/4	55.6	43.6	44.0
25	1	60.3	54.0	57.0
32	1-1/4	66.7	67.5	64.0
40	1-1/2	85.7	76.2	76.0

(1) Thread in accordance with ASME B1.20.1.

(2) Dimensions may vary in according to the customer and manufacturer requirements.

SPECIAL PRODUCT

# BUTT WELDING END 90° ELBOW OUTLET



Dimensions are in millimeters.

90° ELBOW OUTLET					
Outlet Pipe		A	C	F	T
DN	IN				

## Sch 80

8	1/4	40.5	35.2	13.7	3.0
10	3/8	40.5	35.2	17.1	3.2
15	1/2	40.5	35.2	21.3	3.7
20	3/4	47.6	43.6	26.7	3.9
25	1	55.6	54.0	33.4	4.5
32	1-1/4	60.3	67.5	42.2	4.9
40	1-1/2	66.7	76.2	48.3	5.1
50	2	81.0	104.8	60.3	5.5
65	2-1/2	82.6	106.4	73.0	7.0
80	3	96.8	125.4	88.9	7.6
100	4	114.3	163.5	114.3	8.6

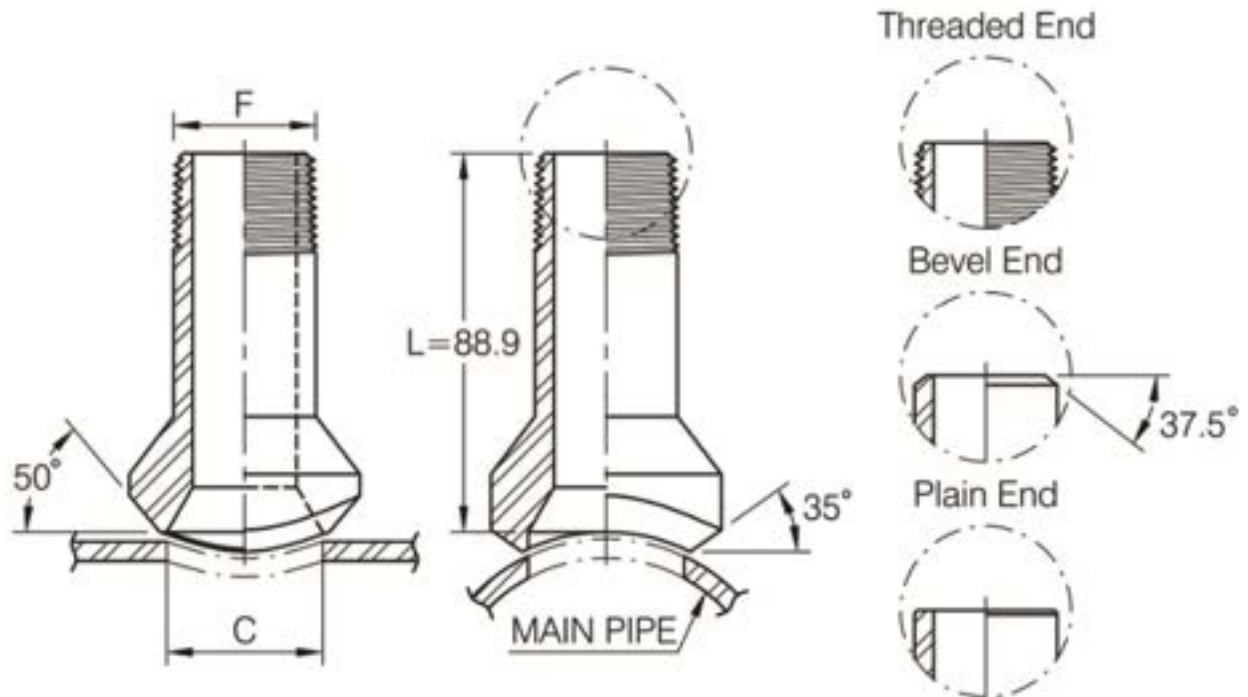
## Sch 160

8	1/4	40.5	35.2	13.7	3.7
10	3/8	40.5	35.2	17.1	4.0
15	1/2	47.6	35.2	21.3	4.7
20	3/4	55.6	43.6	26.7	5.5
25	1	60.3	54.0	33.4	6.4
32	1-1/4	66.7	67.5	42.2	6.4
40	1-1/2	85.7	76.2	48.3	7.1

(1) Weld bevel in accordance with ASME B16.25.

(2) Dimensions may vary in according to the customer and manufacturer requirements.

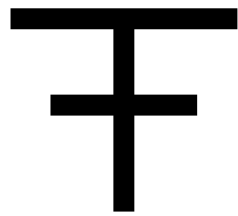
# SPECIAL PRODUCT NIPPLE BRANCH OUTLET



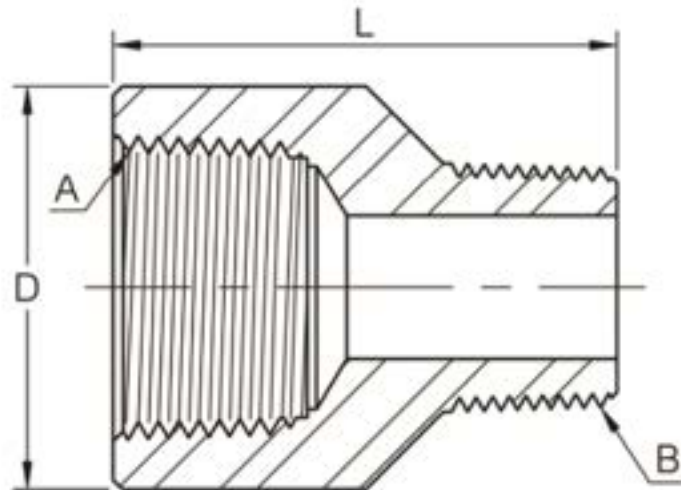
Dimensions are in millimeters.

Outlet Pipe(in)	C	F
<b>3000Lb</b>		
1/2	23.8	21.3
3/4	30.2	26.7
1	36.5	33.4
1-1/4	44.5	42.2
1-1/2	50.8	48.3
2	65.1	60.3
<b>6000Lb</b>		
1/2	13.8	21.3
3/4	18.9	26.7
1	24.3	33.4
1-1/4	32.5	42.2
1-1/2	38.1	48.3
2	49.2	60.3

- (1) The end of the fitting can be :
  - Plain.
  - Weld bevel in accordance with ASME B16.25.
  - Thread in accordance with ASME B1.20.1.
- (2) Range :
  - Thread : Class 3000 / 6000 Lb.
  - Plain and weld : Sch40 / STD / Sch80 / XS / Sch160 / XXS.
- (3) Dimensions may vary in according to the customer and manufacturer requirements.



SPECIAL PRODUCT  
**THREADED ADAPTER**



*Dimensions are in millimeters.*

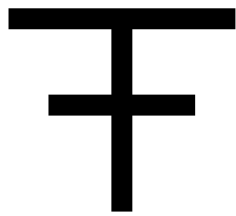
DN	Nom Pipe Size (A)	D	L	Threaded Size (B)
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**3000Lb**

8	1/4	19	33	1/8
10	3/8	22	35	1/4
15	1/2	28	42	3/8
20	3/4	35	47	1/2
25	1	44	55	3/4
32	1-1/4	57	63	1
40	1-1/2	64	66	1-1/4
50	2	76	76	1-1/2
65	2-1/2	92	90	2
80	3	108	110	2-1/2
100	4	140	120	3

(1) Thread in accordance with ANSI / ASME B 1.20.1.

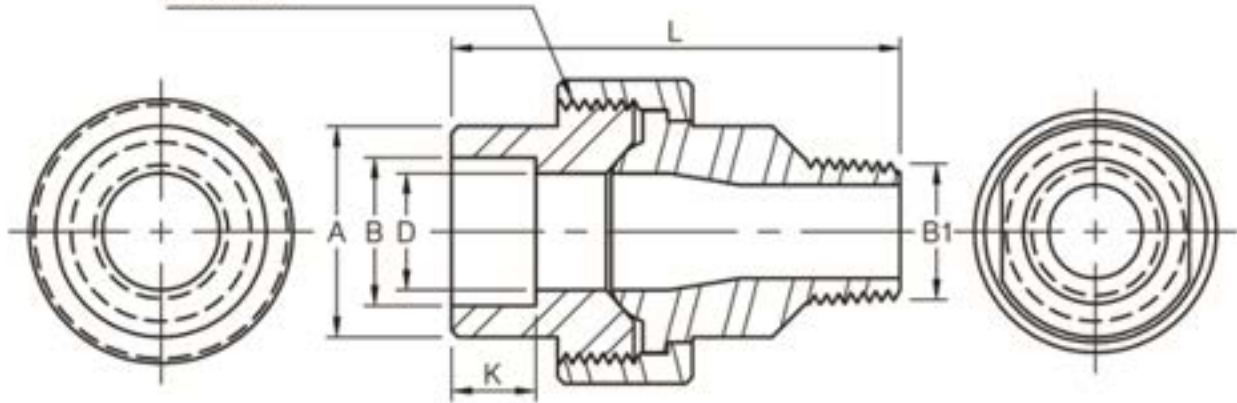
(2) Dimensions may vary in according to the customer and manufacturer requirements.



SPECIAL PRODUCT

# UNION (M/F)

H-Thrd's  
Minimum 4 Full Thrd's  
Engagement Class 2A/2B Fit  
ANSI B1.1



Dimensions are in millimeters.

Nom Pipe Size	A <sup>(1)</sup> (Min)	B1	B	D	K (Min)	L
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3000Lb

1/4	21.8	13.7	14.61 14.10	10.01 8.48	9.7	55.4
3/8	25.9	17.1	18.03 17.53	13.28 11.76	9.7	60.0
1/2	31.2	21.3	22.23 21.72	16.56 15.04	9.7	68.0
3/4	37.1	26.7	27.56 27.05	21.69 20.17	12.7	75.9
1	45.5	33.4	34.29 33.78	27.41 25.88	12.7	86.0
1-1/4	54.9	42.2	43.05 42.55	35.81 34.29	12.7	95.1
1-1/2	61.5	48.3	49.15 48.64	41.66 40.13	12.7	100.5
2	75.2	60.3	61.62 61.11	53.26 51.74	15.7	112.1

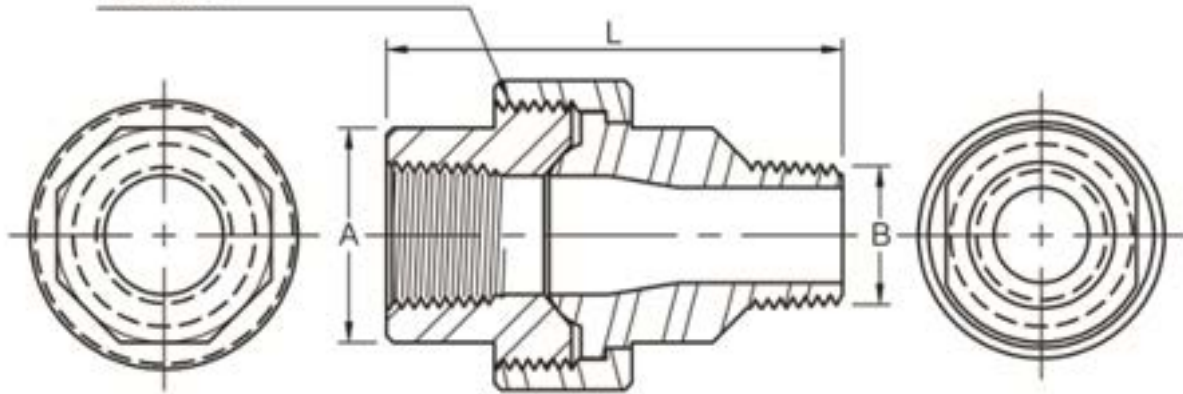
(1) Dimensions refer to MSS SP-83 TABLE 5.

(2) Thread/Socket weld in accordance with ANSI/ASME B 16.11 and ANSI/ASME B 1.20.1.

(3) Dimensions may vary in according to the customer and manufacturer requirements.

# SPECIAL PRODUCT *UNION (M/F)*

H-Thrd's  
Minimum 4 Full Thrd's  
Engagement Class 2A/2B Fit  
ANSI B1.1



*Dimensions are in millimeters.*

Nom Pipe Size	A <sup>(1)</sup> (Min)	B	L
<b>3000Lb</b>			
1/4	19.0	13.7	55.4
3/8	22.9	17.1	60.0
1/2	27.7	21.3	68.0
3/4	33.5	26.7	75.9
1	41.4	33.4	86.0
1-1/4	50.5	42.2	95.1
1-1/2	57.2	48.3	100.5
2	70.1	60.3	112.1

(1) Dimensions refer to MSS SP-83 TABLE 5.

(2) Thread in accordance with ANSI/ASME B 1.20.1.

(3) Dimensions may vary in according to the customer and manufacturer requirements.



# DIMENSIONS OF SEAMLESS STEEL PIPE AND SEAMLESS STAINLESS STEEL PIPE

(ASME B36.10M-2004 , ASME B36.19M-2004)

TOLERANCES				STEEL PIPE																STAINLESS STEEL PIPE										
A53 A106 O.D.	API 5L O.D.	A530 O.D.	NPS IN	Outside Dia.			SCHEDULE NUMBER(SCH) AND WALL THICKNESS																SCHEDULE NUMBER(SCH) AND WALL THICKNESS							
				STD	MAX	MIN	10	20	30	40	STD	60	XS	80	100	120	140	160	XXS	5S	10S	40S	80S							
+1/64" -1/32"	+1/64" -1/32"	+1/64" -1/32"	1/8	10.3	10.7	9.9	1.24	-	1.45	1.73	1.73	-	2.41	2.41	-	-	-	*3.15	*4.83	1.7	1.2	1.7	2.4							
				13.7	14.1	13.3	1.65	-	1.85	2.24	2.24	-	3.02	3.02	-	-	-	*3.68	*6.05	1.7	1.7	1.7	2.2	3.0						
				17.1	17.5	16.7	1.65	-	1.85	2.31	2.31	-	3.20	3.20	-	-	-	*4.01	*6.40	1.7	1.7	1.7	2.3	3.2						
				21.3	21.7	20.9	2.11	-	2.41	2.77	2.77	-	3.73	3.73	-	-	-	4.78	7.47	1.7	2.1	2.1	2.8	3.7						
				26.7	27.1	26.3	2.11	-	2.41	2.87	2.87	-	3.91	3.91	-	-	-	5.56	7.82	1.7	2.1	2.1	2.9	3.9						
				33.4	33.8	33.0	2.77	-	2.97	3.38	3.38	-	4.55	4.55	-	-	-	6.35	9.09	1.7	2.8	2.8	3.4	4.6						
				42.2	42.6	41.8	2.77	-	2.97	3.56	3.56	-	4.85	4.85	-	-	-	6.35	9.70	1.7	2.8	2.8	3.6	4.9						
				48.3	48.7	47.9	2.77	-	3.18	3.68	3.68	-	5.08	5.08	-	-	-	7.14	10.15	1.7	2.8	2.8	3.7	5.1						
				60.3	60.9	59.7	2.77	-	3.18	3.91	3.91	-	5.54	5.54	-	-	-	8.74	11.07	1.7	2.8	2.8	3.9	5.5						
				73.0	73.7	72.2	3.05	-	4.78	5.16	5.16	-	7.01	7.01	-	-	-	9.53	14.02	2.1	3.1	3.1	5.2	7.0						
				88.9	89.8	88.0	3.05	-	4.78	5.49	5.49	-	7.62	7.62	-	-	-	11.13	15.24	2.1	3.1	3.1	5.5	7.6						
				±1/32"	±1/32"	±1/32"	3	101.6	102.6	100.6	3.05	-	4.78	5.74	5.74	-	8.08	8.08	-	-	-	-	2.1	3.1	3.1	5.7	8.1			
114.3	115.4	113.2	3.05					-	4.78	6.02	6.02	-	8.56	8.56	-	-	-	13.49	17.12	2.1	3.1	3.1	6.0	8.6						
141.3	142.7	139.9	3.40					-	6.55	6.55	6.55	-	9.53	9.53	-	-	-	15.88	19.05	2.8	3.4	3.4	6.6	9.5						
168.3	170.0	166.6	3.40					-	7.11	7.11	7.11	-	10.97	10.97	-	-	-	18.26	21.95	2.8	3.4	3.4	7.1	11.0						
219.1	221.3	216.9	3.76					6.35	7.04	8.18	8.18	10.31	12.70	12.70	15.09	18.26	20.62	23.01	22.23	2.8	3.8	3.8	8.2	12.7						
273.0	275.8	270.4	4.19					6.35	7.80	9.27	9.27	12.70	12.70	15.09	18.26	21.44	25.40	28.58	25.40	3.4	4.2	4.2	9.3	12.7						
323.8	327.1	320.7	4.57					6.35	8.38	10.31	9.53	14.27	12.70	17.48	21.44	25.40	28.58	33.32	25.40	4.0	4.6	4.6	9.5	12.7						
355.6	359.2	352.0	6.35					7.92	9.53	11.13	9.53	15.09	12.70	19.05	23.83	27.79	31.75	35.71	-	-	4.0	4.8	4.8	9.5	12.7					
406.4	410.5	402.3	6.35					7.92	9.53	12.70	9.53	16.66	12.70	21.44	26.19	30.96	36.53	40.49	-	-	4.2	4.8	4.8	9.5	12.7					
457.0	461.8	452.6	6.35					7.92	11.13	14.27	9.53	19.05	12.70	23.83	29.36	34.93	39.67	45.24	-	-	4.2	4.8	4.8	9.5	12.7					
508.0	513.1	502.9	6.35					9.53	12.70	15.09	9.53	20.62	12.70	26.19	32.54	38.10	44.45	50.01	-	-	4.8	5.5	5.5	9.5	12.7					
559.0	-	-	6.35					9.53	12.70	-	9.53	22.23	12.70	28.58	34.93	41.28	47.63	53.98	-	-	4.8	5.5	-	-	-					
610.0	615.7	603.5	6.35	9.53	14.27	17.48	9.53	24.61	12.70	30.96	38.89	46.02	52.37	59.54	-	-	5.5	6.4	6.4	9.5	12.7									
660.0	-	-	7.92	12.70	-	-	9.53	-	12.70	-	-	-	-	-	-	-	-	-	-	-	-	-								
711.0	-	-	7.92	12.70	15.88	-	9.53	-	12.70	-	-	-	-	-	-	-	-	-	-	-	-	-								
762.0	-	-	7.92	12.70	15.88	-	9.53	-	12.70	-	-	-	-	-	-	-	-	6.4	7.9	-	-	-								
813.0	-	-	7.92	12.70	15.88	17.48	9.53	-	12.70	-	-	-	-	-	-	-	-	-	-	-	-	-								
864.0	-	-	7.92	12.70	15.88	17.48	9.53	-	12.70	-	-	-	-	-	-	-	-	-	-	-	-	-								
914.0	-	-	7.92	12.70	15.88	19.05	9.53	-	12.70	-	-	-	-	-	-	-	-	-	-	-	-	-								

Unit : mm

\* Thickness in accordance with ASME B16.11.



# WEIGHT LIST

Unit : KG

SIZE NPS	90° Elbow					45° Elbow					Tee				
	2M NPT	3M SW	3M NPT	6M SW	6M NPT	2M NPT	3M SW	3M NPT	6M SW	6M NPT	2M NPT	3M SW	3M NPT	6M SW	6M NPT
1/8"	0.10	0.10	0.09	0.10	0.17	0.09	0.10	0.10	0.09	0.11	0.13	0.13	0.13	0.14	0.20
1/4"	0.09	0.08	0.15	0.15	0.33	0.08	0.08	0.12	0.14	0.27	0.11	0.11	0.22	0.20	0.41
3/8"	0.13	0.12	0.29	0.29	0.45	0.10	0.11	0.24	0.26	0.39	0.17	0.15	0.38	0.43	0.63
1/2"	0.25	0.25	0.42	0.44	0.80	0.20	0.20	0.37	0.36	0.63	0.31	0.32	0.56	0.56	0.98
3/4"	0.35	0.32	0.64	0.73	1.31	0.27	0.29	0.56	0.57	1.07	0.43	0.46	0.92	0.94	1.65
1"	0.52	0.53	1.14	1.17	1.61	0.45	0.43	0.94	1.01	1.27	0.69	0.65	1.49	1.49	2.17
1-1/4"	0.90	0.84	1.42	1.48	2.93	0.68	0.69	1.03	1.11	2.24	1.07	1.04	1.76	1.93	3.74
1-1/2"	1.06	1.07	2.63	2.79	3.79	0.82	0.79	2.05	2.22	2.54	1.39	1.35	3.27	3.37	4.71
2"	1.70	1.50	2.92	3.28	7.31	1.41	1.35	2.23	2.52	4.82	2.16	2.04	3.53	3.95	8.87
2-1/2"	3.61	3.20	5.99	8.11	11.18	2.60	2.53	4.19	-	8.16	4.11	3.98	6.99	10.05	13.11
3"	4.81	5.38	8.88	18.10	17.73	4.23	5.10	6.15	14.54	14.16	6.12	5.90	10.19	22.00	21.70
4"	10.21	10.95	14.85	16.77	15.76	8.96	9.41	11.67	-	-	13.27	12.53	19.13	-	18.00

SIZE NPS	Cross				Full Coupling				Half Coupling			
	2M NPT	3M SW	3M NPT	6M SW	3M SW	3M NPT	6M SW	6M NPT	3M SW	3M NPT	6M SW	6M NPT
1/8"	0.17	0.16	0.29	0.17	0.05	0.04	0.05	0.08	0.04	0.02	0.06	0.07
1/4"	0.14	0.13	0.26	0.26	0.05	0.05	0.07	0.10	0.05	0.03	0.09	0.05
3/8"	0.21	0.20	0.44	0.45	0.07	0.07	0.11	0.20	0.07	0.03	0.12	0.09
1/2"	0.40	0.35	0.76	0.67	0.13	0.14	0.20	0.32	0.15	0.06	0.19	0.16
3/4"	0.54	0.47	1.06	1.07	0.19	0.23	0.27	0.45	0.21	0.11	0.31	0.24
1"	0.83	0.73	1.79	1.82	0.33	0.45	0.44	0.87	0.34	0.23	0.51	0.45
1-1/4"	1.24	1.12	2.13	2.26	0.41	0.73	0.66	1.09	0.48	0.37	0.65	0.55
1-1/2"	1.75	1.58	3.93	3.96	0.59	1.18	1.11	1.94	0.56	0.54	0.91	0.96
2"	2.65	2.25	4.27	4.42	0.86	1.40	1.62	2.87	1.09	0.70	1.92	1.39
2-1/2"	5.26	4.37	8.47	-	1.40	2.29	-	4.20	1.63	1.13	-	2.10
3"	7.58	7.24	12.61	-	1.78	3.38	-	6.10	2.18	1.68	-	3.05
4"	16.00	14.58	20.25	-	2.85	5.65	-	10.04	3.71	3.11	-	5.02

SIZE NPS	Reducing Coupling				Cap				Union				Street Elbow	Hex Nipples	Square Head Plug
	3M SW	3M NPT	6M SW	6M NPT	3M SW	3M NPT	6M SW	6M NPT	3M SW	3M NPT	6M SW	6M NPT	3M NPT	3M NPT	
1/8"	0.04	0.05	-	0.08	0.03	0.03	0.05	0.06	0.28	0.28	-	-	0.12	0.01	0.01
1/4"	0.05	0.05	-	0.06	0.04	0.04	0.08	0.06	0.25	0.25	-	-	0.11	0.03	0.02
3/8"	0.07	0.08	-	0.18	0.06	0.05	0.10	0.09	0.25	0.26	0.38	0.35	0.24	0.04	0.03
1/2"	0.16	0.15	0.24	0.35	0.13	0.11	0.16	0.25	0.33	0.34	0.60	0.55	0.34	0.08	0.05
3/4"	0.25	0.18	0.29	0.53	0.16	0.18	0.23	0.40	0.49	0.48	0.91	0.92	0.55	0.12	0.08
1"	0.43	0.62	0.58	1.01	0.25	0.33	0.44	0.71	0.74	0.77	1.57	1.28	1.02	0.24	0.16
1-1/4"	0.67	0.97	1.37	1.05	0.45	0.62	0.64	0.90	1.10	1.14	1.79	1.82	1.24	0.39	0.27
1-1/2"	0.85	1.49	1.07	2.30	0.59	0.72	0.94	1.44	1.61	1.39	3.37	2.85	2.01	0.38	0.38
2"	1.66	2.20	1.83	3.86	0.96	1.09	1.55	2.25	2.16	2.43	5.24	4.70	2.91	1.00	0.63
2-1/2"	2.60	3.22	-	4.20	1.62	1.92	-	3.68	3.97	3.63	7.84	-	-	1.29	1.08
3"	3.14	4.82	-	6.10	2.68	2.91	3.60	5.12	5.94	5.27	-	-	-	1.87	1.53
4"	5.50	8.97	-	10.04	3.82	4.84	-	8.60	12.79	12.00	-	-	-	3.37	3.36

SIZE NPS	Hex Head Plug	Round Head Plug	Bushing	Reducing inserts											
				SIZE	3M	6M	SIZE	3M	6M	SIZE	3M	6M			
1/8"	0.01	0.02	-	3/8X1/4	0.05	0.06	1-1/4X1/2	0.29	0.34	2X1/2	0.79	0.87	4X2-1/2	3.23	-
1/4"	0.03	0.06	0.01	1/2X3/8	0.07	0.09	1-1/4X3/8	0.32	0.36	2-1/2X2	1.03	1.43	4X2	3.72	-
3/8"	0.05	0.08	0.01	1/2X1/4	0.07	0.08	1-1/4X1/4	0.34	0.37	2-1/2X1-1/2	1.16	1.26	4X1-1/2	4.20	-
1/2"	0.07	0.12	0.03	3/4X1/2	0.12	0.15	1-1/2X1-1/4	0.37	0.53	2-1/2X1-1/4	1.45	1.38	4X1-1/4	4.39	-
3/4"	0.14	0.22	0.05	3/4X3/8	0.08	0.12	1-1/2X1	0.29	0.52	2-1/2X1	1.52	1.56			
1"	0.25	0.34	0.09	3/4X1/4	0.10	0.13	1-1/2X3/4	0.36	0.48	2-1/2X3/4	1.63	1.65			
1-1/4"	0.43	0.55	0.25	1X3/4	0.17	0.27	1-1/2X1/2	0.41	0.52	3X2-1/2	1.38	2.41			
1-1/2"	0.57	0.71	0.34	1X1/2	0.13	0.22	1-1/2X3/8	0.45	0.55	3X2	1.39	1.76			
2"	1.03	1.47	0.45	1X3/8	0.16	0.21	2X1-1/2	0.59	0.87	3X1-1/2	1.41	2.08			
2-1/2"	1.62	2.34	0.60	1X1/4	0.19	0.22	2X1-1/4	0.51	0.61	3X1-1/4	2.12	2.21			
3"	2.60	3.26	1.16	1-1/4X1	0.30	0.40	2X1	0.72	0.75	3X1	2.31	2.39			
4"	5.20	6.24	3.20	1-1/4X3/4	0.25	0.30	2X3/4	0.73	0.83	4X3	2.29	-			

# PACKING LIST

Carton Size : 28 x 20 x 18 cm (L x W x H)

Unit : PC

SIZE NPS	90° Elbow				45° Elbow				Tee				
	2M NPT 3M SW	3M NPT	6M SW	6M NPT	2M NPT 3M SW	3M NPT	6M SW	6M NPT	2M NPT 3M SW	3M NPT	6M SW	6M NPT	9M SW
1/4"	150	100	100	80	150	100	100	80	100	80	80	50	50
3/8"	100	80	80	50	100	80	80	50	80	50	50	35	35
1/2"	80	50	50	25	80	50	50	25	50	35	35	20	15
3/4"	50	25	25	20	50	30	30	20	35	20	20	12	15
1"	30	20	20	12	30	20	20	12	20	15	15	10	10
1-1/4"	20	15	15	5	20	15	15	5	15	10	10	5	6
1-1/2"	15	6	6	4	15	8	8	4	10	5	5	4	4
2"	8	5	5	2	10	6	6	2	6	4	4	2	2
2-1/2"	4	2	2	1	5	2	2	2	3	2	2	1	-
3"	2	2	1	1	2	2	1	1	2	1	1	1	-
4"	1	1	1	1	1	1	1	1	1	1	1	1	-

SIZE NPS	Cross				Full Coupling				Half Coupling			
	2M NPT 3M SW	3M NPT	6M SW	6M NPT	3M SW	3M NPT	6M SW	6M NPT	3M SW	3M NPT	6M SW	6M NPT
1/4"	40	40	80	40	350	250	250	200	400	800	300	150
3/8"	40	40	40	30	250	200	200	100	250	500	150	80
1/2"	40	30	30	20	120	100	100	60	120	250	80	80
3/4"	30	20	20	12	80	70	70	35	80	150	50	50
1"	20	12	12	6	50	35	35	20	50	80	30	35
1-1/4"	10	6	6	4	30	20	20	15	30	35	25	25
1-1/2"	6	4	4	2	25	15	15	10	25	30	15	20
2"	4	4	2	1	15	10	10	5	15	20	10	6
2-1/2"	2	1	-	-	10	5	5	3	10	12	5	4
3"	1	1	-	-	6	3	3	2	6	6	3	2
4"	-	-	-	-	4	2	2	1	4	4	-	1

SIZE NPS	Cap			Boss				Street Elbow		Insert	
	3M SW/NPT	6M SW	6M NPT	3M SW	3M NPT	6M SW	6M NPT	3M NPT	6M NPT	3M SW	6M SW
1/4"	300	200	250	250	200	200	150	150	80	300	250
3/8"	250	150	130	200	150	150	100	80	50	300	200
1/2"	130	80	80	90	80	80	60	50	25	150	120
3/4"	80	50	50	70	40	40	35	30	20	100	80
1"	50	30	30	35	30	30	20	20	12	80	60
1-1/4"	30	25	25	30	20	20	15	15	5	60	50
1-1/2"	25	15	15	25	15	15	10	8	4	40	40
2"	15	8	10	15	10	10	5	5	2	25	20
2-1/2"	10	5	4	10	5	-	-	4	-	12	10
3"	4	3	3	6	3	-	-	2	-	10	8
4"	3	2	2	4	2	-	-	1	-	4	2

SIZE NPS	OutLet		Union		Hex Plug	Round Plug	Square Plug	Bushing	Hex Nipple	Swage Nipple
	3M SW/NPT	6M SW/NPT	3M SW/NPT	6M SW/NPT	NPT	NPT	NPT	NPT	NPT	S40/S80 S160/XXS
1/4"	200	100	70	-	800	250	800	600	500	200
3/8"	150	100	70	50	600	200	500	500	400	150
1/2"	150	100	50	30	250	150	300	400	200	100
3/4"	100	50	30	20	150	100	200	200	100	70
1"	50	30	20	14	100	80	150	100	65	50
1-1/4"	35	25	14	10	35	50	80	60	35	30
1-1/2"	25	15	10	6	25	30	50	50	25	20
2"	15	10	6	2	20	15	30	25	15	8
2-1/2"	10	5	2	-	8	10	15	15	5	4
3"	6	2	2	-	6	5	10	10	3	3
4"	3	1	1	-	3	3	3	5	2	1

PLYWOOD CASE SIZE : 109x94x86cm / 60 CARTON

PLYWOOD CASE SIZE : 93x90x86cm / 48 CARTON

PLYWOOD CASE SIZE : 93x90x68cm / 36 CARTON