



FLOW CONTROL

Forged High Pressure Pipe Fittings



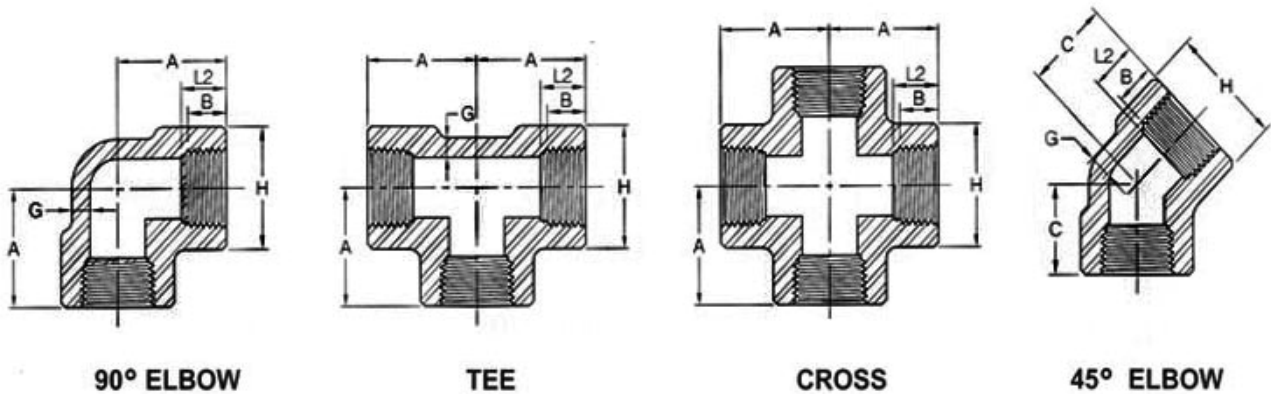
Forged High Pressure Pipe Fittings

Summary :

Type	1. Elbow, Tee, Cross, Coupling, Half Coupling, Cap, Plug, Bushing, Union, HEX. Nipple, Swage nipple, Bull Plug, Street Elbow, Boss, Reducer Insert and Out-let...etc 2. Threaded (NPT or PT Type), Socket-Weld, Butt-welding
Size	NPS 1/8"~4" DN 6~100
Rating Pressure	Threaded End – 2000 / 3000 / 6000 LBS. Socket-weld End – 3000 / 6000 / 9000 LBS. Butt-weld End – SCH40 / SCH80 / SCH160 / XXS.
Specifications	1. Dim. Spec. : ASME B16.11-2009 (Revision of ASME B16.11-2005) MSS – SP – 79, 83, 95, 97 and BS3799. ANSI / ASME B1.20.1-1983 NPT 2. Material Spec. : ASTM A105, A350 LF2, A106, A312, A234, A403 ASTM A182 (F304, F304L, F316, F316L, F304H, F316H, F317L, F321, F11, F22, F91) 3. Size of Raw Material: DIA. 19~85mm Round Bar.
Marking	1. Carbon and Alloy Steel: Marked by stamping. 2. Stainless Steel: Marked by electro-etched, jet printed or stamping. 3. 3/8" under: Brand only. 4. 1/2" to 4": Marked with brand, material, heat code, B16 (For ASME B16.11 product), pressure and size.
Finishing	Carbon steel: Galvanized or black. Stainless steel: Pickled.

Thread Fittings

ASME B16.11-2009 (Revision of ASME B16.11-2005)



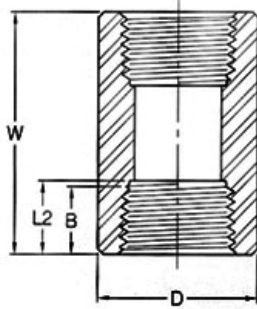
DN	Nom. Pipe Size	Center to End Elbow, Tee, Cross A			Center to End 45° Elbow C			Outside Diameter Of Band H			Minimum Wall Thickness G			Length of Thread Min. (1)	
		2000	3000	6000	2000	3000	6000	2000	3000	6000	2000	3000	6000	B	L2
6	1/8"	21	21	25	17	17	19	22	22	25	3.18	3.18	6.35	6.4	6.7
8	1/4"	21	25	28	17	19	22	22	25	33	3.18	3.30	6.60	8.1	10.2
10	3/8"	25	28	33	19	22	25	25	33	38	3.18	3.51	6.98	9.1	10.4
15	1/2"	28	33	38	22	25	28	33	38	46	3.18	4.09	8.15	10.9	13.6
20	3/4"	33	38	44	25	28	33	38	46	56	3.18	4.32	8.53	12.7	13.9
25	1"	38	44	51	28	33	35	46	56	62	3.68	4.98	9.93	14.7	17.3
32	1-1/4"	44	51	60	33	35	43	56	62	75	3.89	5.28	10.59	17.0	18.0
40	1-1/2"	51	60	64	35	43	44	62	75	84	4.01	5.56	11.07	17.8	18.4
50	2"	60	64	83	43	44	52	75	84	102	4.27	7.14	12.09	19.0	19.2
65	2-1/2"	76	83	95	52	52	64	92	102	121	5.61	7.65	15.29	23.6	28.9
80	3"	86	95	106	64	64	79	109	121	146	5.99	8.84	16.64	25.9	30.5
100	4"	106	114	114	79	79	79	146	152	152	6.55	11.18	18.67	27.7	33.0

(1) Dimensions in Millimeters.

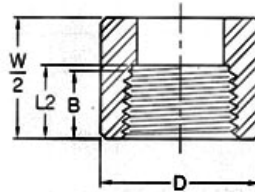
(2) Dimension B is minimum length of perfect thread. The length of useful thread (B plus threads with fully formed roots and flat crests) shall not be less than L2 (effective length of external thread) required by American National Standard for Pipe Threads (ANSI/ASME B1.20.1)

Thread Fittings

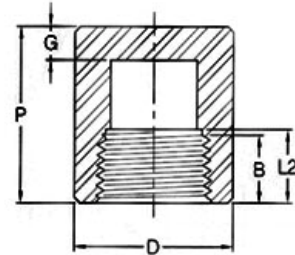
ASME B16.11-2009 (Revision of ASME B16.11-2005)



COUPLING



HALF COUPLING



CAP

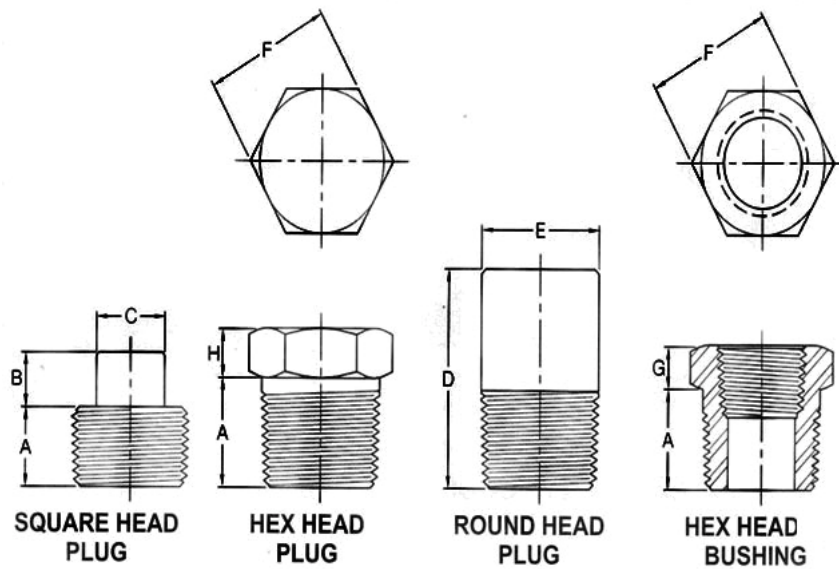
DN	Nom. Pipe Size	Center to End Coupling	Center to End Cap		Outside Diameter		End Wall Thickness		Length of Thread	
		W	P		D		G	Min.	Min. (1)	
		3000 & 6000	3000	6000	3000	6000	3000	6000	B	L2
6	1/8"	32	19		16		4.8		6.4	6.7
8	1/4"	35	25	27	19	25	4.8	6.4	8.1	10.2
10	3/8"	38	25	27	22	32	4.8	6.4	9.1	10.4
15	1/2"	48	32	33	28	38	6.4	7.9	10.9	13.6
20	3/4"	51	37	38	35	44	6.4	7.9	12.7	13.9
25	1"	60	41	43	44	57	9.7	11.2	14.7	17.3
32	1-1/4"	67	44	46	57	64	9.7	11.2	17.0	18.0
40	1-1/2"	79	44	48	64	76	11.2	12.7	17.8	18.4
50	2"	86	48	51	76	92	12.7	15.7	19.0	19.2
65	2-1/2"	92	60	64	92	108	15.7	19.0	23.6	28.9
80	3"	108	65	68	108	127	19.0	22.4	25.9	30.5
100	4"	121	68	75	140	159	22.4	28.4	27.7	33.0

(1) Dimensions in Millimeters.

(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)

Thread Fittings

ASME B16.11-2009 (Revision of ASME B16.11-2005)



DN	Nom. Pipe Size	Length (Min.)	Square Head Plug		Round Head Plug		Hex. Head Plug & Bushing		
			Height of Square (Min.)	Width Flat (Min.)	Nominal Diameter of Head (Nom)	Length (Min.)	Width Flat (Nom.)	Hex. Height (Min.)	
			B	C	E	D	F	Bushing G	Plug H
6	1/8"	10	6	7	10	35			6
8	1/4"	11	6	10	14	41	16	3	6
10	3/8"	13	8	11	18	41	18	4	8
15	1/2"	14	10	14	21	44	22	5	8
20	3/4"	16	11	16	27	44	27	6	10
25	1"	19	13	21	33	51	36	6	10
32	1-1/4"	21	14	24	43	51	46	7	14
40	1-1/2"	21	16	28	48	51	50	8	16
50	2"	22	18	32	60	64	65	9	18
65	2-1/2"	27	19	36	73	70	75	10	19
80	3"	28	21	41	89	70	90	10	21
100	4"	32	25	65	114	76	115	13	25

(1) Dimensions in Millimeters.

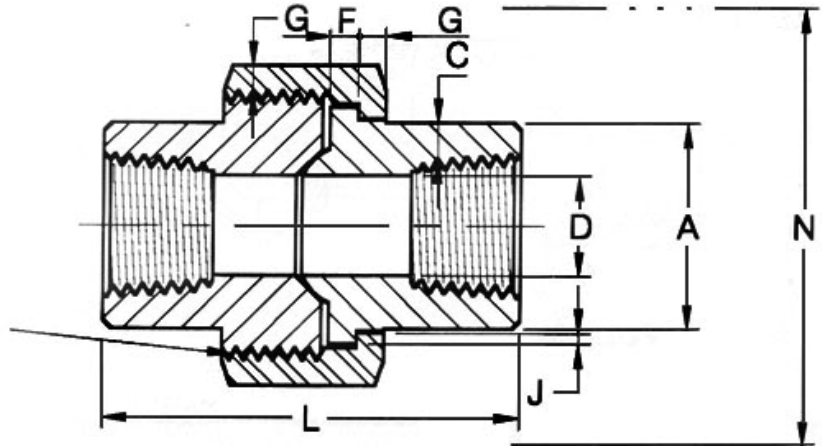
(2) CAUTIONARY NOTE REGARDING HEX BUSHINGS.

Hex head bushing of one-size reduction should not be used in services where they might be subject to harmful loads and forces other than internal pressure.

Unions Threaded

Threaded End MSS-SP-83-2006

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



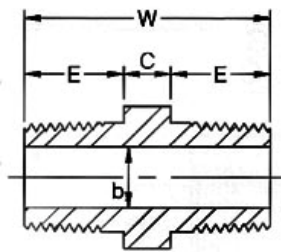
Nom. Pipe Size	Pipe End	Wall	Water Way Bore	Male Flange	Nut	Threads Per 25.4mm	Bearing	Length Assem. Nom.	Clear Assem. Nut
	Min. A	Min. C	D	Min. F	Min. G	Max. H	Min. J	L	N
1/8"	14.7	2.41	8.43 6.43	3.18	3.18	16	1.24	41.4	50.8
1/4"	19.0	3.02	11.13 9.45	3.18	3.18	16	1.24	41.4	50.8
3/8"	22.9	3.20	14.27 13.51	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	11	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	88.25 77.27	8.26	8.00	8	3.53	109.0	175.3

(1) Dimensions in Millimeters.

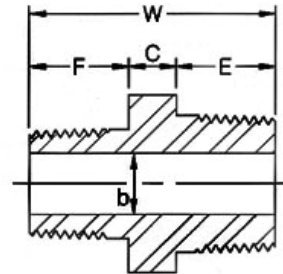
(2) Upper and lower values for each size are the respective maximum and minimum dimensions.

Hex Nipples Threaded

BS3799-1974



FULL SIZE



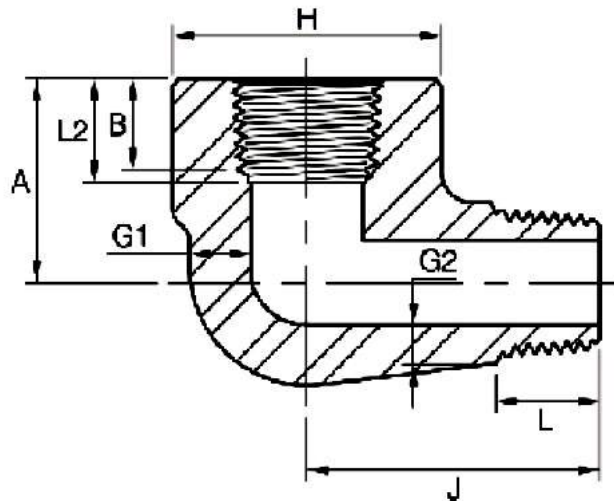
REDUCING SIZE

Nominal Size		A (Min)	W (Min)	E (Min)	b		C (Min)	F (Min)
DN	Inch				3000	6000		
6	1/8"	11	26	10	5	2	6	-
8	1/4"	15	36	15	8	6	6	-
8 x 6	1/4"x1/8"	15	31	15	5	2	6	10
10	3/8"	18	40	16	11	8	8	-
10 x 8	3/8"x1/4"	18	39	16	8	6	8	15
15	1/2"	22	48	20	14	11	8	-
15 x 10	1/2"x3/8"	22	44	20	11	8	8	16
15 x 8	1/2"x1/4"	22	43	20	8	6	8	15
20	3/4"	27	52	21	19	13	10	-
20 x 15	3/4"x1/2"	27	50	21	14	11	9	20
20 x 10	3/4"x3/8"	27	46	21	11	8	9	16
25	1"	35	60	25	24	17	10	-
25 x 20	1"x3/4"	35	56	25	19	13	10	21
25 x 15	1"x1/2"	35	55	25	14	11	10	20
40	1-1/2"	50	68	26	38	30	16	-
40 x 25	1-1/2"x1"	50	67	26	24	17	16	25
40 x 20	1-1/2"x3/4"	50	63	26	19	13	16	21
40 x 15	1-1/2"x1/2"	50	62	26	14	11	16	20
50	2"	62	71	27	49	39	17	-
50 x 40	2"x1-1/2"	62	70	27	38	30	17	26
50 x 25	2"x1"	62	70	27	24	17	18	25
50 x 20	2"x3/4"	62	65	27	19	13	17	21
50 x 15	2"x1/2"	62	65	27	14	11	18	20

Dimensions in Millimeters.

Street Elbows Threaded

Threaded End ASME B16.11-2009 (Revision of ASME B16.11-2005)



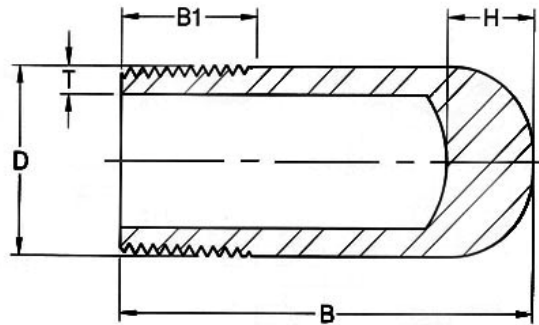
DN	Nom. Pipe Size	H		A		J		G1 (Min.)		G2 ⁽¹⁾ (Min)		B ⁽²⁾ (Min)	L2 ⁽²⁾ (Min)	L (Min)
		3000	6000	3000	6000	3000	6000	3000	6000	3000	6000	(Min)	(Min)	(Min)
6	1/8"	19	25	19	22	25	32	3.18	5.08	2.74	4.22	6.4	6.7	10.0
8	1/4"	25	32	22	25	32	38	3.30	5.66	3.22	5.28	8.1	10.2	11.0
10	3/8"	32	38	25	28	38	41	3.50	6.98	3.50	5.59	9.1	10.4	13.0
15	1/2"	38	44	28	35	41	48	4.09	8.15	4.16	6.53	10.9	13.6	14.0
20	3/4"	44	51	35	44	48	57	4.32	8.53	4.88	6.86	12.7	13.9	16.0
25	1"	51	62	44	51	57	66	4.98	9.93	5.56	7.95	14.7	17.3	19.0
32	1-1/4"	62	70	51	54	66	71	5.28	10.59	5.56	8.48	17.0	18.0	21.0
40	1-1/2"	70	84	54	64	71	84	5.56	11.07	6.25	8.89	17.8	18.4	21.0
50	2"	84	102	64	83	84	105	7.14	12.09	7.64	9.70	19.0	19.0	22.0

(1) Dimensions in Millimeters.

(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)

Bull Plugs Threaded

MSS-SP-95-2006



Nom. Pipe Size	D	B	B1	T (Min)				H
				Sch.40 (STD)	Sch.80 (XS)	Sch.160	XXS	
1/8"	10.3	34	9.5	1.73	2.41			14
1/4"	13.7	34	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	4.56	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	5.05	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	7.60	11.13	15.24	20
4"	114.3	178	32.0	6.35	8.08	13.49	17.12	20

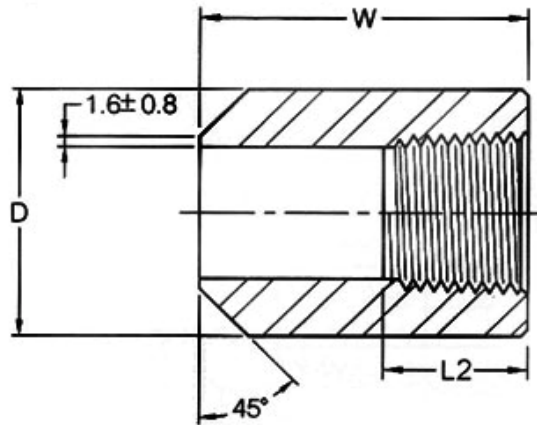
(1) Dimensions in Millimeters.

(2) Thread in accordance with ASME B1.20.1

(3) Wall thickness (T Min.) in accordance with ASME B36.10M.

Bosses Threaded

BS3799-1974

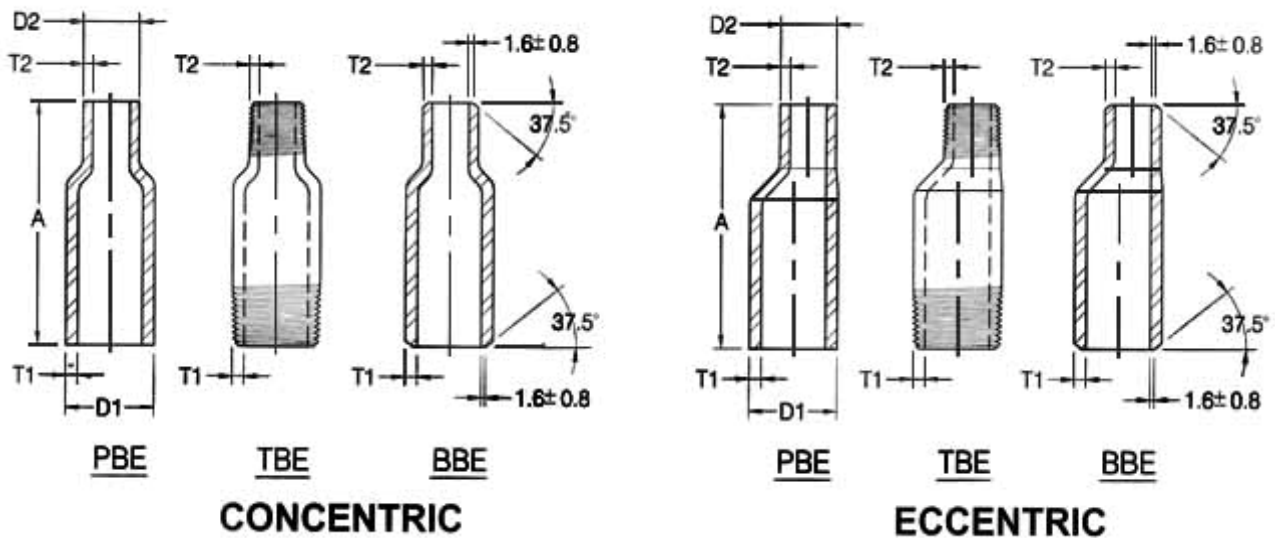


DN	Nom. Pipe Size	D		W		L2 (Min)	
		3000lb	6000lb	3000lb	6000lb	3000lb	6000lb
6	1/8"	16.0	22.0	38.0		6.70	
8	1/4"	19.0	26.0	41.0		10.21	
10	3/8"	22.0	32.0	45.0		10.36	
15	1/2"	29.0	38.0	51.0		13.56	
20	3/4"	35.0	45.0	51.0		13.86	
25	1"	45.0	60.0	51.0		17.34	
40	1-1/2"	64.0	76.0	51.0		18.38	
50	2"	76.0	95.0	51.0		19.22	
65	2-1/2"	95.0		51.0		28.89	
80	3"	110.0		57.0		30.48	
100	4"	140.0		64.0		33.02	

Dimensions in Millimeters.

Swaged Nipples

MSS-SP-95-2006

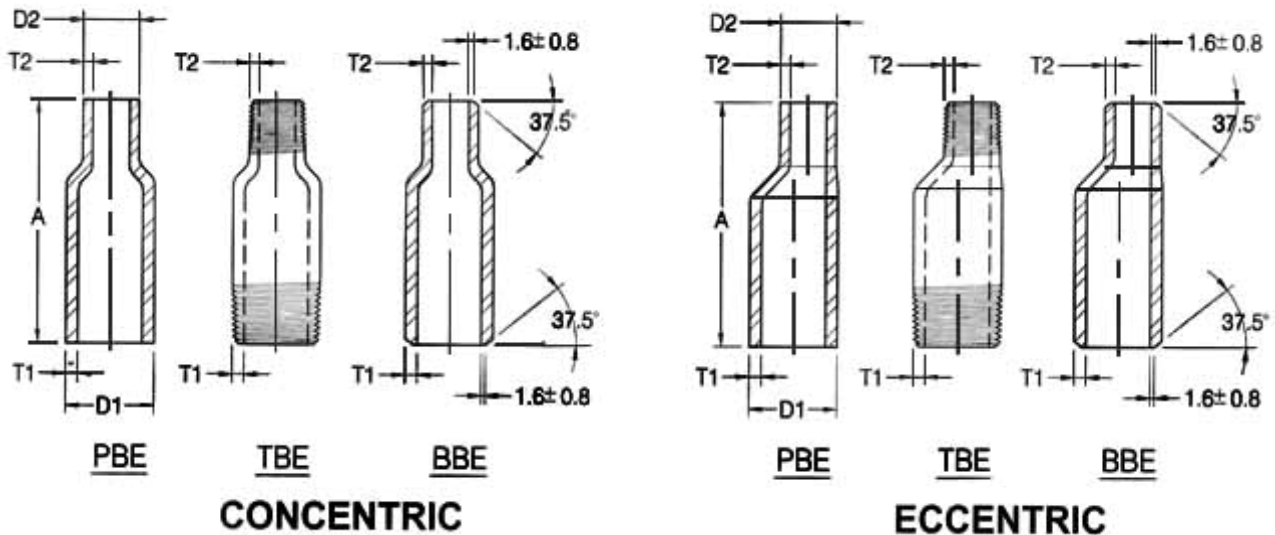


Nominal Pipe Size (NPS)	Outside Diameter		End To End "A"	Wall Thickness							
	Large End D1	Small End D2		T1				T2			
				Sch40 (STD)	Sch80 (XS)	Sch160	XXS	Sch40 (STD)	Sch80 (XS)	Sch160	XXS
1/4"x1/8"	13.7	10.3	57	2.2	3.0	3.7	6.1	1.7	2.4		
3/8"x1/8"	17.1	10.3	64	2.3	3.2	4.0	6.4	1.7	2.4		
3/8"x1/4"	17.1	13.7	64	2.3	3.2	4.0	6.4	2.2	3.0		
1/2"x1/8"	21.3	10.3	70	2.8	3.7	4.8	7.5	1.7	2.4		
1/2"x1/4"	21.3	13.7	70	2.8	3.7	4.8	7.5	2.2	3.0		
1/2"x3/8"	21.3	17.1	70	2.8	3.7	4.8	7.5	2.3	3.2		
3/4"x1/8"	26.7	10.3	76	2.9	3.9	5.6	7.8	1.7	2.4		
3/4"x1/4"	26.7	13.7	76	2.9	3.9	5.6	7.8	2.2	3.0		
3/4"x3/8"	26.7	17.1	76	2.9	3.9	5.6	7.8	2.3	3.2		
3/4"x1/2"	26.7	21.3	76	2.9	3.9	5.6	7.8	2.8	3.7	4.8	7.5
1"x1/8"	33.4	10.3	89	3.4	4.5	6.4	9.1	1.7	2.4		
1"x1/4"	33.4	13.7	89	3.4	4.5	6.4	9.1	2.2	3.0		
1"x3/8"	33.4	17.1	89	3.4	4.5	6.4	9.1	2.3	3.2		
1"x1/2"	33.4	21.3	89	3.4	4.5	6.4	9.1	2.8	3.7	4.8	7.5
1"x3/4"	33.4	26.7	89	3.4	4.5	6.4	9.1	2.9	3.9	5.6	7.8
1-1/4"x1/8"	42.2	10.3	102	3.6	4.9	6.4	9.7	1.7	2.4		
1-1/4"x1/4"	42.2	13.7	102	3.6	4.9	6.4	9.7	2.2	3.0		
1-1/4"x3/8"	42.2	17.1	102	3.6	4.9	6.4	9.7	2.3	3.2		
1-1/4"x1/2"	42.2	21.3	102	3.6	4.9	6.4	9.7	2.8	3.7	4.8	7.5
1-1/4"x3/4"	42.2	26.7	102	3.6	4.9	6.4	9.7	2.9	3.9	5.6	7.8
1-1/4"x1"	42.2	33.4	102	3.6	4.9	6.4	9.7	3.4	4.5	6.4	9.1
1-1/2"x1/8"	48.3	10.3	114	3.7	5.1	7.1	10.2	1.7	2.4		
1-1/2"x1/4"	48.3	13.7	114	3.7	5.1	7.1	10.2	2.2	3.0		
1-1/2"x3/8"	48.3	17.1	114	3.7	5.1	7.1	10.2	2.3	3.2		
1-1/2"x1/2"	48.3	21.3	114	3.7	5.1	7.1	10.2	2.8	3.7	4.8	7.5
1-1/2"x3/4"	48.3	26.7	114	3.7	5.1	7.1	10.2	2.9	3.9	5.6	7.8
1-1/2"x1"	48.3	33.4	114	3.7	5.1	7.1	10.2	3.4	4.5	6.4	9.1
1-1/2"x1-1/4"	48.3	42.2	114	3.7	5.1	7.1	10.2	3.6	4.9	6.4	9.7
2"x1/8"	60.3	10.3	165	3.9	5.5	8.7	11.1	1.7	2.4		
2"x1/4"	60.3	13.7	165	3.9	5.5	8.7	11.1	2.2	3.0		
2"x3/8"	60.3	17.1	165	3.9	5.5	8.7	11.1	2.3	3.2		
2"x1/2"	60.3	21.3	165	3.9	5.5	8.7	11.1	2.8	3.7	4.8	7.5

(Continued)

Swaged Nipples

MSS-SP-95-2006



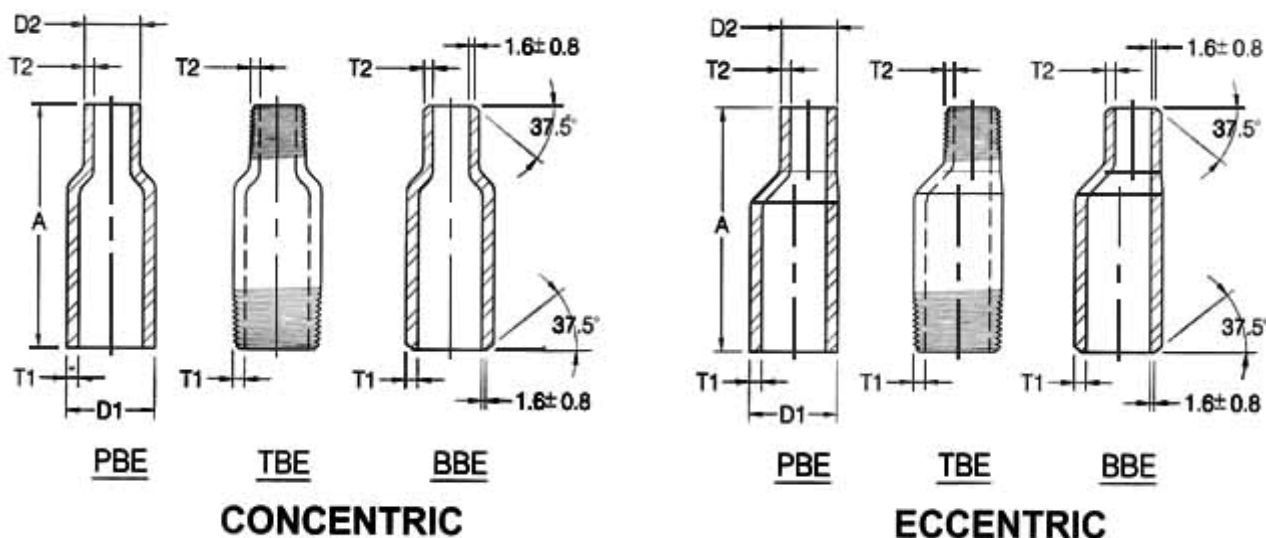
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Nominal Pipe Size (NPS)	Outside Diameter		End To End "A"	Wall Thickness							
	Large End D1	Small End D2		T1				T2			
				Sch40 (STD)	Sch80 (XS)	Sch160	XXS	Sch40 (STD)	Sch80 (XS)	Sch160	XXS
2"x3/4"	60.3	26.7	165	3.9	5.5	8.7	11.1	2.9	3.9	5.6	7.8
2"x1"	60.3	33.4	165	3.9	5.5	8.7	11.1	3.4	4.5	6.4	9.1
2"x1-1/4"	60.3	42.2	165	3.9	5.5	8.7	11.1	3.6	4.9	6.4	9.7
2"x1-1/2"	60.3	48.3	165	3.9	5.5	8.7	11.1	3.7	5.1	7.1	10.2
2-1/2"x1/8"	73.0	10.3	178	5.2	7.0	9.5	14.0	1.7	2.4		
2-1/2"x1/4"	73.0	13.7	178	5.2	7.0	9.5	14.0	2.2	3.0		
2-1/2"x3/8"	73.0	17.1	178	5.2	7.0	9.5	14.0	2.3	3.2		
2-1/2"x1/2"	73.0	21.3	178	5.2	7.0	9.5	14.0	2.8	3.7	4.8	7.5
2-1/2"x3/4"	73.0	26.7	178	5.2	7.0	9.5	14.0	2.9	3.9	5.6	7.8
2-1/2"x1"	73.0	33.4	178	5.2	7.0	9.5	14.0	3.4	4.5	6.4	9.1
2-1/2"x1-1/4"	73.0	42.2	178	5.2	7.0	9.5	14.0	3.6	4.9	6.4	9.7
2-1/2"x1-1/2"	73.0	48.3	178	5.2	7.0	9.5	14.0	3.7	5.1	7.1	10.2
2-1/2"x2"	73.0	60.3	178	5.2	7.0	9.5	14.0	3.9	5.5	8.7	11.1
3"x1/8"	88.9	10.3	203	5.5	7.6	11.1	15.2	1.7	2.4	3.2	4.8
3"x1/4"	88.9	13.7	203	5.5	7.6	11.1	15.2	2.2	3.0	3.7	6.1
3"x3/8"	88.9	17.1	203	5.5	7.6	11.1	15.2	2.3	3.2	4.0	6.4
3"x1/2"	88.9	21.3	203	5.5	7.6	11.1	15.2	2.8	3.7	4.8	7.5
3"x3/4"	88.9	26.7	203	5.5	7.6	11.1	15.2	2.9	3.9	5.6	7.8
3"x1"	88.9	33.4	203	5.5	7.6	11.1	15.2	3.4	4.5	6.4	9.1
3"x1-1/4"	88.9	42.2	203	5.5	7.6	11.1	15.2	3.6	4.9	6.4	9.7
3"x1-1/2"	88.9	48.3	203	5.5	7.6	11.1	15.2	3.7	5.1	7.1	10.2
3"x2"	88.9	60.3	203	5.5	7.6	11.1	15.2	3.9	5.5	8.7	11.1
3"x2-1/2"	88.9	73.0	203	5.5	7.6	11.1	15.2	5.2	7.0	9.5	14.0
3-1/2"x1/8"	101.6	10.3	203	5.7	8.1			1.7	2.4		
3-1/2"x1/4"	101.6	13.7	203	5.7	8.1			2.2	3.0		
3-1/2"x3/8"	101.6	17.1	203	5.7	8.1			2.3	3.2		
3-1/2"x1/2"	101.6	21.3	203	5.7	8.1			2.8	3.7	4.8	7.5
3-1/2"x3/4"	101.6	26.7	203	5.7	8.1			2.9	3.9	5.6	7.8
3-1/2"x1"	101.6	33.4	203	5.7	8.1			3.4	4.5	6.4	9.1
3-1/2"x1-1/4"	101.6	42.2	203	5.7	8.1			3.6	4.9	6.4	9.7

(Continued)

Swaged Nipples

MSS-SP-95-2006



(Continued)

Continued

Nominal Pipe Size (NPS)	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
3-1/2"x1-1/2"	101.6	48.3	203	5.7	8.1			3.7	5.1	7.1	10.2
3-1/2"x2"	101.6	60.3	203	5.7	8.1			3.9	5.5	8.7	11.1
3-1/2"x2-1/2"	101.6	73.0	203	5.7	8.1			5.2	7.0	9.5	14.0
3-1/2"x3"	101.6	88.9	203	5.7	8.1			5.5	7.6	11.1	15.2
4"x1/4"	114.3	13.7	229	6.0	8.6	13.5	17.1	2.2	3.0		
4"x3/8"	114.3	17.1	229	6.0	8.6	13.5	17.1	2.3	3.2		
4"x1/2"	114.3	21.3	229	6.0	8.6	13.5	17.1	2.8	3.7	4.8	7.5
4"x3/4"	114.3	26.7	229	6.0	8.6	13.5	17.1	2.9	3.9	5.6	7.8
4"x1"	114.3	33.4	229	6.0	8.6	13.5	17.1	3.4	4.5	6.4	9.1
4"x1-1/4"	114.3	42.2	229	6.0	8.6	13.5	17.1	3.6	4.9	6.4	9.7
4"x1-1/2"	114.3	48.3	229	6.0	8.6	13.5	17.1	3.7	5.1	7.1	10.2
4"x2"	114.3	60.3	229	6.0	8.6	13.5	17.1	3.9	5.5	8.7	11.1
4"x2-1/2"	114.3	73.0	229	6.0	8.6	13.5	17.1	5.2	7.0	9.5	14.0
4"x3"	114.3	88.9	229	6.0	8.6	13.5	17.1	5.5	7.6	11.1	15.2
4"x3-1/2"	114.3	101.6	229	6.0	8.6	13.5	17.1	5.7	8.1		

(1) Dimensions in Millimeters.

(2) Wall Thickness : T1 & T2 in accordance with ASME B36.10M

PBE : Plain Both Ends

BBE : Bevel Both Ends

TBE : Thread Both Ends

PSE : Plain Small End

BSE : Bevel Small End

TSE : Thread Small End

PLE : Plain Large End

BLE : Bevel Large End

TLE : Thread Large End

Dimensional Tolerance of Swaged Nipple

Nominal Pipe Size (inch)	Overall Length (mm)	Outside diameter at end		Wall Thickness (prior to threading or grooving)
		Square Cut Ends (mm)	Other End Connection (mm)	
1/8" to 3/8"	± 1.5	+ 0.40 - 0.80	± 0.80	Not less than 87.5% of nominal wall thickness
1/2" to 1-1/2"	± 1.5	+ 0.40 - 0.80	+ 1.50 - 0.80	
2" to 2-1/2"	± 3.0	± 0.80	+ 1.50 - 0.80	
3" to 4"	± 3.0	± 0.80	± 1.50	

(1) Dimensions in Millimeters.

(2) Prior to threading or grooving

Pipe Nipples Threaded

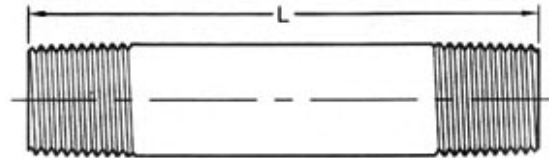
ASME A773-03



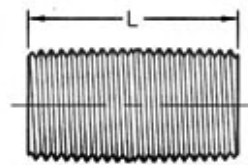
Plain End



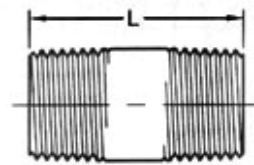
Bevel End



Long Nipple



Close Nipple



Short Nipple

Nom. Pipe Size	L			Plain End Weight (kg/m)			
	Close Nipple	Short Nipple	Long Nipple	Sch40/STD	Sch80/XS	Sch160	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	2	2-1/2~12	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	2-1/2	3~12	3.39	4.47	5.61	7.77
1-1/2"	1-3/4	2-1/2	3~12	4.05	5.41	7.25	9.55
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	16.08	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	67.57	79.22

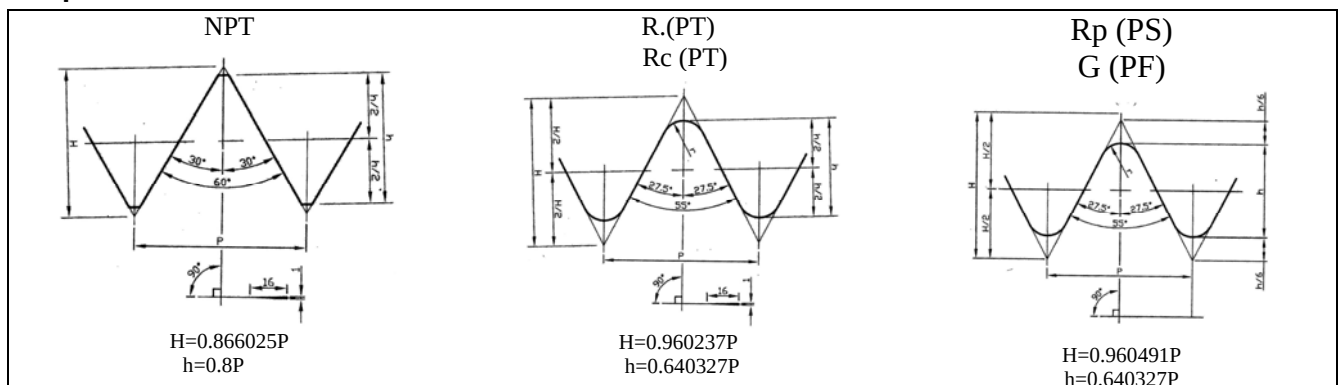
(1) Dimensions in Millimeters.

(2) Thickness in accordance with ASME B1.20.1

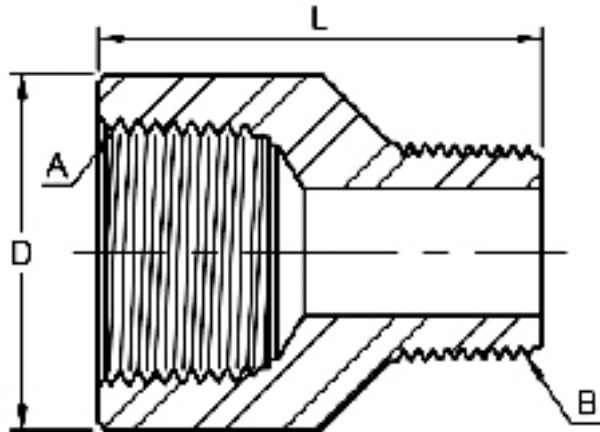
(3) Weld bevel in accordance with ASME B16.25

(4) Weight in accordance with ASME B36.10M Table 1.

Shape of Thread



Adapter Threaded



3000LB

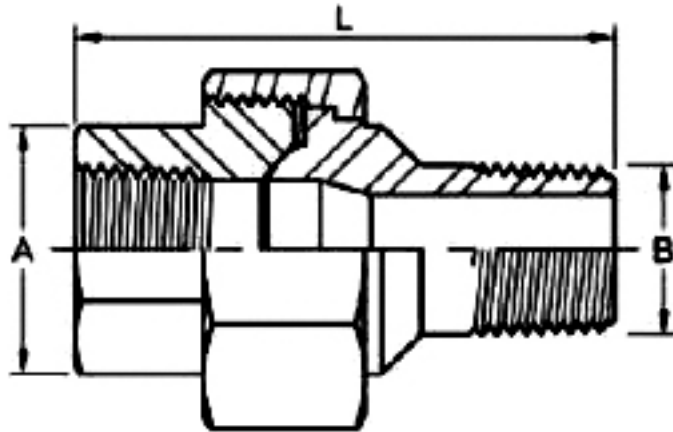
DN	Nom Pipe Size A	D	L	Threaded Size B
8	1/4"	19	33	1/8"
10	3/8"	22	35	1/4"
15	1/2"	28	42	3/8"
20	3/4"	35	47	1/2"
25	1"	44	55	3/4"
32	1-1/4"	57	63	1"
40	1-1/2"	64	66	1-1/4"
50	2"	76	76	1-1/2"
65	2-1/2"	92	90	2"
80	3"	108	110	2-1/2"
100	4"	140	120	3"

(1) Dimensions in Millimeters.

(2) Thickness in accordance with ANSI / ASME B1.20.1 1983

(3) Dimensions may vary according to the customers' and manufacturer's requirement.

Union (Male x Female)



3000LB

Nom Pipe Size	A ⁽²⁾ (Min)	B	L
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 in Millimeters.

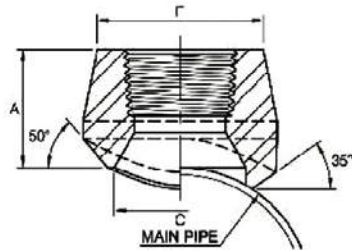
(2) Dimensions refer to MSS SP-83 Table 5.

(3) Thickness in accordance with ANSI / ASME B1.20.1 1983

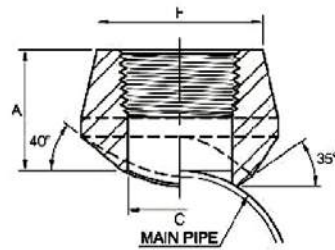
(4) Dimensions may vary according to the customers' and manufacturer's requirement.

Branch Outlet Threaded

Reducing Sizes MSS-SP-97-2006



REDUCING WAY



STRAIGHT WAY

Out-Let Pipe NPS (in)	Reducing Way					
	A		C		F	
	3000lb (Sch80)	6000lb (Sch160)	3000lb (Sch80)	6000lb (Sch160)	3000lb (Sch80)	6000lb (Sch160)
1/8"	19.0		13.7		17.3	
1/4"	19.0		13.7		22.0	
3/8"	21.0		17.1		25.8	
1/2"	25.0	32.0	21.3	16.6	31.3	33.9
3/4"	27.0	37.0	26.7	21.2	37.1	41.2
1"	33.0	40.0	33.4	27.0	45.5	49.9
1-1/4"	33.0	41.0	42.2	35.8	57.0	58.6
1-1/2"	35.0	43.0	48.3	41.2	64.0	66.7
2"	38.0	52.0	60.3	51.6	76.0	83.2
2-1/2"	46.0		73.0		92.0	
3"	51.0		88.9		109.2	
4"	57.0		114.3		140.0	

Out-Let Pipe NPS (in)	Straight Way		
	A	C	F
	3000lb		
1/8"			
1/4"	19.0	11.5	22.0
3/8"	21.0	14.5	25.9
1/2"	25.0	16.5	31.4
3/4"	27.0	21.5	37.1
1"	33.0	27.2	45.5
1-1/4"	33.0	36.0	57.0
1-1/2"	35.0	42.0	64.0
2"	38.0	53.0	76.0
2-1/2"	46.0	65.0	92.0
3"	51.0	80.0	109.2
4"	57.0	104.0	140.0

(1) Dimensions in Millimeters.

(2) Thread in accordance with ASME B1.20.1

(3) 3000LBS outlet size 4 and less fit a number of run pipe sizes and the fitting are marked accordingly.

Dimensional Tolerance of MSS SP-97-2006

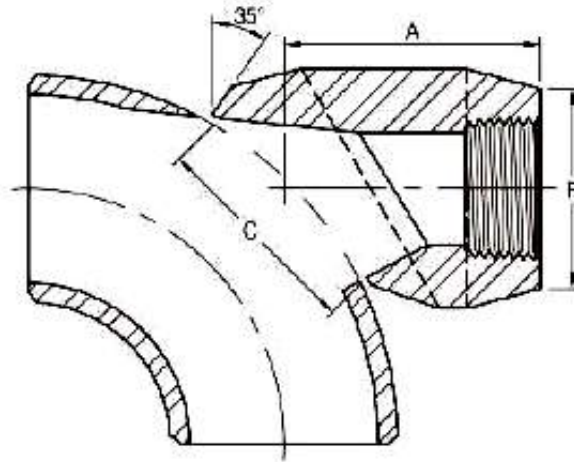
Item	1/8" to 3/4"	1" to 4"
Face of fitting to crotch (A)	± 0.76	± 1.52

Conventional Run Size Combinations

		OUTLET SIZE									
		1/4"	3/8"	1/2"	3/4"	1"	1-1/4"	1-1/2"	2"	2-1/2"	3"
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" 3-1/2"~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" 4"~5" 5"~6" 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"
	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"

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

90° Elbow Outlet Threaded



3000LB

Outlet Pipe		A	C	F
DN	Inch			
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

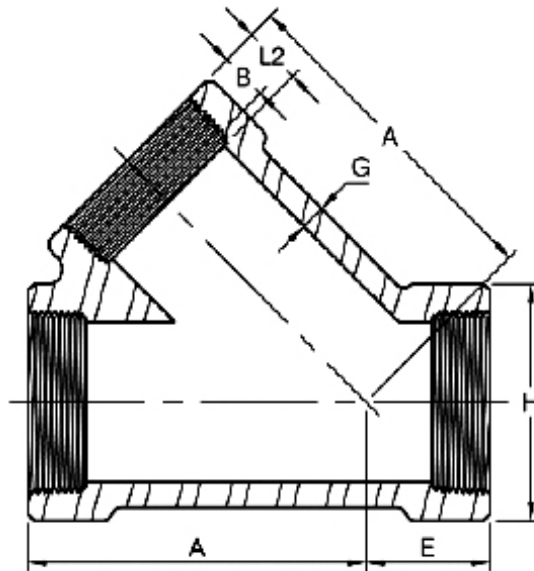
Outlet Pipe		A	C	F
DN	Inch			
8	1/4"	40.5	34.9	26.0
10	3/8"	40.5	34.9	33.0
15	1/2"	47.6	34.9	38.0
20	3/4"	55.6	43.6	44.0
25	1"	60.3	54.0	57.0
32	1-1/4"	66.7	67.5	64.0
40	1-1/2"	85.7	76.2	76.0

(1) Dimensions in Millimeters.

(2) Thread in accordance with ASME B1.20.1

(3) Dimensions may vary according to the customer's and manufacturer's requirement.

45° Lateral Tee Threaded



2000LB

DN	Nom. Pipe Size	Length of Thread (Min)		A	E	G ⁽²⁾ (Min)	H ⁽²⁾
		B ⁽³⁾	L2 ⁽³⁾				
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

DN	Nom. Pipe Size	Length of Thread (Min)		A	E	G ⁽²⁾ (Min)	H ⁽²⁾
		B ⁽³⁾	L2 ⁽³⁾				
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	136	56	7.14	84

(1) Dimensions in Millimeters.

(2) Dimensions refer to ANSI B16.11

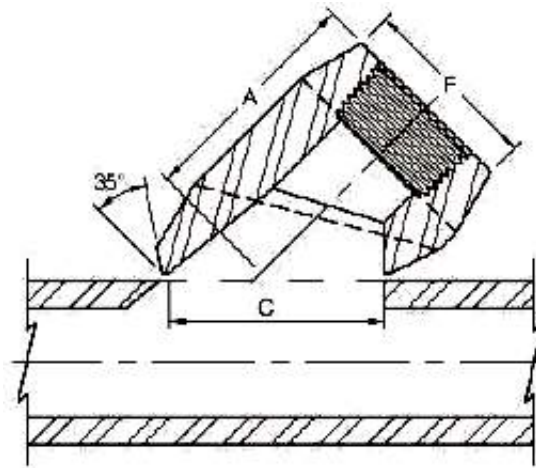
(3) Dimension B is minimum length of perfect thread.

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)

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

(5) Dimensions may vary according to the customer's and manufacturer's requirement.

Lateral Outlet Threaded



3000LB

Outlet Pipe		A	C	F
DN	Inch			
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

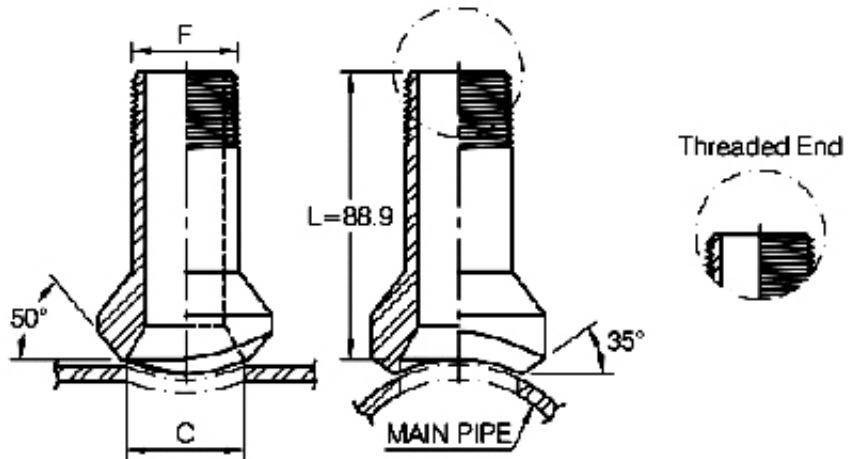
Outlet Pipe		A	C	F
DN	Inch			
8	1/4"	40.5	34.9	26.0
10	3/8"	40.5	34.9	33.0
15	1/2"	47.6	34.9	38.0
20	3/4"	55.6	43.6	44.0
25	1"	60.3	54.0	57.0
32	1-1/4"	66.7	67.5	64.0
40	1-1/2"	85.7	76.2	76.0

(1) Dimensions in Millimeters.

(2) Thread in accordance with ASME B1.20.1

(3) Dimensions may vary according to the customer's and manufacturer's requirement.

Nipple Branch Outlet Threaded



Outlet Pipe	C		F
	3000LB	6000LB	
1/2"	23.8	13.8	21.3
3/4"	30.2	18.9	26.7
1"	36.5	24.3	33.4
1-1/4"	44.5	32.5	42.2
1-1/2"	50.8	38.1	48.3
2"	65.1	49.2	60.3

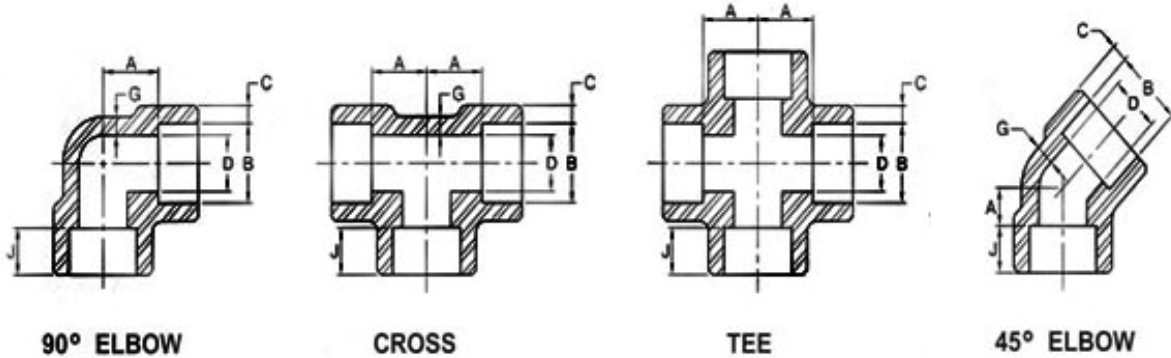
(1) Dimensions in Millimeters.

(2) Thread in accordance with ASME B1.20.1

(3) Dimensions may vary according to the customer's and manufacturer's requirement.

Socket Weld Fittings

ASME B16.11-2009 (Revision of ASME B16.11-2005)



DN	Nom. Pipe Size	Center to Bottom of Socket-A						Socket Bore Dia. B	Bore Dia. Of Fitting D			Socket Wall Thickness (2) C						Body Wall Thickness G			Depth of Socket Min. J
		90° Elbows Tees, Crosses			45° Elbows							Class Designation						Class Designation			
		Class Designation			Class Designation				Class Designation			3000		6000		9000		3000	6000	9000	
		3000	6000	9000	3000	6000	9000		3000	6000	9000	Ave.	Min	Ave.	Min	Ave.	Min	Min.	Min.	Min.	
6	1/8"	11.0	11.0		8.0	8.0		10.8	6.9	4.0		3.18	3.18	3.96	3.43			2.41	3.15		9.5
8	1/4"	11.0	13.5		8.0	8.0		14.2	9.3	6.4		3.78	3.30	4.60	4.01			3.02	3.68		9.5
10	3/8"	13.5	15.5		8.0	11.0		17.6	12.6	9.2		4.01	3.50	5.03	4.37			3.20	4.01		9.5
15	1/2"	15.5	19.0	25.5	11.0	12.5	15.5	21.8	15.8	11.8	6.4	4.67	4.09	5.97	5.18	9.35	8.18	3.73	4.78	7.47	9.5
20	3/4"	19.0	22.5	28.5	13.0	14.0	19.0	27.2	21.0	15.6	11.1	4.90	4.27	6.96	6.04	9.78	8.56	3.91	5.56	7.82	12.5
25	1"	22.5	27.0	32.0	14.0	17.5	20.5	33.9	26.7	20.7	15.2	5.69	4.98	7.92	6.93	11.38	9.96	4.55	6.35	9.09	12.5
32	1-1/4"	27.0	32.0	35.0	17.5	20.5	22.5	42.7	35.1	29.5	22.8	6.07	5.28	7.92	6.93	12.14	10.62	4.85	6.35	9.70	12.5
40	1-1/2"	32.0	38.0	38.0	20.5	25.5	25.5	48.8	40.9	34.0	28.0	6.35	5.54	8.92	7.80	12.70	11.12	5.08	7.14	10.15	12.5
50	2"	38.0	41.0	54.0	25.5	28.5	28.5	61.2	52.5	42.9	38.2	6.93	6.04	10.92	9.50	13.84	12.12	5.54	8.74	11.07	16.0
65	2-1/2"	41.0			28.5			73.9	62.7			8.76	7.67					7.01			16.0
80	3"	57.0			32.0			89.8	78.0			9.52	8.30					7.62			16.0
100	4"	66.5			41.0			115.2	102.3			10.69	9.35					8.56			19.0

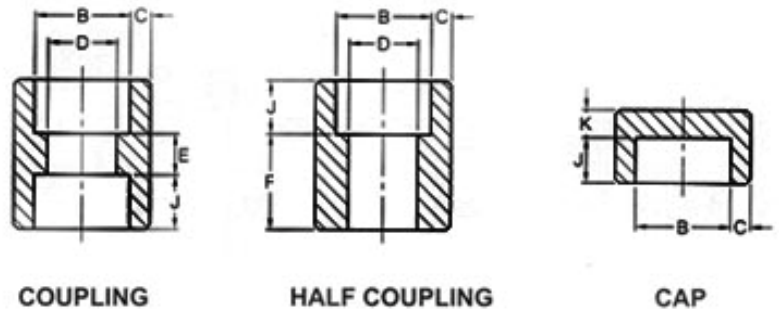
(1) Dimensions in Millimeters.

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

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

Socket Weld Fittings

ASME B16.11-2009 (Revision of ASME B16.11-2005)



DN	Nom. Pipe Size	Socket Bore Dia. B	Bore Dia. Of Fitting D			Socket Wall Thickness (2) C						Laying Lengths		Depth of Socket Min. J	End Wall Thickness K Min.		
						Class Designation						Coupling	Half Coupling				
			Class Designation			3000		6000		9000					E	F	Class Designation
			3000	6000	9000	Ave.	Min	Ave.	Min	Ave.	Min			3000			6000
6	1/8"	10.8	6.9	4.0		3.18	3.18	3.96	3.43			6.5	16.0	9.5	4.8	6.4	
8	1/4"	14.2	9.3	6.4		3.78	3.30	4.60	4.01			6.5	16.0	9.5	4.8	6.4	
10	3/8"	17.6	12.6	9.2		4.01	3.50	5.03	4.37			6.5	17.5	9.5	4.8	6.4	
15	1/2"	21.8	15.8	11.8	6.4	4.67	4.09	5.97	5.18	9.35	8.18	9.5	22.5	9.5	6.4	7.9	11.2
20	3/4"	27.2	21.0	15.6	11.1	4.90	4.27	6.96	6.04	9.78	8.56	9.5	24.0	12.5	6.4	7.9	12.7
25	1"	33.9	26.7	20.7	15.2	5.69	4.98	7.92	6.93	11.38	9.96	12.5	28.5	12.5	9.6	11.2	14.2
32	1-1/4"	42.7	35.1	29.5	22.8	6.07	5.28	7.92	6.93	12.14	10.62	12.5	30.0	12.5	9.6	11.2	14.2
40	1-1/2"	48.8	40.9	34.0	28.0	6.35	5.54	8.92	7.80	12.70	11.12	12.5	32.0	12.5	11.2	12.7	15.7
50	2"	61.2	52.5	42.9	38.2	6.93	6.04	10.92	9.50	13.84	12.12	19.0	41.0	16.0	12.7	15.7	19.0
65	2-1/2"	73.9	62.7			8.76	7.67					19.0	43.0	16.0	15.7	19.0	
80	3"	89.8	78.0			9.52	8.30					19.0	44.5	16.0	19.0	22.4	
100	4"	115.2	102.3			10.69	9.35					19.0	48.0	19.0	22.4	28.4	

(1) Dimensions in Millimeters.

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

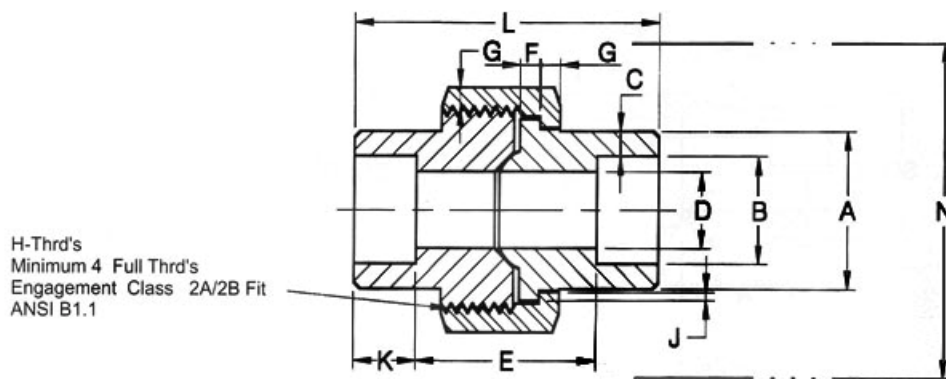
(3) Reducer: C, J, E in accordance with large size.

D in accordance with small size

The others in accordance with each size.

Unions Socket Weld

Socket Weld End MSS-SP-83-2006



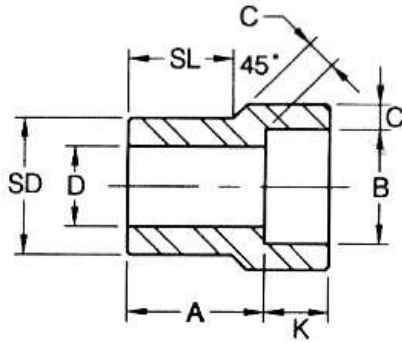
Nom. Pipe Size	Pipe End (Min.) A	Socket Bore Dia. B	Socket Wall (Min.) C	Water Way Bore D	Laying Length E	Male Flange (Min.) F	Nut (Min.) G	Thread s Per 25.4mm H	Bearing (Min.) J	Depth of Socket (Min.) K	Length Assem. Nom. L	Clear Assem. Nut N
1/8"	21.8	11.18 10.67	3.18	7.59 6.07	22.4 19.1	3.18	3.18	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 21.73	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	11	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) Dimensions in Millimeters.

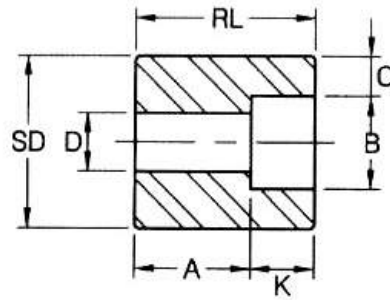
(2) Upper and lower values for each size are the respective maximum and minimum dimensions.

Reducer Inserts Socket Weld

Socket Welding MSS-SP-79-2009



Type 1



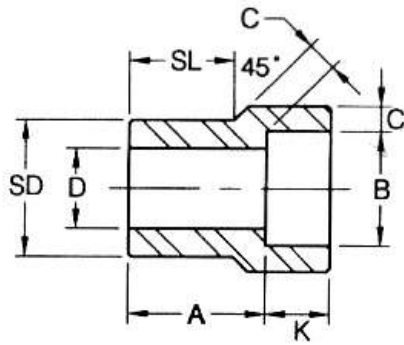
Type 2 ⁽¹⁾

Nom. Pipe Size	Type		Socket		Shank Dia. SD	Laying Length A		Bore D		Wall Min. C		Length			
			Dia. B	Depth Min. K								SL		RL (Min)	
	3000	6000						3000	6000	3000	6000				
3/8"x1/4"	1	1	14.35	10	17.15	19	21	9.0	6.5	3.78	4.60	14	16		
1/2"x3/8"	1	1	17.78	10	21.34	21	23	12.5	9.0	4.01	5.03	16	16		
1/2"x1/4"	1	1	14.35	10	21.34	21	21	9.0	6.5	3.78	4.60	16	16		
3/4"x1/2"	1	1	21.97	10	26.67	22	25	16.0	11.5	4.67	5.97	17	19		
3/4"x3/8"	2	1	17.78	10	26.67	16	22	12.5	9.0	4.01	5.03		19	27	
3/4"x1/4"	2	2	14.35	10	26.67	18	22	9.0	6.5	3.78	4.60			27	32
1"x3/4"	1	1	27.31	13	33.40	24	28	21.0	15.5	4.90	6.96	19	21		
1"x1/2"	2	1	21.97	10	33.40	16	28	16.0	11.5	4.67	5.97		21	28	
1"x3/8"	2	2	17.78	10	33.40	18	22	12.5	9.0	4.01	5.03			28	33
1"x1/4"	2	2	14.35	10	33.40	19	24	9.0	6.5	3.78	4.60			28	33
1-1/4"x1"	1	1	34.04	13	42.16	25	30	26.5	20.5	5.69	7.92	21	22		
1-1/4"x3/4"	2	2	27.31	13	42.16	18	21	21.0	15.5	4.90	6.96			32	35
1-1/4"x1/2"	2	2	21.97	10	42.16	19	22	16.0	11.5	4.67	5.97			32	35
1-1/4"x3/8"	2	2	17.78	10	42.16	21	24	12.5	9.0	4.01	5.03			32	35
1-1/4"x1/4"	2	2	14.35	10	42.16	22	25	9.0	6.5	3.78	4.60			32	35
1-1/2"x1-1/4"	1	1	42.80	13	48.26	28	35	35.0	29.5	6.07	7.92	22	25		
1-1/2"x1"	2	1	34.04	13	48.26	18	29	26.5	20.5	5.69	7.92		25	33	
1-1/2"x3/4"	2	2	27.31	13	48.26	19	25	21.0	15.5	4.90	6.96			33	40
1-1/2"x1/2"	2	2	21.97	10	48.26	21	27	16.0	11.5	4.67	5.97			33	40
1-1/2"x3/8"	2	2	17.78	10	48.26	22	28	12.5	9.0	4.01	5.03			33	40
2"x1-1/2"	1	1	48.90	13	60.32	32	39	41.0	34.0	6.35	8.90	25	28		
2"x1-1/4"	2	2	42.80	13	60.32	21	24	35.0	29.5	6.07	7.92			38	41
2"x1"	2	2	34.04	13	60.32	22	25	26.5	21.0	5.69	7.92			38	41
2"x3/4"	2	2	27.31	13	60.32	24	27	21.0	15.5	4.90	6.96			38	41
2"x1/2"	2	2	21.97	10	60.32	25	28	16.0	11.5	4.67	5.97			38	41
2-1/2"x2"	1	1	61.37	16	73.02	46	43	52.5	43.0	6.93	10.92	32	38		
2-1/2"x1-1/2"	2	2	48.90	13	73.02	35	35	41.0	34.0	6.35				54	54
2-1/2"x1-1/4"	2	2	42.80	13	73.02	37	37	35.0	29.5	6.07				54	54
2-1/2"x1"	2	2	34.04	13	73.02	38	38	26.5	21.0	5.69				54	54
2-1/2"x3/4"	2	2	27.31	13	73.02	40	38	21.0	15.5	4.90				54	54

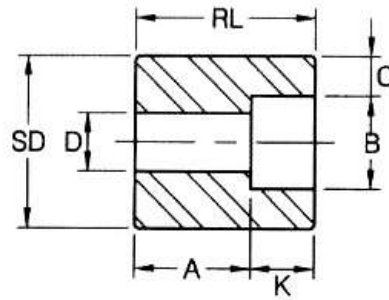
(Continued)

Reducer Inserts Socket Weld

Socket Welding MSS-SP-79-2009



Type 1



Type 2 ⁽²⁾

(Continued)

Nom. Pipe Size	Type		Socket		Shank Dia. SD	Laying Length A		Bore D		Wall Min. C		Length			
			Dia. B	Depth Min. K								SL		RL (Min)	
	3000	6000						3000	6000	3000	6000	3000	6000		
3"x2-1/2"	1	1	74.07	16	88.90	38	57	62.5	54.0	8.76		32	45		
3"x2"	2	2	61.37	16	88.90	25	32	52.5	43.0	6.93				48	54
3"x1-1/2"	2	2	48.90	13	88.90	29	32	41.0	34.0	6.35				48	54
3"x1-1/4"	2	2	42.80	13	88.90	30	32	35.0	29.5	6.07				48	54
3"x1"	2	2	34.04	13	88.90	32	32	26.5	21.0	5.69				48	54
4"x3"	2		90.04	16	114.30	33		78.0		9.50				60	
4"x2-1/2"	2		74.07	16	114.30	38		62.5		8.76				60	
4"x2"	2		61.37	16	114.30	38		52.5		6.93				60	
4"x1-1/2"	2		48.90	13	114.30	42		41.0		6.35				60	
4"x1-1/4"	2		42.80	13	114.30	43		35.0		6.07				60	

(1) Dimensions in Millimeters.

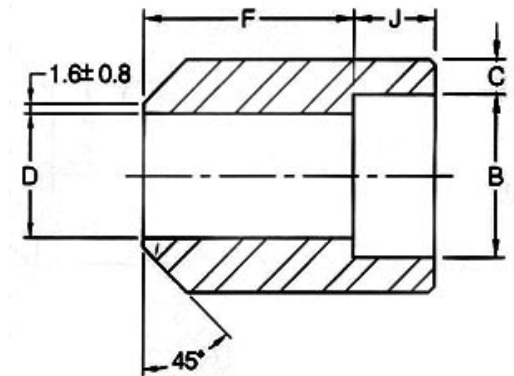
(2) At the option of the manufacturer type 2 reducer may be furnished in type 1 configuration.

Dimensional Tolerance of Reducer Insert

Laying Length A	Size 3/8"	through	3/4"	+ 1.50mm / -0.00mm
	Size 1"	through	2"	+ 2.00mm / -0.00mm
	Size 2-1/2"	through	4"	+ 2.50mm / -0.00mm
Socket Diameter B	Size 1/4"	through	2"	± 0.25mm
	Size 2-1/2"	through	3"	+ 0.40mm / -0.25mm
Bore D	Size 1/4"	through	2"	± 0.80mm
	Size 2-1/2"	through	3"	± 1.50mm
Shank Diameter SD	Size 3/8"	through	1-1/2"	± 0.25mm
	Size 2"	through	3"	± 0.50mm
	Size 4"			± 0.75mm
Shank Length SL	Size 3/8"	through	3/4"	± 0.00mm / -1.50mm
	Size 1"	through	2"	± 0.00mm / -2.00mm
	Size 2-1/2"	through	4"	± 0.00mm / -2.50mm

Bosses Socket Weld

BS3799-1974

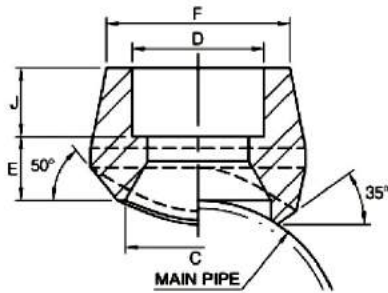


DN	Nom. Pipe Size	B (Min)	D		J (Min)		F		C (Min)	
			3000lb	6000lb	3000lb	6000lb	3000lb	6000lb	3000lb	6000lb
6	1/8"	10.7	6.8		10.0		28.0		3.2	
8	1/4"	14.1	9.2		10.0		32.0		3.3	
10	3/8"	17.6	12.5		11.0		34.0		3.5	
15	1/2"	21.8	15.5	11.8	13.0	13.0	38.0	38.0	4.1	5.2
20	3/4"	27.4	21.0	15.5	13.0	13.0	38.0	38.0	4.3	6.1
25	1"	34.1	26.6	20.7	16.0	16.0	35.0	35.0	5.0	7.0
40	1-1/2"	49.0	40.5	34.0	19.0	19.0	32.0	32.0	5.6	7.8
50	2"	61.0	52.0	43.0	22.0	22.0	29.0	29.0	6.1	9.5
65	2-1/2"	73.8	62.0	54.0	22.0	22.0	29.0	29.0	7.7	10.4
80	3"	89.7	78.0	66.0	22.0	22.0	29.0	29.0	8.3	12.2

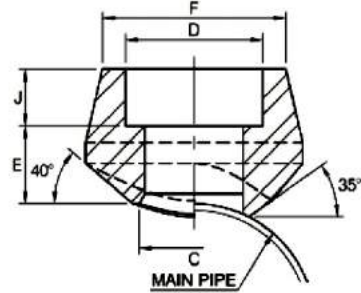
Dimensions in Millimeters.

Branch Outlet Socket Weld

Reducing Sizes MSS-SP-97-2006



REDUCING WAY



STRAIGHT WAY

Out-Let Pipe NPS	Reducing Way									
	C		D		F		J (Min)		E (Min)	
	3000	6000	3000	6000	3000	6000	3000	6000	3000	6000
1/8"	13.7		10.8		22.0		9.7		10.4	
1/4"	13.7		14.2		22.0		9.7		10.4	
3/8"	19.1		17.6		25.9		9.7		12.7	
1/2"	21.3	16.6	21.8	21.8	31.4	38.0	9.7	9.7	16.0	23.9
3/4"	26.7	21.2	27.2	27.2	37.1	44.0	12.7	12.7	16.0	25.4
1"	33.4	27.0	33.9	33.9	45.5	57.0	12.7	12.7	22.4	28.7
1-1/4"	42.2	35.8	42.7	42.7	57.0	64.0	12.7	12.7	22.4	30.2
1-1/2"	48.3	41.2	48.8	48.8	64.0	76.0	12.7	12.7	23.9	31.8
2"	60.3	51.6	61.2	61.2	76.0	92.0	15.8	15.8	23.9	36.6
2-1/2"	73.2		73.9		92.0		15.8		25.4	
3"	88.9		89.8		109.2		15.8		30.2	
4"	114.3		115.2		140.0		19.1		30.2	

Out-Let Pipe NPS	Straight Way				
	C	D	F	J (Min)	E (Min)
	3000				
1/8"					
1/4"	11.5	14.2	22.0	9.7	10.4
3/8"	14.5	17.6	25.9	9.7	12.7
1/2"	16.5	21.8	31.4	9.7	16.0
3/4"	21.5	27.2	37.1	12.7	16.0
1"	27.2	33.9	45.5	12.7	22.4
1-1/4"	36.0	42.7	57.0	12.7	22.4
1-1/2"	42.0	48.8	64.0	12.7	23.9
2"	53.0	61.2	76.0	15.8	23.9
2-1/2"	65.0	73.9	92.0	15.8	25.4
3"	80.0	89.8	109.2	15.8	30.2
4"	104.0	115.2	140.0	19.1	30.2

(1) Dimensions in Millimeters.

(2) Socket in accordance with ASME B16.11

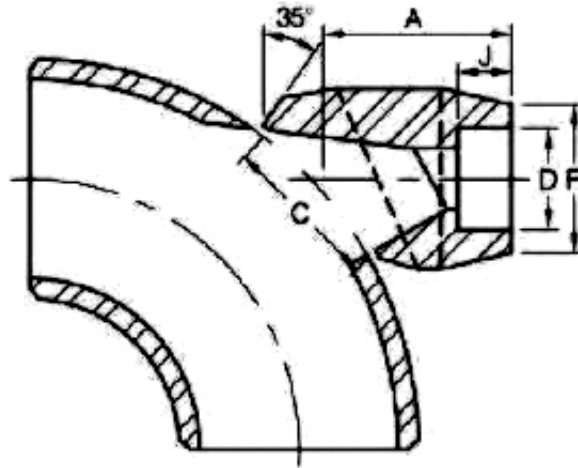
(3) 3000LBS outlet size 4 and less fit a number of run pipe sizes and the fitting are marked accordingly.

Conventional Run Size Combinations

		OUTLET SIZE									
		1/4"	3/8"	1/2"	3/4"	1"	1-1/4"	1-1/2"	2"	2-1/2"	3"
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" 3-1/2"~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"
	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"

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

90° Elbow Outlet Socket Weld



3000LB

Outlet Pipe		A	C	F	D	J
DN	Inch					
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

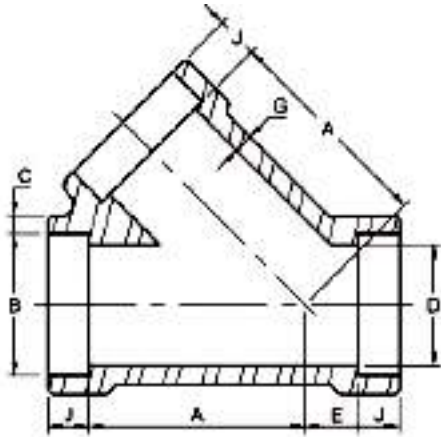
Outlet Pipe		A	C	F	D	J
DN	Inch					
8	1/4"	40.5	34.9	26.0	14.35	10.0
10	3/8"	40.5	34.9	33.0	17.80	10.0
15	1/2"	47.6	34.9	38.0	21.95	10.0
20	3/4"	55.6	43.6	44.0	27.30	14.3
25	1"	60.3	54.0	57.0	34.05	15.9
32	1-1/4"	66.7	67.5	64.0	42.80	20.6
40	1-1/2"	85.7	76.2	76.0	48.90	20.6

(1) Dimensions in Millimeters.

(2) Dimensions refer to ANSI B16.11

(3) Dimensions may vary according to the customer's and manufacturer's requirement.

45° Lateral Tee Socket Weld



3000LB

DN	Nom. Pipe Size	B ⁽²⁾	B ⁽²⁾		D ⁽¹⁾	A	E	G ⁽²⁾ (Min)	J ⁽²⁾ (Min)
			(Avg)	(Min)					
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

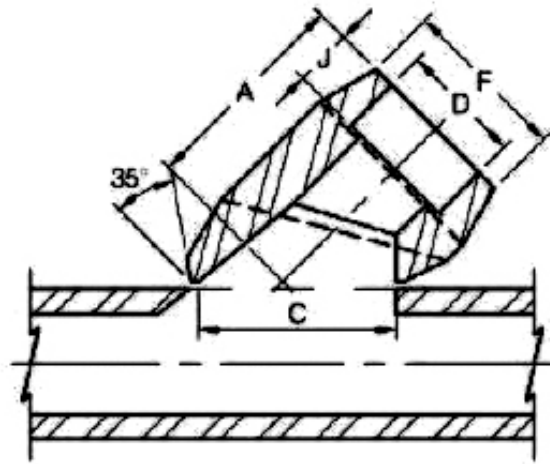
DN	Nom. Pipe Size	B ⁽²⁾	B ⁽²⁾		D ⁽²⁾	A	E	G ⁽²⁾ (Min)	J ⁽²⁾ (Min)
			(Avg)	(Min)					
15	1/2"	21.8	5.97	5.18	11.8	41	9	4.78	9.5
20	3/4"	27.2	6.96	6.04	15.6	51	12	5.56	12.5
25	1"	33.9	7.92	6.93	20.7	59	17	6.35	12.5
32	1-1/4"	42.7	7.92	6.93	29.5	68	21	6.35	12.5
40	1-1/2"	48.8	8.92	7.80	34.0	95	24	7.14	12.5
50	2"	61.2	10.92	9.50	42.9	106	31	8.74	16.0

(1) Dimensions in Millimeters.

(2) Dimensions refer to ANSI B16.11

(3) Dimensions may vary according to the customer's and manufacturer's requirement.

Lateral Outlet Socket Weld



3000LB

Outlet Pipe		A	C	F	D	J
DN	Inch					
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

Outlet Pipe		A	C	F	D	J
DN	Inch					
8	1/4"	40.5	34.9	26.0	14.35	10.0
10	3/8"	40.5	34.9	33.0	17.80	10.0
15	1/2"	47.6	34.9	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

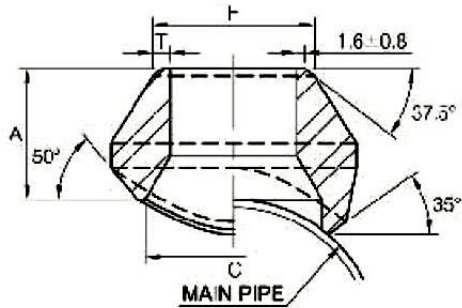
(1) Dimensions in Millimeters.

(2) Dimensions refer to ANSI B16.11

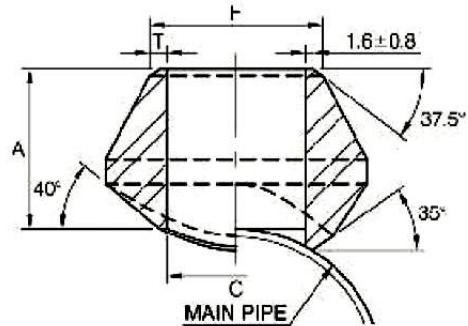
(3) Dimensions may vary according to the customer's and manufacturer's requirement.

Branch Outlet Butt Weld

Reducing Sizes MSS-SP-97-2006



REDUCING WAY



STRAIGHT WAY

Standard Weight and Extra Strong

Out-Let Pipe NPS	Reducing Way				
	A	C	F	T	
				Standard Weight	Extra Strong
1/8"	16.0	13.7	10.3	1.73	2.41
1/4"	16.0	13.7	13.7	2.24	3.02
3/8"	19.0	17.1	17.1	2.31	3.20
1/2"	19.0	21.3	21.3	2.77	3.73
3/4"	22.0	26.7	26.7	2.87	3.91
1"	27.0	33.4	33.4	3.38	4.55
1-1/4"	32.0	42.2	42.2	3.56	4.85
1-1/2"	33.0	48.3	48.3	3.68	5.08
2"	38.0	60.3	60.3	3.91	5.54
2-1/2"	41.0	73.0	73.0	5.16	7.01
3"	44.0	88.9	88.9	5.49	7.62
3-1/2"	48.0	101.6	101.6	5.74	8.56
4"	51.0	114.3	114.3	6.02	8.56
5"	57.0	141.3	141.3	6.55	9.53
6"	78.0	168.3	168.3	7.11	10.97
8"	99.0	219.3	219.3	8.11	12.70
10"	94.0	273.1	273.1	9.27	12.70
12"	103.0	323.9	323.9	9.53	12.70
14"	100.0	355.6	355.6	9.53	12.70
16"	106.0	406.4	406.4	9.53	12.70
18"	111.0	457.2	457.2	9.53	12.70
20"	119.0	508.0	508.0	9.53	12.70
24"	140.0	609.6	609.6	9.53	12.70

Out-Let Pipe NPS	Straight Way				
	A	C	F	T	
				Standard Weight	Extra Strong
1/8"					
1/4"	16.0	11.5	13.7	2.24	3.02
3/8"	19.0	14.5	17.1	2.31	3.20
1/2"	19.0	16.5	21.3	2.77	3.73
3/4"	22.0	21.5	26.7	2.87	3.91
1"	27.0	27.2	33.4	3.38	4.55
1-1/4"	32.0	36.0	42.2	3.56	4.85
1-1/2"	33.0	42.0	48.3	3.68	5.08
2"	38.0	53.0	60.3	3.91	5.54
2-1/2"	41.0	65.0	73.0	5.16	7.01
3"	44.0	80.0	88.9	5.49	7.62
3-1/2"					
4"	51.0	104.0	114.3	6.02	8.56

(1) Dimensions in Millimeters.

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

(3) Outside size 4 and less fit a number of run pipe sizes and the fitting are marked accordingly.

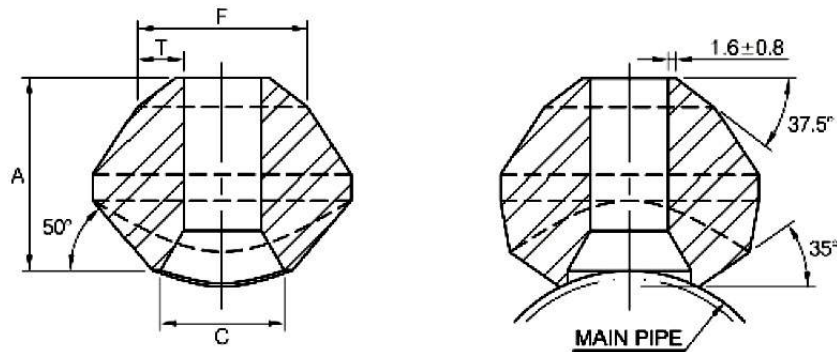
(4) Outside size 5 and up order to specific size combination

Dimensional Tolerance of MSS SP-97-2006

Item	1/8" to 3/4"	1" to 4"	5" to 12"	14" to 24"
Face of fitting to crotch (A)	± 0.76	± 1.52	± 3.05	± 4.83

Branch Outlet Butt Weld

Reducing Sizes MSS-SP-97-2006



Schedule 160 and Double Extra Strong

Out-Let Pipe	A	C	F	T	
				Sch.160	XXS
1/2"	28.0	13.8	21.3	4.78	7.47
3/4"	32.0	18.9	26.7	5.56	7.82
1"	38.0	24.3	33.4	6.35	9.09
1-1/4"	44.0	32.5	42.2	6.35	9.70
1-1/2"	51.0	38.1	48.3	7.14	10.15
2"	55.0	49.2	60.3	8.74	11.07
2-1/2"	62.0	59.0	73.0	9.53	14.02
3"	73.0	73.7	88.9	11.13	15.24
4"	84.0	97.2	114.3	13.49	17.12
5"	94.0	122.2	141.3	15.88	19.05
6"	105.0	146.4	168.3	18.26	21.95

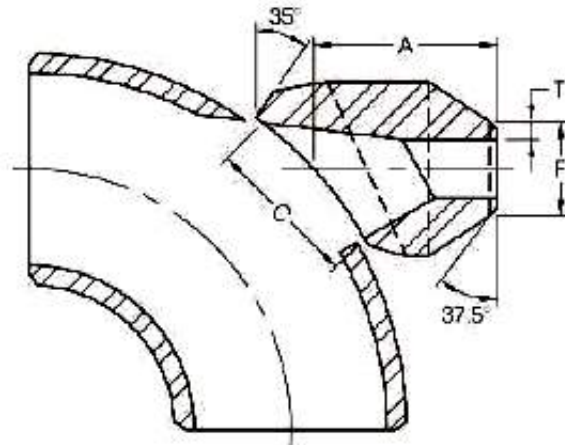
- (1) Dimensions in Millimeters.
- (2) Weld Bevel in accordance with ASME B16.25
- (3) Outlet size by order to specific size combination.

Conventional Run Size Combinations

		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"	1/2"	3/4"	1"	1-1/4"	1-1/2"	2"	2-1/2"	3"	3-1/2"	5"
		1"~36"	3/4"~1-1/4"	1"	1-1/4"	1-1/2"	2"	2-1/2"	3"	3-1/2"	4"	6"
			1-1/2"~36"	1-1/4"	1-1/2"	2"	2-1/2"	3"	3-1/2"	4"	5"	8"
				1-1/2"~3"	2"~3"	2-1/2"	3"	3-1/2"	4"	5"	6"	10"
			3-1/2"~36"	3-1/2"~6"	8"~36"	3"	3-1/2"~5"	4"~5"	5"~6"	6"	8"	12"~14"
	Straight way					3-1/2"~4"	6"~8"	6"~10"	8"~10"	8"	10"	16"~18"
						5"~10"	10" ~ 36"	12"~36"	12"~18"	10"~14"	12"~16"	20"~24"
						12~36"			20"~36"	16"~36"	18"~36"	26"~36"
		3/8"~36"	1/2"~36"	3/4"~36"	1"~36"	1-1/4"~1-1/2"	1-1/2"	2"	2-1/2"	3"	3-1/2"	5"
						2"~36"	2"~3"	2-1/2"~4"	3"~3-1/2"	3-1/2"~4"	5"	6"
					3-1/2"~36"	5"~36"	4"~6"	5"~8"	6"	8"		
							8"~36"	10"~36"	8"~12"	12"~16"		
									14"~36"	18"~36"		

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

90° Elbow Outlet Butt Weld



Sch80

Outlet Pipe		A	C	F	T
DN	Inch				
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

Sch160

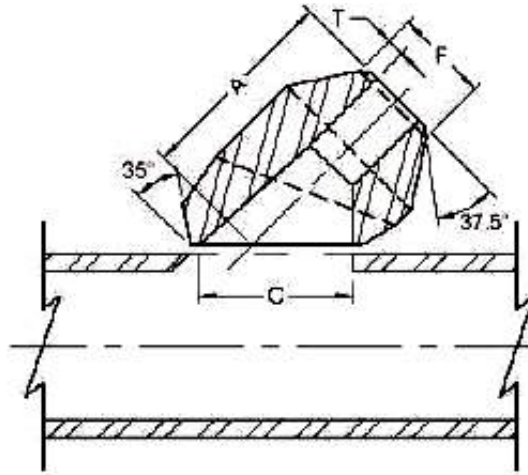
Outlet Pipe		A	C	F	T
DN	Inch				
8	1/4"	40.5	34.9	13.7	3.7
10	3/8"	40.5	34.9	17.1	4.0
15	1/2"	47.6	34.9	21.3	4.7
20	3/4"	55.6	43.6	26.7	5.5
25	1"	60.3	54.0	33.4	6.4
32	1-1/4"	67.7	67.5	42.2	6.4
40	1-1/2"	85.7	76.2	48.3	7.1

(1) Dimensions in Millimeters.

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

(3) Dimensions may vary according to the customer's and manufacturer's requirement.

Lateral Outlet Butt Weld



Sch80

Outlet Pipe		A	C	F	T
DN	Inch				
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

Sch160

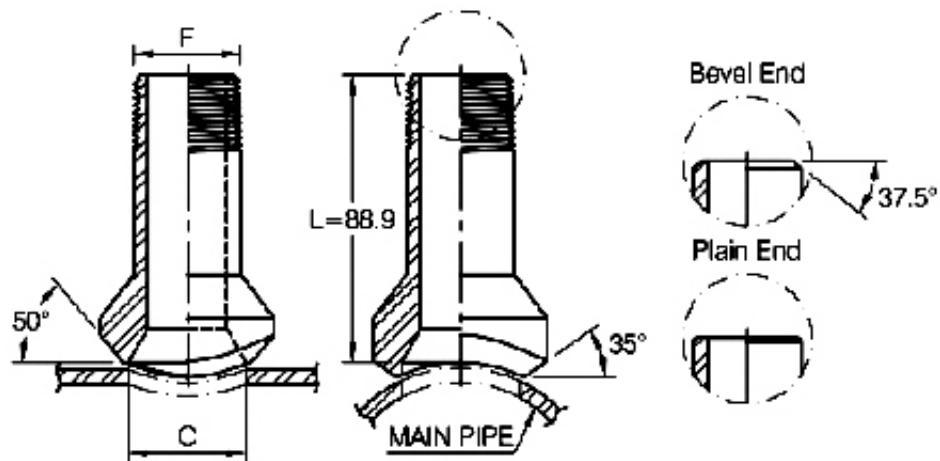
Outlet Pipe		A	C	F	T
DN	Inch				
8	1/4"	40.5	34.9	13.7	3.7
10	3/8"	40.5	34.9	17.1	4.0
15	1/2"	47.6	34.9	21.3	4.7
20	3/4"	55.6	43.6	26.7	5.5
25	1"	60.3	54.0	33.4	6.4
32	1-1/4"	67.7	67.5	42.2	6.4
40	1-1/2"	85.7	76.2	48.3	7.1

(1) Dimensions in Millimeters.

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

(3) Dimensions may vary according to the customer's and manufacturer's requirement.

Nipple Branch Outlet Butt Weld (Bevel / Plain End)



Outlet Pipe	C		F
	STD - XS	Sch160 - XXS	
1/2"	23.8	13.8	21.3
3/4"	30.2	18.9	26.7
1"	36.5	24.3	33.4
1-1/4"	44.5	32.5	42.2
1-1/2"	50.8	38.1	48.3
2"	65.1	49.2	60.3

(1) Dimensions in Millimeters.

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

(3) Dimensions may vary according to the customer's and manufacturer's requirement.

Dimensional Tolerance of ASME B16.11

ASME B16.11-2001

Unit: m/m

Item	Type of pipe Fitting	Nominal diameter				
		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 Fitting	+ 0.4 - 0				+ 0.5 - 0
Bore diameter of fitting (D)		± 0.7				± 1.4
Concentricity of bore (X)		± 0.8				
Coin cadence of axes (Y)		1 / 200 Max				
Center to bottom of socket (A)	45, 90D 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 of socket to opposite face (F)	Half Coupling	± 1.0	± 1.5	± 2.0	± 2.5	

Dimensional Tolerance of BS3799

BS3799-1974

Unit: m/m

Item	Type of pipe Fitting	Nominal diameter				
		DN	6 to 8	10 to 20	25 to 50	65 to 80
		NPS	1/8 to 1/4	3/8 to 3/4	1 to 2	2-1/2 to 3
Concentricity of bore (X)	All types of Pipe Fitting	± 0.8				
Coin cadence of axes (Y)		1 / 200 Max				
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	

Weight List

Thread Fittings

Size Product		1/8"	1/4"	3/8"	1/2"	3/4"	1"	1-1/4"	1-1/2"	2"	2-1/2"	3"	4"
90 Elbow	2000	0.10	0.08	0.13	0.25	0.35	0.53	0.82	1.06	1.70	3.14	4.81	10.21
	3000	0.10	0.14	0.29	0.43	0.69	1.14	1.42	2.63	2.92	5.99	8.88	14.85
	6000	0.17	0.33	0.45	0.80	1.31	1.61	2.93	3.79	7.31	9.88	17.73	15.76
45 Elbow	2000	0.09	0.08	0.10	0.20	0.27	0.41	0.68	0.82	1.41	3.46	5.44	8.96
	3000	0.09	0.12	0.24	0.34	0.56	0.94	1.03	2.05	2.23	3.71	5.97	8.96
	6000	0.11	0.27	0.39	0.63	1.07	1.27	2.24	2.54	4.37	7.01	14.16	11.36
Tee	2000	0.13	0.12	0.17	0.31	0.43	0.69	1.07	1.39	2.16	4.11	6.12	14.74
	3000	0.13	0.20	0.38	0.56	0.92	1.49	1.76	3.27	3.53	6.99	10.19	19.13
	6000	0.20	0.45	0.63	0.98	1.65	2.17	3.74	4.71	7.88	13.11	21.70	18.53
Cross	2000	0.17	0.14	0.21	0.39	0.54	0.83	1.26	1.75	2.65	5.26	7.58	16.35
	3000	0.17	0.26	0.44	0.72	1.06	1.79	2.13	3.93	4.27	8.51	12.45	21.93
Full Coupling	3000	0.05	0.04	0.06	0.13	0.19	0.45	0.81	1.07	1.40	2.29	3.38	6.28
	6000	0.08	0.13	0.20	0.34	0.50	0.87	1.09	1.94	2.87	4.20	6.10	10.04
Half Coupling	3000	0.02	0.02	0.03	0.06	0.10	0.23	0.34	0.54	0.70	1.13	1.68	3.11
	6000	0.07	0.06	0.09	0.16	0.24	0.45	0.55	0.96	1.70	2.10	3.05	5.02
Red Coupling	3000	0.05	0.05	0.06	0.13	0.19	0.39	0.68	0.99	1.37	2.07	3.08	5.44
	6000	0.08	0.06	0.18	0.31	0.41	0.85	1.05	1.81	3.40	4.20	6.10	10.04
Cap	3000	0.02	0.04	0.05	0.11	0.18	0.37	0.62	0.72	1.09	2.22	3.50	4.84
	6000	0.06	0.06	0.09	0.26	0.40	0.71	0.59	0.77	2.23			
Street Elbow	3000	0.13	0.11	0.22	0.31	0.53	1.02	1.13	2.01	2.91			
Union	3000	0.28	0.28	0.24	0.34	0.48	0.77	1.03	1.63	2.43	3.63	5.27	12.00
Hex. Nipple	3000	0.03	0.04	0.05	0.09	0.15	0.47	0.45	0.62	1.03	1.51	2.22	4.00
Square Head Plug		0.01	0.01	0.03	0.05	0.09	0.16	0.27	0.38	0.63	0.96	1.53	3.83
Hex. Head Plug		0.01	0.03	0.05	0.07	0.14	0.22	0.44	0.59	1.03	1.80	2.60	5.20
Round Head Plug		0.02	0.45	0.07	0.12	0.20	0.34	0.55	0.79	1.47	2.34	3.26	6.24
Hex. Head Bushing			0.01	0.01	0.03	0.05	0.09	0.25	0.34	0.45	0.60	1.16	3.20

Unit: KGS

Socket Weld Fittings

Size Product		1/8"	1/4"	3/8"	1/2"	3/4"	1"	1-1/4"	1-1/2"	2"	2-1/2"	3"	4"
90 Elbow	3000	0.09	0.08	0.12	0.22	0.33	0.53	0.84	1.08	1.68	3.20	5.38	10.95
	6000	0.10	0.15	0.29	0.40	0.73	1.17	1.48	2.79	3.28			
45 Elbow	3000	0.08	0.07	0.11	0.20	0.28	0.42	0.69	0.80	1.35	2.53	5.10	9.41
	6000	0.09	0.14	0.26	0.36	0.57	0.92	1.11	2.01	2.09			
Tee	3000	0.13	0.09	0.15	0.29	0.42	0.65	1.04	1.35	2.04	3.98	5.90	13.92
	6000	0.14	0.20	0.43	0.56	0.94	1.49	1.93	3.37	3.95			
Cross	3000	0.16	0.13	0.20	0.35	0.47	0.73	1.12	1.58	2.25	4.37	6.69	14.58
	6000	0.17	0.26	0.45	0.67	1.07	1.75	2.26	3.96	4.42			
Full Coupling	3000	0.04	0.05	0.07	0.13	0.17	0.29	0.45	0.59	0.86	1.40	1.78	2.85
	6000	0.05	0.07	0.114	0.204	0.27	0.44	0.60	1.11	1.62			
Half Coupling	3000	0.04	0.05	0.07	0.13	0.21	0.30	0.34	0.66	1.09	1.63	2.10	3.71
	6000	0.06	0.09	0.12	0.21	0.31	0.51	0.75	1.25	1.92			
Red Coupling	3000	0.04	0.05	0.07	0.13	0.19	0.27	0.49	0.59	0.97	1.42	1.88	3.31
	6000				0.24	0.33	0.65	0.75	1.20	2.12			
Cap	3000	0.03	0.04	0.07	0.10	0.16	0.25	0.45	0.59	0.96	1.43	2.74	4.24
	6000	0.05	0.08	0.10	0.16	0.23	0.36	0.64	0.94	1.41			
Union	3000	0.28	0.28	0.25	0.35	0.49	0.81	1.10	1.61	2.16	3.50	5.15	11.59

Unit: KGS