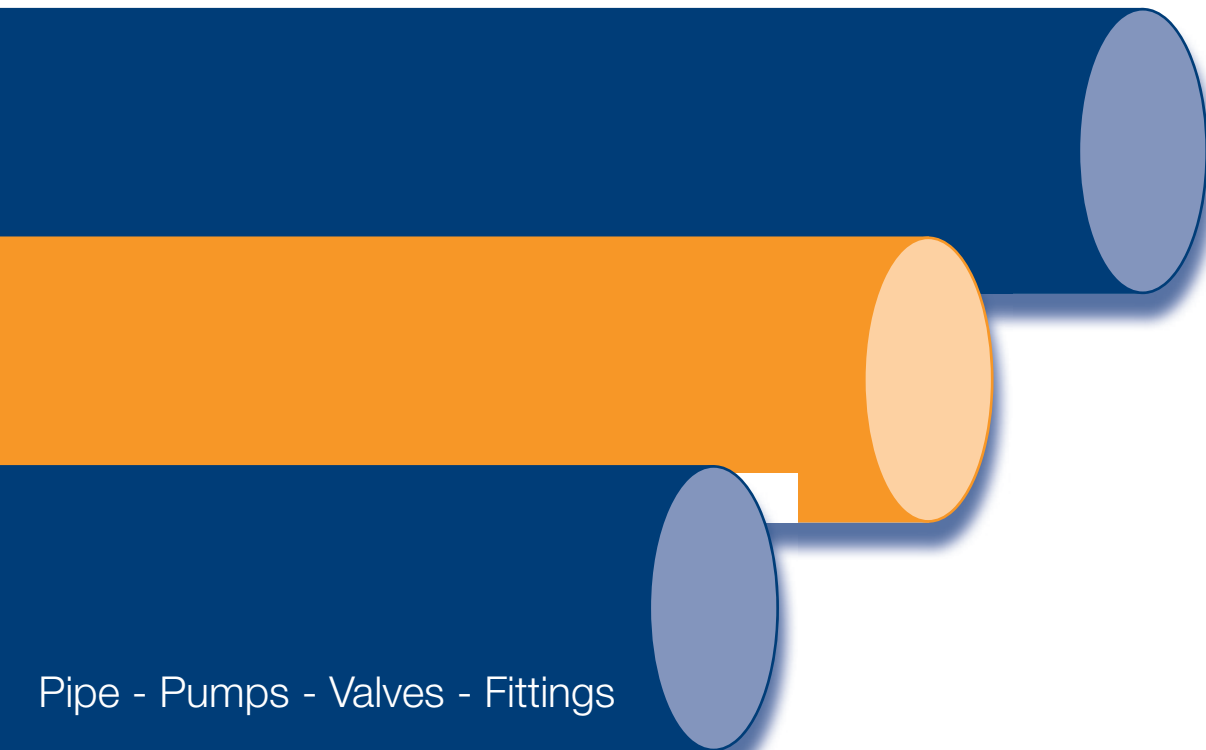


Pipe & Engineering Supply

PTY. LTD.

Technical Data Chart



Pipe - Pumps - Valves - Fittings

1-2 Old Port Rd, Port Kembla NSW 2505

Phone **(02) 4274 0313** or **4274 0314**

Fax **(02) 4276 2414**

Email: sales@pespk.com.au

Product & Specification Guide

Pipe

Linepipe	Specifications	ASTM A53/A53M
	Dimensions	ASME B36.10
	Product	Welded and Seamless Steel Pipe for High and Low Temperature and Pressure
	Grades	A, B
	Specifications	ASTM A106
	Dimensions	ASME B36.10
	Product	Seamless Carbon Steel Pipe for High Temperature Service
	Grades	A, B, C (Indicates tensile strength and yield point design)
	Specification	API 5L
	Dimensions	ASME B36.10
	Products	Seamless & ERW for conveying Water, Oil, Gas
	Grades	B, X42, X52, X60, Refer API 5L specification for others
Commercial Pipe/ Structural Pipe	Specification	AS1074/AS1163
	Dimensions	AS1163
	Product	Circular Steel Hollow Sections
	Grade	C250/C350

Fittings

Buttwelding Fittings	Specifications	ASTM A234/A234M
	Dimensions	(Moderate and High Temperature Service)
	Product	ASME B36.9 & ASME B16.28 Elbows, Return Bends, Tees, Crosses, Reducers, End Caps
	Grade	WPB
High Pressure Fittings	Specification	ASTM A105
	Dimensions	ASME B16.11
	Product	Elbows, Tees, Couplings, Unions, Hex Nipples, Hex Plugs, Brushes & other reducing fittings, Thread Outlets, Socket Outlets, Weld Outlets, Pipe Nipples
	Grade	Forged Steel

Flanges

Flanges	Specifications	ASTM A105/A105M
	Dimensions	ASME B16.5
	Product	Weld Neck, Slip-on, Blind, Socket Weld, Threaded
	Face	Raised Face, Flat Face
	Bore	Pipe Schedule
	Class	150, 300, 400, 600, 900, 1500, 2500 (to 600mm only)
	Grade	Carbon Steel
	Specifications	AS2129
	Dimensions	AS2192 & BS 4504
	Applications	Slip-on, Blind "Table" Flanges
	Face	Flat Face
	Bore	To suit Pipe & Tube OD
	Table	D, E, F and H and DIN 16

Grooved

Grooved	Specifications	ULFM
	Product	Couplings: Lightweight & Rigid, Tees, Elbows, Caps, Mechanical Tees, Concentric Reducers, Reducing Couplings Grooved Butterfly, Gate & Checked Couplings, Painted & Galvanised
	Finish	

While every care has been taken to ensure the accuracy of this information, Pipe & Engineering does not accept any responsibility for errors loss or damage as a result of this literature.

Call (02) 4274 0313 • Fax (02) 4276 2414

NOMINAL WALL THICKNESS FOR WELDED & SEAMLESS STEEL PIPE
 ASME B36.10 All dimensions are shown in millimeters

NORMAL SIZE DN	OUT SIDE DIAM. mm														
		STAN-DARD	EXTRA STRONG	XX STRONG	SCHED. 10	SCHED. 20	SCHED. 30	SCHED. 40	SCHED. 60	SCHED. 80	SCHED. 100	SCHED. 120	SCHED. 140	SCHED. 160	
6	10.3	1.73	2.41	-	-	-	-	↑ SAME AS STANDARD W.T. (Std. W.T.) ↓	-	↑ SAME AS EXTRA STRONG W.T. (X.S.) ↓	-	-	-	-	
8	13.7	2.42	3.02	-	-	-	-		-		-	-	-	-	-
10	17.1	2.31	3.20	-	-	-	-		-		-	-	-	-	-
15	21.3	2.77	3.73	7.74	-	-	-		-		-	-	-	-	4.78
20	26.7	2.87	3.91	7.82	-	-	-		-		-	-	-	-	5.56
25	33.4	3.38	4.55	9.09	-	-	-		-		-	-	-	-	6.35
32	42.2	3.56	4.85	9.70	-	-	-		-		-	-	-	-	6.35
40	48.3	3.68	5.08	10.15	-	-	-		-		-	-	-	-	7.14
50	60.3	3.91	5.54	11.07	-	-	-		-		-	-	-	-	8.74
65	73.0	5.16	7.01	14.02	-	-	-		-		-	-	-	-	9.53
80	88.9	5.49	7.62	15.24	-	-	-	-	-	-	-	-	11.13		
90	101.6	5.74	8.08	-	-	-	-	-	-	-	-	-	-		
100	114.3	6.02	8.56	17.12	-	-	-	-	-	-	-	11.13	13.49		
125	141.3	6.55	9.53	19.05	-	-	-	-	-	-	-	12.70	15.88		
150	168.3	7.11	10.97	21.95	-	-	-	-	-	-	-	14.27	18.26		
200	219.1	8.18	12.70	22.23	-	6.35	7.04	-	10.31	-	15.09	18.26	20.62	23.01	
250	273.1	9.27	12.70	25.40	-	6.35	7.80	-	10.31	XS	15.09	18.26	21.44	XXS	28.58
300	323.9	9.53	12.70	25.40	-	6.35	8.38	10.31	14.27	17.48	21.44	XXS	28.58	33.32	
350	355.6	9.53	12.70	-	6.35	7.92	Std.W.T.	11.13	15.09	19.05	23.83	27.79	31.75	35.71	
400	406.4	9.53	12.70	-	6.35	7.92	Std.W.T.	XS	16.66	21.44	26.19	30.96	36.53	40.49	
450	457	9.53	12.70	-	6.35	7.92	11.13	14.27	19.05	23.83	29.36	34.93	39.67	45.24	
500	508	9.53	12.70	-	6.35	Std.W.T.	XS	15.09	20.62	26.19	32.54	38.10	44.45	50.01	
550	559	9.53	12.70	-	6.35	Std.W.T.	XS	-	22.23	28.58	34.93	41.28	47.63	53.98	
600	610	9.53	12.70	-	6.35	Std.W.T.	14.27	17.48	24.61	30.89	38.89	46.02	52.37	59.54	
650	660	9.53	12.70	-	7.92	XS	-	-	-	-	-	-	-	-	
700	711	9.53	12.70	-	7.92	XS	15.88	-	-	-	-	-	-	-	
750	762	9.53	12.70	-	7.92	XS	15.88	-	-	-	-	-	-	-	
800	813	9.53	12.70	-	7.92	XS	15.88	17.48	-	-	-	-	-	-	
850	864	9.53	12.70	-	7.92	XS	15.88	17.48	-	-	-	-	-	-	
900	914	9.53	12.70	-	7.92	XS	15.88	19.05	-	-	-	-	-	-	
1050	1067	9.53	12.70	-	-	-	-	-	-	-	-	-	-	-	

Formula to attain approximate mass in kilograms per metre (kg/m) for Steel Round Pipe and Tubing

$m = (D - t) t \times 0.02466$

Where,
 m = mass to the nearest 0.01 kg/m
 D = Outside Diameter in millimeters
 (To nearest 0.1mm for OD up to 406.4mm)
 (To nearest 1.0mm for OD 457mm and above)
 t = Wall Thickness to nearest 0.01mm

EXAMPLE: { Normal Size **DN300 NPS12**
 OD = 323.9mm
 W.T. = 9.53mm

{ Step 1. 323.9 - 9.53 = 314.37
 Step 2. 314.37 x 9.53 = 2995.9461
 Step 3. 2995.9461 x 0.024 66
 = 73.88kg/m

Call (02) 4274 0313 • Fax (02) 4276 2414

CARBON STEEL LINEPIPE • WEIGHTS

Nominal Size		OD	Welded & Seamless Carbon Steel Pipe to ASME B36.10M All Weights are in kg/m														
DN	NPS	mm	Schedule														
			10	20	30	40	Std	60	80	XS	100	120	140	160	XXS		
6	1/8	10.3	0.28		0.32	0.37	0.37			0.47	0.47						
8	1/4	13.7	0.49		0.54	0.63	0.63			0.80	0.80						
10	3/8	17.1	0.63		0.70	0.84	0.84			1.10	1.10						
15	1/2	21.3	1.00		1.12	1.27	1.27			1.62	1.62					1.95	2.55
20	3/4	26.7	1.28		1.44	1.69	1.69			2.20	2.20					2.90	3.64
25	1	33.4	2.09		2.18	2.50	2.50			3.24	3.24					4.24	5.45
32	1 1/4	42.2	2.70		2.87	3.39	3.39			5.41	5.41					7.25	9.56
40	1 1/2	48.3	3.11		3.53	4.05	4.05			5.41	5.41					7.25	9.56
50	2	60.3	3.93		4.48	5.44	5.44			7.48	7.48					11.11	13.44
65	2 1/2	73.0	5.26		8.04	8.63	8.63			11.41	11.41					14.92	20.39
80	3	88.9	6.45		9.92	11.29	11.29			15.27	15.27					21.35	27.67
90	3 1/2	101.6	7.40		11.41	13.57	13.57			18.63	18.63						
100	4	114.3	8.36		12.91	16.07	16.07			22.32	22.32		28.32			33.54	14.03
125	5	141.3	11.57			21.77	21.77			30.97	30.97		40.28			49.11	57.43
150	6	168.3	132.84			28.26	28.26			42.56	42.56		54.20			67.56	79.22
200	8	219.1	19.96	33.31	36.81	42.55	42.55	53.08	64.65	64.64	75.92	90.44	100.92	111.27	107.92		
250	10	273.1	27.78	41.77	51.03	60.31	30.31	81.55	96.01	81.55	114.75	133.06	155.15	172.33	155.15		
300	12	323.9	36.00	49.73	65.20	79.73	73.88	108.96	132.08	186.97	159.91	186.97	208.14	238.76	186.97		
350	14	355.6	54.59	67.90	81.33	94.55	81.33	126.70	158.10	107.10	194.96	224.65	253.56	281.70			
400	16	406.4	62.64	77.82	93.27	123.50	93.27	160.12	203.53	123.30	245.56	286.64	333.19	365.35			
450	18	457	70.57	87.71	122.38	155.80	105.16	205.74	254.55	139.15	309.62	363.56	408.26	459.37			
500	20	508	78.55	117.15	155.12	183.42	117.15	247.83	311.17	155.12	381.53	441.49	508.11	564.81			
550	22	559	86.54	129.13	171.09		129.13	294.25	373.83	171.09	451.42	527.05	600.63	672.26			
600	24	610	94.53	141.12	209.64	255.41	141.12	355.26	442.08	187.06	547.71	640.03	720.15	808.22			
650	26	660	127.36	202.72			152.87			202.72							
700	28	711	137.32	218.69	271.21		164.85			218.69							
750	30	762	147.28	234.67	292.18		176.84			234.67							
800	32	813	157.24	250.64	312.15	342.91	188.82			250.64							
850	34	854	167.20	266.61	332.12	364.90	200.31			266.61							
900	36	914	176.96	282.27	351.70	420.42	121.56			282.27							
950	38	965					224.54			298.24							
1000	40	1016					236.53			314.22							
1050	42	1067					248.52			330.19							
1100	44	1118					260.50			346.16							
1150	46	1168					272.25			351.82							
1200	48	1219					284.24			377.79							

Note: All weights are theoretical and approximate

Call (02) 4274 0313 • Fax (02) 4276 2414

**SEAMLESS CARBON STEEL PIPE. GRADE B, with plain ends. ASTM A106, API 5L & ASTM A53
FOR ERW APPLICATION SEE NOTES ON PAGE 4**

Nominal Size DN	Temp C° >			-29 to 38	205	260	350	370	400	430*	450	
	Stress (SE) in kPa >			137800	137800	130221	117130	115752	89570	47712	59943	
	Wall Thickness			MAXIMUM ALLOWABLE PRESSURE / TEMPERATURE RATINGS** IN kPa FOR CHEMICAL PLANT AND PETROLIUM REFINERY PIPING SYSTEMS TO ANSI / ASME B31.3a - 1981								
MM		Sched. No.	mm									
15	STD XS XSS	40	2.77	34416	34416	32528	29255	28910	22372	18589	14972	
		80	3.73	48092	48092	45446	40878	40396	31260	25936	20918	
		160	4.78	62830	62830	59378	53404	52777	40837	33926	27333	
			7.47	98245	98245	92836	83507	82522	63857	53053	42739	
20	STD XS XSS	40	2.87	28070	28070	26526	23578	23578	18245	15158	12209	
		80	3.91	39418	39418	37247	33106	33106	25617	21283	17142	
		160	5.56	58152	58152	54955	48843	48843	37799	31398	25293	
			7.82	83107	83107	78539	69809	69809	54024	44881	36152	
25	STD XS XSS	40	3.38	26251	26251	24804	22310	22048	17060	14173	11417	
		80	4.55	36283	36283	34285	30862	30474	23584	19595	15785	
		160	6.35	52481	52481	49594	44606	44082	34112	28339	22827	
			9.09	77030	77030	72793	65476	64704	55070	41595	33506	
32	STD XS XSS	40	3.56	21614	21614	20421	18369	18155	14049	11672	9404	
		80	4.85	30178	30178	28518	25651	25348	19616	16295	13125	
		160	6.35	40596	40596	38364	34505	34099	26389	21924	17659	
			9.70	64601	64601	61045	549006	54266	41988	34884	28097	
40	STD XS XSS	40	3.68	19444	19444	18375	16529	16329	12636	10550	8454	
		80	5.08	27402	27402	25900	23295	23019	17811	14800	11919	
		160	7.14	39738	39738	37599	33816	33416	25858	21483	17308	
			10.16	58779	54779	55547	49966	49374	38205	31742	35569	
50	STD XS XSS	40	3.91	16378	16378	15468	13925	13759	10645	8847	7124	
		80	5.54	23653	23653	22351	20105	19871	15378	12774	10287	
		160	8.74	38866	38866	36731	33037	32652	35266	20987	16908	
			11.07	50793	50793	48003	43173	42670	33017	27429	22096	
65	STD XS XSS	48	5.16	17914	17914	16929	15227	15048	11644	9674	7793	
		80	7.01	24818	24818	23447	21097	20849	16129	13401	10797	
		160	9.53	34615	34615	32714	29420	29076	22503	18693	15055	
			14.02	53081	53081	50159	45116	44585	34498	28662	23088	
80	STD XS XSS	40	5.49	15558	15558	14959	13222	13063	10108	8399	6766	
		80	7.62	21986	21985	20780	18693	18472	14290	11871	9563	
		160	11.13	33079	33079	31253	28111	27780	21497	17859	14386	
			15.24	46976	46976	44392	39928	39459	30536	25369	20436	
100	STD XS XSS	40	6.02	13187	13187	12464	11210	11079	8571	7124	5739	
		80	8.56	19058	19058	18010	16198	16012	12388	10910	8289	
		120	11.13	25190	25190	23805	21407	21159	16370	13601	10955	
		160	13049	31019	31019	29310	26368	26058	20160	16750	13208	
	17.12	40348	40348	38129	34298	33892	26230	21786	17549			
125	STD XS XSS	40	6.55	11561	11561	10921	9825	9708	7517	6243	5038	
		80	9.53	17060	17060	16122	14503	14331	101093	9212	7421	
		120	12.70	23130	23130	21855	19657	19430	15034	12492	10059	
		160	15.88	29407	29407	27787	24997	24701	19113	15881	12795	
	19.05	35897	35897	33926	30516	20158	23337	19388	15620			
150	STD XS XSS	40	7.11	10550	10550	9928	8924	8819	6828	5370	4568	
		80	10.97	16474	16474	15571	14007	13842	10707	8895	7165	
		120	14.27	21745	21745	20553	18486	18265	14138	11747	9460	
		160	18.26	28325	28325	26768	24074	23784	18410	15296	12319	
	212.95	34608	34608	32707	29420	29069	22496	18686	15054			
200	STD	20	6.35	7138	7138	6745	6063	5994	4637	3852	3100	
		30	7.04	7924	7924	7489	6732	6656	5147	4879	3445	
		40	8.18	9246	9246	8737	7855	7765	6008	4995	4024	
		60	10.31	11741	11741	11093	9977	9860	7627	6339	5105	
		80	12.70	14572	14572	13766	12388	12237	9474	77868	6338	
		100	15.09	17452	17452	16488	14834	14655	11341	9426	7593	
	XS	120	18.26	21345	21345	20174	18148	17935	13876	11527	9288	
		140	20.62	24308	24308	22971	20656	20415	15799	13125	10569	
		160	22.23	26334	26334	24877	22386	22124	17115	14221	11458	
			23.01	27340	27340	25838	23240	22964	17769	14765	11892	
		XSS	20	6.35	5698	5698	5388	4844	4789	3707	3080	2480
			30	7.80	7028	7028	6642	5974	5905	4568	3796	3059
40	9.27		8385	8385	7923	7121	7048	5450	4527	3652		
60	12.70		115596	11596	10955	9853	9735	7538	6263	5043		
80	15.09		13863	13863	13098	11781	11644	9012	7308	6028		
100	18.26		16922	16922	15992	14386	14214	10996	9139	7359		
XSS	120	21.44	20036	20036	18934	17032	16825	13022	10817	8716		
	140	25.40	23998	23998	16474	20394	20153	15599	12660	10438		
	160	28.53	27229	27229	25734	23143	22875	17700	14703	11844		
	300	STD	20	6.35	4795	4534	4534	4072	4024	3114	3591	2088
			30	8.38	6359	6359	6008	5402	5540	4134	3431	2763
			40	9.53	7241	7241	6842	6153	6084	4706	3914	3149
XS		40	10.31	7854	7854	7421	6676	6601	5015	4244	3417	
		60	12.70	9722	9722	9191	8268	8165	6318	5250	5430	
		80	14.27	10969	10969	10363	9322	9212	7131	5925	4768	
XSS	100	17.48	13525	13525	12850	11492	11362	8492	7303	5884		
	120	21.44	16736	16736	15819	14227	14062	10879	9040	7283		
	140	25.40	20015	20015	18913	17011	16811	13008	10804	8702		
	160	28.58	22682	22682	21435	19278	19051	14744	12244	9866		
		33.32	26740	26740	25273	22730	22461	17383	14441	11630		

Call (02) 4274 0313 • Fax (02) 4276 2414

**SEAMLESS CARBON STEEL PIPE. GRADE B, with plain ends. ASTM A106, API 5L & ASTM A53
FOR ERW APPLICATION SEE NOTES ON PAGE 4**

Nominal Size DN MM	Temp C° >			-29 to 38	205	260	350	370	400	430*	450
	Stress (SE) in kPa >			137800	137800	130221	117130	115752	89570	47712	59943
	Wall Thickness			MAXIMUM ALLOWABLE PRESSURE / TEMPERATURE RATINGS** IN kPa FOR CHEMICAL PLANT AND PETROLIUM REFINERY PIPING SYSTEMS TO ANSI / ASME B31.3a - 1981							
	Sched. No.	mm									
350	STD	10	6.35	4361	4631	4120	3707	3665	2831	2356	1895
		20	7.92	5457	5457	5161	4644	4589	3548	2949	2377
		30	9.53	6580	6580	6222	5595	5533	4279	3555	2866
		40	11.13	7717	7717	7310	6559	6477	5016	4168	3355
		XS	12.70	8833	8833	8351	7510	7421	5739	4768	3845
		60	15.09	10541	10541	9963	8964	8861	6855	5691	4589
		80	19.05	13421	13421	12684	11410	11272	8723	7248	5836
		100	23.83	16949	16949	16019	14407	14242	11017	9157	7372
		120	27.79	19933	19933	18837	16943	16743	12960	10762	8675
		140	31.75	22964	22964	21703	19519	19292	14931	12402	9990
160	35.71	26051	26051	24618	22144	21883	16936	14069	11334		
400	STD	10	6.35	3810	3810	3603	3238	3197	2472	2060	1660
		20	7.92	4868	4868	4507	4051	4004	3100	2577	2074
		30	9.53	5746	5746	5429	4885	4830	3734	3100	2501
		40	12.70	7703	7703	7283	6545	6470	5009	4126	3349
		XS	16.66	10176	10176	9618	8654	8550	6614	5698	4430
		60	21.44	13208	13208	12478	11224	11093	8585	7131	5746
		80	26.19	16274	16274	15378	13835	13670	10576	8785	7076
		100	30.96	19409	19409	18340	16481	16302	12616	10480	8440
		120	36.53	23130	23130	21855	19657	19430	15034	12492	10059
		140	40.49	25824	25824	24404	21952	21697	16784	13945	11238
450	STD	10	6.35	3383	3383	3197	2873	2839	2198	1826	1474
		20	7.92	4230	4230	3996	3597	3555	2749	2287	1839
		30	9.53	5099	5099	4816	4334	4286	3314	2756	2219
		SX	11.13	5967	5967	5643	5071	5016	3879	3225	2598
		40	12.70	6835	6835	6456	5808	5739	4437	3686	2869
		60	14.27	7696	7696	7276	6545	6463	5002	4155	3349
		80	19.05	10349	10349	9784	8799	8695	6725	5588	4499
		100	23.83	13043	13043	12326	11086	10955	8475	7042	5670
		120	29.36	16219	16219	15323	13787	13622	10542	8757	7055
		140	34.93	19464	19464	18389	16543	16350	12650	10507	8468
160	39.67	22282	22082	21056	18940	19713	11483	12030	9694		
160	45.24	25638	25638	24225	21793	21531	16660	13842	11155		
500	STD	10	6.35	3038	3038	2873	2584	2556	1977	1640	1323
		20	9.53	4582	4582	4327	3893	3852	2976	2474	1991
		30	12.70	6139	6139	5801	5216	5154	3989	3314	2666
		40	15.09	7317	7317	6911	6215	6146	4754	3948	3183
		XS	20.62	10080	10080	9522	8564	8468	6552	5443	4382
		60	26.19	12898	12898	12188	10962	10831	8385	6966	5608
		80	32.54	16171	16171	15287	13746	13580	10514	8730	7035
		100	38.10	19085	19085	18038	16226	16033	12409	10307	8302
		120	44.45	22475	22475	21242	19106	18876	14614	12140	9777
		140	50.01	25450	25450	24094	21675	21421	16577	13766	11093
600	STD	10	6.35	2529	2529	2391	2120	2129	1647	1364	1102
		20	9.53	3810	3810	3603	3238	3197	2474	2060	1660
		30	12.70	5097	5097	4816	4334	4286	3314	2756	2219
		40	14.27	5739	5739	5423	4878	4823	3734	3100	2494
		XS	17.48	7055	7055	6670	5994	5925	4589	3810	3066
		60	24.61	10018	10018	9467	8516	8420	6511	5409	4361
		80	30.96	12691	12691	12002	10783	10659	8254	6856	5519
		100	38.89	16102	16102	15220	13690	13525	10466	8695	7007
		120	46.02	19223	19223	18168	16336	16150	12491	10383	8364
		140	52.37	22048	22048	20835	18741	18520	14331	11906	9591
160	59.54	25279	2388	21489	21235	16433	16433	1349	10996		

THE ASME CODE FOR PRESSURE PIPING including allowable stress values (SE) for metal temperatures⁼ up to 595°C for Carbon Steel Pipe, but cautions that conversion of carbides to graphite (graphitization) may occur in Carbon Steel Pipes after prolonged exposures to temperatures over 425°C. For this reason, with temperatures above 425°C it is recommended that Alloy Steel Pipes should be used.

Allowable Stress values (SE) used in tabulated calculations are those approved for piping systems which come under Section B313.3 of the Code.

⁼ For practical purposes, the metal temperature in a pipe can be considered to be equal to the temperature of the line fluid.

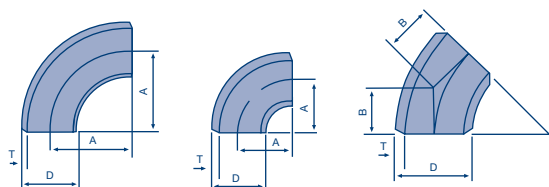
The Pressure/Temperature Chart lists maximum allowable pressure ratings for Seamless Carbon Steel Pipe Grade B, with plain ends at temperatures up to 450°C. The pressures shown can be used as the basis for calculating maximum allowable pressure ratings for other pipes by applying the following factors:

1. Seamless Grade A Pipes: Use 0.80 to 250°C, 0.85 from 260 to 370°C, 0.82 at 400°C, 0.86 at 425°C and .090 at 450°C
2. Electric Resistance Welded Pipes:
 - Grade A. - Use 0.68 to 205°C, 0.72 from 260 to 370°C, 0.70 at 400°C, 0.73 at 425°C and .077 at 450°C
 - Grade B. - Use 0.85 at all temperatures.

3. ASTM A333 Seamless Carbon Steel Pipes for Low Temperatures service:
 - Grade 6 Use 1.0 for all temperatures down to -46°C
4. ASTM A333 Seamless Alloy Steel Pipes for Low Temperature service:
 - Grade 3. - Use 1.08 for -101 to +38°C and 0.93 for 38 to 350°C
 - Grade 4. - Use 1.00 for -101 to +38°C and 0.86 for 38 to 350°C
 - Grade 7. - Use 1.08 for -73 to +38°C and 0.93 for 38 to 350°C

For other grades and temperatures above 350°C refer Appendix A of ANSI B31.3

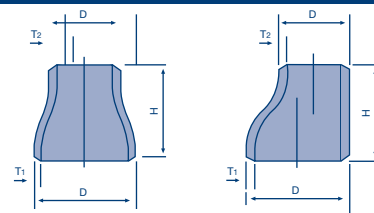
** Caution - Codes for the specific application may vary
* For Temperatures above 425°C See Above Notes on Graphitization



Long and Short Radius Elbows ASME B16.9 & B16.28 (in mm)

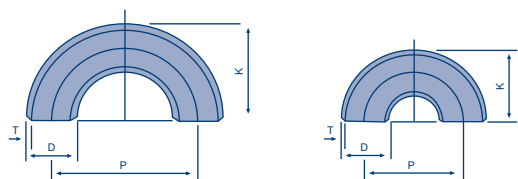
Nominal Pipe Size mm	Outside Diameter at Bevel D	Centre to End		
		Long Radius Elbow		Shirt Radius Elbow
		90 Deg A	45 Deg B	
15	21.3	38.1	15.7	-
20	26.7	28.4	11.2	-
25	33.5	38.1	22.4	25.4
32	42.2	47.8	25.4	31.8
40	48.3	57.2	28.4	38.1
50	60.5	76.2	35.1	50.8
65	73.2	95.2	44.4	63.5
80	88.9	114.3	50.8	76.2
100	114.3	152.4	63.5	101.6
125	141.2	190.5	79.2	127.0
150	168.1	228.6	95.2	152.4
200	218.9	304.8	127.0	203.2
250	273.0	381.0	158.8	254.0
300	323.8	457.2	190.5	304.8
350	355.6	533.4	222.2	355.6
400	406.4	609.6	254.0	406.4
450	457.2	685.8	285.8	457.2
500	508.0	762.0	317.5	508.0
600	609.6	914.4	381.0	609.6

NOTE: T, T¹ & T² = Wall Thickness Designated as per Linepipe schedule (refer Page 1.)



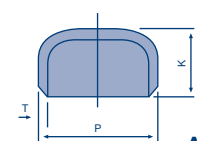
Concentric and Eccentric Reducers ASME B16.9 (in mm)

Nominal Pipe Size mm	Outside Diameter at Bevel		End to End H	Nominal Pipe Size mm	Outside Diameter at Bevel		End to End H
	Large End	Small End			Large End	Small End	
20x15	26.7	21.3	38.1	150x125	168.1	141.2	139.7
25x20	33.5	26.7	50.8	150x100		114.3	
25x15		21.3		150x80		88.9	
32x25	42.2	33.5	50.8	150x65		73.2	
32x20		26.7		200x150	218.9	168.1	152.4
32x15		21.3		200x125		141.2	
40x32	48.3	42.2	63.5	200x100		114.3	
40x25		33.5		200x80		88.9	
40x20		26.7		250x200	273.0	218.9	177.8
40x15		21.3		250x150		168.1	
50x40	60.5	48.3	76.2	250x125		141.2	
50x32		42.2		250x100		114.3	
50x25		33.5		300x250	323.8	273.0	203.2
50x20		26.7		300x200		218.9	
65x50	73.2	60.5	88.9	300x150		168.1	
65x40		48.3		300x125		141.2	
65x32		42.2		350x300	355.6	323.8	330.2
65x25		33.5		350x250		273.0	
80x65	88.9	73.2	88.9	350x200		218.9	
80x50		60.5		350x150		168.1	
80x40		48.3		400x350	406.4	355.6	355.6
80x32		42.2		400x300		323.8	
100x80	114.3	88.9	101.6	400x250		273.0	
100x65		73.2		400x200		218.9	
100x50		60.5		450x400	457.2	406.4	381.0
100x40		48.3		450x350		355.6	
125x100	141.2	114.3	127.0	450x300		323.8	
125x80		88.9		450x250		273.0	
125x65		73.2		500x450	508.0	457.2	508.0
125x50		60.5		500x400		406.4	
				500x350		355.6	
				500x300		323.8	
				600x500	609.6	508.0	508.0
				600x450		457.2	
				600x400		406.4	



Long and Short Radius Return Elbows ASME B16.9 & B16.28 (in mm)

Nominal Pipe Size mm	Outside Diameter at Bevel D	Long Radius		Short Radius	
		Centre to Centre P	Back to Face K	Centre to Centre P	Back to Face K
15	21.3	76.2	47.8	-	-
20	26.7	57.2	42.9	-	-
25	33.5	76.2	55.6	50.8	41.1
32	42.2	95.2	69.8	63.5	52.3
40	48.3	114.3	82.6	76.2	62.0
50	60.5	152.4	106.4	101.6	81.0
65	73.2	190.5	131.8	127.0	100.1
80	88.9	228.6	158.8	152.4	120.7
100	114.3	304.8	209.6	203.2	158.8
125	141.2	381.0	261.9	254.0	196.9
150	168.1	457.2	312.7	304.8	236.5
200	218.9	609.6	414.3	406.4	312.7
250	273.0	762.0	517.7	508.0	390.7
300	323.8	914.4	619.3	609.6	466.9
350	355.6	1066.8	711.2	711.2	533.4
400	406.4	1219.2	812.8	812.8	609.6
450	457.2	1371.6	914.4	914.4	685.8
500	508.0	1524.0	1016.0	1016.0	762.0
600	609.6	1828.8	1219.2	1219.2	914.4

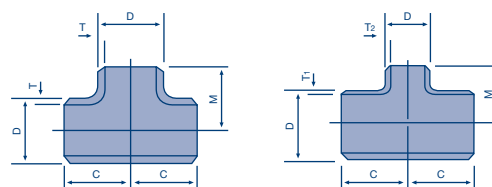
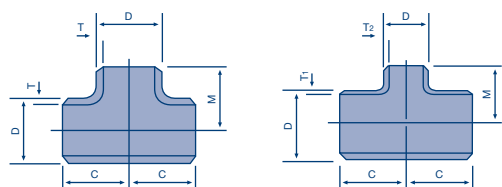


Caps ASME B16.9 (in mm)

Nominal Pipe Size mm	Outside Diameter at Bevel D	Length* E	Limiting Wall Thickness for Length E
15	21.3	25.4	4.6
20	26.7	25.4	3.8
25	33.5	38.1	4.6
32	42.2	38.1	4.8
40	48.3	38.1	5.1
50	60.5	38.1	5.6
65	73.2	38.1	7.1
80	88.9	50.8	7.6
100	114.3	63.5	8.6
125	141.2	76.2	9.7
150	168.1	88.9	10.9
200	218.9	101.6	12.7
250	273.0	127.0	12.7
300	323.8	152.4	12.7
350	355.6	165.1	12.7
400	406.4	177.8	12.7
450	457.2	203.2	12.7
500	508.0	228.6	12.7
600	609.6	266.7	12.7

*LENGTH E APPLIES FOR THICKNESS NOT EXCEEDING THAT GIVEN IN COLUMN "LIMITING WALL THICKNESS FOR LENGTH E"

Call (02) 4274 0313 • Fax (02) 4276 2414



Straight and Reducing Tees

ASME B16.9 (in mm)

Nominal Pipe Size mm	Outside Diameter at Bevel		Centre-to-end		Nominal Pipe Size mm	Outside Diameter at Bevel		Centre-to-end	
	D		Run C	Outlet M		D		Run C	Outlet M
	Run	Outlet				Run	Outlet		
15x15	21.3	21.3	25.4	25.4	100x100	114.3	114.3	104.6	104.6
20x20	26.7	26.7	28.4	28.4	100x80		88.9		98.6
20x15		21.3		28.4	100x65		73.2		95.2
25x25	33.5	33.5	38.1	38.1	100x50		60.5		88.9
25x20		26.7		38.1	100x40		48.3		85.9
25x15		21.3		38.1	125x125	141.2	141.2	124.0	124.0
32x32	42.2	42.2	47.8	47.8	125x100		114.3		117.3
32x25		33.5		47.8	125x80		88.9		111.3
32x20		26.7		47.8	125x65		73.2		108.0
32x15		21.3		47.8	125x50		60.5		104.5
40x40	48.3	48.3	57.2	57.2	150x150	168.1	168.1	142.7	142.7
40x32		42.2		57.2	150x125		141.2		136.7
40x25		33.5		57.2	150x100		114.3		130.0
40x20		26.7		57.2	150x80		88.9		124.0
40x15		21.3		57.2	150x65		73.2		120.5
50x50	60.5	60.5	63.5	63.5	200x200	218.9	218.9	177.8	177.8
50x40		48.3		60.5	200x150		168.1		168.1
50x32		42.2		57.2	200x125		141.2		162.1
50x25		33.5		50.8	200x100		114.2		155.4
50x20		26.7		44.4	250x250	273.0	273.0	215.9	215.9
65x65	73.2	73.2	76.2	76.2	250x200		218.9		203.2
65x50		60.5		69.8	250x150		168.1		193.5
65x40		48.3		66.5	250x125		141.2		190.5
65x32		42.2		63.5	250x100		114.3		184.2
65x25		33.5		57.2	300x300	323.8	323.8	254.0	254.0
80x80	88.9	88.9	85.9	85.9	300x250		273.0		241.3
80x65		73.2		82.6	300x200		218.9		228.6
80x50		60.5		76.2	300x150		168.1		218.9
80x40		48.3		73.2	300x125		141.2		215.9
80x32		42.2		69.8					

Straight and Reducing Tees

ASME B16.9 (in mm)

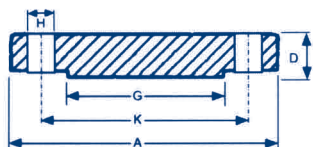
Nominal Pipe Size mm	Outside Diameter at Bevel		Centre-to-end		Nominal Pipe Size mm	Outside Diameter at Bevel		Centre-to-end	
	D		Run C	Pipe Outlet M		D		Run C	Outlet M
	Run	Outlet				Run	Outlet		
350x350	355.6	355.6	279.4	279.4	500x500	508.0	508.0	381.0	381.0
350x300		323.8		269.7	500x450		457.2		368.3
350x250		273.0		257.0	500x400		406.4		355.6
350x200		218.9		247.6	500x350		355.6		355.6
350x150		168.1		238.3	500x300		323.8		345.9
400x400	406.4	406.4	304.8	304.8	500x250		273.0		333.2
400x350		355.6		304.8	500x200		218.9		323.8
400x300		323.8		295.1	600x600	609.6	609.6	431.8	431.8
400x250		273.0		282.4	600x500		508.0		431.8
400x200		218.9		373.0	600x450		457.2		419.1
400x150		168.1		263.7	600x400		406.4		406.4
450x450	457.2	457.2	342.9	342.9	600x350		355.6		406.4
450x400		406.4		330.2	600x300		323.8		396.7
450x350		355.6		330.2	600x250		273.0		384.0
450x300		323.8		320.5					
450x250		273.0		307.8					
450x200		218.9		298.4					

NOTE (1): OUTLET DIMENSION "M" FOR SIZES 350 & LARGER IS RECOMMENDED BUT NOT MANDATORY

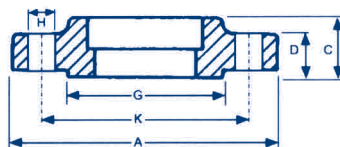
NOTE (2): T₁ & T₂ = Wall Thickness Designated as per Linepipe schedule (refer Page 1.)

APPROX WEIGHT OF COMMON BUTTWELD FITTINGS Kg

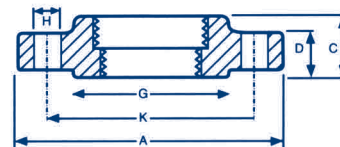
Description	Schedule	15	20	25	32	40	50	65	80	100	125	150	200	250	300	350	400	450	500	600
90 LR ELBOW	STD WT	0.10	0.10	0.20	0.30	0.40	0.70	1.40	2.20	4.20	6.80	10.90	21.80	39	57	73	98	120	150	220
	XS	0.10	0.10	0.20	0.40	0.50	1.00	1.80	2.90	5.70	10.00	16.30	33.10	52	75	97	130	165	200	280
	Sch160	0.12	0.13	0.25	0.42	0.65	1.33	2.33	3.83	8.02	14.70	24.20	53.20	103	171	236	350	495	676	1160
90 SR ELBOW	STD WT			0.11	0.18	0.25	0.44	0.69	1.36	2.56	4.32	6.63	12.40	23.60	34.60	45.30	59.10	75.10	93.10	135.00
	XS			0.14	0.23	0.33	0.60	1.19	1.83	3.58	6.09	10.00	20.30	31.80	45.80	60.00	78.30	100.00	124.00	179.00
	Sch160			0.17	0.28	0.43	0.89	1.49	2.55	5.35	9.79	16.20	35.50	68.60	114.00	158.00	234.00	300.00	451.00	773.00
45 LR ELBOW	STD WT	0.04	0.05	0.08	0.13	0.19	0.22	0.69	1.02	1.92	3.24	4.97	10.10	17.70	26.00	34.00	44.50	56.50	70.00	101.00
	XS	0.05	0.07	0.10	0.18	0.25	0.45	0.90	1.37	2.68	4.57	7.50	15.30	23.90	34.40	45.00	59.00	75.50	93.00	134.00
	Sch160			0.13	0.21	0.33	0.67	1.17	1.92	4.01	7.35	12.10	26.60	51.50	85.50	118.00	175.00	247.00	338.00	580.00
180 BEND SR	STD WT			0.21	0.35	0.49	0.87	1.82	2.71	5.11	8.64	13.30	26.80	47.20	71.90					
	Xs			0.26	0.46	0.66	1.19	2.38	3.65	7.15	12.20	20.11	40.70	74.90	94.90					
	Sch160																			
180 BEND LR	STD WT	0.16	0.21	0.31	0.52	0.74	1.30	2.73	4.07	7.67	13.00	19.19	40.30	70.80	112.00					
	XS	0.30	0.31	0.41	0.70	1.02	1.88	3.56	5.74	15.76	19.39	31.98	64.33	99.66	144.96					
	Sch160																			
EQUAL TEE	STD WT	0.20	0.20	0.30	0.60	1.00	1.50	2.50	3.50	5.70	9.10	13.60	25.00	41.00	57.00	73.00	91.00	135.00	168.00	240.00
	XS	0.20	0.30	0.40	0.80	1.10	1.70	3.00	4.30	7.30	11.80	19.00	33.50	54.00	77.00	93.00	120.00	190.00	245.00	350.00
	Sch160	0.12	0.21	0.41	0.69	1.07	1.78	2.86	4.55	8.50	14.80	23.30	47.20	88.00	143.00	186.00	260.00	356.00	502.00	800.00
CON & ECC REDUCER	STD WT	0.10	0.10	0.10	0.20	0.30	0.40	0.70	0.90	1.60	2.70	3.90	5.90	10.00	15.00	28.00	35.00	40.00	61.00	77.00
	XS	0.10	0.10	0.20	0.20	0.30	0.50	0.90	1.30	2.20	3.80	5.40	8.60	14.00	20.00	37.00	45.00	53.00	82.00	95.00
	Sch160			0.19	0.25	0.43	0.75	1.20	1.71	3.00	5.59	8.53	15.00	27.50	44.60	88.50	121.00	165.00	233.00	
CAPS	STD WT	0.04	0.06	0.11	0.14	0.17	0.24	0.42	0.67	1.17	1.90	2.83	5.11	8.92	12.10	15.90	20.00	25.50	31.80	45.40
	XS	0.05	0.07	0.15	0.20	0.24	0.33	0.57	0.92	1.67	2.73	4.38	7.91	12.20	17.40	21.20	26.70	34.10	45.50	60.10
	Sch160	0.06	0.09	0.20	0.25	0.35	0.54	0.77	1.40	2.76	4.85	7.81	15.20	28.90	47.70	61.20	92.80	131.00	179.00	307.00



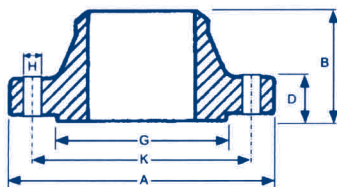
BLIND (BLD)



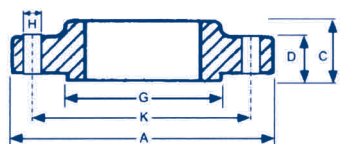
SOCKET WELD (SW)



THREADED (THD)



WELD NECK (WN)



SLIP-ON WELD (SOW)

NOMINAL SIZE

CLASS 150 (PN20)		15	20	25	32	40	50	65	80	100	125	150#	200#	250	300	350	400	450	500	600
OD	A	90	100	110	120	130	150	180	190	230	255	280	345	405	485	535	600	635	700	815
MIN THICK*	D	11.5	13.0	14.5	16.0	17.5	19.5	22.5	24.0	24.0	24.0	25.5	29.0	30.5	32.0	35.0	37.0	40.0	43.0	48.0
HUB LENGTH**	C	16	16	17	21	22	25	29	30	33	36	40	44	49	56	57	64	68	73	83
HUB LENGTH W/N	B	48	52	56	57	62	64	70	70	76	89	89	102	102	114	127	127	140	145	152
PCD	K	60.5	70.0	79.5	89.0	98.5	120.5	139.5	152.5	190.5	216.0	241.5	298.5	362.0	432.0	476.0	540.0	578.0	635.0	749.5
BOLT HOLE DIA	H	16	16	16	16	16	20	20	20	20	22	22	22	26	26	30	30	33	33	36
No BOLTS		4	4	4	4	4	4	4	4	8	8	8	8	12	12	12	16	16	20	20
WEIGHT Kg***		0.5	0.7	1.0	1.1	1.4	2.2	3.8	4.1	5.9	6.1	8.2	12.7	17.2	27.2	35.4	42.2	52.6	65.3	91.6
WEIGHT Kg W/N		0.8	0.9	1.1	1.4	1.8	2.8	4.4	5.2	7.5	9.5	11.3	19.1	25.4	38.1	51.3	63.5	74.9	89.4	121.7
WEIGHT Kg BLIND		0.9	0.9	0.9	1.4	1.8	2.3	3.2	4.1	7.7	9.1	12.0	21.4	30.5	50.6	63.0	85.0	99.0	129.0	190.0

CLASS 300 (PN50)		15	20	25	32	40	50	65	80	100	125	150#	200#	250	300	350	400	450	500	600
OD	A	95	120	125	135	155	165	190	210	255	280	320	380	445	520	585	650	710	775	915
MIN THICK*	D	14.5	16.0	17.5	19.5	21.0	22.5	25.5	29.0	32.0	35.0	37.0	41.5	48.0	51.0	54.0	57.5	60.5	63.5	70.0
HUB LENGTH**	C	22	25	27	27	30	33	38	43	48	51	52	62	67	73	76	83	89	95	106
HUB LENGTH W/N	B	52	57	62	65	68	70	76	79	86	98	98	111	117	130	143	146	159	162	168
PCD	K	66.5	82.5	89.0	98.5	114.5	127.0	149.0	168.5	200.0	235.0	270.0	330.0	387.5	451.0	514.5	571.5	628.5	686.0	813.0
BOLT HOLE DIA	H	16	20	20	20	22	20	22	22	22	22	22	26	30	33	33	36	36	36	42
No BOLTS		4	4	4	4	4	8	8	8	8	8	12	12	16	16	20	20	24	24	24
WEIGHT Kg***		0.7	1.3	1.4	2.0	2.8	3.1	4.5	6.1	9.5	12.7	16.3	25.4	35.4	50.8	72.2	95.3	114.9	139.4	222.3
WEIGHT Kg W/N		0.9	1.4	1.8	2.3	3.1	3.7	5.6	8.2	11.8	16.3	20.0	32.2	45.4	64.4	93.5	113.1	138.4	167.5	235.6
WEIGHT Kg BLIND		0.9	1.4	1.8	2.7	3.2	3.6	5.5	7.3	12.7	16.8	21.8	35.9	55.0	83.0	110.0	143.0	188.0	234.0	364.0

CLASS 600 (PN100)		15	20	25	32	40	50	65	80	100	125	150#	200#	250	300	350	400	450	500	600
OD	A	95	120	125	135	155	165	190	210	275	330	355	420	510	560	605	685	745	815	940
MIN THICK*	D	14.5	16.0	17.5	21.0	22.5	26.5	29.0	32.0	38.5	44.5	48.0	55.5	63.5	66.5	70.0	76.5	83.0	89.0	102.0
HUB LENGTH**	C	22	25	27	29	32	37	41	46	54	60	67	76	86	92	94	106	117	127	140
HUB LENGTH W/N	B	52	57	62	67	70	73	79	83	102	114	117	133	152	156	165	178	184	190	203
PCD	K	66.5	82.5	89.0	98.5	114.5	127.0	149.0	168.5	216.0	267.0	292.0	349.0	432.0	489.0	527.0	603.0	654.0	724.0	838.0
BOLT HOLE DIA	H	16	20	20	20	22	20	22	22	26	30	30	33	36	36	39	42	45	45	52
No BOLTS		4	4	4	4	4	8	8	8	8	8	12	12	16	20	20	20	20	24	24
WEIGHT Kg***		0.9	1.4	1.6	2.0	3.0	3.6	5.5	6.8	15.0	28.6	36.3	44.0	80.4	97.6	117.6	166.2	216.1	277.9	397.7
WEIGHT Kg W/N		1.4	1.6	1.8	2.5	3.6	4.5	6.4	8.2	16.8	30.9	38.1	50.6	85.8	102.6	157.5	218.4	252.0	313.3	443.6
WEIGHT Kg BLIND		0.9	1.4	1.8	2.7	3.6	4.6	6.8	9.1	18.6	30.9	39.1	63.0	105.0	134.0	172.0	240.0	302.0	389.0	534.0

* MINIMUM THICKNESS INCLUDING RAISED FACE BUT EXCLUDING HUB OR WELD NECK

** HUB LENGTH FOR SLIP ON SCREWED & SOCKET WELD FLANGES

*** APPROXIMATE WEIGHT FOR SLIP ON SOCKET WELD & SCREWED

OD OF PIPE MUST BE NOMINATED

Call (02) 4274 0313 • Fax (02) 4276 2414

NOMINAL SIZE

CLASS 900 (PN150)	15	20	25	32	40	50	65	80	100	125	150 [#]	200 [#]	250	300	350	400	450	500	600
OD A	USE CLASS 1500 DIMENSIONS							240	295	350	380	470	545	610	640	705	785	855	1040
MIN THICK* D	USE CLASS 1500 DIMENSIONS							38.5	44.5	51.0	56.0	63.5	70.0	79.5	86.0	89.0	102.0	108.0	140.0
HUB LENGTH** C	USE CLASS 1500 DIMENSIONS							54	70	79	86	102	108	117	130	133	152	159	203
HUB LENGTH W/N B	USE CLASS 1500 DIMENSIONS							102	114	127	140	162	184	200	213	216	229	248	292
PCD K	IN THESE SIZES							190.5	235.0	279.5	317.5	393.5	470.0	533.5	559.0	616.0	686.0	749.5	901.5
BOLT HOLE DIA H	IN THESE SIZES							26	32	35	32	39	39	39	42	45	52	54	68
No BOLTS	IN THESE SIZES							8	8	8	12	12	16	20	20	20	20	20	20
WEIGHT Kg***	IN THESE SIZES							14.1	24.1	37.7	49.0	78.1	111.2	148.0	172.5	208.4	293.7	359.6	671.9
WEIGHT Kg W/N	IN THESE SIZES							13.2	23.2	39.0	49.9	84.9	121.7	168.9	255.2	311.0	419.5	528.5	956.6
WEIGHT Kg BLIND	IN THESE SIZES							14.0	24.6	39.6	51.0	90.0	132.0	188.0	225.0	281.0	400.0	503.0	954.0

CLASS 1500 (PN250)	15	20	25	32	40	50	65	80	100	125	150 [#]	200 [#]	250	300	350	400	450	500	600
OD A	120	130	150	160	180	215	245	270	310	375	395	485	585	675	750	825	915	985	1170
MIN THICK* D	22.5	25.5	29.0	29.0	32.0	38.5	41.5	48.0	54.0	73.5	83.0	92.0	108.0	124.0	133.5	146.5	162.0	178.0	203.5
HUB LENGTH** C	32	35	41	41	44	57	64	73	90	105	119	143	159	181					
HUB LENGTH W/N B	60	70	73	73	83	102	105	113	124	155	171	213	254	283	298	311	327	356	406
PCD K	82.5	89.0	101.5	111.0	124.0	165.0	190.5	203.0	241.5	292.0	317.5	393.5	482.5	571.5	635.0	705.0	774.5	832.0	990.5
BOLT HOLE DIA H	22	22	26	26	30	26	30	33	36	42	39	45	52	56	60	68	76	80	94
No BOLTS	4	4	4	4	4	8	8	8	8	8	12	12	12	16	16	16	16	16	16
WEIGHT Kg***	2.7	2.7	3.4	4.5	6.4	10.0	16.3	21.8	33.3	59.9	74.5	117.1	197.9	302.8					
WEIGHT Kg W/N	3.2	3.2	3.9	4.5	6.4	10.9	16.3	21.8	31.3	59.9	74.5	123.9	206.1	313.3					
WEIGHT Kg BLIND	1.8	2.7	4.1	4.6	6.4	11.4	15.9	21.8	33.2	65.0	72.0	137.0	230.0	352.0					

* MINIMUM THICKNESS INCLUDING RAISED FACE BUT EXCLUDING HUB OR WELD NECK

** HUB LENGTH FOR SLIP ON, SCREWED & SOCKET WELD FLANGES

*** APPROXIMATE WEIGHT FOR SLIP ON, SOCKET WELD & SCREWED

OD OF PIPE MUST BE NOMINATED

TEMPERATURE PRESSURE RATINGS

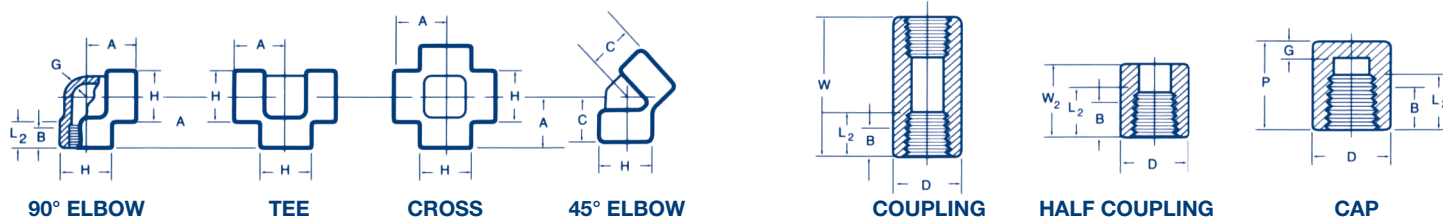
CARBON STEEL PIPE FLANGES TO ASME B16.5 (BS. 1560) FORGINGS TO ASTM A105 -Not recommended for prolonged use above 427°C FORGINGS TO ASTM A350-LF2 -Not to be used above 343°C					
TEMPERATURE IN °C	MAXIMUM WORKING PRESSURE IN kPa BY PN				
	PN20	PN50	PN100	PN150	PN250
	CLASS 150	CLASS 300	CLASS 600	CLASS 900	CLASS 1500
-29 to 38	1960	5110	10210	15320	25530
50	1920	5010	10020	15020	25040
100	1770	4640	9280	13910	23190
150	1580	4520	9050	13570	22610
200	1400	4380	8760	13150	21910
250	1210	4170	8340	12520	20860
300	1020	3870	7750	11620	19370
350	840	3700	7390	11090	18480
375	740	3650	7290	10940	18230
400	650	3450	6900	10350	17250
425	560	2880	5750	8630	14380
450	470	2000	4010	6010	10020
475	370	1350	2710	4060	6770
500	280	880	1760	2640	4400
525	190	520	1040	1550	2590
540	130	330	650	980	1630

FLANGES ABOVE DN 600 ARE NOT INCLUDED IN ASME B16.5 AND THE CLASS DESIGNATIONS IN THESE

LARGE DIAMETERS **DO NOT IMPLY** SPECIFIC TEMPERATURE/PRESSURE RATINGS.

FORGED STEEL HIGH PRESSURE FITTINGS TO ASME 816.11

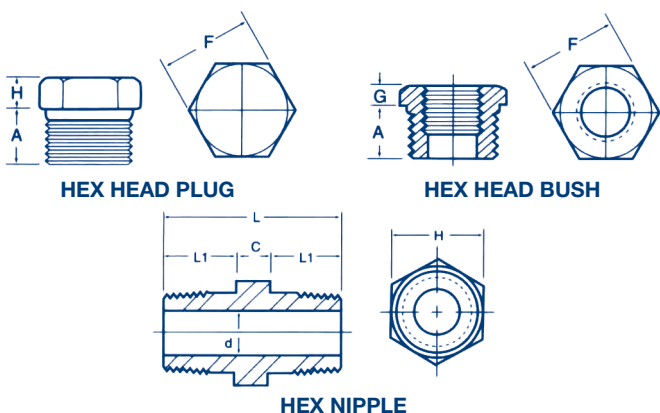
SCREWED ELBOWS, TEES, CROSSES, CAPS & COUPLINGS



SCREWED NPT ELBOW, TEE, CROSS, CAP & COUPLING Dimensions in mm

SIZE	CENTRE TO END A 90 ELBOW, TEE & CROSS		CENTRE TO END C 45 ELBOW		OD OF BAND H		MIN WALL THICKNESS G		THREAD LENGTH MIN		END TO END W	END TO END W2	END TO END P CAPS		OUTSIDE DIAMETER D COUPLING, CAP		END THICKNESS G MIN CAP	
	CLASS		CLASS		CLASS		CLASS		B	L2	3000 & 6000	3000 & 60000	CLASS		CLASS		CLASS	
	3000	6000	3000	6000	3000	6000	3000	6000					3000	6000	3000	6000	3000	6000
6	21	25	17	19	22	25	3.18	6.35	6.4	6.7	32	16	19	16	22	4.8		
8	25	28	19	22	25	33	3.30	6.60	8.1	10.2	35	17	25	27	19	25	4.8	6.4
10	28	33	22	25	33	38	3.51	6.98	9.1	10.4	38	19	25	27	22	32	4.8	6.4
15	33	38	25	28	38	46	4.09	8.15	10.9	13.6	48	24	32	33	28	38	6.4	7.9
20	38	44	28	33	46	56	4.32	8.53	12.7	13.9	51	25	37	38	35	44	6.4	7.9
25	44	51	33	35	56	62	4.98	9.93	14.7	17.3	60	30	41	43	44	57	9.7	11.2
32	51	60	35	43	62	75	5.28	10.59	17.0	18.0	67	33	44	46	57	64	9.7	11.2
40	60	64	43	44	75	84	5.56	11.07	17.8	18.4	79	39	44	48	64	76	11.2	12.7
50	64	83	44	52	84	102	7.14	12.09	19.0	19.2	86	43	48	51	76	92	12.7	15.7
65	83	95	52	64	102	121	7.65	15.29	23.6	28.9	92	46	60	64	92	108	15.7	19.0
80	95	106	64	79	121	146	8.84	16.64	25.9	30.5	108	54	65	68	108	127	19.0	22.4
100	114	114	79	79	152	152	11.18	18.67	27.7	33.0	121	60	68	75	140	159	22.4	28.4

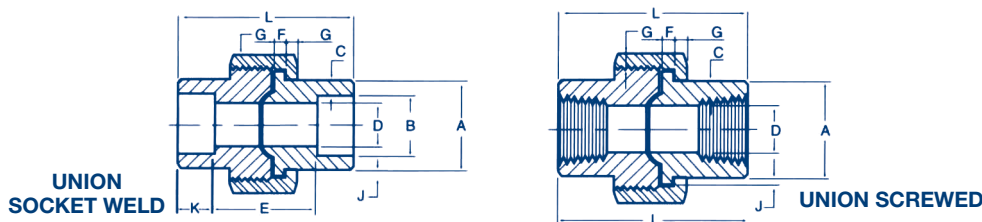
SCREWED, HEX PLUGS, BUSHES & NIPPLES



SCREWED NPT HEX PLUGS, BUSHES & NIPPLES Dimensions mm

SIZE	MIN LENGTH A	PLUGS & BRUSHES			HEX NIPPLES				
		WIDTH FLATS F	HEX HEIGHT		C	L1	L	d	H
			BRUSH G	PLUG H					
6	10	11		6	6.0	10	26	4.0	12.0
6	11	16	3	6	8.0	14	36	6.7	17.0
10	13	18	4	8	8.0	14	36	8.9	19.0
15	14	22	5	8	9.0	19	47	11.9	24.0
20	16	27	6	10	10.0	19	48	16.0	30.0
25	19	36	6	10	11.0	24	59	20.1	35.0
32	21	46	7	14	12.0	24	60	27.9	46.0
40	21	50	8	16	14.0	24	62	32.0	50.0
50	22	65	9	18	16.0	26	68	39.9	65.0
65	27	75	10	19	18.0	38	94	55.1	80.0
80	28	90	10	21	20.0	40	100	65.0	95.0
100	32	115	13	25	24.5	40	105	85.0	125.5

NOTE: Hex head bushes of one size reduction should not be used in services wherein they might be subject to harmful loads and forces other than internal pressures.

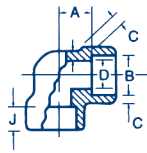


UNIONS TO TO MSS-SP-83 1995 Dimensions mm

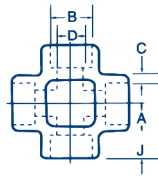
SIZE	COMMON DIMENSIONS					SOCKET WELD DIMENSIONS					SCRD DIMENSIONS	
	BORE D MAX/MIN	MALE FLANGE F MIN	NUT G MIN	BEARING J MIN	LENGTH L	END A MIN	BORE B MAX	WALL C MIN	LAY Lth E MAX	SOCKET K MIN	END A MIN	WALL C MIN
6	6.83 / 6.43	3.17	3.17	1.24	41.40	21.80	10.92	3.17	22.40	9.60	14.70	2.41
8	9.85 / 9.45	3.17	3.17	1.24	41.40	21.80	14.22	3.30	22.40	9.60	19.00	3.02
10	13.92 / 3.51	3.43	3.43	1.37	46.00	25.90	17.78	3.48	26.90	9.60	22.90	3.20
15	17.47 / 17.07	3.68	3.68	1.50	49.00	31.20	21.84	4.06	26.90	9.60	27.70	3.73
20	21.79 / 21.39	4.06	4.06	1.68	56.90	31.10	27.18	4.27	31.80	12.70	33.50	3.91
25	28.14 / 27.74	4.57	4.44	1.85	62.00	45.50	34.04	4.95	34.30	12.70	41.40	4.55
32	35.76 / 35.36	5.33	5.21	2.13	71.10	54.90	42.67	5.28	40.60	12.70	50.50	4.85
40	41.61 / 41.20	5.84	5.59	2.31	76.50	61.50	48.77	5.54	42.20	12.70	57.20	5.08
50	52.53 / 52.12	6.60	6.35	2.69	86.10	75.20	61.47	6.05	45.50	15.80	70.10	5.54
65	64.72 / 64.31	7.49	7.11	3.07	102.40	91.70	74.17	7.65	61.70	15.80	85.30	7.01
80	77.67 / 77.27	8.25	8.00	3.53	109.00	109.20	90.17	8.31	63.80	15.80	102.40	7.62

Call (02) 4274 0313 • Fax (02) 4276 2414

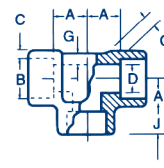
SOCKET WELD



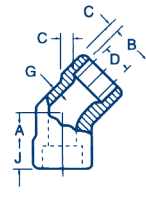
90° ELBOW



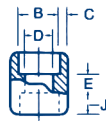
CROSS



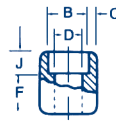
TEE



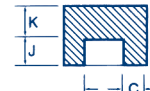
45° ELBOW



COUPLING



HALF COUPLING



CAP

SOCKET WELD FITTINGS Dimensions in mm

SIZE	BORE		BORE		SOCKET WALL		BODY WALL		SOCKET DEPTH J MIN	CENTRE TO BOTTOM OF SOCKET A				LAYING LENGTH		END WALL	
	B	D MAX/MIN CLASS	C MIN CLASS	G MIN CLASS	90 ELBOWS, TEES CROSSES CLASS		45 ELBOWS CLASS			COUPLING E	HALF COUPLING F	THICKNESS K MIN CLASS					
					3000	6000	3000	6000				3000	6000				
6	11.2/10.8	7.6/6.1	4.8/3.2	3.18	3.43	2.41	3.15	9.5	11.00	11.00	8.00	8.00	6.5	16.0	4.8	6.4	
8	14.6/14.2	10.0/8.5	7.1/5.6	3.30	4.01	3.02	2.68	9.5	11.00	13.50	8.00	8.00	6.5	16.0	4.8	6.4	
10	18.0/17.6	13.3/11.8	9.9/8.4	3.50	4.37	3.20	4.01	9.5	13.50	15.50	8.00	11.00	6.5	17.5	4.8	6.4	
15	22.2/21.8	16.6/15.0	12.5/11.0	4.09	5.18	3.73	4.78	9.5	15.50	19.00	11.00	12.50	9.5	22.5	6.4	7.9	
20	27.6/27.2	21.7/20.2	16.3/14.8	4.27	6.04	3.91	5.56	12.5	19.00	22.50	13.00	14.00	9.5	24.0	6.4	7.9	
25	34.3/33.9	27.4/25.9	21.5/19.9	4.98	6.93	4.55	6.35	12.5	22.50	27.00	14.00	17.00	12.5	28.5	9.6	11.2	
32	43.1/42.7	35.8/34.3	30.2/28.7	5.28	6.93	4.85	6.35	12.5	27.00	32.00	17.50	20.50	12.5	30.0	9.6	11.2	
40	49.2/48.8	41.6/40.1	34.7/33.2	5.54	7.80	5.08	7.14	12.5	23.00	38.00	20.50	25.50	12.5	32.0	11.2	12.7	
50	61.7/61.2	53.3/51.7	43.6/42.1	6.04	9.50	5.54	8.74	16.0	38.00	41.00	25.50	28.50	19.0	41.0	12.7	15.7	
65	74.4/73.9	64.2/61.2		7.67		7.01		16.0	41.00		28.50		19.0	43.0	15.7	19.0	
80	90.3/89.8	79.4/76.4		8.30		7.62		16.0	57.00		32.00		19.0	44.5	19.0	22.4	
100	115.7/115.2	103.8/100.7		9.35		8.56		19.0	66.50		41.00		19.0	48.0	22.4	28.4	

APPROXIMATE WEIGHT 3000 LB FITTINGS Kg

SIZE	BUSH	PLUG	90 ELBOW	45 ELBOW	TEE	UNION	HEX NIPPLE	COUPLING	HALF COUPLING	CAPS
6		0.01	0.10	0.08	0.13	0.28	0.03	0.05	0.04	0.04
8	0.01	0.03	0.14	0.12	0.13	0.28	0.04	0.05	0.04	0.04
10	0.01	0.05	0.27	0.24	0.38	0.28	0.05	0.06	0.09	0.05
15	0.03	0.07	0.41	0.34	0.56	0.31	0.09	0.13	0.16	0.11
20	0.05	0.14	0.72	0.54	0.84	0.57	0.15	0.19	0.20	0.18
25	0.09	0.22	1.03	0.92	1.70	10.3	0.27	0.39	0.43	0.35
32	0.25	0.44	1.31	0.97	7.95	1.51	0.45	0.69	0.53	0.60
40	0.34	0.59	2.21	1.84	3.18	2.43	0.62	0.99	0.91	0.70
50	0.45	1.03	2.47	1.93	3.63	2.43	1.03	1.19	1.70	1.06
65	0.60	1.80	4.53	3.46	6.24	3.48	1.51	2.07	2.10	1.84
80	1.16	2.60	7.77	5.44	9.53	5.25	2.22	3.08	3.05	2.65
100	3.20	5.20	13.27	8.96	17.24	12.00	4.00	5.44	5.02	4.57

WORKING PRESSURES

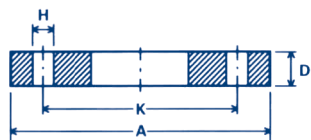
Possible Temperature Limitations

Nominal Pressure Ratings	TEMPERATURE °C																		
	38	66	93	121	149	177	204	232	260	288	316	343	371	399	427	427*	428*	510*	*538*
2000lb	13780	13573	13366	13194	13056	12918	12746	12470	11954	11299	10610	9852	8991	8130	6993	5718	4237	2928	1619
3000lb	20670	20359	20084	19808	19602	19360	19119	18706	17948	16949	15915	14813	13504	12229	10507	8612	6373	4409	2445
6000lb	41340	40754	40168	39617	39232	38756	38239	37412	37142	33933	31831	29627	27008	24459	21014	17225	12780	8853	4926

Non-shock Working Pressures tabulated in kPa

+ These pressures are in accordance with ANSI Code for Pressure Piping (ASME 831.1)

* Suggest Alloy Steel above 482°C.



SLIP-ON WELD



BLIND

NOMINAL SIZE

TABLE D		15	20	25	32	40	50	65	80	100	125	150 [#]	200 [#]	250	300	350	400	450	500	600
THICKNESS*	D	5	5	5	6	6	8	8	10	10	13	13	13	16	19	22	22	25	29	32
O D	A	95	100	115	120	135	150	165	185	215	255	280	335	405	455	525	580	640	705	825
PCD	K	67	73	83	87	98	114	127	146	178	210	235	292	356	406	470	521	584	641	756
No BOLTS		4	4	4	4	4	4	4	4	8	8	8	8	8	12	12	12	12	16	16
BOLT SIZE	H	M12	M12	M12	M12	M12	M16	M16	M16	M16	M16	M16	M16	M20	M20	M24	M24	M24	M24	M27
BOLT LENGTH***		45	45	45	50	50	60	60	60	65	65	65	70	75	85	100	95	100	110	120
WEIGHT SOW Kg		0.3	0.3	0.4	0.5	0.6	0.9	1.1	1.6	2.1	3.7	4.1	5.1	8.8	11.9	20.2	23.1	30.7	42.4	60.2
BLD Kg		0.28	0.31	0.41	0.54	0.68	1.12	1.36	2.14	2.89	5.28	6.36	9.11	16.39	24.56	37.86	46.21	63.94	90.00	136.00

TABLE E		15	20	25	32	40	50	65	80	100	125	150 [#]	200 [#]	250	300	350	400	450	500	600
THICKNESS*	D	6	6	7	8	9	10	10	11	13	14	17	19	22	25	29	32	35	38	48
O D	A	95	100	115	120	135	150	165	185	215	255	280	335	405	455	525	580	640	705	825
PCD	K	67	73	83	87	98	114	127	146	178	210	235	292	356	406	470	521	584	641	756
No BOLTS		4	4	4	4	4	4	4	4	8	8	8	8	12	12	12	12	15	16	16
BOLT SIZE	H	M12	M12	M12	M12	M12	M16	M16	M16	M16	M16	M20	M20	M20	M24	M24	M24	M24	M24	M30
BOLT LENGTH***		45	45	45	50	50	60	60	60	65	65	70	75	75	90	100	95	100	110	140
WEIGHT SOW Kg		0.3	0.4	0.5	0.6	0.9	1.2	1.3	1.8	2.7	3.9	5.3	7.5	12.1	15.6	26.6	33.6	42.9	55.5	90.3
BLD Kg		0.34	0.37	0.58	0.72	1.02	1.40	1.70	2.35	3.75	5.58	8.32	13.31	22.53	32.32	49.91	67.22	89.50	117.93	204.00

TABLE H		15	20	25	32	40	50	65	80	100	125	150 [#]	200 [#]	250	300	350	400	450	500	600
THICKNESS*	D	13	13	14	17	17	19	19	22	25	29	29	32	35	41	48	54	60	67	76
O D	A	115	115	120	135	140	165	185	205	230	280	305	370	430	490	550	610	675	735	850
PCD	K	83	83	87	98	105	127	146	165	191	235	260	342	381	438	495	552	610	673	781
No BOLTS		4	4	4	4	4	4	8	8	8	8	12	12	12	16	16	20	20	24	24
BOLT SIZE	H	M16	M16	M16	M16	M16	M16	M16	M16	M16	M20	M20	M20	M24	M24	M27	M27	M30	M30	M33
BOLT LENGTH***		60	60	60	65	65	75	75	75	85	100	100	100	120	120	130	140	160	150	180
WEIGHT SOW Kg		1.0	1.0	1.2	1.7	1.8	2.8	3.4	4.7	6.2	10.6	11.8	17.6	23.7	34.1	52.1	68.7	90.8	115.9	162.9
BLD Kg		1.01	1.07	1.26	1.93	2.08	3.23	4.06	5.77	8.26	14.31	16.84	27.35	40.41	61.47	90.66	125.47	170.7	226.00	343.00

PN16		15	20	25	32	40	50	65	80	100	125	150 [#]	200 [#]	250	300	350	400	450	500	600
THICKNESS*	D	14	16	16	16	16	18	18	20	20	22	22	24	28	28	30	32	36	36	44
O D	A	95	105	115	140	150	165	185	200	220	250	285	340	405	460	520	580	640	715	840
PCD	K	65	75	85	100	110	125	145	160	180	210	240	295	355	410	470	525	585	650	770
No BOLTS		4	4	4	4	4	4	4	8	8	8	8	12	12	12	16	16	20	20	20
BOLT SIZE	H	M12	M12	M12	M16	M16	M16	M16	M16	M16	M16	M20	M20	M20	M24	M24	M27	M27	M30	M33
BOLT LENGTH***		50	55	55	60	60	65	65	70	75	80	90	90	100	100	120	120	120	130	140
WEIGHT SOW Kg		0.7	1.0	1.2	1.7	1.9	2.4	3.2	4.1	4.4	5.0	7.3	9.3	10.1	14.5	24.5	28.8	31.0	42.8	53.5
BLD Kg		0.8	1.1	1.3	2.0	2.3	3.1	3.9	4.6	5.6	8.1	11.2	17.3							

* THICKNESS OF PLATE FLANGE NOTE IT IS NOT PRACTICAL TO PROVIDE PLATE FLANGES LESS THAN 12mm THICK

OD OF PIPE MUST BE NOMINATED

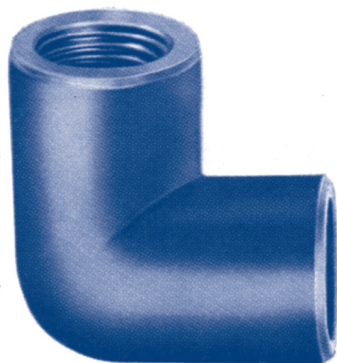
*** LENGTHS OF BOLTS FOR PLATE STEEL FLANGES

AS FLANGES TEMPERATURE PRESSURE RATINGS

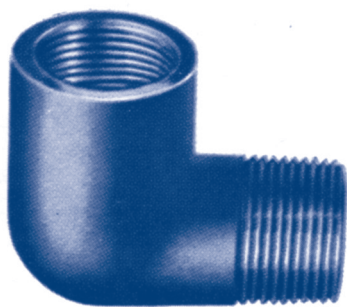
TEMPERATURE C	-50 to 232	250	275	300	325	350	375	400	425	450	475	MAX HYDROSTATIC TEST kPa
	PRESSURE kPa											
TABLE D	700	650	600	570	550	500	450	400	350			1050
TABLE E	1400	1300	1200	1100	1000	950	900	800	700			2100
TABLE F	2100	2000	1800	1700	1600	1400	1300	1200	1000			3150
TABLE H	3500	3300	3100	2900	2600	2400	2200	2000	1700	1300	900	5250

NOTE PLATE FLANGES MUST NOT BE USED ON PRESSURE VESSELS -CERTIFIED BOILER PLATE FLANGES MUST BE USED

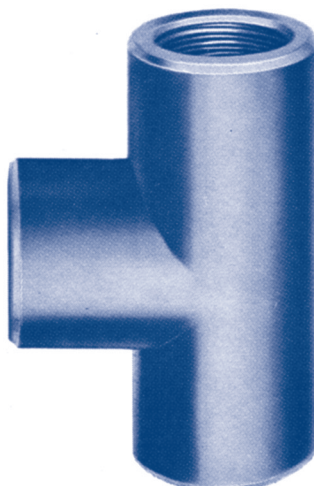
Call (02) 4274 0313 • Fax (02) 4276 2414



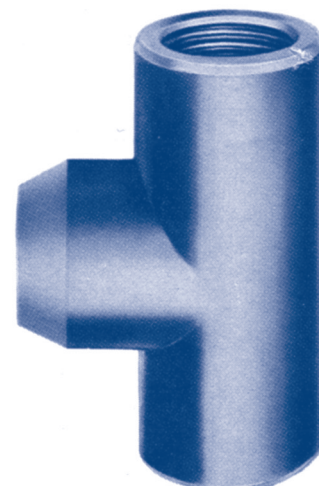
ELBOW 'F. & F.'



ELBOW 'M. & F.'



TEE 'F'



TEE 'F' REDUCING

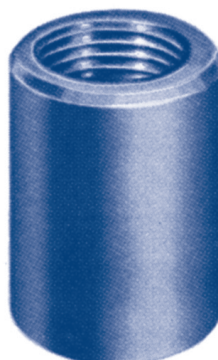
Elbows, 'F. & F.'	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4
Elbows, 'M. & F.'	-	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	-
Tees, 'F.'	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4
Tees, 'F.' Reducing	3/8 x 1/4	1/2 x 1/4	1/2 x 3/8	3/4 x 3/8	3/4 x 1/2	1 x 1/2	1 x 3/4	1 1/4 x 1	1 1/2 x 3/4	1 1/2 x 1	1 1/2 x 1 1/4	2 x 1 1/2
	2 x 3/4	2 x 1	2 x 1 1/4	2 x 1 1/2	2 1/2 x 1 1/2	2 1/2 x 2	3 x 2	3 x 2 1/2	4 x 2	4 x 3	-	-



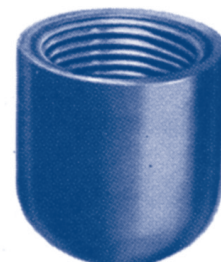
ADAPTOR



SOCKET REDUCING



SOCKET



CAP

Adaptor B.S.P. to B.S.P. or N.P.T. to B.S.P.	-	1/4	3/8	1/2	3/4	1	-	-	-	-	-	-	-	
Sockets Reducing	1/4 x 1/8	3/8 x 1/4	1/2 x 1/4	1/2 x 3/8	3/4 x 1/4	3/4 x 3/8	3/4 x 1/2	1 x 1/4	1 x 3/8	1 x 1/2	1 x 3/4	1 1/4 x 3/4	1 1/4 x 1	1 1/2 x 3/4
	1 1/2 x 1	1 1/2 x 1 1/4	2 x 3/4	2 x 1	2 x 1 1/4	2 x 1 1/2	2 1/2 x 1 1/2	2 1/2 x 2	3 x 1	3 x 2	3 x 2 1/2	4 x 2	4 x 2 1/2	4 x 3
Sockets	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	-	-	-
Caps	-	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	-	-



UNION 'M. & F.'



UNION 'F. & F.'

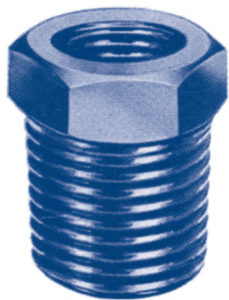


NIPPLE HEX. REDUCING



NIPPLE HEX.

Unions, 'M. & F.'	–	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4
	All available in Steel to Steel or Steel to Bronze or Bronze to Bronze Seats											
Unions, 'F. & F.'	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4
	All available in Steel to Steel or Steel to Bronze or Bronze to Bronze Seats											
Nipples, Hex. Reducing	1/4 x 1/8	3/8 x 1/8	3/8 x 1/4	1/2 x 1/4	1/2 x 3/8	3/4 x 3/8	3/4 x 1/2	1 x 1/2	1 x 3/4	1 1/4 x 3/4	1 1/4 x 1	1 1/2 x 3/4
	1 1/2 x 1	1 1/2 x 1 1/4	2 x 3/4	2 x 1	2 x 1 1/4	2 x 1 1/2	2 1/2 x 1 1/2	2 1/2 x 2	3 x 2	3 x 2 1/2	4 x 2	4 x 3
Nipples, Hex.	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4



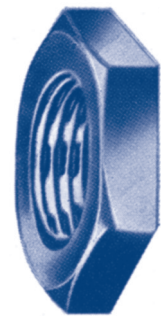
BRUSH HEX.



PLUG HEX.



PLUG SQUARE



BACK NUT

Bushes, Hex.	1/4 x 1/8	3/8 x 1/8	3/8 x 1/4	1/2 x 1/4	1/2 x 3/8	3/4 x 1/4	3/4 x 3/8	3/4 x 1/2	1 x 1/4	1 x 3/8	1 x 1/2	1 x 3/4	1 1/4 x 1/2	1 1/4 x 3/4	1 1/4 x 1	–
	1 1/2 x 1 1/2	1 1/2 x 3/4	1 1/2 x 1	1 1/2 x 1 1/4	2 x 1 1/2	2 x 3/4	2 x 1	2 x 1 1/4	2 x 1 1/2	2 1/2 x 1 1/2	2 1/2 x 2	3 x 2	3 x 2 1/2	4 x 2	4 x 2 1/2	4 x 3
Plugs, Hex.	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	–	–	–	–
Plugs, Square.	1/8	1/4	3/8	1/2	3/4	–	–	–	–	–	–	–	–	–	–	–
Back Nuts	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	–	–	–	–	–	–	–

Call (02) 4274 0313 • Fax (02) 4276 2414

USEFUL CONVERSION FACTORS - IMPERIAL TO METRIC

"SI" denotes the INTERNATIONAL SYSTEM of Metric Units adopted in Australia

MULTIPLY COLUMN "A" BY COLUMN "B" TO OBTAIN "C"

THIS TABLE MAY BE USED IN TWO WAYS:

ALTERNATIVELY

DIVIDE COLUMN "C" BY COLUMN "B" TO OBTAIN COLUMN "A"

REMARKS	A MULTIPLY	B BY	C TO OBTAIN	REMARKS	A MULTIPLY	B BY	C TO OBTAIN
AREA : Symbol m² The SI unit of AREA is the SQUARE METER	Square inches Square feet Square yards Acre Hectare (ha)	645.16 0.929 0.836 4047 10.000	mm ² m ² m ² m ² m ²	POWER : Symbol W The SI unit of POWER is the WATT	Btu per hour (Btu/hr) horsepower (hp) ton of refrigeration	0.2931 0.7457 3.517	W kW kW
DENSITY: Symbol kg/m³ The SI unit of DENSITY is the kilogram per cubic meter	lb/in ³ lb/ft ³ lb/yd ³	27.68 16.02 0.5933	t/m ³ kg/m ³ kg/m ³	PRESSURE: Symbol Pa The SI unit of PRESSURE or stress is the NEWTON PER SQUARE METRE which has been given the name PASCAL	lbf/in ² kip/in ² (1000 psi) lbf/ft ² kgf/cm ² bar Vertical column (head) of water. (h ₂₀ at 20°C) metres of water feet of water torr (vacuum) 1mm Hg (mercury) 1in Hg (mercury) atmpsphere (atm) microns	6.895 6.895 47.88 98.07 100 9.79 2.984 0.1333 0.1333 3.386 101.325 0.133	kPa MPa Pa kPa kPa kPa kPa kPa Pa
ENERGY: Symbol J The SI unit of ENERGY is the JOULE	1. ELECTRICAL ENERGY kilowatt hour (kW.h)	3.6	MJ	1N/m ² = 1Pa = 0.000145lbf/in ² A pascal is the pressure or stress which arises when a force is applied uniformly over an area of one square metre.	TORQUE: Symbol N.m (Moment of force) The SI unit of TORQUE is the NEWTON METRE. The newton metre is the work done when a force of one newton moves the point of application a distance of one metre in the direction of that force	0.4214 0.1130 1.356 3.037 9.908	J kJ KJ/L †† KJ/m ³ J J J kJ J
1 J = 1 N.m	2. HEAT ENERGY British thermal unit (Btu) Btu/gal Btu/ft ³	43155 0.2321 37.26	kJ KJ/L †† KJ/m ³	1 N.m = 1 J	VELOCITY: Symbol m/s The SI unit of VELOCITY is the METRE PER SECOND	0.4214 0.1130 1.152 1.356 13.83 3.037 9.807 0.09807	N.m N.m kgf.com N.m kgf.cm kN.m N.m N.m
A joule is the energy expended of the work done when a force of one newton moves the point of application a distance of one metre in the direction of that force.	3. MECHANICAL ENERGY <u>Foot poundal</u> ft.pdl <u>Inch pound-force</u> in.lbf <u>Foot pound-force</u> ft.lbf <u>Foot ton force</u> ft.tonf <u>Metre kilogram force</u> m.kgf	0.4214 0.1130 1.356 3.037 9.908	J J J kJ J	FORCE: Symbol N (NEWTON) The SI unit of FORCE (kg.m/s ²) has been given the special name - NEWTON The newton is the force which when applied to a body having a mass of one kilogram, causes an acceleration of one metre per second in the direction of application of the force	VOLUME: CAPACITY: Symbol m³ The SI unit of VOLUME is the CUBIC METRE	0.1383 4.448 9.964 9.807	N N Kn N
FORCE PER UNIT LENGTH: The SI unit is NEWTON PER METRE. Symbol N/m	pounds-force per inch (lbf/in) pounds-force per foot (lbf/ft) ton-force per foot (ton/ft)	175.1 14.59 32.69	N/m N/m kN/m	DRY: cubic inch (in ³) cubic foot (ft ³) cubic yard (yd ³) litre (L) †† Litre (L) †† Gallons (Imp.)	IMPERIAL LIQUID fluid ounce pint (20 fl. oz) quart (2 pints) gallon (Imp.) gallon (US) litre (water 4°C) Imp. Gallons (water 20°C)	16.87 0.02832 0.7646 1 000 000 0.001 0.004546 28.41 568.3 1.137 4.546 3.785 1.000 4.536	mm ³ m ³ m ³ mm ³ m ³ m ³ millilitre (ml) millilitre (ml) litre (L) †† litre (L) †† litre (L) †† kilogram (kg) kilogram (kg)
Length: Symbol m The SI unit of LENGTH is the METRE	inches feet yards chain mile mile	25.4 0.3048 0.9144 20.12 1609 1.609	millimeters (mm) meters (m) metres (m) metres (m) metres (m) kilometres (km)	NOTE: †† Capital "L" is now the legal Preferred symbol for litre In Australia	VOLUME: RATE OF FLOW Symbol m³/s The SI unit of VOLUME RATE OF FLOW is the CUBIC METRE PER SECOND	25.35 0.4536 14.59 1016.05 907.2 1.016	grams (g) kilograms (kg) kg kg kg tonne (t)
MASS: Symbol kg The SI unit of MASS is the KILOGRAM	ounce pound slug ton (2240 lb) short ton (2000 lb) ton (2240 lb)	25.35 0.4536 14.59 1016.05 907.2 1.016	grams (g) kilograms (kg) kg kg kg tonne (t)	VOLUME: RATE OF FLOW Symbol m³/s The SI unit of VOLUME RATE OF FLOW is the CUBIC METRE PER SECOND	Imp. gal. per minute (gal/min) Imp. gal. per minute Imp. gal. per minute cubic ft. per minute cubic ft. per minute	.0000758 0.272765 .0758 .000472 0.472	m ³ /s m ³ /s litre per second (L/s) m ³ /s litre per second (L/s) 1 m ³ = 1 kL
	pounds per foot (lb/ft) pounds per yard (lb/yd)	1.88 0.4961	kg/m kg/m	SUNDRY ITEMS	miles per gallon gallons per mile	0.3540 2.825	km per litre litres per km

TEMPERATURE

The SI unit of TEMPERATURE is the KELVIN -Symbol K

For most practical purposes of temperature measurement and most calculations involving temperatures, degrees Celsius, symbol DC will be used.

DEGREES FAHRENHEIT TO CELSIUS
(°F - 32) X 5/9 = °C

DEGREES CELSIUS TO FAHRENHEIT
(OC x 9/5) + 32 = of