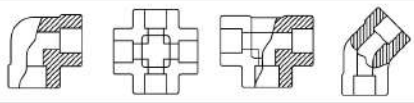
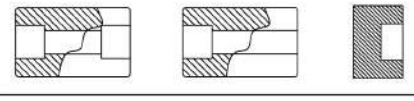
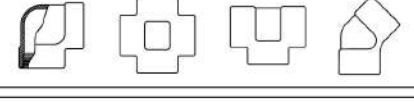
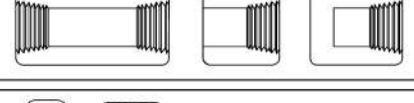
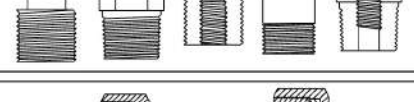
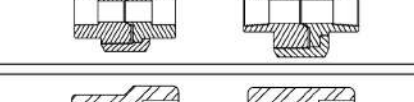
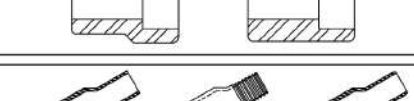

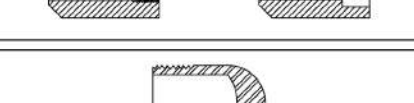
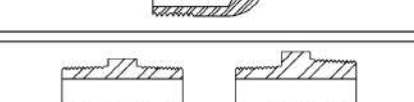
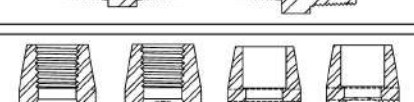


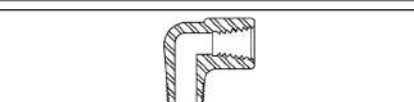



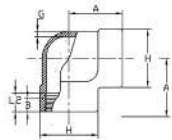
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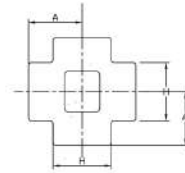
FORGED THREADED FITTING

90° ELBOW | CROSS | TEE | 45° ELBOW

ASME B16.11-2001
(Rev. of ASME B16.11-1996)



90° ELBOW



CROSS

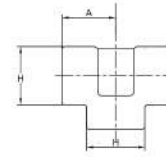
DN	NOM PIPE SIZE	CENTER TO END						CENTER TO END						LENGTH OF THREAD			
		A						C						B		L2	
		90° ELBOWS, TEES, AND CROSSES						45° ELBOW						MIN		MIN	
2000		3000		6000		2000		3000		6000		MIN		MIN			
MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.		
6	1/8	21.0	0.827	21.0	0.827	25.0	0.984	17.0	0.669	17.0	0.669	19.0	0.748	6.4	0.252	6.7	0.264
8	1/4	21.0	0.827	25.0	0.984	28.0	1.102	17.0	0.669	19.0	0.748	22.0	0.866	8.1	0.319	10.2	0.402
10	3/8	25.0	0.984	28.0	1.102	33.0	1.299	19.0	0.748	22.0	0.866	25.0	0.984	9.1	0.358	10.4	0.409
15	1/2	28.0	1.102	33.0	1.299	38.0	1.496	22.0	0.866	25.0	0.984	28.0	1.102	10.9	0.429	13.6	0.535
20	3/4	33.0	1.299	38.0	1.496	44.0	1.732	25.0	0.984	28.0	1.102	33.0	1.299	12.7	0.500	13.9	0.547
25	1	38.0	1.496	44.0	1.732	51.0	2.008	28.0	1.102	33.0	1.299	35.0	1.378	14.7	0.579	17.3	0.681
32	1 1/2	44.0	1.732	51.0	2.008	60.0	2.362	33.0	1.299	35.0	1.378	43.0	1.693	17.0	0.669	18.0	0.709
40	1 3/4	51.0	2.008	60.0	2.362	64.0	2.520	35.0	1.378	43.0	1.693	44.0	1.732	17.8	0.701	18.4	0.724
50	2	61.0	2.402	64.0	2.520	83.0	3.268	43.0	1.693	44.0	1.732	52.0	2.047	19.0	0.748	19.2	0.756
65	2 1/2	76.0	2.992	83.0	3.268	95.0	3.740	52.0	2.047	52.0	2.047	64.0	2.520	23.6	0.929	28.9	1.138
80	3	86.0	3.386	95.0	3.740	106.0	4.173	64.0	2.520	64.0	2.520	79.0	3.110	25.9	1.020	30.5	1.201
100	4	106.0	4.173	114.0	4.488	114.0	4.488	79.0	3.110	79.0	3.110	79.0	3.110	27.7	1.091	33.0	1.299

(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)

FORGED THREADED FITTING

90° ELBOW | CROSS | TEE | 45° ELBOW

ASME B16.11-2001
(Rev. of ASME B16.11-1996)



TEE



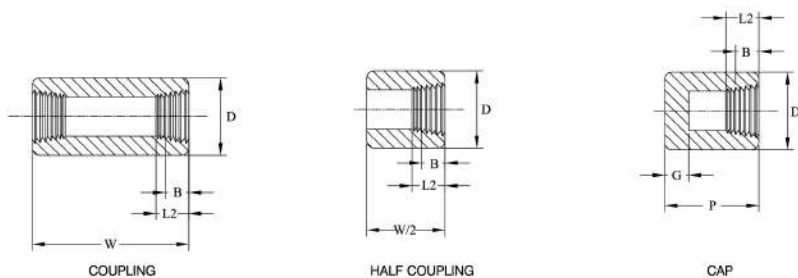
45° ELBOW

MINIMUM WALL THICKNESS						OUTSIDE DIAMETER OF BEND						END WALL THICKNESS							
G						H						K MIN.							
2000						3000						3000				6000			
2000		3000		6000		2000		3000		6000		MIN		MIN					
MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.				
3.18	0.125	3.18	0.125	6.35	0.250	22.0	0.866	22.0	0.866	25.0	0.984	4.8	0.2	6.4	0.3				
3.18	0.125	3.30	0.130	6.60	0.260	22.0	0.866	25.0	0.984	33.0	1.299	4.8	0.2	6.4	0.3				
3.18	0.125	3.51	0.138	6.98	0.275	25.0	0.984	33.0	1.299	38.0	1.496	4.8	0.2	6.4	0.3				
3.18	0.125	4.09	0.161	8.15	0.321	33.0	1.299	38.0	1.496	46.0	1.811	6.4	0.3	7.9	0.3				
3.18	0.125	4.32	0.170	8.53	0.336	38.0	1.496	46.0	1.811	56.0	2.205	6.4	0.3	7.9	0.3				
3.68	0.145	4.98	0.196	9.93	0.391	46.0	1.811	56.0	2.205	62.0	2.441	9.6	0.4	11.2	0.4				
3.89	0.153	5.28	0.208	10.59	0.417	56.0	2.205	62.0	2.441	75.0	2.953	9.6	0.4	11.2	0.4				
4.01	0.158	5.56	0.219	11.07	0.436	62.0	2.441	75.0	2.953	84.0	3.307	11.2	0.4	12.7	0.5				
4.27	0.168	7.14	0.281	12.09	0.476	75.0	2.953	84.0	3.307	102.0	4.016	12.7	0.5	15.7	0.6				
5.61	0.221	7.65	0.301	15.29	0.602	92.0	3.622	102.0	4.016	121.0	4.764	15.7	0.6	19.0	0.7				
5.99	0.236	8.84	0.348	16.64	0.655	109.0	4.291	121.0	4.764	146.0	5.748	19.0	0.7	22.4	0.9				
6.55	0.258	11.18	0.440	18.67	0.735	146.0	5.748	152.0	5.984	152.0	5.984	22.4	0.9	28.4	1.1				

FORGED TREADED FITTINGS

COUPLING | HALF COUPLING | CAP

ASME B16.11-2001
(Rev. of ASME B16.11-1996)



DN	NOM PIPE SIZE	END TO END COUPLING				END TO END CAPS				OUTSIDE DIAMETER				MIN. END WALL THICKNESS				LENGTH OF THREAD				END WALL THICKNESS					
		W		P		D		G (min)		B		L2		K (min)		A		B		C		D		E			
		MM	IN	MM	IN	MM	IN	MM	IN	MM	IN	MM	IN	MM	IN	MM	IN	MM	IN	MM	IN	MM	IN	MM	IN	MM	IN
		3000 & 6000		3000		6000		3000		6000		3000		6000		3000		6000		3000		6000		3000		6000	
6	1/8	32.0	1.260	19.0	0.748	**	**	16.0	0.630	22.0	0.866	4.8	0.189	**	**	6.4	0.252	6.7	0.264	4.8	0.2	6.4	0.3				
8	1/4	35.0	1.378	25.0	0.984	27.0	1.063	19.0	0.748	25.0	0.984	4.8	0.189	6.4	0.252	8.1	0.319	10.2	0.402	4.8	0.2	6.4	0.3				
10	3/8	38.0	1.496	25.0	0.984	27.0	1.063	22.0	0.866	32.0	1.260	4.8	0.189	6.4	0.252	9.1	0.358	10.4	0.409	4.8	0.2	6.4	0.3				
15	1/2	48.0	1.890	32.0	1.260	33.0	1.299	28.0	1.102	38.0	1.496	6.4	0.252	7.9	0.311	10.9	0.429	13.6	0.535	6.4	0.3	7.9	0.3				
20	3/4	51.0	2.008	37.0	1.457	38.0	1.496	35.0	1.378	44.0	1.732	6.4	0.252	7.9	0.311	12.7	0.500	13.9	0.547	6.4	0.3	7.9	0.3				
25	1	60.0	2.362	41.0	1.614	43.0	1.693	44.0	1.732	57.0	2.244	9.7	0.382	11.2	0.441	14.7	0.579	17.3	0.681	9.6	0.4	11.2	0.4				
32	1 1/2	67.0	2.638	44.0	1.732	46.0	1.811	57.0	2.244	64.0	2.520	9.7	0.382	11.2	0.441	17.0	0.669	18.0	0.709	9.6	0.4	11.2	0.4				
40	1 1/4	79.0	3.110	44.0	1.732	48.0	1.890	64.0	2.520	76.0	2.992	11.2	0.441	12.7	0.500	17.8	0.701	18.4	0.724	11.2	0.4	12.7	0.5				
50	2	86.0	3.386	48.0	1.890	51.0	2.008	76.0	2.992	92.0	3.622	12.7	0.500	15.7	0.618	19.0	0.748	19.2	0.756	12.7	0.5	15.7	0.6				
65	2 1/2	92.0	3.622	60.0	2.362	64.0	2.520	92.0	3.622	108.0	4.252	15.7	0.618	19.0	0.748	23.6	0.929	28.9	1.138	15.7	0.6	19.0	0.7				
80	3	108.0	4.252	65.0	2.559	68.0	2.677	108.0	4.252	127.0	5.000	19.0	0.748	22.4	0.882	25.9	1.020	30.5	1.201	19.0	0.7	22.4	0.9				
100	4	121.0	4.764	68.0	2.677	75.0	2.953	140.0	5.512	159.0	6.260	22.4	0.882	26.4	1.118	27.7	1.091	33.0	1.299	22.4	0.9	28.4	1.1				

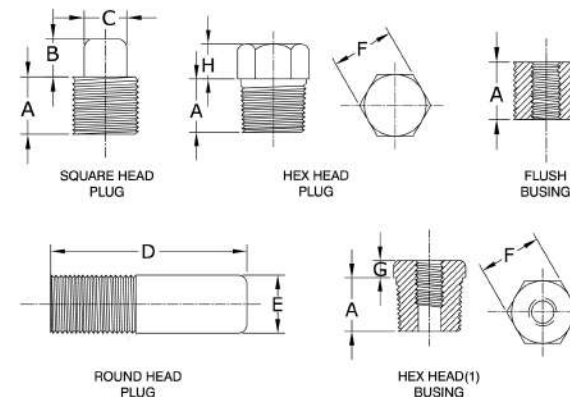
(1) Dimension B is minimum length of perfect thread. The length of useful thread (B plus threads with fully formed roots and flat crests) shall not be less than L2 (effective length of external thread) required by American National Standard for Pipe Threads (ANSI/ASME B1.20.1)

(2) Class 2000 and NPS 1/8 class 6000 couplings, half couplings, and caps are not included in this standard.

THREADED FITTING

SQUARE HEAD PLUG | HEX HEAD PLUG
ROUND HEAD PLUG | HEX HEAD(1) BUSHING
FLUSH BUSHING

ASME B16.11-2001
(Rev. of ASME B16.11-1996)



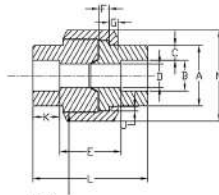
DN	NOM PIPE SIZE	SQUARE HEAD PLUGS						ROUND HEAD PLUGS				HEX PLUGS AND BUSHINGS					
		MINIMUM LENGTHS		MINIMUM SQUARE HEIGHT		MINIMUM WIDTH FLATS		MINIMUM LENGTH		NOMINAL HEAD DIAMETER		NOMINAL WIDTH FLATS		MINIMUM HEX HEIGHT BUSHING		MINIMUM HEX HEIGHT PLUG	
		A	B	C	D	E	F	G	H								
		MM	IN	MM	IN	MM	IN	MM	IN	MM	IN	MM	IN	MM	IN	MM	IN
6	1/8	10.0	0.394	6.0	0.236	7.0	0.276	35.0	1.378	10.0	0.394	11.0	0.433	**	**	6.0	0.236
8	1/4	11.0	0.433	6.0	0.236	10.0	0.394	41.0	1.614	14.0	0.551	16.0	0.630	3.00	0.118	6.0	0.236
10	3/8	13.0	0.512	8.0	0.315	11.0	0.433	41.0	1.614	18.0	0.709	18.0	0.709	4.00	0.157	8.0	0.315
15	1/2	14.0	0.551	10.0	0.394	14.0	0.551	44.0	1.732	21.0	0.827	22.0	0.866	5.00	0.197	8.0	0.315
20	3/4	16.0	0.630	11.0	0.433	16.0	0.630	44.0	1.732	27.0	1.063	27.0	1.063	6.00	0.236	10.0	0.394
25	1	19.0	0.748	13.0	0.512	21.0	0.827	51.0	2.008	33.0	1.299	36.0	1.417	6.00	0.236	10.0	0.394
32	1 1/4	21.0	0.827	14.0	0.551	24.0	0.945	51.0	2.008	43.0	1.693	46.0	1.811	7.00	0.275	14.0	0.551
40	1 1/2	21.0	0.827	16.0	0.630	28.0	1.102	51.0	2.008	48.0	1.890	50.0	1.969	8.00	0.315	16.0	0.630
50	2	22.0	0.866	18.0	0.709	32.0	1.260	64.0	2.520	60.0	2.362	65.0	2.559	9.00	0.354	18.0	0.709
65	2 1/2	27.0	1.063	19.0	0.748	36.0	1.417	70.0	2.756	73.0	2.874	75.0	2.953	10.00	0.394	19.0	0.748
80	3	28.0	1.102	21.0	0.827	41.0	1.614	70.0	2.756	89.0	3.504	90.0	3.543	10.00	0.394	21.0	0.827
100	4	32.0	1.260	25.0	0.984	65.0	2.559	76.0	2.992	114.0	4.488	115.0	4.528	13.00	0.512	25.0	0.984

(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 other than internal pressures.

UNION

Socket Welding MSS-SP-83-2001

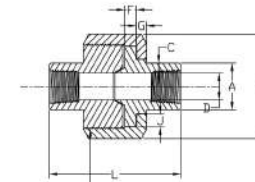


H-Thrds
Minimum 4 Full Thrds Engagement
Class 2A/2B Fit ANSI B1.1

DN	NOM PIPE SIZE	PIPE END MIN		SOCKET BORE MIN		SOCKET WALL MIN		WATER WAY BORE		LAYING LENGTH		MALE FLANGE MIN		NUT MIN.		THRDS / IN	BEARING MIN		DEPTH OF SOCKET MIN		LENGTH ASSEMBLY NOMINAL		CLEAR ASSEMBLY NUT			
		A		B		C		D		E		F		G			H		J		K		L		N	
		MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.		MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.
6	1/8	21.8	0.86	11.2	0.440	3.2	0.125	7.6	0.299	22.4	0.880	3.2	0.125	3.2	0.125	16	1.2	0.049	9.7	0.380	41.4	1.630	50.8	2.000		
6	1/8	21.8	0.86	10.7	0.420	3.2	0.125	6.1	0.239	19.1	0.750	3.2	0.125	3.2	0.125	16	1.2	0.049	9.7	0.380	41.4	1.630	50.8	2.000		
8	1/4	21.8	0.86	14.6	0.575	3.3	0.130	10.0	0.394	22.4	0.880	3.2	0.125	3.2	0.125	16	1.2	0.049	9.7	0.380	41.4	1.630	50.8	2.000		
8	1/4	21.8	0.86	14.1	0.555	3.3	0.130	8.5	0.334	19.1	0.750	3.2	0.125	3.2	0.125	16	1.2	0.049	9.7	0.380	41.4	1.630	50.8	2.000		
10	3/8	25.9	1.02	18.0	0.710	3.5	0.138	13.3	0.523	26.9	1.060	3.4	0.135	3.4	0.135	14	1.4	0.054	9.7	0.380	46.0	1.810	55.9	2.200		
10	3/8	25.9	1.02	17.5	0.690	3.5	0.138	11.8	0.463	20.6	0.810	3.4	0.135	3.4	0.135	14	1.4	0.054	9.7	0.380	46.0	1.810	55.9	2.200		
15	1/2	31.2	1.23	22.2	0.875	4.1	0.161	16.6	0.652	26.9	1.060	3.7	0.145	3.7	0.145	14	1.5	0.059	9.7	0.380	49.0	1.930	58.4	2.300		
15	1/2	31.2	1.23	21.7	0.855	4.1	0.161	15.0	0.592	20.6	0.810	3.7	0.145	3.7	0.145	14	1.5	0.059	9.7	0.380	49.0	1.930	58.4	2.300		
20	3/4	37.1	1.46	27.6	1.085	4.3	0.168	21.7	0.854	31.8	1.250	4.1	0.160	4.1	0.160	11	1.7	0.066	12.7	0.500	56.9	2.240	66.0	2.600		
20	3/4	37.1	1.46	27.1	1.065	4.3	0.168	20.2	0.794	25.4	1.000	4.1	0.160	4.1	0.160	11	1.7	0.066	12.7	0.500	56.9	2.240	66.0	2.600		
25	1	45.5	1.79	34.3	1.350	5.0	0.196	27.4	1.079	34.3	1.350	4.6	0.180	4.4	0.175	11	1.9	0.073	12.7	0.500	62.0	2.440	78.7	3.100		
25	1	45.5	1.79	33.8	1.330	5.0	0.196	25.9	1.019	26.2	1.030	4.6	0.180	4.4	0.175	11	1.9	0.073	12.7	0.500	62.0	2.440	78.7	3.100		
32	1 1/4	54.9	2.16	43.1	1.696	5.3	0.208	35.8	1.410	40.6	1.600	5.3	0.210	5.2	0.205	10	2.1	0.084	12.7	0.500	71.1	2.800	94.0	3.700		
32	1 1/4	54.9	2.16	42.5	1.675	5.3	0.208	34.3	1.350	32.5	1.280	5.3	0.210	5.2	0.205	10	2.1	0.084	12.7	0.500	71.1	2.800	94.0	3.700		
40	1 1/2	61.0	2.40	49.1	1.935	5.5	0.218	41.7	1.640	42.2	1.660	5.8	0.230	5.6	0.220	10	2.3	0.091	12.7	0.500	76.5	3.010	111.8	4.400		
40	1 1/2	61.0	2.40	48.6	1.915	5.5	0.218	40.1	1.580	34.0	1.340	5.8	0.230	5.6	0.220	10	2.3	0.091	12.7	0.500	76.5	3.010	111.8	4.400		
50	2	275.2	2.96	61.6	2.426	6.0	0.238	53.3	2.097	45.5	1.790	6.6	0.260	6.4	0.250	10	2.7	0.106	15.7	0.620	86.1	3.390	132.1	5.200		
50	2	275.2	2.96	61.1	2.406	6.0	0.238	51.7	2.037	37.3	1.470	6.6	0.260	6.4	0.250	10	2.7	0.106	15.7	0.620	86.1	3.390	132.1	5.200		
65	2 1/2	91.7	3.61	74.4	2.931	7.7	0.302	64.2	2.529	61.7	2.430	7.5	0.295	7.1	0.280	8	3.1	0.121	15.7	0.620	102.4	4.030	149.9	5.900		
65	2 1/2	91.7	3.61	73.8	2.906	7.7	0.302	61.2	2.409	52.1	2.050	7.5	0.295	7.1	0.280	8	3.1	0.121	15.7	0.620	102.4	4.030	149.9	5.900		
80	3	109.2	4.30	90.4	3.560	8.3	0.327	79.5	3.128	63.8	2.510	8.3	0.325	8.0	0.315	8	3.5	0.139	15.7	0.620	109.0	4.290	175.3	6.900		
80	3	109.2	4.30	89.8	3.535	8.3	0.327	76.4	3.008	53.6	2.110	8.3	0.325	8.0	0.315	8	3.5	0.139	15.7	0.620	109.0	4.290	175.3	6.900		

UNION

Threaded End MSS-SP-83-2001



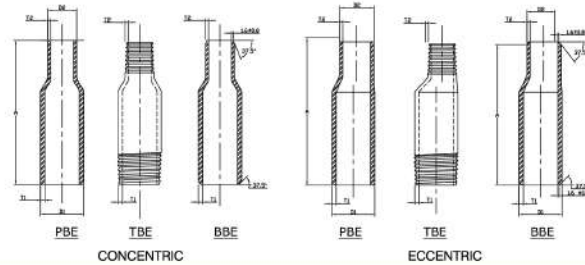
H-Thrds
Minimum 4 Full Thrds Engagement
Class 2A/2B Fit ANSI B1.1

DN	NOM PIPE SIZE	PIPE END MIN		SOCKET WALL MIN		WATER WAY BORE		MALE FLANGE MIN		NUT MIN.		THRDS/IN	BEARING MIN		LENGTH ASSEMBLY NOMINAL		CLEAR ASSEMBLY NUT			
		A		C		D		F		G			H		J		L		N	
		MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.		MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.
6	1/8	14.7	0.58	2.4	0.095	8.4	0.332	3.2	0.125	3.2	0.125	16	1.2	0.049	41.4	1.630	50.8	2.000		
6	1/8	14.7	0.58	2.4	0.095	6.4	0.253	3.2	0.125	3.2	0.125	16	1.2	0.049	41.4	1.630	50.8	2.000		
8	1/4	19.1	0.75	3.0	0.119	11.1	0.438	3.2	0.125	3.2	0.125	16	1.2	0.049	41.4	1.630	50.8	2.000		
8	1/4	19.1	0.75	3.0	0.119	9.4	0.372	3.2	0.125	3.2	0.125	16	1.2	0.049	41.4	1.630	50.8	2.000		
10	3/8	22.9	0.90	3.2	0.126	13.5	0.532	3.4	0.135	3.4	0.135	14	1.4	0.054	46.0	1.810	55.9	2.200		
10	3/8	22.9	0.90	3.2	0.126	14.3	0.562	3.4	0.135	3.4	0.135	14	1.4	0.054	46.0	1.810	55.9	2.200		
15	1/2	27.7	1.09	3.7	0.147	17.1	0.672	3.7	0.145	3.7	0.145	14	1.5	0.059	49.0	1.930	58.4	2.300		
15	1/2	27.7	1.09	3.7	0.147	17.9	0.703	3.7	0.145	3.7	0.145	14	1.5	0.059	49.0	1.930	58.4	2.300		
20	3/4	33.5	1.32	3.9	0.154	21.4	0.842	4.1	0.160	4.1	0.160	11	1.7	0.066	56.9	2.240	66.0	2.600		
20	3/4	33.5	1.32	3.9	0.154	23.0	0.906	4.1	0.160	4.1	0.160	11	1.7	0.066	56.9	2.240	66.0	2.600		
25	1	41.4	1.63	4.5	0.179	29.0	1.141	4.6	0.180	4.4	0.175	11	1.9	0.073	62.0	2.440	78.7	3.100		
25	1	41.4	1.63	4.5	0.179	27.7	1.092	4.6	0.180	4.4	0.175	11	1.9	0.073	62.0	2.440	78.7	3.100		
32	1 1/4	50.5	1.99	4.9	0.191	37.7	1.484	5.3	0.210	5.2	0.205	10	2.1	0.084	71.1	2.800	94.0	3.700		
32	1 1/4	50.5	1.99	4.9	0.191	35.4	1.392	5.3	0.210	5.2	0.205	10	2.1	0.084	71.1	2.800	94.0	3.700		
40	1 1/2	57.2	2.25	5.1	0.200	43.5	1.714	5.8	0.230	5.6	0.220	10	2.3	0.091	76.5	3.010	111.8	4.400		
40	1 1/2	57.2	2.25	5.1	0.200	41.2	1.622	5.8	0.230	5.6	0.220	10	2.3	0.091	76.5	3.010	111.8	4.400		
50	2	70.1	2.76	5.5	0.218	55.6	2.188	6.6	0.260	6.4	0.250	10	2.7	0.106	86.1	3.390	132.1	5.200		
50	2	70.1	2.76	5.5	0.218	52.1	2.052	6.6	0.260	6.4	0.250	10	2.7	0.106	86.1	3.390	132.1	5.200		
65	2 1/2	85.3	3.36	7.0	0.276	66.3	2.609	7.5	0.295	7.1	0.280	8	3.1	0.121	102.4	4.030	149.9	5.900		
65	2 1/2	85.3	3.36	7.0	0.276	64.3	2.532	7.5	0.295	7.1	0.280	8	3.1	0.121	102.4	4.030	149.9	5.900		
80	3	102.4	4.03	7.6	0.300	82.6	3.250	8.3	0.325	8.0	0.315	8	3.5	0.139	109.0	4.290	175.3	6.900		
80	3	102.4	4.03	7.6	0.300	77.3	3.042	8.3	0.325	8.0	0.315	8	3.5	0.139	109.0	4.290	175.3	6.900		

SWAGED NIPPLE

CONCENTRIC | ECCENTRIC

MSS-SP-95-2000



NOM. PIPE SIZE	OUT SIDE LARGE END	DIAMETER SMALL END	END TO END	WALL THICKNESS																		
				T1						T2												
				SCH.40		SCH.80(STD)		SCH.160(XS)		SCH.(XXS)		SCH.40		SCH.80(STD)		SCH.160(XS)		SCH.(XXS)				
MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.					
1/4 x 1/8	13.7	0.540	10.3	0.405	57.2	2.250	2.3	0.090	3.0	0.120	3.8	0.150	6.1	0.240	1.8	0.070	22.9	0.900	3.3	0.130	4.8	0.190
3/8 x 1/8	17.1	0.675	10.3	0.405	63.5	2.500	2.3	0.090	3.3	0.130	4.1	0.160	6.4	0.250	1.8	0.070	22.9	0.900	3.3	0.130	4.8	0.190
1/4 x 1/4	17.1	0.675	13.7	0.540	63.5	2.500	2.3	0.090	3.3	0.130	4.1	0.160	6.4	0.250	2.3	0.090	3.0	0.120	3.8	0.150	6.1	0.240
1/4 x 1/8	21.3	0.840	10.3	0.405	69.9	2.750	2.8	0.110	3.8	0.150	4.8	0.190	7.6	0.300	1.8	0.070	22.9	0.900	3.3	0.130	4.8	0.190
1/4 x 1/4	21.3	0.840	13.7	0.540	69.9	2.750	2.8	0.110	3.8	0.150	4.8	0.190	7.6	0.300	2.3	0.090	3.0	0.120	3.8	0.150	6.1	0.240
1/4 x 3/8	21.3	0.840	17.1	0.675	69.9	2.750	2.8	0.110	3.8	0.150	4.8	0.190	7.6	0.300	2.3	0.090	3.3	0.130	4.1	0.160	6.4	0.250
3/4 x 1/8	26.7	1.050	10.3	0.405	76.2	3.000	2.8	0.110	3.8	0.150	5.6	0.220	7.9	0.310	1.8	0.070	22.9	0.900	3.3	0.130	4.8	0.190
3/4 x 1/4	26.7	1.050	13.7	0.540	76.2	3.000	2.8	0.110	3.8	0.150	5.6	0.220	7.9	0.310	2.3	0.090	3.0	0.120	3.8	0.150	6.1	0.240
3/4 x 3/8	26.7	1.050	17.1	0.675	76.2	3.000	2.8	0.110	3.8	0.150	5.6	0.220	7.9	0.310	2.3	0.090	3.3	0.130	4.1	0.160	6.4	0.250
1 x 1/2	26.7	1.050	21.3	0.840	76.2	3.000	2.8	0.110	3.8	0.150	5.6	0.220	7.9	0.310	2.8	0.110	3.8	0.150	4.8	0.190	7.6	0.300
1 x 1/8	33.4	1.315	10.3	0.405	89.9	3.500	3.3	0.130	4.6	0.180	6.4	0.250	9.1	0.360	1.8	0.070	22.9	0.900	3.3	0.130	4.8	0.190
1 x 1/4	33.4	1.315	13.7	0.540	89.9	3.500	3.3	0.130	4.6	0.180	6.4	0.250	9.1	0.360	2.3	0.090	3.0	0.120	3.8	0.150	6.1	0.240
1 x 3/8	33.4	1.315	17.1	0.675	89.9	3.500	3.3	0.130	4.6	0.180	6.4	0.250	9.1	0.360	2.8	0.110	3.8	0.150	4.8	0.190	7.6	0.300
1 x 1/2	33.4	1.315	21.3	0.840	89.9	3.500	3.3	0.130	4.6	0.180	6.4	0.250	9.1	0.360	2.8	0.110	3.8	0.150	4.8	0.190	7.6	0.300
1 x 3/4	33.4	1.315	26.7	1.050	89.9	3.500	3.3	0.130	4.6	0.180	6.4	0.250	9.1	0.360	2.8	0.110	3.8	0.150	5.6	0.220	7.9	0.310
1 1/4 x 1/8	42.2	1.660	10.3	0.405	101.6	4.000	3.6	0.140	4.8	0.190	7.1	0.280	9.7	0.380	1.8	0.070	22.9	0.900	3.3	0.130	4.8	0.190
1 1/4 x 1/4	42.2	1.660	13.7	0.540	101.6	4.000	3.6	0.140	4.8	0.190	7.1	0.280	9.7	0.380	2.3	0.090	3.0	0.120	3.8	0.150	6.1	0.240
1 1/4 x 3/8	42.2	1.660	17.1	0.675	101.6	4.000	3.6	0.140	4.8	0.190	7.1	0.280	9.7	0.380	2.3	0.090	3.3	0.130	4.1	0.160	6.4	0.250
1 1/4 x 1/2	42.2	1.660	21.3	0.840	101.6	4.000	3.6	0.140	4.8	0.190	7.1	0.280	9.7	0.380	2.8	0.110	3.8	0.150	4.8	0.190	7.6	0.300
1 1/4 x 3/4	42.2	1.660	26.7	1.050	101.6	4.000	3.6	0.140	4.8	0.190	7.1	0.280	9.7	0.380	2.8	0.110	3.8	0.150	5.6	0.220	7.9	0.310
1 1/2 x 1	42.2	1.660	33.4	1.315	101.6	4.000	3.6	0.140	4.8	0.190	7.1	0.280	9.7	0.380	3.3	0.130	4.6	0.180	6.4	0.250	9.1	0.360
1 1/2 x 1/8	48.3	1.900	10.3	0.405	114.3	4.500	3.8	0.150	5.1	0.200	8.6	0.340	10.2	0.400	1.8	0.070	22.9	0.900	3.3	0.130	4.8	0.190
1 1/2 x 1/4	48.3	1.900	13.7	0.540	114.3	4.500	3.8	0.150	5.1	0.200	8.6	0.340	10.2	0.400	2.3	0.090	3.0	0.120	3.8	0.150	6.1	0.240
1 1/2 x 3/8	48.3	1.900	17.1	0.675	114.3	4.500	3.8	0.150	5.1	0.200	8.6	0.340	10.2	0.400	2.3	0.090	3.3	0.130	4.1	0.160	6.4	0.250
1 1/2 x 1/2	48.3	1.900	21.3	0.840	114.3	4.500	3.8	0.150	5.1	0.200	8.6	0.340	10.2	0.400	2.8	0.110	3.8	0.150	4.8	0.190	7.6	0.300
1 1/2 x 3/4	48.3	1.900	26.7	1.050	114.3	4.500	3.8	0.150	5.1	0.200	8.6	0.340	10.2	0.400	2.8	0.110	3.8	0.150	5.6	0.220	7.9	0.310
1 1/2 x 1	48.3	1.900	33.4	1.315	114.3	4.500	3.8	0.150	5.1	0.200	8.6	0.340	10.2	0.400	3.3	0.130	4.6	0.180	6.4	0.250	9.1	0.360
1 1/2 x 1 1/4	48.3	1.900	42.2	1.660	114.3	4.500	3.8	0.150	5.1	0.200	8.6	0.340	10.2	0.400	3.6	0.140	4.8	0.190	6.4	0.250	9.7	0.380
2 x 1/8	60.3	2.375	10.3	0.405	165.1	6.500	3.8	0.150	5.6	0.220	9.4	0.370	11.2	0.440	1.8	0.070	22.9	0.900	3.3	0.130	4.8	0.190
2 x 1/4	60.3	2.375	13.7	0.540	165.1	6.500	3.8	0.150	5.6	0.220	9.4	0.370	11.2	0.440	2.3	0.090	3.0	0.120	3.8	0.150	6.1	0.240
2 x 3/8	60.3	2.375	17.1	0.675	165.1	6.500	3.8	0.150	5.6	0.220	9.4	0.370	11.2	0.440	2.3	0.090	3.3	0.130	4.1	0.160	6.4	0.250
2 x 1/2	60.3	2.375	21.3	0.840	165.1	6.500	3.8	0.150	5.6	0.220	9.4	0.370	11.2	0.440	2.8	0.110	3.8	0.150	4.8	0.190	7.6	0.300
2 x 3/4	60.3	2.375	26.7	1.050	165.1	6.500	3.8	0.150	5.6	0.220	9.4	0.370	11.2	0.440	2.8	0.110	3.8	0.150	5.6	0.220	7.9	0.310
2 x 1	60.3	2.375	33.4	1.315	165.1	6.500	3.8	0.150	5.6	0.220	9.4	0.370	11.2	0.440	3.3	0.130	4.6	0.180	6.4	0.250	9.1	0.360
2 x 1 1/4	60.3	2.375	42.2	1.660	165.1	6.500	3.8	0.150	5.6	0.220	9.4	0.370	11.2	0.440	3.6	0.140	4.8	0.190	6.4	0.250	9.7	0.380

Continued

SWAGED NIPPLE

CONCENTRIC | ECCENTRIC

MSS-SP-95-2000

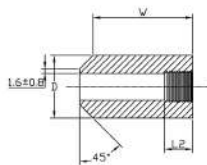
Continued

NOM. PIPE SIZE	OUT SIDE LARGE END	DIAMETER SMALL END	END TO END	WALL THICKNESS																		
				T1						T2												
				SCH.40		SCH.80(STD)		SCH.160(XS)		SCH.(XXS)		SCH.40		SCH.80(STD)		SCH.160(XS)		SCH.(XXS)				
MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.					
2 x 1 1/2	60.3	2.375	48.3	1.900	165.1	6.500	3.8	0.150	5.6	0.220	9.4	0.370	11.2	0.440	3.8	0.150	5.1	0.200	7.1	0.280	10.2	0.400
2 1/2 x 1/8	73.0	2.875	10.3	0.405	177.8	7.000	5.1	0.200	7.1	0.280	11.4	0.450	14.0	0.550	1.8	0.070	22.9	0.900	3.3	0.130	4.8	0.190
2 1/2 x 1/4	73.0	2.875	13.7	0.540	177.8	7.000	5.1	0.200	7.1	0.280	11.4	0.450	14.0	0.550	2.3	0.090	3.0	0.120	3.8	0.150	6.1	0.240
2 1/2 x 3/8	73.0	2.875	17.1	0.675	177.8	7.000	5.1	0.200	7.1	0.280	11.4	0.450	14.0	0.550	2.3	0.090	3.3	0.130	4.1	0.160	6.4	0.250
2 1/2 x 1/2	73.0	2.875	21.3	0.840	177.8	7.000	5.1	0.200	7.1	0.280	11.4	0.450	14.0	0.550	2.8	0.110	3.8	0.150	4.8	0.190	7.6	0.300
2 1/2 x 3/4	73.0	2.875	26.7	1.050	177.8	7.000	5.1	0.200	7.1	0.280	11.4	0.450	14.0	0.550	2.8	0.110	3.8	0.150	5.6	0.220	7.9	0.310
2 1/2 x 1	73.0	2.875	33.4	1.315	177.8	7.000	5.1	0.200	7.1	0.280	11.4	0.450	14.0	0.550	3.3	0.130	4.6	0.180	6.4	0.250	9.1	0.360
2 1/2 x 1 1/4	73.0	2.875	42.2	1.660	177.8	7.000	5.1	0.200	7.1	0.280	11.4	0.450	14.0	0.550	3.6	0.140	4.8	0.190	6.4	0.250	9.7	0.380
2 1/2 x 1 1/2	73.0	2.875	48.3	1.900	177.8	7.000	5.1	0.200	7.1	0.280	11.4	0.450	14.0	0.550	3.8	0.150	5.1	0.200	7.1	0.280	10.2	0.400
2 1/2 x 2	73.0	2.875	60.3	2.375	177.8	7.000	5.1	0.200	7.1	0.280	11.4	0.450	14.0	0.550	3.8	0.150	5.6	0.220	8.6	0.340	11.2	0.440
3 x 1/8	88.9	3.500	10.3	0.405	203.2	8.000	5.6	0.220	7.6	0.300	11.4	0.450	15.2	0.600	1.8	0.070	22.9	0.900	3.3	0.130	4.8	0.190
3 x 1/4	88.9	3.500	13.7	0.540	203.2	8.000	5.6	0.220	7.6	0.300	11.4	0.450	15.2	0.600	2.3	0.090	3.0	0.120	3.8	0.150	6.1	0.240
3 x 3/8	88.9	3.500	17.1	0.675	203.2	8.000	5.6	0.220	7.6	0.300	11.4	0.450	15.2	0.600	2.3	0.090	3.3	0.130	4.1	0.160	6.4	0.250
3 x 1/2	88.9	3.500	21.3	0.840	203.2	8.000	5.6	0.220	7.6	0.300	11.4	0.450	15.2	0.600	2.8	0.110	3.8	0.150	4.8	0.190	7.6	0.300
3 x 3/4	88.9	3.500	26.7	1.050	203.2	8.000	5.6	0.220	7.6													

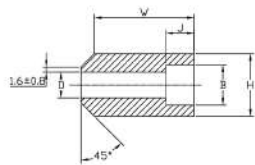
BOSSSES

THREADED | SOCKET-WELDING

ASME B16.11-2001
(Rev. of ASME B16.11-1996)



THREADED



SOCKET-WELDING

THREADED

DN	NOM PIPE SIZE	D				W				L2				T			
		3000		6000		3000		6000		3000		6000		3000		6000	
		MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.
8	1/4	22.36	0.87	26.21	1.02	40.35	1.57	40.35	1.57	10.02	0.39	10.02	0.39	4.37	0.17	6.17	0.24
10	3/8	26.21	1.02	36.49	1.42	50.63	1.97	50.63	1.97	10.54	0.41	10.54	0.41	4.37	0.17	9.51	0.37
15	1/2	34.44	1.34	44.46	1.73	50.63	1.97	50.63	1.97	13.62	0.53	13.62	0.53	6.43	0.25	9.00	0.35
20	3/4	39.56	1.54	50.63	1.97	50.63	1.97	50.63	1.97	14.14	0.55	14.14	0.55	6.17	0.24	10.79	0.42
25	1	48.57	1.89	60.65	2.36	50.63	1.97	50.63	1.97	17.73	0.69	17.73	0.69	7.45	0.29	13.36	0.52
32	1 1/4	60.65	2.36	65.79	2.56	50.63	1.97	50.63	1.97	18.25	0.71	18.25	0.71	9.00	0.35	11.57	0.45
40	1 1/2	65.79	2.56	80.96	3.15	50.63	1.97	50.63	1.97	18.76	0.73	18.76	0.73	8.48	0.33	15.93	0.62
50	2	80.96	3.15	96.12	3.74	60.65	2.36	60.65	2.36	19.28	0.75	19.28	0.75	10.02	0.39	17.48	0.68

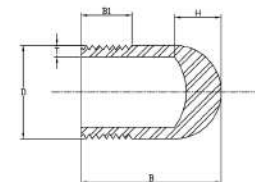
SOCKET-WELDING

DN	NOM PIPE SIZE	B				D				J				W				H				T			
		3000		6000		3000		6000		3000		6000		3000		6000		3000		6000		3000		6000	
		MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.		
8	1/4	14.39	0.56	**	**	9.25	0.36	**	**	10.02	0.39	**	**	40.35	1.57	**	**	22.62	0.88	**	**	4.37	0.17	**	**
10	3/8	17.99	0.70	**	**	12.59	0.49	**	**	11.05	0.43	**	**	50.63	1.97	**	**	26.73	1.04	**	**	4.88	0.19	**	**
15	1/2	22.10	0.86	22.10	0.86	15.93	0.62	11.82	0.46	13.11	0.51	14.14	0.55	50.63	1.97	50.63	1.97	34.70	1.35	43.69	1.70	6.43	0.25	11.05	0.43
20	3/4	27.50	1.07	27.50	1.07	21.07	0.82	15.68	0.61	14.14	0.55	16.19	0.63	50.63	1.97	50.63	1.97	40.09	1.56	49.60	1.93	6.43	0.25	11.31	0.44
25	1	34.44	1.34	34.44	1.34	26.99	1.05	20.82	0.81	16.19	0.63	18.25	0.71	50.63	1.97	50.63	1.97	46.77	1.82	56.54	2.20	6.43	0.25	11.31	0.44
32	1 1/4	43.43	1.69	43.43	1.69	35.47	1.38	29.81	1.16	18.25	0.71	19.28	0.75	50.63	1.97	50.63	1.97	55.77	2.17	66.05	2.57	6.68	0.26	11.57	0.45
40	1 1/2	49.60	1.93	49.60	1.93	41.38	1.61	34.18	1.33	19.28	0.75	22.36	0.87	50.63	1.97	50.63	1.97	65.79	2.56	80.96	3.15	8.48	0.33	16.19	0.63
50	2	61.94	2.41	61.94	2.41	53.20	2.07	43.43	1.69	22.36	0.87	26.21	1.02	60.65	2.36	60.65	2.36	81.21	3.16	96.12	3.74	10.02	0.39	17.73	0.69

(1) Thread in Accordance with ASME B 1.20.1
Socket Dimensions in Accordance with ASME B16.11

BULL PLUG

MSS-SP-95-2000



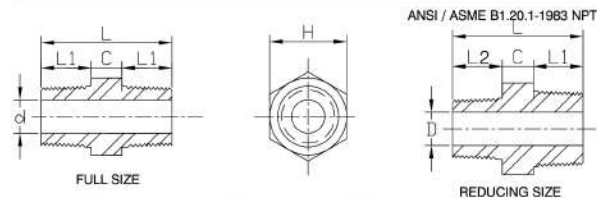
DN	NOM PIPE SIZE	D		B		B1		H		T (MIN)									
		MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.	SCH.40(STD)		SCH.80(XS)		SCH.160		XXS			
		MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.
6	1/8	10.3	0.405	50.8	2.000	9.4	0.370	14.0	0.550	1.8	0.070	2.3	0.090	3.3	0.130	4.8	0.190		
8	1/4	13.7	0.540	50.8	2.000	10.9	0.430	14.0	0.550	2.3	0.090	3.0	0.120	3.8	0.150	6.1	0.240		
10	3/8	17.1	0.675	57.2	2.250	12.4	0.490	14.0	0.550	2.8	0.110	3.3	0.130	4.1	0.160	6.4	0.250		
15	1/2	21.3	0.840	63.5	2.500	14.5	0.570	14.0	0.550	2.8	0.110	3.8	0.150	4.8	0.190	7.4	0.290		
20	3/4	26.7	1.050	69.9	2.750	16.0	0.630	18.0	0.710	2.8	0.110	3.8	0.150	5.6	0.220	7.9	0.310		
25	1	33.4	1.315	76.2	3.000	19.1	0.750	18.0	0.710	3.3	0.130	4.6	0.180	6.4	0.250	9.1	0.360		
32	1 1/4	42.2	1.660	82.6	3.250	20.6	0.810	18.0	0.710	3.6	0.140	4.8	0.190	6.4	0.250	9.7	0.380		
40	1 1/2	48.3	1.900	88.9	3.500	20.6	0.810	18.0	0.710	3.6	0.140	5.1	0.200	7.1	0.280	10.2	0.400		
50	2	60.3	2.375	101.6	4.000	22.1	0.870	20.1	0.790	3.8	0.150	5.6	0.220	8.6	0.340	11.2	0.440		
65	2 1/2	73.0	2.875	127.0	5.000	26.9	1.060	20.1	0.790	5.1	0.200	7.1	0.280	9.7	0.380	14.0	0.550		
80	3	88.9	3.500	152.4	6.000	28.4	1.120	20.1	0.790	5.6	0.220	7.6	0.300	11.2	0.440	15.2	0.600		
100	4	114.3	4.500	177.8	7.000	28.6	1.126	20.1	0.790	6.4	0.250	8.1	0.320	13.5	0.530	17.0	0.670		

TOLERANCES (ASME B 16.11-2009)

ITEM	TYPE OF PIPE PIPE FITTING	DN NPS	6 TO 8 1/8 TO 1/4	10 TO 20 3/8 TO 3/4	25 TO 50 1 TO 2	65 To 100 3 TO 4
BORE DIA OF SOCKET (B)				+0.012"/-0.0 (+0.3/-0.0MM)		+0.06"/0.0(+0.4/0.0MM)
BORE DIA OF FITTING (D)	ALL TYPE OF			±0.01" (±0.25MM)		±0.03" (±0.8MM)
CENTRICITY OF BORE (X)	PIPE FITTING			±0.03" (±0.8MM)		
COIN CADENCE OF AXIS (Y)				0.06" PER 1 FEET MAX. (5MM MAX PER METER)		
CENTER TO BOTTOM OF SOCKET (A)	45°, 90° ELBOW, TEE		±0.03" (±0.8MM)	±0.06" (±1.5MM)	±0.08" (±2MM)	±0.1" (±2.5MM)
BOTTOM TO BOTTOM OF SOCKET (E)	FULL COUPLING		±0.06" (±1.5MM)	±0.12" (±3MM)	±0.16" (±6.0MM)	±0.2" (±5MM)
BOTTOM OF SOCKET TO OPPOSITE FACE (F)	HALF COUPLING		±0.03" (±0.8MM)	±0.06" (±1.5MM)	±0.08" (±2MM)	±0.1" (±2.5MM)

(1) Thread in Accordance with ASME B 1.20.1.
(2) Wall Thickness (T Min.) in Accordance with ASME B36.10.

HEX NIPPLE



DN	NOM PIPE SIZE	C		L1		L		H		D			
		MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.	3000	6000	3000	6000
6	1/8	6.1	0.240	9.9	0.390	25.9	1.020	11.9	0.470	1.8	0.070	2.3	0.090
8	1/4	7.9	0.310	14.0	0.550	36.1	1.420	17.0	0.670	2.3	0.090	3.0	0.120
10	3/8	7.9	0.310	14.0	0.550	36.1	1.420	19.1	0.750	22.9	0.900	3.3	0.130
15	1/2	8.9	0.350	19.1	0.750	47.0	1.850	23.9	0.940	2.8	0.110	3.8	0.150
20	3/4	9.9	0.390	19.1	0.750	48.0	1.890	30.0	1.180	2.8	0.110	3.8	0.150
25	1	10.9	0.430	23.9	0.940	58.9	2.320	35.1	1.380	3.3	0.130	4.6	0.180
32	1 1/4	11.9	0.470	23.9	0.940	59.9	2.360	46.0	1.810	3.6	0.140	4.8	0.190
40	1 1/2	14.0	0.550	23.9	0.940	62.0	2.440	50.0	1.970	3.6	0.140	5.1	0.200
50	2	16.0	0.630	25.9	1.020	68.1	2.680	65.0	2.560	3.8	0.150	5.6	0.220
65	2 1/2	18.0	0.710	38.1	1.500	94.0	3.700	80.0	3.150	5.1	0.200	7.1	0.280
80	3	20.1	0.790	39.9	1.570	100.1	3.940	95.0	3.740	5.6	0.220	7.6	0.300
100	4	24.4	0.960	39.9	1.570	104.9	4.130	125.5	4.940	6.4	0.250	8.1	0.320

NOM PIPE SIZE	C		L1		L2		L		H		D			
	MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.	3000	6000	3000	6000
3/8 x 1/4	7.9	0.310	14.0	0.550	14.0	0.550	36.1	1.420	19.1	0.750	6.4	0.250	***	***
1/2 x 1/4	8.9	0.350	19.1	0.750	14.0	0.550	41.9	1.650	23.9	0.940	6.4	0.250	***	***
1/2 x 3/8	8.9	0.350	19.1	0.750	14.0	0.550	41.9	1.650	23.9	0.940	9.1	0.360	4.3	0.170
3/4 x 1/4	9.9	0.390	19.1	0.750	14.0	0.550	42.9	1.690	30.0	1.180	6.4	0.250	***	***
3/4 x 3/8	9.9	0.390	19.1	0.750	14.0	0.550	42.9	1.690	30.0	1.180	9.1	0.360	4.3	0.170
3/4 x 1/2	9.9	0.390	19.1	0.750	19.1	0.750	48.0	1.890	30.0	1.180	11.7	0.460	6.4	0.250
1 x 3/8	10.9	0.430	23.9	0.940	14.0	0.550	49.0	1.930	35.1	1.380	9.1	0.360	4.3	0.170
1 x 1/2	10.9	0.430	23.9	0.940	19.1	0.750	54.1	2.130	35.1	1.380	11.7	0.460	6.4	0.250
1 x 3/4	10.9	0.430	23.9	0.940	19.1	0.750	54.1	2.130	35.1	1.380	15.5	0.610	11.2	0.440
1 1/4 x 1/2	11.9	0.470	23.9	0.940	19.1	0.750	55.1	2.170	46.0	1.810	11.7	0.460	6.4	0.250
1 1/4 x 3/4	11.9	0.470	23.9	0.940	19.1	0.750	55.1	2.170	46.0	1.810	15.5	0.610	11.2	0.440
1 1/4 x 1	11.9	0.470	23.9	0.940	23.9	0.940	59.9	2.360	46.0	1.810	20.6	0.810	15.2	0.600
1 1/2 x 3/4	14.0	0.550	23.9	0.940	19.1	0.750	56.9	2.240	50.0	1.970	15.5	0.610	11.2	0.440
1 1/2 x 1	14.0	0.550	23.9	0.940	23.9	0.940	62.0	2.440	50.0	1.970	20.6	0.810	15.2	0.600
1 1/2 x 1 1/4	14.0	0.550	23.9	0.940	23.9	0.940	62.0	2.440	50.0	1.970	29.5	1.160	22.9	0.900
2 x 1	16.0	0.630	25.9	1.020	23.9	0.940	66.0	2.600	65.0	2.560	20.6	0.810	15.2	0.600
2 x 1 1/4	16.0	0.630	25.9	1.020	23.9	0.940	66.0	2.600	65.0	2.560	29.5	1.160	22.9	0.900
2 x 1 1/2	16.0	0.630	25.9	1.020	23.9	0.940	66.0	2.600	65.0	2.560	34.0	1.340	27.9	1.100
2 1/2 x 1 1/4	18.0	0.710	38.1	1.500	23.9	0.940	80.0	3.150	80.0	3.150	29.5	1.160	22.9	0.900
2 1/2 x 1 1/2	18.0	0.710	38.1	1.500	23.9	0.940	80.0	3.150	80.0	3.150	34.0	1.340	27.9	1.100
2 1/2 x 2	18.0	0.710	38.1	1.500	25.9	1.020	82.0	3.230	80.0	3.150	42.9	1.690	38.1	1.500
3 x 1 1/2	20.1	0.790	39.9	1.570	23.9	0.940	84.1	3.310	95.0	3.740	34.0	1.340	27.9	1.100
3 x 2	20.1	0.790	39.9	1.570	25.9	1.020	86.1	3.390	95.0	3.740	42.9	1.690	38.1	1.500
3 x 2 1/2	20.1	0.790	39.9	1.570	38.1	1.500	98.0	3.860	95.0	3.740	53.8	2.120	***	***
4	24.4	0.960	39.9	1.570	104.9	4.130	87.4	3.440	***	***	***	***	125.5	4.940

1) H. Size 2-1/2 and smaller are Hexagonal Bodies, size 3 is Octagonal body.

BRANCH OUTLET FITTINGS THREAD END

Reducing Sizes MSS-SP-97-2001



3000 Lb Standard and extra strong

DN	OUTLET PIPE SIZE	A		C		F	
		MM.	IN.	MM.	IN.	MM.	IN.
6	1/8	19.1	0.75	13.7	0.54	17.3	0.68
8	1/4	19.1	0.75	13.7	0.54	22.1	0.87
10	3/8	20.6	0.81	17.0	0.67	25.9	1.02
15	1/2	25.4	1.00	21.3	0.84	31.2	1.23
20	3/4	26.9	1.06	26.7	1.05	37.1	1.46
25	1	33.3	1.31	33.3	1.31	45.5	1.79
32	1 1/4	33.3	1.31	42.2	1.66	54.9	2.16
40	1 1/4	35.1	1.38	48.3	1.90	61.7	2.43
50	2	38.1	1.50	60.2	2.37	75.2	2.96
65	2 1/2	46.0	1.81	72.9	2.87	91.7	3.61
80	3	50.8	2.00	88.9	3.50	109.2	4.30
100	4	57.2	2.25	114.3	4.50	137.2	5.40

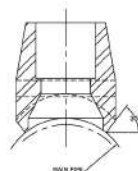
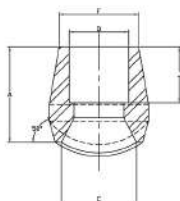
6000 Lb Schedule 160 and double extra strong

DN	OUTLET PIPE SIZE	A		C		F	
		MM.	IN.	MM.	IN.	MM.	IN.
15	1/2	31.8	1.25	16.5	0.65	33.8	1.33
20	3/4	36.6	1.44	21.1	0.83	41.1	1.62
25	1	39.6	1.56	26.9	1.06	49.8	1.96
32	1 1/4	41.1	1.62	35.8	1.41	58.7	2.31
40	1 1/2	42.9	1.69	41.1	1.62	66.8	2.63
50	2	52.3	2.06	52.3	2.06	83.3	3.28

(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 21 for Conventional Run Size Combination.

BRANCH OUTLET FITTINGS SOCKET WELD END

Reducing Sizes MSS-SP-97-2001



3000 Lb Standard and extra strong
6000 Lb Schedule 160 and double extra strong

OUTLET PIPE SIZE		A		C		D		F		J (min)	
		MM	IN.	MM	IN.	MM	IN.	MM	IN.	MM	IN.
6	1/8	19.1	0.75	13.7	0.54	10.9	0.43	17.3	0.68	9.7	0.38
8	1/4	19.1	0.75	13.7	0.54	14.5	0.57	22.1	0.87	9.7	0.38
10	3/8	21.1	0.83	17.0	0.67	17.8	0.70	25.9	1.02	9.7	0.38
15	1/2	24.9	0.98	21.3	0.84	22.1	0.87	31.2	1.23	9.7	0.38
20	3/4	26.9	1.06	26.7	1.05	27.2	1.07	37.1	1.46	12.7	0.50
25	1	33.0	1.30	33.3	1.31	34.0	1.34	45.5	1.79	12.7	0.50
32	1 1/4	33.0	1.30	42.2	1.66	42.9	1.69	54.9	2.16	12.7	0.50
40	1 1/2	35.1	1.38	48.3	1.90	49.0	1.93	61.7	2.43	12.7	0.50
50	2	38.1	1.50	60.2	2.37	61.5	2.42	75.2	2.96	15.7	0.62
65	2 1/2	46.0	1.81	72.9	2.87	74.2	2.92	91.7	3.61	20.8	0.82
80	3	51.1	2.01	88.9	3.50	90.2	3.55	109.2	4.30	20.8	0.82
100	4	56.9	2.24	114.3	4.50	115.8	4.56	137.2	5.40	26.7	1.05

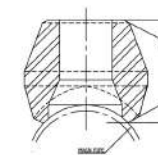
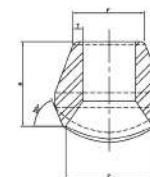
OUTLET PIPE SIZE		A		C		D		F		J (min)	
		MM	IN.	MM	IN.	MM	IN.	MM	IN.	MM	IN.
15	1/2	32.0	1.26	16.5	0.65	22.1	0.87	33.8	1.33	9.7	0.38
20	3/4	37.1	1.46	21.1	0.83	27.2	1.07	41.1	1.62	12.7	0.50
25	1	39.9	1.57	26.9	1.06	34.0	1.34	49.8	1.96	12.7	0.50
32	1 1/4	40.9	1.61	35.8	1.41	42.9	1.69	58.7	2.31	12.7	0.50
40	1 1/2	42.9	1.69	41.1	1.62	49.0	1.93	66.8	2.63	12.7	0.50
50	2	52.1	2.05	51.6	2.03	61.5	2.42	83.3	3.28	15.7	0.62

(1) Socket Dimension 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 21 for Conventional Run Size Combination.

BRANCH OUTLET FITTINGS BUTT WELDING END

STANDARD WEIGHT

Reducing Sizes MSS-SP-97-2001



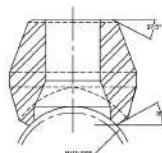
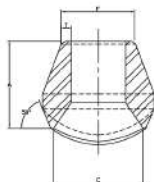
OUTLET PIPE SIZE		A		C		F		T	
		MM	IN.	MM	IN.	MM	IN.	MM	IN.
1/8		15.7	0.62	13.7	0.54	10.4	0.41	1.8	0.07
1/4		15.7	0.62	13.7	0.54	13.7	0.54	2.3	0.09
3/8		19.1	0.75	17.0	0.67	17.0	0.67	2.3	0.09
1/2		19.1	0.75	21.3	0.84	21.3	0.84	2.8	0.11
3/4		22.4	0.88	26.7	1.05	26.7	1.05	2.8	0.11
1		26.9	1.06	33.3	1.31	33.3	1.31	3.3	0.13
1 1/4		31.8	1.25	42.2	1.66	42.2	1.66	3.6	0.14
1 1/2		33.3	1.31	48.3	1.90	48.3	1.90	3.6	0.14
2		38.1	1.50	60.2	2.37	60.2	2.37	3.8	0.15
2 1/2		41.1	1.62	72.9	2.87	72.9	2.87	5.1	0.20
3		44.5	1.75	88.9	3.50	88.9	3.50	5.6	0.22
3 1/2		47.8	1.88	101.6	4.00	101.6	4.00	5.8	0.23
4		50.8	2.00	114.3	4.50	114.3	4.50	6.1	0.24
5		57.2	2.25	141.2	5.56	141.2	5.56	6.6	0.26
6		60.5	2.38	168.4	6.63	168.4	6.63	7.1	0.28
8		69.9	2.75	219.2	8.63	219.2	8.63	8.1	0.32
10		77.7	3.06	273.1	10.75	273.1	10.75	9.1	0.36
12		85.9	3.38	323.9	12.75	323.9	12.75	9.7	0.38
14		89.9	3.50	355.6	14.00	355.6	14.00	9.7	0.38
16		93.7	3.69	406.4	16.00	406.4	16.00	9.7	0.38
18		96.6	3.81	457.2	18.00	457.2	18.00	9.7	0.38
20		101.6	4.00	508.0	20.00	508.0	20.00	9.7	0.38
24		114.3	4.50	609.6	24.00	609.6	24.00	9.7	0.38.50

(1) Weld Bevel in Accordance with ASME B16.25.
(2) Outlet size 4 and less fit a number of run pipe sizes and the fitting are marked accordingly.
See page 21 for Conventional Run Size Combination.
(3) Outlet sizes 5 and up order to specific size combination.

BRANCH OUTLET FITTINGS BUTT WELDING END

EXTRA STRONG

Reducing Sizes MSS-SP-97-2001

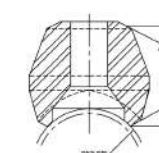
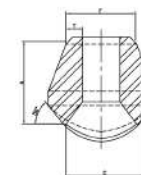


OUTLET PIPE SIZE	A		C		F		T	
	MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.
1/8	15.7	0.62	13.7	0.54	10.4	0.41	2.3	0.09
1/4	15.7	0.62	13.7	0.54	13.7	0.54	3.0	0.12
3/8	19.1	0.75	17.0	0.67	17.0	0.67	3.3	0.13
1/2	19.1	0.75	21.3	0.84	21.3	0.84	3.8	0.15
3/4	22.4	0.88	26.7	1.05	26.7	1.05	3.8	0.15
1	26.9	1.06	33.3	1.31	33.3	1.31	4.6	0.18
1 1/4	31.8	1.25	42.2	1.66	42.2	1.66	4.8	0.19
1 1/2	33.3	1.31	48.3	1.90	48.3	1.90	5.1	0.20
2	38.1	1.50	60.2	2.37	60.2	2.37	5.6	0.22
2 1/2	41.1	1.62	72.9	2.87	72.9	2.87	7.1	0.28
3	44.5	1.75	88.9	3.50	88.9	3.50	7.6	0.30
3 1/2	47.8	1.88	101.6	4.00	101.6	4.00	8.6	0.34
4	50.8	2.00	114.3	4.50	114.3	4.50	8.6	0.34
5	57.2	2.25	141.2	5.56	141.2	5.56	9.7	0.38
6	77.7	3.06	168.4	6.63	168.4	6.63	10.9	0.43
8	98.6	3.88	219.2	8.63	219.2	8.63	12.7	0.50
10	93.7	3.69	273.1	10.75	273.1	10.75	12.7	0.50
12	103.1	4.06	323.9	12.75	323.9	12.75	12.7	0.50
14	100.1	3.94	355.6	14.00	355.6	14.00	12.7	0.50
16	106.2	4.18	406.4	16.00	406.4	16.00	12.7	0.50
18	111.3	4.38	457.2	18.00	457.2	18.00	12.7	0.50
20	119.1	4.69	508.0	20	508.0	20.00	12.7	0.50
24	139.7	5.50	609.6	24	609.6	24.00	12.7	0.50

BRANCH OUTLET FITTINGS BUTT WELDING END

SCHEDULE 160 And DOUBLE EXTRA STRONG

Reducing Sizes MSS-SP-97-2001



OUTLET PIPE SIZE	A		C		F		T			
	MM.	IN.	MM.	IN.	MM.	IN.	S160		XXS	
1/2	28.4	1.12	13.7	0.54	21.3	0.84	4.8	0.19	7.4	0.29
3/4	31.8	1.25	18.8	0.74	26.7	1.05	5.6	0.22	7.9	0.31
1	38.1	1.50	24.4	0.96	33.3	1.31	6.4	0.25	9.1	0.36
1 1/4	44.5	1.75	32.5	1.28	42.2	1.66	6.4	0.25	9.7	0.38
1 1/2	50.8	2.00	38.1	1.5	48.3	1.90	7.1	0.28	10.2	0.4
2	55.4	2.18	49.3	1.94	60.2	2.37	8.6	0.34	11.2	0.44
2 1/2	62.0	2.44	58.9	2.32	72.9	2.87	9.7	0.38	14.0	0.55
3	73.2	2.88	73.7	2.90	88.9	3.50	11.2	0.44	15.2	0.6
4	84.1	3.31	97.3	3.83	114.3	4.50	13.5	0.53	17.0	0.67
5	93.7	3.69	122.2	4.81	141.2	5.56	16.0	0.63	19.1	0.75
6	104.6	4.12	146.3	5.76	168.4	6.63	18.3	0.72	21.8	0.86

CONVENTIONAL RUN SIZE COMBINATIONS

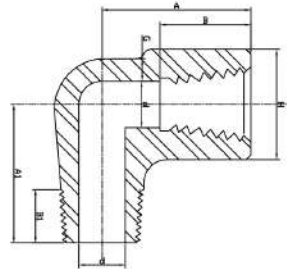
3000# THREAD /SOCKET-WELD END STD/XS BUTT WELDING END

OUTLET SIZE								
1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"
3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	3 1/2"	5"
1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	3 1/2"	4"	6"
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"	3"	3 1/2"- 5"	4"- 5"	5"- 6"	6"	8"	12"- 14"
**	8"- 36"	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"

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

(1)Weld Bevel in Accordance with ASME B16.25.
(2) Outlet size 4 and less fit a number of run pipe sizes and the fitting are marked accordingly.
See page 21 for Conventional Run Size Combination.
(3)Outlet sizes 5 and up order to specific size combination.

STREET ELBOW



3000 PSI

DN	NOM PIPE SIZE	A		A1		B (MIN)		B1 (MIN)		D		D1		G (MIN)		H		T	
		MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.
8	1/4	22.1	0.870	31.8	1.250	7.9	0.310	10.4	0.410	11.2	0.440	6.4	0.250	3.3	0.130	24.9	0.980	3.0	0.120
10	3/8	25.4	1.000	38.1	1.500	8.9	0.350	10.4	0.410	14.5	0.570	9.1	0.360	3.6	0.140	33.0	1.300	3.6	0.140
15	1/2	28.7	1.130	41.1	1.620	10.9	0.430	13.7	0.540	15.7	0.620	11.7	0.460	4.1	0.160	38.1	1.500	4.1	0.160
20	3/4	34.8	1.370	47.5	1.870	12.4	0.490	13.7	0.540	20.8	0.820	15.5	0.610	4.3	0.170	46.0	1.810	4.8	0.190
25	1	44.5	1.750	57.2	2.250	14.5	0.570	17.3	0.680	26.7	1.050	20.6	0.810	5.1	0.200	55.9	2.200	5.6	0.220
32	1 1/4	50.8	2.000	66.8	2.630	17.0	0.670	18.0	0.710	35.1	1.380	29.5	1.160	5.3	0.210	62.0	2.440	6.4	0.250
40	1 1/2	54.1	2.130	71.4	2.810	18.0	0.710	18.3	0.720	40.9	1.610	34.0	1.340	5.6	0.220	74.9	2.950	6.4	0.250
50	2	63.5	2.500	84.1	3.310	19.3	0.760	19.3	0.760	52.6	2.070	42.9	1.690	7.1	0.280	84.1	3.310	7.1	0.280

3000 PSI

DN	NOM PIPE SIZE	A		A1		B (MIN)		B1 (MIN)		D		D1		G (MIN)		H		T	
		MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.	MM.	IN.
8	1/4	25.4	1.000	38.1	1.500	7.9	0.310	10.4	0.410	11.2	0.440	1.5	0.060	6.6	0.260	33.0	1.300	6.1	0.240
10	3/8	28.7	1.130	41.1	1.620	8.9	0.350	10.4	0.410	14.5	0.570	4.3	0.170	6.9	0.270	38.1	1.500	6.4	0.250
15	1/2	34.8	1.370	47.5	1.870	10.9	0.430	13.7	0.540	15.7	0.620	6.4	0.250	8.1	0.320	46.0	1.810	7.4	0.290
20	3/4	44.5	1.750	57.2	2.250	12.4	0.490	13.7	0.540	20.8	0.820	11.2	0.440	8.6	0.340	55.9	2.200	7.9	0.310
25	1	50.8	2.000	66.8	2.630	14.5	0.570	17.3	0.680	26.7	1.050	15.2	0.600	9.9	0.390	62.0	2.440	9.1	0.360
32	1 1/4	54.1	2.130	71.4	2.810	17.0	0.670	18.0	0.710	35.1	1.380	22.9	0.900	10.7	0.420	74.9	2.950	9.7	0.380
40	1 1/2	63.5	2.500	84.1	3.310	18.0	0.710	18.3	0.720	40.9	1.610	27.9	1.100	11.2	0.440	84.1	3.310	10.2	0.400

H in Accordance with ASME 16.11