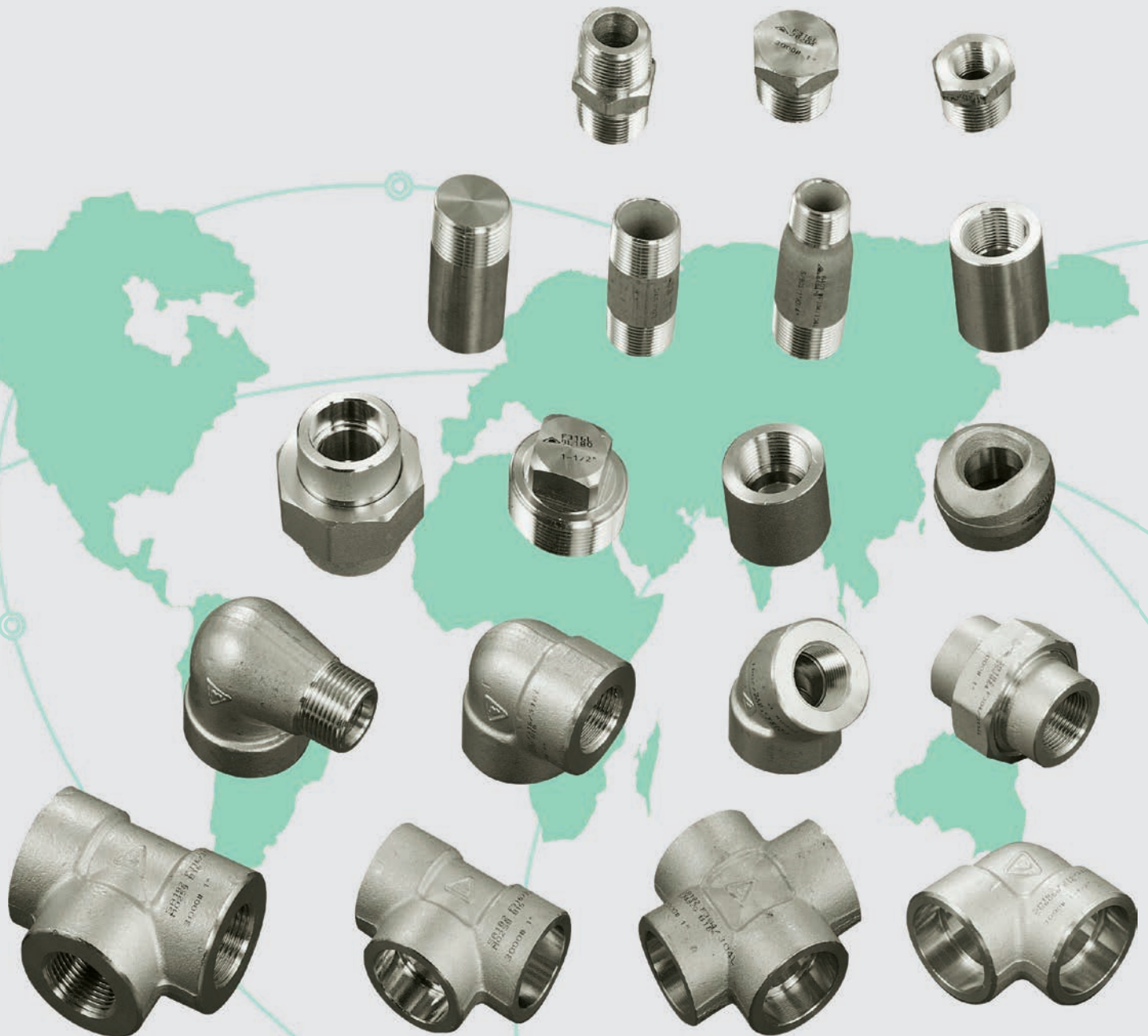


# BOTH - WELL

## HIGH PRESSURE FITTINGS

**FORGED  
CARBON ALLOY  
STAINLESS STEEL  
THREADED SOCKETWELD**



**BOTH-WELL STEEL FITTINGS CO., LTD.**

NO.303 Rensin Road, Renwu District, Kaohsiung City,  
Taiwan, R.O.C. (81460)

TEL : 886-7-371-1536 ● 371-0497 ● 372-0260

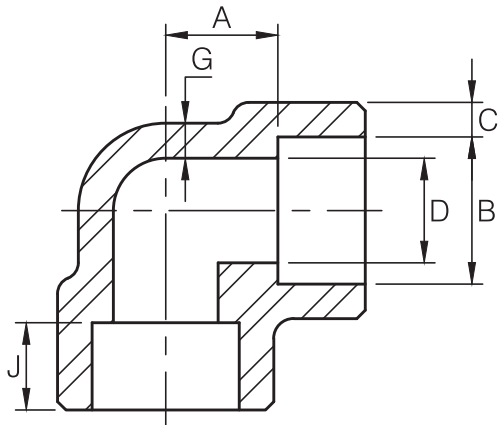
FAX : 886-7-371-3864 ● 371-3882



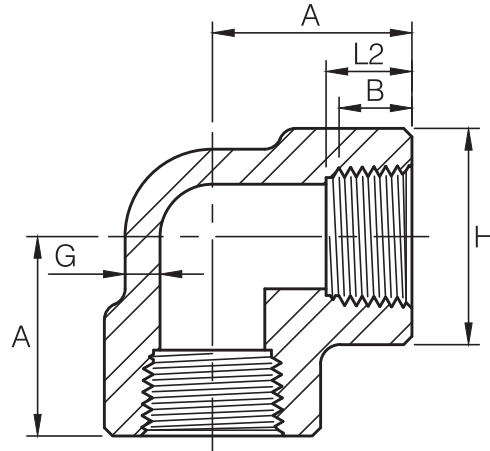


# 90° ELBOW

ASME B16.11-2011(Revision of ASME B16.11-2009)



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 20.

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

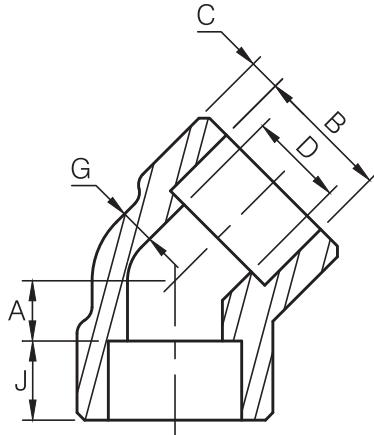
6	1/8	6.4	6.7	25	6.35	25
8	1/4	8.1	10.2	28	6.60	33
10	3/8	9.1	10.4	33	6.98	38
15	1/2	10.9	13.6	38	8.15	46
20	3/4	12.7	13.9	44	8.53	56
25	1	14.7	17.3	51	9.93	62
32	1-1/4	17.0	18.0	60	10.59	75
40	1-1/2	17.8	18.4	64	11.07	84
50	2	19.0	19.2	83	12.09	102
65	2-1/2	23.6	28.9	95	15.29	121
80	3	25.9	30.5	106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

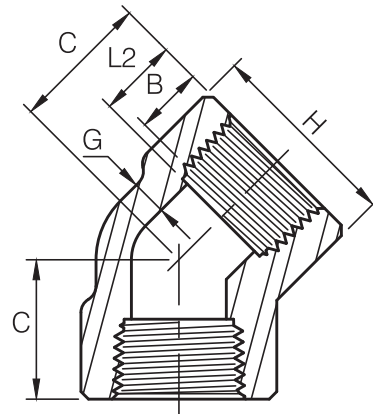


# 45° ELBOW

ASME B16.11-2011(Revision of ASME B16.11-2009)



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	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

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

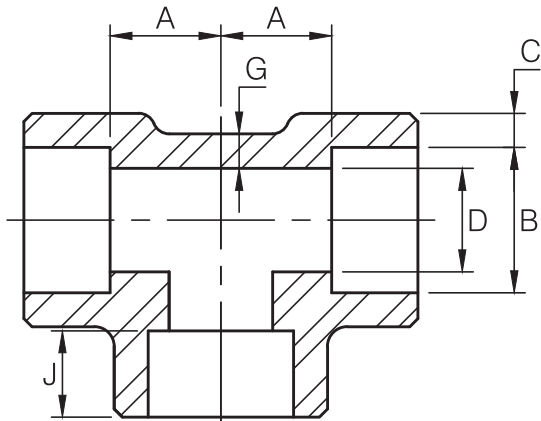
- (1) Average of socket Wall Thickness around periphery shall be no less than listed values. The minimum values are permitted in localized areas.
- (2) Tolerance see page 20.

- (\*) 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) .

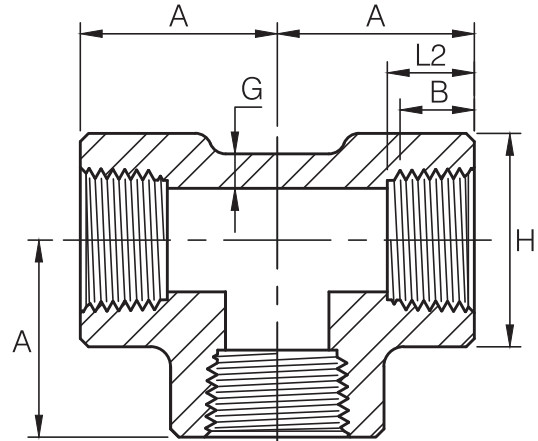


**TEE**

ASME B16.11-2011 (Revision of ASME B16.11-2009)



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 20.

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**

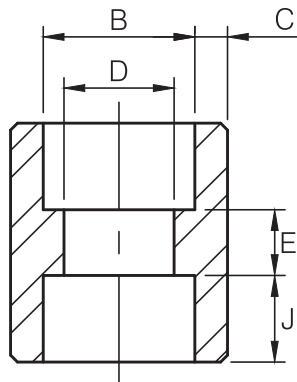
6	1/8	6.4	6.7	25	6.35	25
8	1/4	8.1	10.2	28	6.60	33
10	3/8	9.1	10.4	33	6.98	38
15	1/2	10.9	13.6	38	8.15	46
20	3/4	12.7	13.9	44	8.53	56
25	1	14.7	17.3	51	9.93	62
32	1-1/4	17.0	18.0	60	10.59	75
40	1-1/2	17.8	18.4	64	11.07	84
50	2	19.0	19.2	83	12.09	102
65	2-1/2	23.6	28.9	95	15.29	121
80	3	25.9	30.5	106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

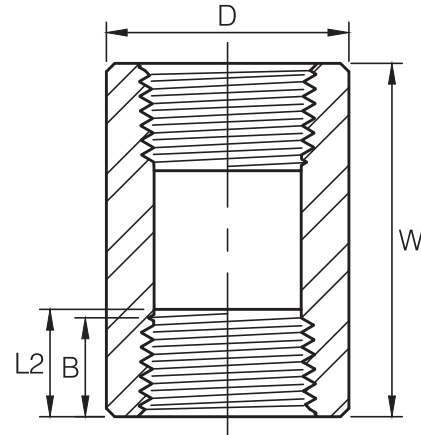


# FULL COUPLING

ASME B16.11-2011 (Revision of ASME B16.11-2009)



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 20.
- (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

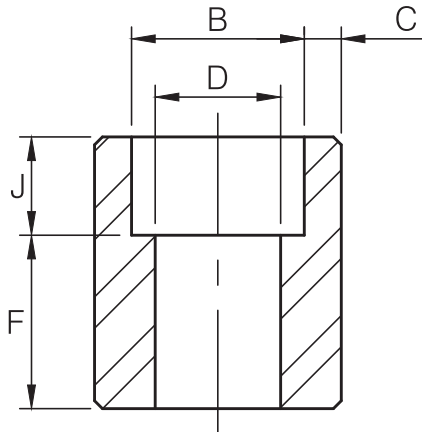
6	1/8	6.4	6.7	32	22
8	1/4	8.1	10.2	35	25
10	3/8	9.1	10.4	38	32
15	1/2	10.9	13.6	48	38
20	3/4	12.7	13.9	51	44
25	1	14.7	17.3	60	57
32	1-1/4	17.0	18.0	67	64
40	1-1/2	17.8	18.4	79	76
50	2	19.0	19.2	86	92
65	2-1/2	23.6	28.9	92	108
80	3	25.9	30.5	108	127
100	4	27.7	33.0	121	159

- (\*) 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) .

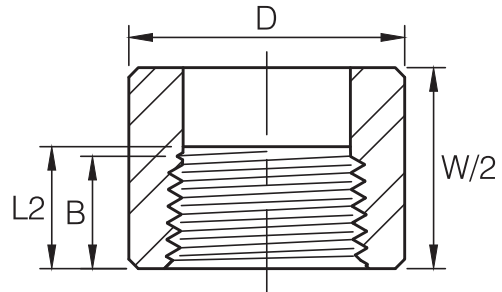


# HALF COUPLING

ASME B16.11-2011(Revision of ASME B16.11-2009)



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 20.

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

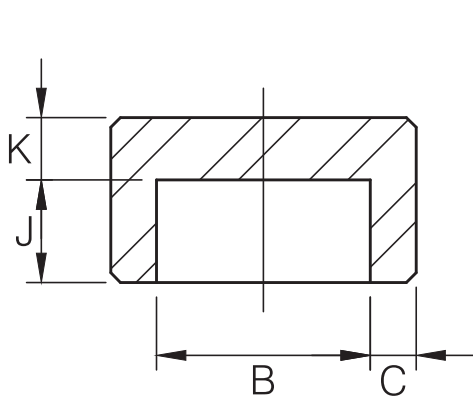
### 3000Lb

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

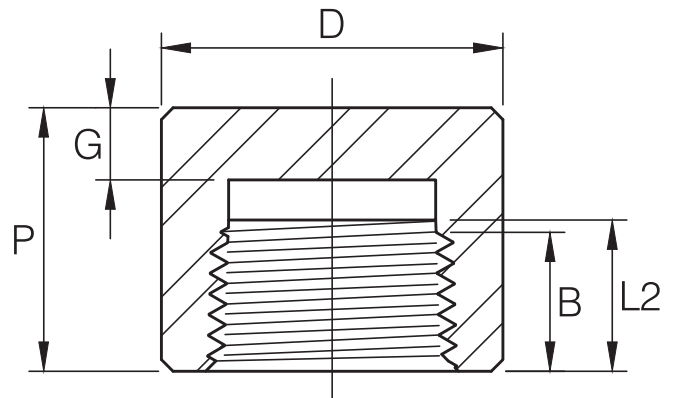
### 6000Lb

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).



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)		

**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

**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

**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 20.

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

**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**

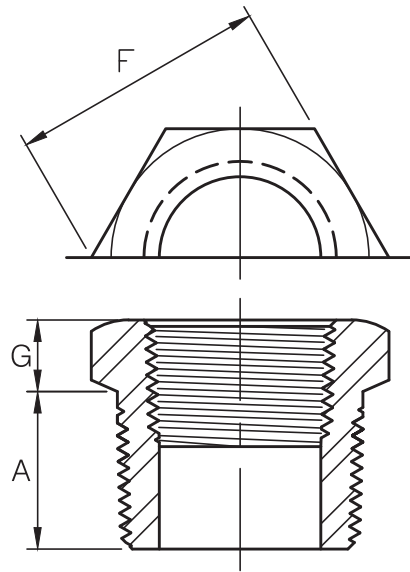
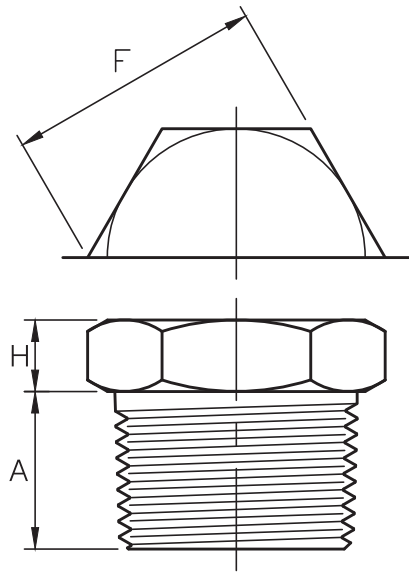
8	1/4	8.1	10.2	27	25	6.4
10	3/8	9.1	10.4	27	32	6.4
15	1/2	10.9	13.6	33	38	7.9
20	3/4	12.7	13.9	38	44	7.9
25	1	14.7	17.3	43	57	11.2
32	1-1/4	17.0	18.0	46	64	11.2
40	1-1/2	17.8	18.4	48	76	12.7
50	2	19.0	19.2	51	92	15.7
65	2-1/2	23.6	28.9	64	108	19.0
80	3	25.9	30.5	68	127	22.4
100	4	27.7	33.0	75	159	28.4

(\*) 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).



# HEX HEAD PLUG & BUSHING

ASME B16.11-2011 (Revision of ASME B16.11-2009)



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.

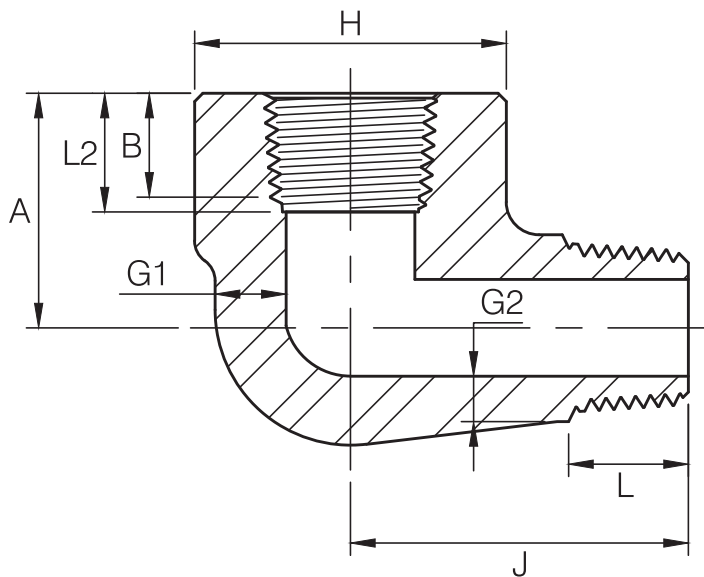
Hex Head Bushings of one-size reduction should not be used in services where they might be subject to harmful loads and forces than internal pressures.





# STREET ELBOW

ASME B16.11-2011(Revision of ASME B16.11-2009)



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

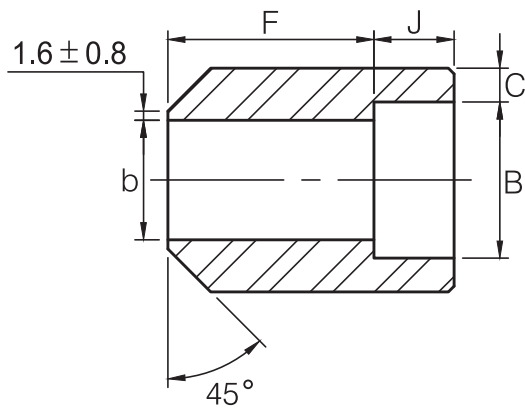
6	1/8	19	19	25	3.18	2.74	6.4	6.7	10.0
8	1/4	25	22	32	3.30	3.22	8.1	10.2	11.0
10	3/8	32	25	38	3.51	3.50	9.1	10.4	13.0
15	1/2	38	28	41	4.09	4.16	10.9	13.6	14.0
20	3/4	44	35	48	4.32	4.88	12.7	13.9	16.0
25	1	51	44	57	4.98	5.56	14.7	17.3	19.0
32	1-1/4	62	51	66	5.28	5.56	17.0	18.0	21.0
40	1-1/2	70	54	71	5.56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

### 6000Lb

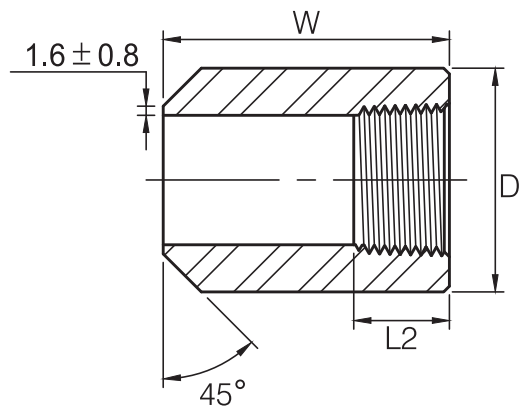
6	1/8	25	22	32	5.08	4.22	6.4	6.7	10.0
8	1/4	32	25	38	5.66	5.28	8.1	10.2	11.0
10	3/8	38	28	41	6.98	5.59	9.1	10.4	13.0
15	1/2	44	35	48	8.15	6.53	10.9	13.6	14.0
20	3/4	51	44	57	8.53	6.86	12.7	13.9	16.0
25	1	62	51	66	9.93	7.95	14.7	17.3	19.0
32	1-1/4	70	54	71	10.59	8.48	17.0	18.0	21.0
40	1-1/2	84	64	84	11.07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



Dimensions are in millimeters.



Dimensions are in millimeters.

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

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

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

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				
1/8	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

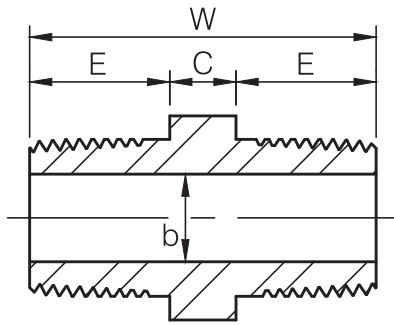
Unit: mm

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	

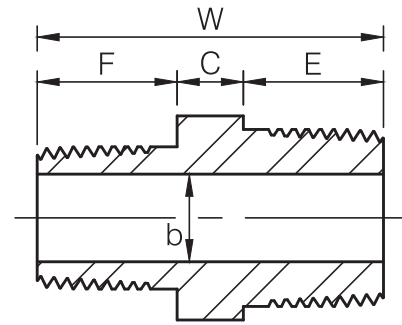
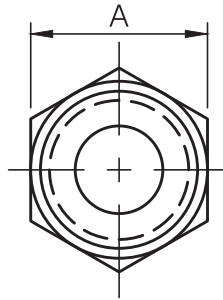


# HEX NIPPLE

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 23.

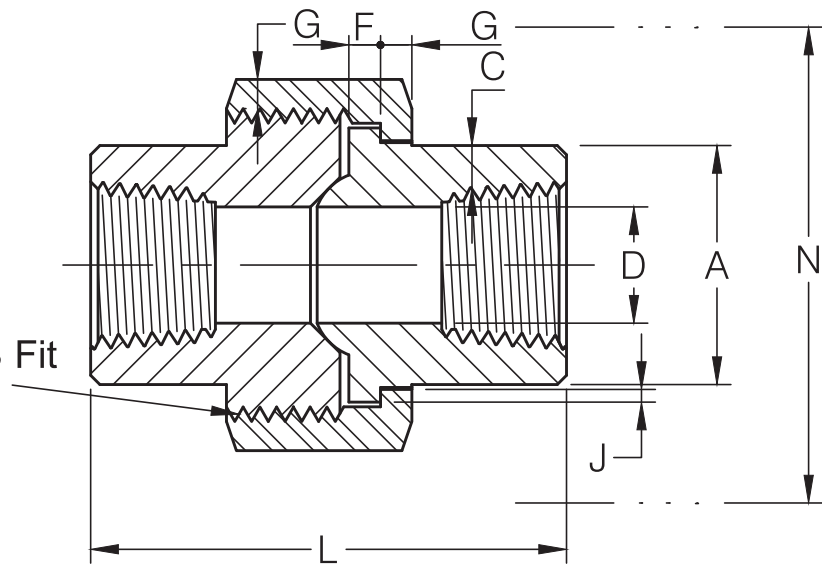
(2) 3M & 6M symbols denote 3000 & 6000 classes.



# THREADED 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	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

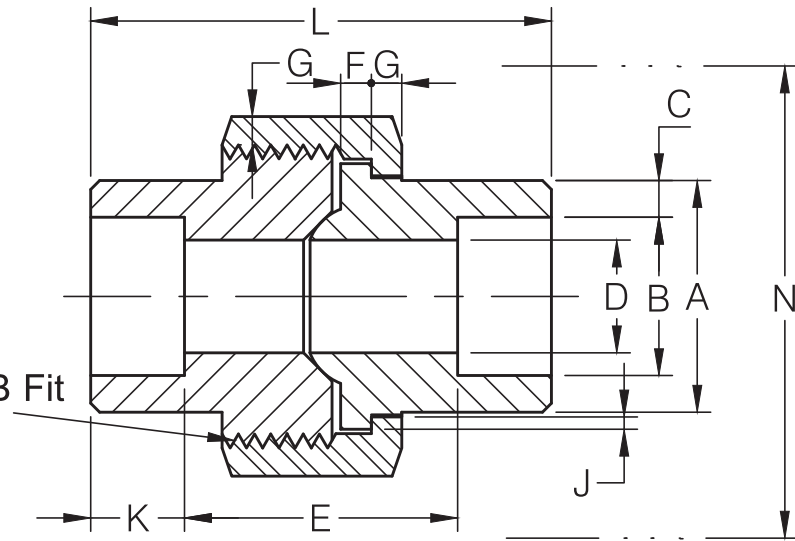
(1) Upper and lower values for each size are the respective maximum and minimum dimensions.



# 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

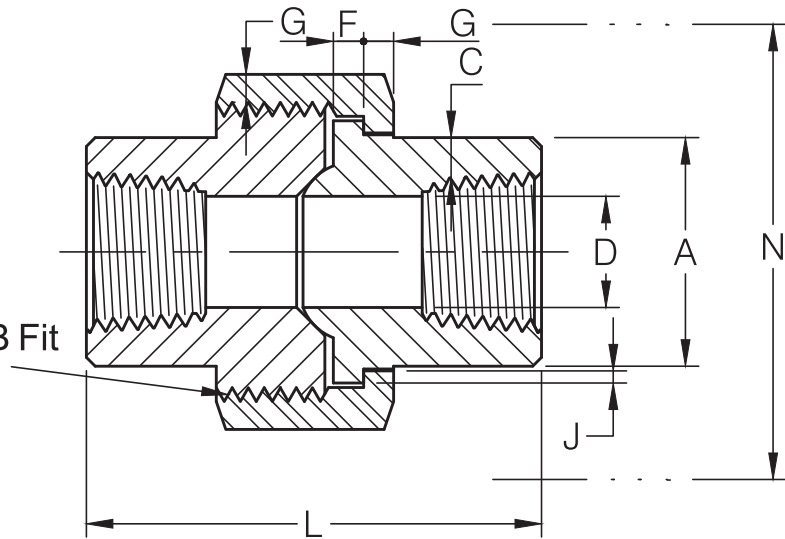
(1) Upper and lower values for each size are the respective maximum and minimum dimensions.



# THREADED 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	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.

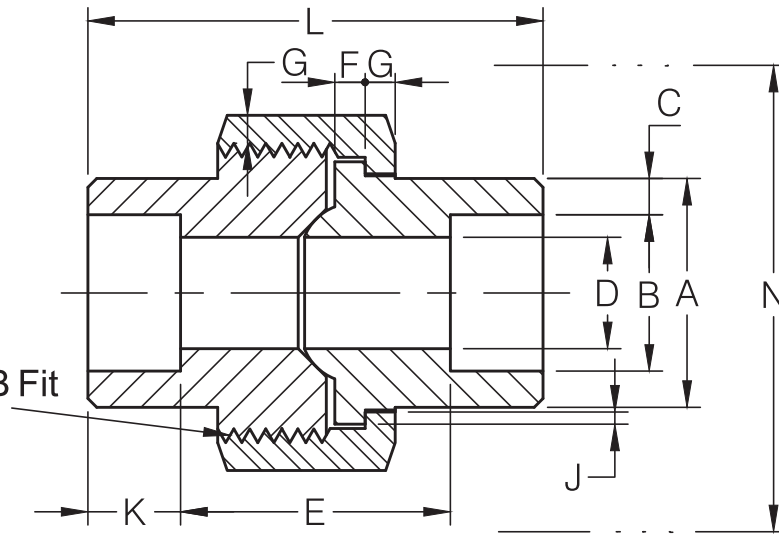
(2) This length size is 158mm by BothWell standards, and the actual length is 190.5mm from MSS SP-83 2014.



# 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.

生產製造：  
鍛造碳鋼、不鏽鋼、合金鋼  
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Millimeters

CAT. NO: 1603