

PIPESTEC

Pipeline Products Specialists

Industry products solutions for a worldwide

Products

Pipe
Flange
Butt Welding Pipe Fittings
Forged Pipe Fittings
Fasteners
Valves
Accessories



PIPESTEC INDUSTRIAL GROUP LIMITED

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Buttweld, Elbow, Lateral, Nipple, Insert Branch, Flanged Buttweld, Flanged Nipple	
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An integrated partner in the value chain

At **PIPESTEC INDUSTRIAL GROUP LIMITED** you will find an extensive range of Pipe, Valves, Flanges, Pipe Fittings, Fasteners, Gaskets and other spare parts for industrial use - more than 50 product types available in over 400 sizes and 20 materials, in fact. And our engineers work tirelessly to innovate and improve.

Quality Control and Technical Support

Supporting by our strong QC personnel, the quality of our products are always guaranteed. Our products are 100% inspected before being packed and dispatched. We also accept any Third Party of Inspection appointed by our customers, such as Lloyd's Register, TUV, DNV, BV, SGS, IEI, SAI and etc.

With a staff of 25 engineers and technical professionals, who are highly experienced in pipeline products design and are another checkpoint in our extensive quality control system. These engineers specialize in product development, research and quality control, and are a vital component of our customer technical support team.

Quality Control Procedures

Quality assurance is carried throughout the process from the raw material purchasing to processing, packing, storage and transportation. Every process strictly conforms to the ISO 9001:2008. "Quality First" is our promise forever to any of our customers.



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Qualification to TPI

For supply of pipe, flange, pipe fittings, valves and related products, it is important to ensure the quality of the material from steelmaking to finished products.

PipesTec Technical department is competent and experienced in qualifying steel mills, foundries and manufacturers according to ISO9001;2008 specification. Our people are also qualified to do this certification to meet all kind of third party inspection.

Typical products and materials

Products in stock:

- Pipe, fittings and flanges from 1/2"-64".
- Valves (Gate, Globe, Ball, Check, Butterfly).
- Fasteners.
- Mechanical joints.
- Gaskets
- Compact flanges.
- Customer Design & Special Items.

Material qualities:

- Carbon steel
 - ASTM A53/A106/API 5L/A234/A105
 - ASTM A333 /A420 /A350 LF2
 - ISO3183 L360(API 5L Gr. X52)/ASTM A860 WPHY52/A694 F52
- Stainless steel
 - ASTM A312/A269/A403/A182
 - ASTM A789/A790 /A815
 - 304/304L, 316/316L, 317/317L, 321, 347
 - S31803, S32750, S32760, F51/F53
- Alloy steel
 - ASTM A213/A335/A234/A182/B111
 - T1/P1/F1/WP1, T5/P5/F5/WP5, T9/P9/F9/WP9, T11/P11/F11/WP11, T22/P22/F22/WP22, T91/P91/F91/WP91

This is a very brief overview of our regular material, as a complete list of finished products and raw material covers more than 6000 items.

More detailed information of products and materials of pipes, fittings and flanges can be seen at the next pages.

Types of pipes, fittings and flanges in stock

Sizes and material types:

The below listed products are typical available from our stock in size range from 0.5" to 24". Larger sizes and other materials may also be available on request, but can in all cases be offered based on new production at mills.

Material properties / certification:

Material purchased to our stock are manufactured, tested and certified in accordance to specification
Typical modified requirements are indicated in tables below.
All products are certified to EN10204 type 3.1

Carbon steel - Type 235				
Product	Standard	Grade	Class	Suppl. requirement
Seamless pipe Welded pipe Wrought fitting Forging/ flange	ASTM A106 ISO 3183 (API 5L) ASTM A672 ASTM A234 ASTM A105	B L245 (B) SAWL C60, C70 WPB	PSL1 12, 22 for t>19mm	S6 S3 S4
Chemical:	C< 0.20 %; S< 0.025 %; P< 0.025 %;			
Hardness:	CE = C + Mn/6 + (Cr+Mo+V)/5 + (Cu+Ni)/15 < 0.43 NACE MR-0175/ ISO 15156 compliance			

Carbon steel - Type 235LT				
Product	Standard	Grade	Class	Suppl. requirement
Seamless pipe Welded pipe Wrought fitting Forging/ flange	ASTM A333 ASTM A671 ASTM A420 ASTM A350	6 CC60, CC70 WPL6 LF2	12, 22 for t>19mm 1	S2, S7, S14 S51, S53, S59, S69 S6, S55
Chemical:	C< 0.20 %; S< 0.025 %; P< 0.025 %; (+ additional limitations for A333 gr.6) CE = C + Mn/6 + (Cr+Mo+V)/5 + (Cu+Ni)/15 < 0.43			
Hardness:	NACE MR-0175/ ISO 15156 compliance			
Impact:	27J average/ 20J single at -46 degree C, for thicknesses above 6mm			

Carbon steel - Type 360LT				
Product	Standard	Grade	Class	Suppl. requirement
Seamless pipe Wrought fitting Forging/ flange	ISO 3183 (API 5L) ASTM A860 ASTM A694	L360N or Q (X52) WPHY52 F52	PSL2 Smls & welded	S53, S69 S55
Chemical:	C< 0.20% (C< 0.16% for X52); Mn = 0.90-1.60%; Si = 0.10-0.50%; S< 0.025%; P< 0.035%; Ti< 0.05%; Nb< 0.04%; Al< 0.06%; N< 0.015%; V+Nb+Ti< 0.10% CE = C + Mn/6 + (Cr+Mo+V)/5 + (Cu+Ni)/15 < 0.43			
Hardness:	NACE MR-0175/ ISO 15156 compliance			
Impact:	40J average/ 30J single at -46 degree C, for thicknesses above 6mm			

High strength, low alloyed steel - Type 4130/4140				
Product	Standard	Grade	Class	Suppl. requirement
Seamless pipe Wrought fitting Forging/ flange Forging/ flange	ASTM A519 ASTM A234 ASTM A788 API 6A	AISI 4130 AISI 4130 AISI 4140 60K (AISI 4130)	Seamless PSL 3	S2 S18
Chemical:	Pipe and fitting: S< 0.015%, P< 0.025%			
Tensile:	Pipe and fitting: Yield (0.2%) > 415MPa, UTS > 620MPa, A5 > 18% A788 forging: Yield (0.2%) > 515MPa, UTS > 690MPa, A5 > 15%			
Hardness:	Pipes, fittings and API 6A forgings: Maximum 250HV10, 237HB or 22HRC A788 forgings: 328HB or 35HRC			
Impact:	42J average/ 30J single at -30 degree C, for thicknesses above 6mm			

Austenitic Stainless steel - Type 316/316L				
Product	Standard	Grade	Class	Suppl. requirement
Seamless pipe Welded pipe Wrought fitting Forging/ flange Tube	ASTM A312 ASTM A312 ASTM A358 ASTM A403 ASTM A182 ASTM A269	TP316/ TP316L TP316/ TP316L 316/ 316L WP316/ WP316L F316/ F316L 316/ 316L	1, 3, 4 and 5 S, W, WX	
Chemical:	C < 0.035%			
Tensile:	Yield (0.2%) > 205MPa, UTS > 515MPa, A > 35%			
Hardness:	NACE MR-0175/ ISO 15156 compliance			

Austenitic Stainless steel - Type 6Mo				
Product	Standard	Grade	Class	Suppl. requirement
Seamless pipe Welded pipe Wrought fitting Forging/ flange Tube	ASTM A312 ASTM A358 ASTM A403 ASTM A182 ASTM A269	UNS S31254* UNS S31254* WP S31254* F44 (S31254)* UNS S31254*	1, 3 and 5 S, W, WX	S3 S56
Grades *:	UNS N08926 are acceptable in addition to the above grade			
Corrosion test:	ASTM G48 method A, 50 degree C / 24h, max 4g/m2 weight loss, no pitting			
Hardness:	NACE MR-0175/ ISO 15156 compliance			

Ferritic/Austenitic Stainless steel - Type 22Cr duplex				
Product	Standard	Grade	Class	Suppl. requirement
Seamless pipe Welded pipe Wrought fitting Forging/ flange Tube	ASTM A790 ASTM A928 ASTM A815 ASTM A182 ASTM A789	UNS S31803* UNS S31803* UNS S31803* F51* UNS S31803*	1, 3 and 5 S, W, WX	S3 S7 S56
Grades *:	UNS S32205/ F60 are acceptable in addition to the above grade			
Chemical:	N = 0.14-0.20%; PREN > 34%			
Impact:	45J average/ 35J single at -46 degree C, for thicknesses above 6mm			
Corrosion test:	ASTM G48 method A, 25 degree C / 24h, max 4g/m2 weight loss, no pitting			
Hardness:	Max 290 HV10 (or 28HRC or 271HB)			
Micro:	Ferrite level 35-55% for base, 35-65% for weld areas. No phases or precipitates.			

Ferritic/Austenitic Stainless steel - Type 25Cr duplex				
Product	Standard	Grade	Class	Suppl. requirement
Seamless pipe Welded pipe Wrought fitting Forging/ flange Tube	ASTM A790 ASTM A928 ASTM A815 ASTM A182 ASTM A789	UNS S32760* UNS S32760* UNS S32760* F55 (S32760)* UNS S32760*	1, 3 and 5 S, W, WX	S3 S7 S56
Grades*:	UNS S32750/F53 and UNS S32550 are acceptable in addition to the above grade			
Chemical:	PRE (Cr + 3.3xMo + 16xN) > 40.0			
Tensile:	Yield (0.2%) > 550MPa, UTS > 750MPa, A5 > 25%			
Impact:	45J average/ 35J single at -46 degree C, for thicknesses above 6mm			
Corrosion test:	ASTM G48 method A, 50 degree C / 24h, max 4g/m2 weight loss, no pitting			
Hardness:	Max 330 HV10 (or 32HRC or 301HB)			
Micro:	Ferrite level 35-55% for base, 35-65% for weld areas. No phases or precipitates.			

TYPES OF PIPES, FITTINGS AND FLANGES IN STOCK

High strength Austenitic Stainless steel - Type Superaustenite

Product	Standard	Grade	Class	Suppl. requirement
Welded pipe	ASTM A358	UNS S34565	1, 3	S3
Wrought fitting	ASTM A403	UNS S34566	S, WX	
Forging/ flange	ASTM A182	F49		S56
Tensile: Yield (0.2%) > 415MPa, UTS > 795MPa Hardness: Max 34HRC Corrosion test: ASTM G48 method A, 50 degree C / 24h, max 4g/m2 weight loss, no pitting				

Copper alloy - Type CuNi 90/10

Product	Standard	Grade	Class	Suppl. requirement
Seamless pipe	ASTM B466	UNS C70600		
Welded pipe	ASTM B467	UNS C70600		
Wrought fitting		UNS C70600		
Forging/flange		UNS C70600		
Material purchased to our stock are modified to Norsok data sheet MDS K01, e.g: Dimensions: In accordance to respective EEMUA standards - No.144, 145, 146				

Nickel alloy - Type Inconel 625

Product	Standard	Grade	Class	Suppl. requirement
Seamless pipe	ASTM B444	UNS N06625	1	S3 S5.3
Welded pipe	ASTM B705	UNS N06625		
Wrought fitting	ASTM B366	UNS N06625		
Forging/flange	ASTM B564	UNS N06625		
Tube	ASTM B444	UNS N06625		
Material purchased to our stock are modified to Norsok data sheet MDS N01, e.g: Heat treatment: All products shall be annealed				



PIPES

ASME B36.10
ASME B36.19

PIPE SCHEDULE CHART [INCH]

ASME B36.19-B36.10 – pipe dimensions in inch and weights in kg

NPS (INCH)	O.D. (INCH)	5 S	5	10 S	10	20	30	STD 40 S	40	60	XS 80 S	80	100	120	140	160	XXS
1/8	0,405			0,049			0,057	0,068			0,095						
				0,3			0,3	0,4			0,5						
1/4	0,540			0,065			0,073	0,088			0,119						
				0,5			0,5	0,6			0,8						
3/8	0,675			0,065			0,073	0,091			0,126						
				0,6			0,7	0,9			1,1						
1/2	0,840	0,065		0,083			0,095	0,109			0,147					0,187	0,294
		0,8		1,0			1,1	1,3			1,6					2,0	2,6
3/4	1,050	0,065		0,083			0,095	0,113			0,154					0,219	0,308
		1,0		1,3			1,4	1,7			2,2					2,9	3,7
1	1,315	0,065		0,109			0,114	0,133			0,179					0,250	0,358
		1,3		2,1			2,2	2,5			3,3					4,3	5,5
1 ¼	1,660	0,065		0,109			0,117	0,140			0,191					0,250	0,382
		1,7		2,7			2,9	3,4			4,5					5,7	7,9
1 ½	1,900	0,065		0,109			0,125	0,145			0,200					0,281	0,400
		1,9		3,2			3,5	4,1			5,5					7,4	9,7
2	2,375	0,065		0,109			0,125	0,154			0,218					0,344	0,436
		2,4		4,0			4,5	5,5			7,6					11,1	13,4
2 ½	2,875	0,083		0,120			0,188	0,203			0,276					0,375	0,552
		3,8		5,3			8,0	8,6			11,4					14,0	20,4
3	3,500	0,083		0,120			0,188	0,216			0,300					0,438	0,600
		4,6		6,5			9,9	11,3			15,3					21,4	27,7
3 ½	4,000	0,083		0,120			0,188	0,226			0,318						
		5,2		7,4			11,4	13,6			18,6						
4	4,500	0,083		0,120			0,188	0,237			0,337			0,438		0,531	0,674
		5,8		8,4			12,9	16,1			22,3			28,3		33,5	41,0
5	5,563	0,109		0,134				0,258			0,375			0,500		0,625	0,750
		9,5		11,6				21,8			31,0			40,3		49,1	57,4
6	6,625	0,109		0,134				0,280			0,432			0,562		0,719	0,864
		11,3		13,8				28,3			42,6			54,2		67,6	79,2
8	8,625	0,109		0,148		0,250	0,277	0,322		0,406	0,500		0,594	0,719	0,812	0,906	0,875
		14,8		20,0		33,3	36,8	42,6		53,1	64,6		75,9	90,4	100,9	111,3	107,9
10	10,75	0,134		0,165		0,250	0,307	0,365		0,500	0,500	0,594	0,719	0,844	1,000	1,125	1,000
		22,6		27,8		42,4	51,8	60,3		81,6	81,6	96,0	114,8	133,1	155,2	172,3	155,2
12	12,75	0,156		0,180		0,250	0,330	0,375	0,406	0,562	0,500	0,688	0,844	1,000	1,125	1,312	1,000
		31,3		36,0		49,7	65,2	73,9	79,7	109,0	97,4	132,1	159,9	187,0	208,1	238,8	187,0
14	14,00	0,156		0,188	0,250	0,312	0,375	0,375	0,438	0,594	0,500	0,750	0,938	1,094	1,250	1,406	
		34,4		41,3	54,7	67,9	81,3	81,3	94,6	126,7	107,4	158,1	195,0	224,7	253,5	281,7	
16	16,00	0,165		0,188	0,250	0,312	0,375	0,375	0,500	0,656	0,500	0,844	1,031	1,219	1,438	1,594	
		41,6		47,3	62,6	77,8	93,3	93,3	123,3	160,1	123,3	203,5	245,6	286,6	333,2	365,4	
18	18,00	0,165		0,188	0,250	0,312	0,438	0,375	0,562	0,750	0,500	0,938	1,156	1,375	1,562	1,781	
		46,8		53,3	70,6	87,7	122,4	105,2	155,8	205,7	139,2	254,6	309,6	363,6	408,3	459,4	
20	20,00	0,188		0,218	0,250	0,375	0,500	0,375	0,594	0,812	0,500	1,031	1,281	1,500	1,750	1,969	
		59,3		68,6	78,6	117,2	155,1	117,2	183,4	247,8	155,1	311,2	381,5	441,5	508,1	564,8	
22	22,00	0,188		0,218	0,250	0,375	0,500	0,375		0,875	0,500	1,125	1,375	1,625	1,875	2,125	
		65,2		75,5	86,5	129,1	171,1	129,1		299,3	171,1	373,8	451,5	527,0	600,6	672,3	
24	24,00	0,218		0,250	0,250	0,375	0,562	0,375	0,688	0,969	0,500	1,219	1,531	1,812	2,062	2,344	
		82,5		94,5	94,5	141,1	209,6	141,1	255,4	355,3	187,1	442,1	547,7	640,0	720,2	808,2	
26	26,00				0,312	0,500		0,375			0,500						
					127,4	202,7		152,9			202,7						
28	28,00				0,312	0,500	0,625	0,375			0,500						
					137,2	218,7	271,2	164,9			218,7						
30	30,00	0,250		0,312	0,312	0,500	0,625	0,375			0,500						
		118,3		147,4	147,3	324,7	292,2	176,8			324,7						
32	32,00				0,312	0,500	0,625	0,375	0,688		0,500						
					157,2	250,7	316,9	188,8	342,9		250,6						
34	34,00				0,312	0,500	0,625	0,375	0,688		0,500						
					167,2	266,6	332,1	200,3	365,0		266,6						
36	36,00				0,312	0,500	0,625	0,375	0,750		0,500						
					177,0	282,3	351,7	212,6	420,4		282,3						

NOTE: Light blue values are wall thicknesses in inch, darker blue values are weights in kg/m.
Specific steel weight used for calculation is 8.0.
Titanium weight is approximately 57% of the table values.

NPS = Nominal Pipe Size - description of pipe size in inch,
O.D. = Outside Diameter of pipe,
Sch5S and 10S do not permit threading according to ANSI B1.20.1,
Sch40S and 80S in the table are applicable up to and including 12".

ASME B36.19-B36.10 – pipe dimensions in mm and weights in kg

DN (MM)	NPS (INCH)	O.D. (MM)	5 S	5	10 S	10	20	30	STD 40 S	40	60	XS 80 S	80	100	120	140	160	XXS
-	1/8	10,3			1,24			1,45	1,73			2,41						
					0,3			0,3	0,4			0,5						
-	1/4	13,7			1,65			1,85	2,24			3,02						
					0,5			0,5	0,6			0,8						
10	3/8	17,1			1,65			1,85	2,31			3,20						
					0,6			0,7	0,9			1,1						
15	1/2	21,3	1,65		2,11			2,41	2,77			3,73					4,75	7,47
			0,8		1,0			1,1	1,3			1,6					2,0	2,6
20	3/4	26,7	1,65		2,11			2,41	2,87			3,91					5,56	7,82
			1,0		1,3			1,4	1,7			2,2					2,9	3,7
25	1	33,4	1,65		2,77			2,90	3,38			4,55					6,35	9,09
			1,3		2,1			2,2	2,5			3,3					4,3	5,5
32	1 ¼	42,2	1,65		2,77			2,97	3,56			4,85					6,35	9,70
			1,7		2,7			2,9	3,4			4,5					5,7	7,9
40	1 ½	48,3	1,65		2,77			3,18	3,68			5,08					7,14	10,15
			1,9		3,2			3,5	4,1			5,5					7,4	9,7
50	2	60,3	1,65		2,77			3,18	3,91			5,54					8,74	11,07
			2,4		4,0			4,5	5,5			7,6					11,1	13,4
65	2 ½	73,0	2,11		3,05			4,78	5,16			7,01					9,53	14,02
			3,8		5,3			8,0	8,6			11,4					14,0	20,4
80	3	88,9	2,11		3,05			4,78	5,49			7,62					11,13	15,24
			4,6		6,5			9,9	11,3			15,3					21,4	27,7
-	3 ½	101,6	2,11		3,05			4,78	5,74			8,08						
			5,2		7,4			11,4	13,6			18,6						
100	4	114,3	2,11		3,05			4,78	6,02			8,56			11,13		13,49	17,12
			5,8		8,4			12,9	16,1			22,3			28,3		33,5	41,0
125	5	141,3	2,77		3,40				6,55			9,53			12,70		15,88	19,05
			9,5		11,6				21,8			31,0			40,3		49,1	57,4
150	6	168,3	2,77		3,40				7,11			10,97			14,27		18,26	21,95
			11,3		13,8				28,3			42,6			54,2		67,6	79,2
200	8	219,1	2,77		3,76		6,35	7,04	8,18		10,31	12,70		15,09	18,26	20,62	23,01	22,23
			14,8		20,0		33,3	36,8	42,6		53,1	64,6		75,9	90,4	100,9	111,3	107,9
250	10	273,0	3,40		4,19		6,35	7,80	9,27		12,70	12,70	15,09	18,26	21,44	25,40	28,58	25,40
			22,6		27,8		42,4	51,8	60,3		81,6	81,6	96,0	114,8	133,1	155,2	172,3	155,2
300	12	323,8	3,96		4,57		6,35	8,38	9,53	10,31	14,27	12,70	17,48	21,44	25,40	28,58	33,32	25,40
			31,3		36,0		49,7	65,2	73,9	79,7	109,0	97,4	132,1	159,9	187,0	208,1	238,8	187,0
350	14	355,6	3,96		4,78	6,35	7,92	9,53	9,53	11,13	15,09	12,70	19,05	23,83	27,79	31,75	35,71	
			34,4		41,3	54,7	67,9	81,3	81,3	94,6	126,7	107,4	158,1	195,0	224,7	253,5	281,7	
400	16	406,4	4,19		4,78	6,35	7,92	9,53	9,53	12,70	16,66	12,70	21,44	26,19	30,96	36,53	40,49	
			41,6		47,3	62,6	77,8	93,3	93,3	123,3	160,1	123,3	203,5	245,6	286,6	333,2	365,4	
450	18	457	4,19		4,78	6,35	7,92	11,13	9,53	14,27	19,05	12,70	23,83	29,36	34,93	39,67	45,24	
			46,8		53,3	70,6	87,7	122,4	105,2	155,8	205,7	139,2	254,6	309,6	363,6	408,3	459,4	
500	20	508	4,78		5,54	6,35	9,53	12,70	9,53	15,09	20,62	12,70	26,19	32,54	38,10	44,45	50,01	
			59,3		68,6	78,6	117,2	155,1	117,2	183,4	247,8	155,1	311,2	381,5	441,5	508,1	564,8	
-	22	559	4,78		5,54	6,35	9,53	12,70	9,53		22,23	12,70	28,58	34,93	41,28	47,63	53,98	
			65,2		75,5	86,5	129,1	171,1	129,1		299,3	171,1	373,8	451,5	527,0	600,6	672,3	
600	24	610	5,54		6,35	6,35	9,53	14,27	9,53	17,48	24,61	12,70	30,96	38,89	46,02	52,37	59,54	
			82,5		94,5	94,5	141,1	209,6	141,1	255,4	355,3	187,1	442,1	547,7	640,0	720,2	808,2	
-	26	660				7,92	12,70		9,53			12,70						
						127,4	202,7		152,9			202,7						
700	28	711				7,92	12,70	15,88	9,53			12,70						
						137,2	218,7	271,2	164,9			218,7						
-	30	762	6,35		7,92	7,92	12,70	15,88	9,53			12,70						
			118,3		147,4	147,3	234,7	292,2	176,8			234,7						
800	32	813				7,92	12,70	15,88	9,53	17,48		12,70						
						157,2	250,7	316,9	188,8	342,9		250,6						
-	34	864				7,92	12,70	15,88	9,53	17,48		12,70						
						167,2	266,6	332,1	200,3	365,0		266,6						
900	36	914				7,92	12,70	15,88	9,53	19,05		12,70						
						177,0	282,3	351,7	212,6	420,4		282,3						

NOTE: Light blue values are wall thicknesses in mm, darker blue values are weights in kg/m.
 Specific steel weight used for calculation is 8,0.
 Titanium weight is approximately 57% of the table values.
 DN = Nominal Diameter - SI description of pipe size in mm,

NPS = Nominal Pipe Size - description of pipe size in inch,
 O.D. = Outside Diameter of pipe,
 Sch5S and 10S do not permit threading according to ANSI B1.20.1,
 Sch40S and 80S in the table are applicable up to and including 12".

ASME B 36.10 DIMENSIONS

SIZE IN.	OUTSIDE DIAMETER mm	WALL THICKNESS mm	INNER DIAMETER mm	WEIGHT KG/M	IDENTIFICATION		SIZE IN. NO	OUTSIDE DIAMETER mm	WALL THICKNESS mm	INNER DIAMETER mm	WEIGHT KG/M	IDENTIFICATION	
					STD XS;XXS	SCHEDULE						STD XS;XXS	SCHEDULE NO
1/8	10,3	1,73 2,41	6,8 5,5	0,4 0,5	STD XS	40 80	3	88,9	5,49 6,35 7,14	77,9 76,2 74,6	11,3 12,9 14,4	STD	40
1/4	13,7	2,24 3,02	9,2 7,7	0,6 0,8	STD XS	40 80			7,62 11,13 15,24	73,7 66,6 58,4	15,3 21,4 27,7	XS XXS	80 160
3/8	17,1	2,31 3,20	12,5 10,7	0,8 1,1	STD XS	40 80	3 1/2	101,6	2,11 2,77 3,05 3,18	97,4 96,1 95,5 95,3	5,2 6,8 7,4 7,7		5
1/2	21,3	2,77 3,73 4,78 7,47	15,8 13,8 11,7 6,4	1,3 1,6 2,0 2,6	STD XS XXS	40 80 160			3,58 3,96 4,37 4,78 5,74 6,35 7,14 8,08	94,4 93,7 92,9 92,0 90,1 88,9 87,3 85,4	8,7 9,5 10,5 11,4 13,6 14,9 16,6 18,6	STD	40
3/4	26,7	2,87 3,91 5,56 7,82	21,0 18,9 15,6 11,1	1,7 2,2 2,9 3,6	STD XS XXS	40 80 160	4	114,3	2,11 2,77 3,05 3,18 3,58 3,96 4,37 4,78 5,16 5,56 6,02 6,35 7,14 7,92 8,56 11,13 13,49 17,12	110,1 108,8 108,2 108,0 107,1 106,4 105,6 104,7 104,0 103,2 102,3 101,6 100,0 98,5 97,2 92,0 87,3 80,1	5,8 7,6 8,4 8,7 9,8 10,8 11,9 12,9 13,9 14,9 16,1 16,9 18,9 20,8 22,3 28,3 33,5 41,0	STD XS	40 80
1	33,4	3,38 4,55 6,35 9,09	26,6 24,3 20,7 15,2	2,5 3,2 4,2 5,5	STD XS XXS	40 80 160	5	141,3	2,11 2,77 3,18 3,58 3,96 4,37 4,78 5,16 5,56 6,02 6,35 7,14 7,92 8,56 11,13 13,49 17,12	137,1 135,8 135,0 134,5 133,4 131,7 130,2 128,2 127,0 125,5 123,8 122,3 115,9 109,6 103,2	7,2 9,5 10,8 11,6 13,4 16,1 18,6 21,8 23,6 26,1 28,6 31,0 40,3 49,1 57,4	STD XS XXS	40
1 1/4	42,2	3,56 4,85 6,35 9,70	35,1 32,5 29,5 22,8	3,4 4,5 5,6 7,8	STD XS XXS	40 80 160	6	168,3	2,11 2,77 3,18 3,58 3,96 4,37 4,78 5,16 5,56 6,02 6,35 7,14 7,92 8,56 11,13 13,49 17,12	164,1 162,8 162,0 161,5 161,1 160,4 159,6 158,7 157,2	8,7 11,3 13,0 13,8 14,5 16,1 17,7 19,3 20,8 22,3		5
1 1/2	48,3	3,68 5,08 7,14 10,15	40,9 38,1 34,0 28,0	4,1 5,4 7,3 9,6	STD XS XXS	40 80 160							
2	60,3	1,65 2,11 2,77 3,18 3,58 3,91 4,37 4,78 5,54 6,35 7,14 8,74 11,07	57,0 56,1 54,8 53,9 53,1 52,5 51,6 50,7 49,2 47,6 46,0 42,8 38,2	2,4 3,0 3,9 4,5 5,0 5,4 6,0 6,5 7,5 8,5 9,4 11,1 13,4	STD XS XXS	5 10 30 40 80 160							
2 1/2	73,0	2,11 2,77 3,05 3,18 3,58 3,96 4,37 4,78 5,16 5,49 6,35 7,01 9,53 14,02	68,8 67,5 66,9 66,7 65,8 65,1 64,3 63,4 62,7 62,0 60,3 59,0 54,0 45,0	3,7 4,8 5,3 5,5 6,1 6,7 7,4 8,0 8,6 9,1 10,4 11,4 14,9 20,4	STD XS XXS	5 10 30 40 80 160							
3	88,9	2,11 2,77 3,05 3,18 3,58 3,96 4,37 4,78	84,7 83,4 82,8 82,6 81,7 81,0 80,2 79,3	4,5 5,9 6,5 6,7 7,5 8,3 9,1 9,9	STD XS XXS	5 10 30							

ASME B 36.10 DIMENSIONS

SIZE	OUTSIDE DIAMETER	WALL THICKNESS	INNER DIAMETER	WEIGHT	IDENTIFICATION		SIZE	OUTSIDE DIAMETER	WALL THICKNESS	INNER DIAMETER	WEIGHT	IDENTIFICATION			
IN.	mm	mm	mm	KG/M	STD XS;XXS	SCHEDULE NO	IN.	mm	mm	mm	KG/M	STD XS;XXS	SCHEDULE NO		
6	168,3	6,35	155,6	25,4	STD	40	12	323,8	3,96	315,9	31,3		5		
		7,11	154,1	28,3					4,37	315,1	34,4				
		7,92	152,5	31,3					4,57	314,7	36,0			10	
		8,74	150,8	34,4					4,78	314,2	37,6				
		9,53	149,3	37,3	5,16	313,5			40,6	80					
		10,97	146,4	42,6	5,56	312,7			43,7						
		12,70	142,9	48,7	6,35	311,1			49,7		20				
		14,27	139,8	54,2	7,14	309,5			55,8						
		15,88	136,6	59,7	7,92	308,0			61,7	160					
		18,26	131,8	67,6	8,38	307,0			65,2						
		19,05	130,2	70,1	8,74	306,3			67,9						
		21,95	124,4	79,2	9,53	304,7			73,9		STD				
22,23	123,8	80,1	10,31	303,2	79,7	40									
8	219,1	2,77	213,6	14,8					5	11,13		301,5	85,8	XS	
		3,18	212,8	16,9						12,70		298,4	97,5		
		3,76	211,6	20,0						14,27	295,3	109,0	60		
		3,96	211,2	21,0		15,88				292,1	120,6				
		4,78	209,5	25,3		17,48				288,8	132,1	80			
		5,16	208,8	27,2		19,05				285,7	143,2				
		5,56	208,0	29,3		20,62				282,6	154,2		100		
		6,35	206,4	33,3		21,44				280,9	159,9				
		7,04	205,0	36,8		22,23				279,4	165,4				
		7,92	203,3	41,2		23,83				276,1	176,3	XXS		120	
		8,18	202,7	42,6		25,40				273,0	187,0				
		8,74	201,6	45,3		26,97				269,9	197,5				
		9,53	200,1	49,3	28,58	266,7			208,1	140					
		10,31	198,5	53,1	31,75	260,3			228,7						
		11,13	196,8	57,1	33,32	257,2			238,8		160				
		12,70	193,7	64,6	XS	80	14	355,6	3,96			347,7	34,4		5
		14,27	190,6	72,1					4,78	346,0		41,4			
		15,09	188,9	75,9					5,16	345,3		44,6	10		
		15,88	187,4	79,6					5,33	344,9	46,0				
		18,26	182,6	90,4					5,56	344,5	48,0	20			
		19,05	181,0	94,0					6,35	342,9	54,7				
		20,62	177,9	100,9					7,14	341,3	61,4		STD	30	
		22,23	174,7	107,9					7,92	339,8	67,9				
		23,01	173,1	111,3					8,74	338,1	74,8	XS			40
		25,40	168,3	121,3					9,53	336,6	81,3				
									10,31	335,0	87,8		60		
		10	273,0	3,40					266,2	22,6				5	
3,96	265,1			26,3	11,91	331,8			100,9						
4,19	264,6			27,8	12,70	330,2			107,4	XS		60			
4,78	263,4			31,6	14,27	327,1			120,1						
5,16	262,7			34,1	15,09	325,4			126,7						
5,56	261,9			36,7	15,88	323,9			133,0				80		
6,35	260,3			41,8	17,48	320,6			145,8						
7,09	258,8			46,5	19,05	317,5			158,1						
7,80	257,4			51,0	20,62	314,4			170,3	100					
8,74	255,5			57,0	22,23	311,2			182,8						
9,27	254,5			60,3	23,83	307,9			195,0						
11,13	250,7			71,9	25,40	304,8			206,8			120			
12,70	247,6			81,6	26,97	301,7			218,6						
14,27	244,5			91,1	27,79	300,0			224,7						
15,09	242,8			96,0	28,58	298,4			230,5	140					
15,88	241,3			100,7	31,75	292,1			253,6						
18,26	236,5			114,8	35,71	284,2			281,7		160				
20,62	231,8			128,4	50,80	254,0	381,8								
21,44	230,1			133,1	53,98	247,7	401,5								
22,23	228,5			137,5	55,88	243,8	413,0	XXS	140						
23,83	225,3			146,5	63,50	228,6	457,4								
25,40	222,2			155,2											
28,58	215,9			172,3											
31,75	209,5	189,0													

ASME B 36.10 DIMENSIONS

SIZE	OUTSIDE DIAMETER	WALL THICKNESS	INNER DIAMETER	WEIGHT	IDENTIFICATION		SIZE	OUTSIDE DIAMETER	WALL THICKNESS	INNER DIAMETER	WEIGHT	IDENTIFICATION	
IN.	mm	mm	mm	KG/M	STD XS:XXS	SCHEDULE NO	IN.	mm	mm	mm	KG/M	STD XS:XXS	SCHEDULE NO
16	406,4	4,19	398,0	41,6		5	20	508	4,78	498,4	59,3		5
		4,78	396,8	47,3					5,56	496,9	68,9		
		5,16	396,1	51,1					6,35	495,3	78,6		10
		5,56	395,3	55,0					7,14	493,7	88,2		
		6,35	393,7	62,6		10			7,92	492,2	97,7		
		7,14	392,1	70,3					8,74	490,5	107,6		
		7,92	390,6	77,8		20			9,53	489,0	117,2	STD	20
		8,74	388,9	85,7					10,31	487,4	126,5		
		9,53	387,4	93,3	STD	30			11,13	485,7	136,4		
		10,31	385,8	100,7					11,91	484,2	145,7		
		11,13	384,1	108,5					12,70	482,6	155,1	XS	30
		11,91	382,6	115,9					14,27	479,5	173,7		
		12,70	381,0	123,3	XS	40			15,09	477,8	183,4		40
		14,27	377,9	138,0					15,88	476,3	192,7		
		15,88	374,7	152,9					17,48	473,0	211,4		
		16,66	373,1	160,1		60			19,05	469,9	229,7		
		17,48	371,4	167,7					20,62	466,8	247,8		60
		19,05	368,3	182,0					22,23	463,6	266,3		
		20,62	365,2	196,2					23,83	460,3	284,5		
		21,44	363,5	203,5		80			25,40	457,2	302,3		
		22,23	362,0	210,6					26,19	455,6	311,2		80
		23,83	358,7	224,8					26,97	454,1	319,9		
		25,40	355,6	238,6					28,58	450,9	337,9		
		26,19	354,0	245,6		100			30,18	447,7	355,6		
		26,97	352,5	252,4					31,75	444,5	372,9		
		28,58	349,3	266,3					32,54	442,9	381,5		100
		30,18	346,0	280,0					33,32	441,4	390,0		
		30,96	344,5	286,6		120			34,93	438,2	407,5		
		31,75	342,9	293,3					38,10	431,8	441,5		120
		36,53	333,3	333,2		140			44,45	419,1	508,1		140
		40,49	325,4	365,4		160			50,01	408,0	564,8		160
18	457	4,19	448,6	46,8		5	22	559	4,78	549,4	65,2		5
		4,78	447,4	53,3					5,56	547,9	75,9		
		5,56	445,9	61,9					6,35	546,3	86,5		10
		6,35	444,3	70,6		10			7,14	544,7	97,2		
		7,14	442,7	79,2					7,92	543,2	107,6		
		7,92	441,2	87,8		20			8,74	541,5	118,6		
		8,74	439,5	96,6					9,53	540,0	129,1	STD	20
		9,53	438,0	105,2	STD				10,31	538,4	139,5		
		10,31	436,4	113,6					11,13	536,7	150,4		
		11,13	434,7	122,4		30			11,91	535,2	160,7		
		11,91	433,2	130,7					12,70	533,6	171,1	XS	30
		12,70	431,6	139,2	XS				14,27	530,5	191,7		
		14,27	428,5	155,8		40			15,88	527,3	212,7		
		15,88	425,3	172,7					17,48	524,0	233,4		
		17,48	422,0	189,5					19,05	520,9	253,7		
		19,05	418,9	205,7		60			20,62	517,8	273,8		
		20,62	415,8	221,9					22,23	514,6	294,3		60
		22,23	412,6	238,3					23,83	511,3	314,5		
		23,83	409,3	254,6		80			25,40	508,2	334,2		
		25,40	406,2	270,3					26,97	505,1	353,8		
		26,97	403,1	286,0					28,58	501,9	373,8		80
		28,58	399,9	301,9					30,18	498,6	393,6		
		29,36	398,3	309,6		100			31,75	495,5	412,8		
		30,18	396,7	317,7					33,32	492,4	431,9		
		31,75	393,5	333,0					34,93	489,2	451,4		100
		34,93	387,2	363,6		120			36,53	485,9	470,7		
		39,67	377,7	408,3		140			38,10	482,8	489,4		
		45,24	366,5	459,4		160			41,28	476,5	527,0		120
									47,63	463,8	600,6		140
									53,98	451,1	672,3		160

ASME B 36.10 DIMENSIONS

SIZE IN.	OUTSIDE DIAMETER mm	WALL THICKNESS mm	INNER DIAMETER mm	WEIGHT KG/M	IDENTIFICATION	
					STD XS;XXS	SCHEDULE NO
24	610	5,54	599,0	82,5		5
		6,35	597,3	94,5		10
		7,14	595,7	106,2		
		7,92	594,2	117,6		
		8,74	592,5	129,6		
		9,53	591,0	141,1	STD	20
		10,31	589,4	152,5		
		11,13	587,7	164,4		
		11,91	586,2	175,7		
		12,70	584,6	187,1	XS	30
		14,27	581,5	209,6		
		15,88	578,3	232,7		
		17,48	575,0	255,4		40
		19,05	571,9	277,6		
		20,62	568,8	299,7		
		22,23	565,6	322,2		
		23,83	562,3	344,5		
		24,61	560,8	355,3		60
		25,40	559,2	366,2		
		26,97	556,1	387,8		
		28,58	552,9	409,8		
		30,18	549,6	431,5		
		30,96	548,1	442,1		80
		31,75	546,5	452,7		
		33,32	543,4	473,8		
		34,93	540,2	495,4		
		36,50	537,0	516,8		
		38,10	533,8	537,3		
		38,89	532,2	547,7		100
		39,67	530,7	557,4		
		46,02	518,0	640,0		120
		52,37	505,3	720,2		140
		59,54	490,9	808,2		160
26	660	6,35	647,3	102,4		
		7,14	645,7	115,0		
		7,92	644,2	127,4		10
		8,74	642,5	140,4		
		9,53	641,0	152,9	STD	
		10,31	639,4	165,2		
		11,13	637,7	178,1		
		11,91	636,2	190,3		
		12,70	634,6	202,7	XS	20
		14,27	631,5	227,2		
		15,88	628,3	252,2		
		17,48	625,0	277,0		
		19,05	621,9	301,1		
		20,62	618,8	325,1		
		22,23	615,6	349,6		
		23,83	612,3	373,8		
		25,40	609,2	397,5		
28	711	6,35	698,3	110,3		
		7,14	696,7	123,9		
		7,92	695,2	137,3		10
		8,74	693,5	151,4		
		9,53	692,0	164,9	STD	
		10,31	690,4	178,2		
		11,13	688,7	192,1		
		11,91	687,2	205,3		
		12,70	685,6	218,7	XS	20
		14,27	682,5	245,2		
		15,88	679,3	271,2		30
		17,48	676,0	299,0		
28	711	19,05	672,9	325,1		
		20,62	669,8	351,1		
		22,23	666,6	377,6		
		23,83	663,3	403,8		
		25,40	660,2	429,4		
30	762	6,35	749,3	118,3		5
		7,14	747,7	132,9		
		7,92	746,2	147,3		10
		8,74	744,5	162,4		
		9,53	743,0	176,8	STD	
		10,31	741,4	191,1		
		11,13	739,7	206,1		
		11,91	738,2	220,3		
		12,70	736,6	234,7	XS	20
		14,27	733,5	263,1		
		15,88	730,3	292,2		30
		17,48	727,0	320,9		
		19,05	723,9	394,0		
		20,62	720,8	377,0		
		22,23	717,6	405,5		
		23,83	714,3	433,8		
32	813	25,40	711,2	461,4		
		26,97	708,1	488,9		
		28,58	704,8	516,9		
		30,18	701,6	544,7		
		31,75	698,5	571,8		
		6,35	800,3	126,3		
		7,14	798,7	141,9		
		7,92	797,2	157,2		10
		8,74	795,5	173,3		
		9,53	794,0	188,8	STD	
		10,31	792,4	204,1		
		11,13	790,7	220,1		
		11,91	789,2	235,3		
		12,70	787,6	250,6	XS	20
		14,27	784,5	281,1		
		15,88	781,3	312,2		30
		17,48	778,0	342,9		40
34	864	19,05	774,9	373,0		
		20,62	771,8	402,9		
		22,23	768,6	433,5		
		23,83	765,3	463,8		
		25,40	762,2	493,3		
		26,97	759,1	522,8		
		28,58	755,8	552,9		
		30,18	752,6	582,6		
		31,75	749,5	611,7		
		6,35	851,3	134,3		
		7,14	849,7	150,9		
		7,92	848,2	167,2		10
		8,74	846,5	184,3		
		9,53	845,0	200,3	STD	
		10,31	843,4	217,1		
		11,13	841,7	234,1		
		11,91	840,2	250,3		
		12,70	838,6	266,6	XS	20
		14,27	835,5	299,0		
		15,88	832,3	332,1		30
		17,48	829,0	364,9		40
		19,05	825,9	396,9		
		20,62	822,8	428,9		
		22,23	819,6	461,5		

ASME B 36.10 DIMENSIONS

SIZE IN.	OUTSIDE DIAMETER mm	WALL THICKNESS mm	INNER DIAMETER mm	WEIGHT KG/M	IDENTIFICATION		SIZE IN.	OUTSIDE DIAMETER mm	WALL THICKNESS mm	INNER DIAMETER mm	WEIGHT KG/M	IDENTIFICATION	
					STD XS;XXS	SCHEDULE NO						STD XS;XXS	SCHEDULE NO
34	864	23,83	816,3	493,7			42	1067	8,74	1049,6	228		
		25,40	813,2	525,3					9,53	1048,0	248		
		26,97	810,1	556,7					10,31	1046,4	269		
		28,58	806,8	588,8					11,13	1044,8	290		
		30,18	803,6	620,6					11,91	1043,2	310		
		31,75	800,5	651,6					12,70	1041,6	330		
36	914	6,35	901,3	142,1					14,27	1038,4	370		
		7,14	899,7	159,7					15,88	1035,2	411		
		7,92	898,2	177,0		10			17,48	1032,0	452		
		8,74	896,5	195,1					19,05	1029,0	492		
		9,53	895,0	212,6	STD				20,62	1025,8	532		
		10,31	893,4	229,8					22,23	1022,6	572		
		11,13	891,7	247,3					23,83	1019,4	615		
		11,91	890,2	264,9					25,40	1016,2	652		
		12,70	888,6	282,3		20	44	1168	8,74	1150,6	239		
		14,27	885,5	316,1					9,53	1149,0	260		
		15,88	882,3	351,7		30			10,31	1147,4	282		
		17,48	879,0	386,5					11,13	1145,8	304		
		19,05	875,9	420,4		40			11,91	1144,2	325		
		20,62	872,8	454,3					12,70	1142,6	346		
		22,23	869,6	488,9					14,27	1139,4	388		
		23,83	866,3	523,1					15,88	1136,2	431		
		25,40	863,2	556,6					17,48	1133,0	474		
		26,97	860,1	590,0					19,05	1130,0	516		
		28,58	856,8	624,0					20,62	1126,8	558		
		30,18	853,6	657,8					22,23	1123,6	600		
		31,75	850,5	690,8					23,83	1120,4	643		
38	965	7,92	949,1	186,9					25,40	1117,2	684		
		8,74	947,5	206,1			46	1158	8,74	1140,6	250		
		9,53	945,9	224,5					9,53	1139,0	272		
		10,31	944,4	242,7					10,31	1137,4	294		
		11,13	942,7	261,8					11,13	1135,8	317		
		11,91	941,2	279,9					11,91	1134,2	340		
		12,70	939,6	298,2					12,70	1132,6	362		
		14,27	936,5	334,6					14,27	1129,4	406		
		15,88	933,2	371,7					15,88	1126,2	451		
		17,48	930,0	408,4					17,48	1123,0	496		
		19,05	926,9	444,4					19,05	1120,0	540		
		20,62	923,8	480,2					20,62	1116,8	584		
		22,23	920,5	516,8					22,23	1113,6	628		
		23,83	917,3	553,1					23,83	1110,4	672		
		25,40	914,2	588,5					25,40	1107,2	716		
40	1016	7,92	1000,2	196,9			48	1219	8,74	1201,6	261		
		8,74	998,5	217,1					9,53	1200,0	284		
		9,53	996,9	236,5					10,31	1198,4	307		
		10,31	995,4	255,7					11,13	1196,8	331		
		11,13	993,7	275,8					11,91	1195,2	355		
		11,91	992,2	294,8					12,70	1193,6	378		
		12,70	990,6	314,2					14,27	1190,4	424		
		14,27	987,5	352,5					15,88	1187,2	471		
		15,88	984,2	391,7					17,48	1184,0	518		
		17,48	981,0	430,4					19,05	1181,0	564		
		19,05	977,9	468,3					20,62	1177,8	610		
		20,62	974,8	506,1					22,23	1174,6	656		
		22,23	971,5	544,8					23,83	1171,4	702		
		23,83	968,3	583,1					25,40	1168,2	748		
		25,40	965,2	620,5									

NOTE: Complete range of wall thicknesses from ASME B36.10 are included for 2" - 36" pipe sizes.
Other dimensions are only including a range of dimensions/wall thicknesses from ASME B36.10.



TUBES

ASTM A269

ASTM A789

FACTOR CHART FOR PRESSURE CALCULATION OF TUBING - METRIC

The below table values are based on ASME B31.3 section 304, and may be used for calculation of:

- 1) Working pressure (maximum allowable by design standard), i.e. "Table factor" multiplied by "Maximum Allowable Stress" (MPa)
- 2) Yield pressure (calculated by nominal values), i.e. "Table factor" multiplied by "Minimum Yield Strength" (MPa)
- 3) Burst pressure (calculated by nominal values), i.e. "Table factor" multiplied by "Minimum Tensile Strength" (MPa)

TUBE O.D. (mm)	TUBE WALL THICKNESS (mm)								
	1	1,2	1,5	1,6	1,8	2	2,2	2,5	3
3	0,8000								
4	0,6000	0,7241							
6	0,3846	0,4706	0,6000	0,6423					
8	0,2778	0,3409	0,4382	0,4706					
10	0,2174	0,2655	0,3409	0,3670	0,4188	0,4706			
12	0,1786	0,2174	0,2778	0,2985	0,3409	0,3846			
14	0,1515	0,1840	0,2344	0,2516	0,2866	0,3226	0,3595	0,4152	0,5077
16	0,1316	0,1596	0,2027	0,2174	0,2473	0,2778	0,3090	0,3571	0,4382
18	0,1163	0,1408	0,1786	0,1914	0,2174	0,2439	0,2709	0,3125	0,3846
20	0,1042	0,1261	0,1596	0,1709	0,1940	0,2174	0,2412	0,2778	0,3409
22	0,0943	0,1141	0,1442	0,1544	0,1751	0,1961	0,2174	0,2500	0,3061
25	0,0826	0,0998	0,1261	0,1349	0,1528	0,1709	0,1893	0,2174	0,2655
28	0,0735	0,0888	0,1119	0,1198	0,1355	0,1515	0,1677	0,1923	0,2344
30	0,0685	0,0826	0,1042	0,1114	0,1261	0,1408	0,1558	0,1786	0,2174
38	0,0538	0,0648	0,0815	0,0871	0,0985	0,1099	0,1214	0,1389	0,1685

NOTE: Factors below heavy black line are calculated to ASME B31.3 section 304 using the $Y=0.4$, while the right factors are calculated by using $Y=d/(d+D)$.

WORKING PRESSURE FOR SEAMLESS ASTM A269 316/ 316L (BAR)

Allowable stress = 129MPa between -29 degree C and 38 degree C, based on:

ASTM A213 - minimum yield 205MPa and min. tensile strength 515MPa

Safety factor = 4 - for 515MPa

TUBE O.D. (mm)	TUBE WALL THICKNESS (mm)								
	1	1,2	1,5	1,6	1,8	2	2,2	2,5	3
3	1032								
4	774	934							
6	496	607	774	829					
8	358	440	565	607					
10	280	342	440	473	540	607			
12	230	280	358	385	440	496			
14	195	237	302	325	370	416	464	536	655
16	170	206	261	280	319	358	399	461	565
18	150	182	230	247	280	315	350	403	496
20	134	163	206	221	250	280	311	358	440
22	122	147	186	199	226	253	280	323	395
25	107	129	163	174	197	221	244	280	342
28	95	114	144	154	175	195	216	248	302
30	88	107	134	144	163	182	201	230	280
38	69	84	105	112	127	142	157	179	217

NOTE: The above pressures should only be used for guidance - as applicable codes, design standards and allowable stresses may result in other values.

WORKING PRESSURE FOR SEAMLESS ASTM A269 6MO - UNS S31254 (BAR)

Allowable stress = 169 MPa between -29 degree C and 93 degree C, based on:

ASTM A249 - minimum yield 310MPa and min. tensile strength 675MPa.

Safety factor = 4 - for 675MPa

TUBE O.D. (mm)	TUBE WALL THICKNESS (mm)								
	1	1,2	1,5	1,6	1,8	2	2,2	2,5	3
3	1352								
4	1014	1224							
6	650	795	1014	1086					
8	469	576	741	795					
10	367	449	576	620	708	795			
12	302	367	469	504	576	650			
14	256	311	396	425	484	545	608	702	858
16	222	270	343	367	418	469	522	604	741
18	197	238	302	323	367	412	458	528	650
20	176	213	270	289	328	367	408	469	576
22	159	193	244	261	296	331	367	423	517
25	140	169	213	228	258	289	320	367	449
28	124	150	189	202	229	256	283	325	396
30	116	140	176	188	213	238	263	302	367
38	91	110	138	147	166	186	205	235	285

NOTE: The above pressures should only be used for guidance - as applicable codes, design standards and allowable stresses may result in other values.

WORKING PRESSURE FOR SEAMLESS 22CR DUPLEX - UNS S31803 (BAR)

Allowable stress =155 MPa between -29 degree C and 38 degree C, based on:

ASTM A789 - minimum yield 450MPa and min. tensile strength 620MPa.

Safety factor = 4 - for 620MPa

TUBE O.D. (mm)	TUBE WALL THICKNESS (mm)								
	1	1,2	1,5	1,6	1,8	2	2,2	2,5	3
3	1240								
4	930	1122							
6	596	729	930	996					
8	431	528	679	729					
10	337	412	528	569	649	729			
12	277	337	431	463	528	596			
14	235	285	363	390	444	500	557	644	787
16	204	247	314	337	383	431	479	554	679
18	180	218	277	297	337	378	420	484	596
20	161	195	247	265	301	337	374	431	528
22	146	177	224	239	271	304	337	388	474
25	128	155	195	209	237	265	293	337	412
28	114	138	174	186	210	235	260	298	363
30	106	128	161	173	195	218	242	277	337
38	83	100	126	135	153	170	188	215	261

NOTE: The above pressures should only be used for guidance - as applicable codes, design standards and allowable stresses may result in other values.

FACTOR CHART FOR PRESSURE CALCULATION OF TUBING - FRACTIONAL

The below table values are based on ASME B31.3 section 304, and may be used for calculation of:

- 1) Working pressure (maximum allowable by design standard), i.e. "Table factor" multiplied by "Maximum Allowable Stress" (MPa)
- 2) Yield pressure (calculated by nominal values), i.e. "Table factor" multiplied by "Minimum Yield Strength" (MPa)
- 3) Burst pressure (calculated by nominal values), i.e. "Table factor" multiplied by "Minimum Tensile Strength" (MPa)

TUBE O.D. (IN.)	TUBE OD (MM.) (Info only)	TUBE WALL THICKNESS (INCHES)										
		0,028	0,035	0,049	0,065	0,083	0,095	0,109	0,120	0,134	0,148	0,156
1/8	3,18	0,5329	0,6756									
3/16	4,76	0,3392	0,4360	0,6289								
1/4	6,35	0,2460	0,3153	0,4602	0,6255							
5/16	7,94	0,1930	0,2460	0,3586	0,4914							
3/8	9,53	0,1588	0,2017	0,2918	0,4017	0,5260						
1/2	12,70	0,1173	0,1483	0,2127	0,2902	0,3828	0,4447					
5/8	15,88		0,1173	0,1673	0,2269	0,2972	0,3461	0,4044				
3/4	19,05		0,0970	0,1379	0,1862	0,2428	0,2819	0,3289	0,3670			
7/8	22,23		0,0826	0,1173	0,1580	0,2053	0,2378	0,2767	0,3081	0,3490		
1	25,40		0,0720	0,1020	0,1371	0,1778	0,2056	0,2388	0,2655	0,3002		
1 ¼	31,75			0,1085	0,1403	0,1618	0,1875	0,2080	0,2345	0,2616	0,2773	
1 ½	38,10				0,1158	0,1334	0,1543	0,1709	0,1924	0,2142	0,2269	
2	50,80					0,0988	0,1140	0,1261	0,1416	0,1573	0,1664	

NOTE: Factors below heavy black line are calculated to ASME B31.3 section 304 using the $Y=0.4$, while the right factors are calculated by using $Y=d/(d+D)$.

WORKING PRESSURE FOR SEAMLESS ASTM A269 316/ 316L (PSI)

Allowable stress = 18750 psi between -29 degree C and 38 degree C, based on:

ASTM A213 - minimum yield 205MPa and min. tensile strength 515MPa

Safety factor = 4 - for 75000psi (515MPa)

TUBE O.D. (IN.)	TUBE OD (MM.) (Info only)	TUBE WALL THICKNESS (INCHES)										
		0,028	0,035	0,049	0,065	0,083	0,095	0,109	0,120	0,134	0,148	0,156
1/8	3,18	9992	12668									
3/16	4,76	6360	8176	11791								
1/4	6,35	4613	5912	8629	11728							
5/16	7,94	3619	4613	6723	9213							
3/8	9,53	2978	3782	5472	7532	9862						
1/2	12,70	2198	2781	3988	5441	7178	8338					
5/8	15,88		2198	3137	4254	5572	6489	7583				
3/4	19,05		1818	2585	3492	4553	5286	6167	6881			
7/8	22,23		1550	2198	2962	3849	4459	5188	5777	6545		
1	25,40		1350	1912	2571	3334	3856	4478	4978	5628		
1 ¼	31,75				2035	2630	3034	3515	3899	4397	4905	5199
1 ½	38,10					2171	2502	2893	3205	3608	4017	4254
2	50,80						1852	2137	2363	2655	2950	3120

NOTE: The above pressures should only be used for guidance - as applicable codes, design standards and allowable stresses may result in other values.

WORKING PRESSURE FOR SEAMLESS ASTM A269 6MO - UNS S31254 (PSI)

Allowable stress = 24500 psi between -29 degree C and 93 degree C, based on:
 ASTM A249 - minimum yield 310MPa and min. tensile strength 675MPa (ASTM A249)
 Safety factor = 4 - for 98000psi (675MPa)

TUBE O.D. (IN.)	TUBE OD (MM.) (Info only)	TUBE WALL THICKNESS (INCHES)										
		0,028	0,035	0,049	0,065	0,083	0,095	0,109	0,120	0,134	0,148	0,156
1/8	3,18	13056	16552									
3/16	4,76	8310	10683	15407								
1/4	6,35	6028	7725	11275	15324							
5/16	7,94	4729	6028	8785	12038							
3/8	9,53	3891	4942	7150	9842	12887						
1/2	12,70	2873	3633	5211	7109	9380	10894					
5/8	15,88		2873	4099	5558	7281	8479	9909				
3/4	19,05		2375	3378	4563	5949	6907	8058	8991			
7/8	22,23		2025	2873	3870	5030	5826	6780	7548	8552		
1	25,40		1764	2499	3360	4356	5038	5851	6504	7354		
1 ¼	31,75				2659	3436	3965	4593	5095	5746	6409	6793
1 ½	38,10					2837	3269	3780	4188	4714	5249	5558
2	50,80						2419	2792	3088	3469	3854	4076

NOTE: The above pressures should only be used for guidance - as applicable codes, design standards and allowable stresses may result in other values.

WORKING PRESSURE FOR SEAMLESS 22CR DUPLEX - UNS S31803 (PSI)

Allowable stress = 22500 psi between -29 degree C and 38 degree C, based on:
 ASTM A789 - minimum yield 450MPa and min. tensile strength 620MPa.
 Safety factor = 4 - for 90000psi (620MPa)

TUBE O.D. (IN.)	TUBE OD (MM.) (Info only)	TUBE WALL THICKNESS (INCHES)										
		0,028	0,035	0,049	0,065	0,083	0,095	0,109	0,120	0,134	0,148	0,156
1/8	3,18	11991	15201									
3/16	4,76	7632	9811	14150								
1/4	6,35	5536	7095	10355	14073							
5/16	7,94	4343	5536	8068	11056							
3/8	9,53	3573	4539	6566	9038	11835						
1/2	12,70	2638	3337	4785	6529	8614	10005					
5/8	15,88		2638	3764	5105	6686	7787	9100				
3/4	19,05		2181	3102	4191	5464	6343	7400	8257			
7/8	22,23		1860	2638	3554	4619	5350	6226	6932	7854		
1	25,40		1620	2295	3085	4001	4627	5374	5973	6754		
1 ¼	31,75				2442	3156	3641	4218	4679	5277	5885	6239
1 ½	38,10					2605	3002	3472	3846	4329	4820	5105
2	50,80						2222	2564	2836	3186	3540	3744

NOTE: The above pressures should only be used for guidance - as applicable codes, design standards and allowable stresses may result in other values.

BUTT-WELD FITTINGS

ASME B 16.9

MSS SP-75

ASME B 16.28

JIS B2311/2316



ELBOWS



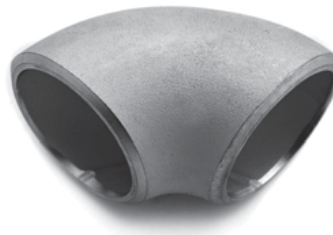
45° Long Radius Elbow



90° Long Radius Elbow



180° Long Radius Elbow



90° Short Radius Elbow

TEES



Equal Tee



Reducing Tee

STUB ENDS



ASA Stub End

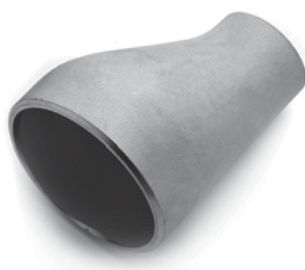


MSS Stub End

REDUCERS



Concentric Reducer



Eccentric Reducer

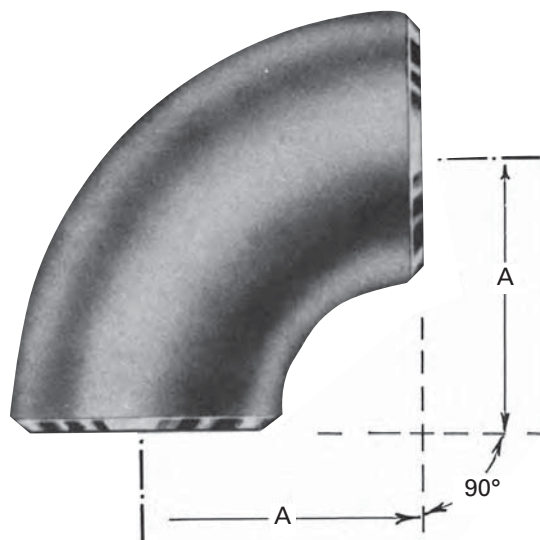
CAP



Cap

Long radius elbows

90° long radius elbow



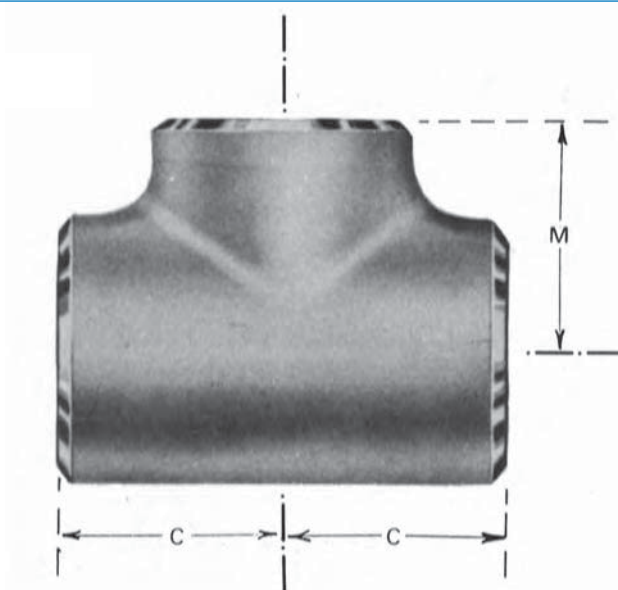
45° long radius elbow



ASME B16.9				MSS SP-75			
N.B.	O.D. at Bevel	A (mm)	B (mm)	N.B.	O.D. at Bevel	A (mm)	B (mm)
1/2	21,3	38	16				
3/4	26,7	38	19				
1	33,4	38	22				
1 1/4	42,2	48	25				
1 1/2	48,3	57	29				
2	60,3	76	35				
2 1/2	73,0	95	44				
3	88,9	114	51				
3 1/2	101,6	133	57				
4	114,3	152	64				
5	141,3	190	79				
6	168,3	229	95				
8	219,1	305	127				
10	273,0	381	159				
12	323,8	457	190				
14	355,6	533	222				
16	406,4	610	254	16	406,4	610	254
18	457,0	686	286	18	457,0	686	286
20	508,0	762	318	20	508,0	762	318
22	559,0	838	343	22	559,0	838	343
24	610,0	914	381	24	610,0	914	381
26	660,0	991	406	26	660,0	991	406
28	711,0	1067	438	28	711,0	1067	438
30	762,0	1143	470	30	762,0	1143	470
32	813,0	1219	502	32	813,0	1219	502
34	864,0	1295	533	34	864,0	1295	533
36	914,0	1372	565	36	914,0	1372	565
38	965,0	1448	600	38	965,0	1448	600
40	1016,0	1524	632	40	1016,0	1524	632
42	1067,0	1600	660	42	1067,0	1600	660
44	1118,0	1676	695	44	1118,0	1676	695
46	1168,0	1753	727	46	1168,0	1753	727
48	1219,0	1829	759	48	1219,0	1829	759

Tees

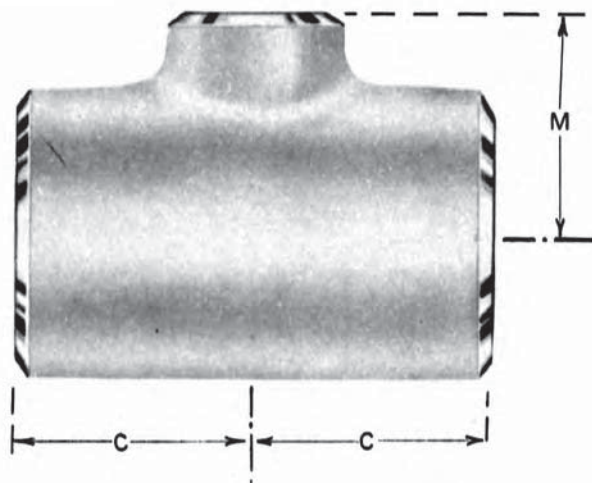
Equal Tees



ASME B16.9				MSS SP-75			
N.B.	O.D. at Bevel	C (mm)	M (mm)	N.B.	O.D. at Bevel	C (mm)	M (mm)
1/2	21,3	25	25				
3/4	26,7	29	29				
1	33,4	38	38				
1 1/4	42,2	48	48				
1 1/2	48,3	57	57				
2	60,3	64	64				
2 1/2	73,0	76	76				
3	88,9	86	86				
3 1/2	101,6	95	95				
4	114,3	105	105				
5	141,3	124	124				
6	168,3	143	143				
8	219,1	178	178				
10	273,0	216	216				
12	323,8	254	254				
14	355,6	279	279				
16	406,4	305	305	16	406,4	305	305
18	457,0	343	343	18	457,0	343	343
20	508,0	381	381	20	508,0	381	381
22	559,0	419	419	22	559,0	419	419
24	610,0	432	432	24	610,0	432	432
26	660,0	495	495	26	660,0	495	495
28	711,0	521	521	28	711,0	521	521
30	762,0	559	559	30	762,0	559	559
32	813,0	597	597	32	813,0	597	597
34	864,0	635	635	34	864,0	635	635
36	914,0	673	673	36	914,0	673	673
38	965,0	711	711	38	965,0	711	711
40	1016,0	749	749	40	1016,0	749	749
42	1067,0	762	711	42	1067,0	762	711
44	1118,0	813	762	44	1118,0	813	762
46	1168,0	851	800	46	1168,0	851	800
48	1219,0	889	838	48	1219,0	889	838

Tees

Reducing Outlet Tees



REDUCING OUTLET TEES (dimensions in mm)

ASME B16.9						MSS SP-75					
N.B.		O.D. at Bevel		Run	Outlet	N.B.		O.D. at Bevel		Run	Outlet
Run	Outlet	Run	Outlet	C	M	Run	Outlet	Run	Outlet	C	M
1/2	3/8	21,3	17,3	25	25						
1/2	1/4	21,3	13,7	25	25						
3/4	1/2	26,7	21,3	29	29						
3/4	3/8	26,7	17,3	29	29						
1	3/4	33,4	26,7	38	38						
1	1/2	33,4	21,3	38	38						
1 1/4	1	42,2	33,4	48	48						
1 1/4	3/4	42,2	26,7	48	48						
1 1/4	1/2	42,2	21,3	48	48						
1 1/2	1 1/4	48,3	42,2	57	57						
1 1/2	1	48,3	33,4	57	57						
1 1/2	3/4	48,3	26,7	57	57						
1 1/2	1/2	48,3	21,3	57	57						
2	1 1/2	60,3	48,3	64	60						
2	1 1/4	60,3	42,2	64	57						
2	1	60,3	33,4	64	51						
2	3/4	60,3	26,7	64	44						
2 1/2	2	73,0	60,3	76	70						
2 1/2	1 1/2	73,0	48,3	76	67						
2 1/2	1 1/4	73,0	42,2	76	64						
2 1/2	1	73,0	33,4	76	57						
3	2 1/2	88,9	73,0	86	83						
3	2	88,9	60,3	86	76						
3	1 1/2	88,9	48,3	86	73						
3	1 1/4	88,9	42,2	86	70						
3 1/2	3	101,6	88,9	95	92						
3 1/2	2 1/2	101,6	73,0	95	89						
3 1/2	2	101,6	60,3	95	83						
3 1/2	1 1/2	101,6	48,3	95	79						

REDUCING OUTLET TEES (dimensions in mm) – continued

ASME B16.9						MSS SP-75					
N.B.		O.D. at Bevel		Run	Outlet	N.B.		O.D. at Bevel		Run	Outlet
Run	Outlet	Run	Outlet	C	M	Run	Outlet	Run	Outlet	C	M
4	3 ½	114,3	101,6	105	102						
4	3	114,3	88,9	105	98						
4	2 ½	114,3	73,0	105	95						
4	2	114,3	60,3	105	89						
4	1 ½	114,3	48,3	105	86						
5	4	141,3	114,3	124	117						
5	3 ½	141,3	101,6	124	114						
5	3	141,3	88,9	124	111						
5	2 ½	141,3	73,0	124	108						
5	2	141,3	60,3	124	105						
6	5	168,3	141,3	143	137						
6	4	168,3	114,3	143	130						
6	3 ½	168,3	101,6	143	127						
6	3	168,3	88,9	143	124						
6	2 ½	168,3	73,0	143	121						
8	6	219,1	168,3	178	168						
8	5	219,1	141,3	178	162						
8	4	219,1	114,3	178	156						
8	3 ½	219,1	101,6	178	152						
10	8	273,0	219,1	216	203						
10	6	273,0	168,3	216	194						
10	5	273,0	141,3	216	191						
10	4	273,0	114,3	216	184						
12	10	323,8	273,0	254	241						
12	8	323,8	219,1	254	229						
12	6	323,8	168,3	254	219						
12	5	323,8	141,3	254	216						
14	12	355,6	323,8	279	270						
14	10	355,6	273,1	279	257						
14	8	355,6	219,1	279	248						
14	6	355,6	168,3	279	238						
16	14	406,4	355,6	305	305	16	14	406,4	355,6	305	305
16	12	406,4	323,8	305	295	16	12	406,4	323,8	305	295
16	10	406,4	273,0	305	283	16	10	406,4	273,0	305	283
16	8	406,4	219,1	305	273	16	8	406,4	219,1	305	273
16	6	406,4	168,3	305	264	16	6	406,4	168,3	305	264
18	16	457	406,4	343	330	18	16	457	406,4	343	330
18	14	457	355,6	343	330	18	14	457	355,6	343	330
18	12	457	323,8	343	321	18	12	457	323,8	343	321
18	10	457	273,0	343	308	18	10	457	273,0	343	308
18	8	457	219,1	343	298	18	8	457	219,1	343	298
20	18	508	457,0	381	368	20	18	508	475,0	381	368
20	16	508	406,4	381	356	20	16	508	406,4	381	356
20	14	508	355,6	381	356	20	14	508	355,6	381	356
20	12	508	323,8	381	346	20	12	508	323,8	381	346
20	10	508	273,0	381	333	20	10	508	273,0	381	333
20	8	508	219,1	381	324	20	8	508	219,1	381	324
22	20	559	508,0	419	406	22	20	559	508,0	419	406
22	18	559	457,0	419	394	22	18	559	457,0	419	394
22	16	559	406,4	419	381	22	16	559	406,4	419	381
22	14	559	355,6	419	381	22	14	559	355,6	419	381
22	12	559	323,8	419	371	22	12	559	323,8	419	371
22	10	559	273,0	419	359	22	10	559	273,0	419	359
24	22	610	559,0	432	432	24	22	610	559,0	432	432
24	20	610	508,0	432	432	24	20	610	508,0	432	432
24	18	610	457,0	432	419	24	18	610	457,0	432	419
24	16	610	406,4	432	406	24	16	610	406,4	432	406
24	14	610	355,6	432	406	24	14	610	355,6	432	406
24	12	610	323,8	432	397	24	12	610	323,8	432	397
24	10	610	273,0	432	384	24	10	610	273,0	432	384

REDUCING OUTLET TEES (dimensions in mm) – continued

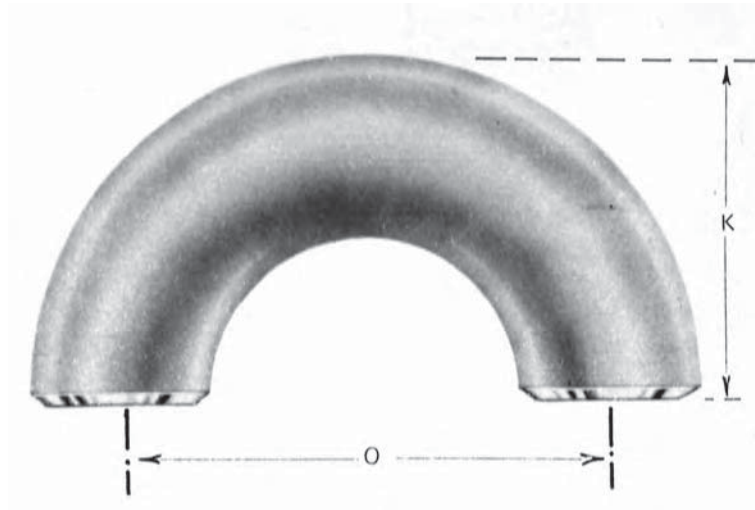
ASME B16.9						MSS SP-75					
N.B.		O.D. at Bevel		Run	Outlet	N.B.		O.D. at Bevel		Run	Outlet
Run	Outlet	Run	Outlet	C	M	Run	Outlet	Run	Outlet	C	M
26	24	660	610,0	495	483	26	24	660	610,0	495	483
26	22	660	559,0	495	470	26	22	660	559,0	495	470
26	20	660	508,0	495	457	26	20	660	508,0	495	457
26	18	660	457,0	495	444	26	18	660	457,0	495	444
26	16	660	406,4	495	432	26	16	660	406,4	495	432
26	14	660	355,6	495	432	26	14	660	355,6	495	432
26	12	660	323,8	495	422	26	12	660	323,8	495	422
28	26	711	660,0	521	521	28	26	711	660,0	521	521
28	24	711	610,0	521	508	28	24	711	610,0	521	508
28	22	711	559,0	521	495	28	22	711	559,0	521	495
28	20	711	508,0	521	483	28	20	711	508,0	521	483
28	18	711	457,0	521	470	28	18	711	457,0	521	470
28	16	711	406,4	521	457	28	16	711	406,4	521	457
28	14	711	355,6	521	457	28	14	711	355,6	521	457
28	12	711	323,8	521	448	28	12	711	323,8	521	448
30	28	762	711,0	559	546	30	28	762	711,0	559	546
30	26	762	660,0	559	546	30	26	762	660,0	559	546
30	24	762	610,0	559	533	30	24	762	610,0	559	533
30	22	762	559,0	559	521	30	22	762	559,0	559	521
30	20	762	508,0	559	508	30	20	762	508,0	559	508
30	18	762	457,0	559	495	30	18	762	457,0	559	495
30	16	762	406,4	559	483	30	16	762	406,4	559	483
30	14	762	355,6	559	483	30	14	762	355,6	559	483
30	12	762	323,8	559	473	30	12	762	323,8	559	473
30	10	762	273,0	559	460	30	10	762	273,0	559	460
32	30	813	762,0	597	584	32	30	813	762,0	597	584
32	28	813	711,0	597	572	32	28	813	711,0	597	572
32	26	813	660,0	597	572	32	26	813	660,0	597	572
32	24	813	610,0	597	559	32	24	813	610,0	597	559
32	22	813	559,0	597	546	32	22	813	559,0	597	546
32	20	813	508,0	597	533	32	20	813	508,0	597	533
32	18	813	457,0	597	521	32	18	813	457,0	597	521
32	16	813	406,4	597	508	32	16	813	406,4	597	508
32	14	813	355,6	597	508	32	14	813	355,6	597	508
34	32	864	813,0	635	622	34	32	864	813,0	635	622
34	30	864	762,0	635	610	34	30	864	762,0	635	610
34	28	864	711,0	635	597	34	28	864	711,0	635	597
34	26	864	660,0	635	597	34	26	864	660,0	635	597
34	24	864	610,0	635	584	34	24	864	610,0	635	584
34	22	864	559,0	635	572	34	22	864	559,0	635	572
34	20	864	508,0	635	559	34	20	864	508,0	635	559
34	18	864	457,0	635	546	34	18	864	457,0	635	546
34	16	864	406,4	635	533	34	16	864	406,4	635	533
36	34	914	864,0	673	660	36	34	914	864,0	673	660
36	32	914	813,0	673	648	36	32	914	813,0	673	648
36	30	914	762,0	673	635	36	30	914	762,0	673	635
36	28	914	711,0	673	622	36	28	914	711,0	673	622
36	26	914	660,0	673	622	36	26	914	660,0	673	622
36	24	914	610,0	673	610	36	24	914	610,0	673	610
36	22	914	559,0	673	597	36	22	914	559,0	673	597
36	20	914	508,0	673	584	36	20	914	508,0	673	584
36	18	914	457,0	673	572	36	18	914	457,0	673	572
36	16	914	406,4	673	559	36	16	914	406,4	673	559
38	36	965	914,0	711	711	38	36	965	914,0	711	711
38	34	965	864,0	711	698	38	34	965	864,0	711	698
38	32	965	813,0	711	686	38	32	965	813,0	711	686
38	30	965	762,0	711	673	38	30	965	762,0	711	673
38	28	965	711,0	711	648	38	28	965	711,0	711	648
38	26	965	660,0	711	648	38	26	965	660,0	711	648
38	24	965	610,0	711	635	38	24	965	610,0	711	635
38	22	965	559,0	711	622	38	22	965	559,0	711	622
38	20	965	508,0	711	610	38	20	965	508,0	711	610
38	18	965	457,0	711	597	38	18	965	457,0	711	597

REDUCING OUTLET TEES (dimensions in mm) – continued

ASME B16.9						MSS SP-75					
N.B.		O.D. at Bevel		Run	Outlet	N.B.		O.D. at Bevel		Run	Outlet
Run	Outlet	Run	Outlet	C	M	Run	Outlet	Run	Outlet	C	M
40	38	1016	965	749	749	40	38	1016	965	749	749
40	36	1016	914	749	737	40	36	1016	914	749	737
40	34	1016	864	749	724	40	34	1016	864	749	724
40	32	1016	813	749	711	40	32	1016	813	749	711
40	30	1016	762	749	698	40	30	1016	762	749	698
40	28	1016	711	749	673	40	28	1016	711	749	673
40	26	1016	660	749	673	40	26	1016	660	749	673
40	24	1016	610	749	660	40	24	1016	610	749	660
40	22	1016	559	749	648	40	22	1016	559	749	648
40	20	1016	508	749	635	40	20	1016	508	749	635
40	18	1016	457	749	622	40	18	1016	457	749	622
42	40	1067	1016	762	711						
42	38	1067	968	762	711						
42	36	1067	914	762	711	42	36	1067	914	762	711
42	34	1067	864	762	711	42	34	1067	864	762	711
42	32	1067	813	762	711	42	32	1067	813	762	711
42	30	1067	762	762	711	42	30	1067	762	762	711
42	28	1067	711	762	698	42	28	1067	711	762	698
42	26	1067	660	762	698	42	26	1067	660	762	698
42	24	1067	610	762	660	42	24	1067	610	762	660
42	22	1067	559	762	660	42	22	1067	559	762	660
42	20	1067	508	762	660	42	20	1067	508	762	660
42	18	1067	457	762	648	42	18	1067	457	762	648
42	16	1067	406,4	762	635	42	16	1067	406,4	762	635
44	42	1118	1067	813	762	44	42	1118	1067	813	762
44	40	1118	1016	813	749	44	40	1118	1016	813	749
44	38	1118	965	813	737	44	38	1118	965	813	737
44	36	1118	914	813	724	44	36	1118	914	813	724
44	34	1118	864	813	724	44	34	1118	864	813	724
44	32	1118	813	813	711	44	32	1118	813	813	711
44	30	1118	762	813	711	44	30	1118	762	813	711
44	28	1118	711	813	698	44	28	1118	711	813	698
44	26	1118	660	813	698	44	26	1118	660	813	698
44	24	1118	610	813	698	44	24	1118	610	813	698
44	22	1118	559	813	686	44	22	1118	559	813	686
44	20	1118	508	813	686	44	20	1118	508	813	686
46	44	1168	1118	851	800	46	44	1168	1118	851	800
46	42	1168	1067	851	787	46	42	1168	1067	851	787
46	40	1168	1016	851	775	46	40	1168	1016	851	775
46	38	1168	965	851	762	46	38	1168	965	851	762
46	36	1168	914	851	762	46	36	1168	914	851	762
46	34	1168	864	851	749	46	34	1168	864	851	749
46	32	1168	813	851	749	46	32	1168	813	851	749
46	30	1168	762	851	737	46	30	1168	762	851	737
46	28	1168	711	851	737	46	28	1168	711	851	737
46	26	1168	660	851	737	46	26	1168	660	851	737
46	24	1168	610	851	724	46	24	1168	610	851	724
46	22	1168	559	851	724	46	22	1168	559	851	724
48	46	1219	1168	889	838	48	46	1219	1168	889	838
48	44	1219	1118	889	838	48	44	1219	1118	889	838
48	42	1219	1067	889	813	48	42	1219	1067	889	813
48	40	1219	1016	889	813	48	40	1219	1016	889	813
48	38	1219	965	889	813	48	38	1219	965	889	813
48	36	1219	914	889	787	48	36	1219	914	889	787
48	34	1219	864	889	787	48	34	1219	864	889	787
48	32	1219	813	889	787	48	32	1219	813	889	787
48	30	1219	762	889	762	48	30	1219	762	889	762
48	28	1219	711	889	762	48	28	1219	711	889	762
48	26	1219	660	889	762	48	26	1219	660	889	762
48	24	1219	610	889	737	48	24	1219	610	889	737
48	22	1219	559	889	737	48	22	1219	559	889	737

Long Radius Bends

Long Radius Return Bends

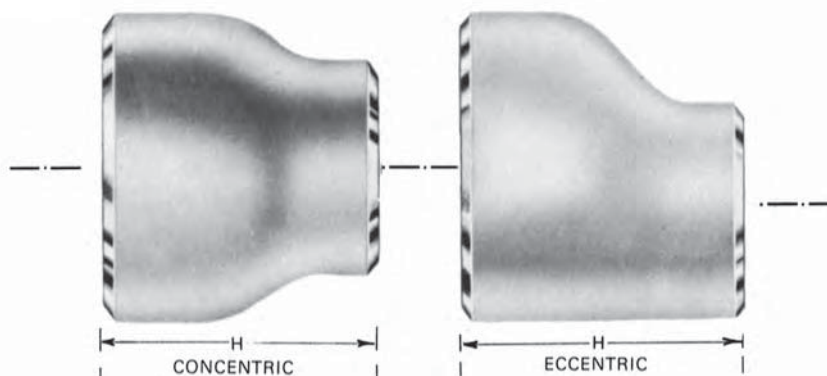


LONG RADIUS RETURN BENDS (dimensions in mm)

ASME B16.9			
N.B.	O.D. at Bevel	O	K
1/2	21,3	76	48
3/4	26,7	76	51
1	33,4	76	56
1 1/4	42,2	95	70
1 1/2	48,3	114	83
2	60,3	152	106
2 1/2	73,0	190	132
3	88,9	229	159
3 1/2	101,6	267	184
4	114,3	305	210
5	141,3	381	262
6	168,3	457	313
8	219,1	610	414
10	273,0	762	518
12	323,8	914	619
14	355,6	1067	711
16	406,4	1219	813
18	457,0	1372	914
20	508,0	1524	1016
22	559,0	1676	1118
24	610,0	1829	1219

Reducers

Concentric and eccentric reducers



REDUCERS (dimensions in mm)

ASME B16.9					MSS SP-75					ASME B16.9					MSS SP-75				
N.B.		O.D. at Bevel			N.B.		O.D. at Bevel			N.B.		O.D. at Bevel			N.B.		O.D. at Bevel		
L.E.	S.E.	L.E.	S.E.	H	L.E.	S.E.	L.E.	S.E.	H	L.E.	S.E.	L.E.	S.E.	H	L.E.	S.E.	L.E.	S.E.	H
3/4	3/8	26,7	17,3	38						5	4	141,3	114,3	127					
3/4	1/2	26,7	21,3	38						5	3 1/2	141,3	101,6	127					
1	3/4	33,4	26,7	51						5	3	141,3	88,9	127					
1	1/2	33,4	21,3	51						5	2 1/2	141,3	73,0	127					
1 1/4	1	42,2	33,4	51						5	2	141,3	60,3	127					
1 1/4	3/4	42,2	26,7	51						6	5	168,3	141,3	140					
1 1/4	1/2	42,2	21,3	51						6	4	168,3	114,3	140					
1 1/2	1 1/4	48,3	42,2	64						6	3 1/2	168,3	101,6	140					
1 1/2	1	48,3	33,4	64						6	3	168,3	88,9	140					
1 1/2	3/4	48,3	26,7	64						6	2 1/2	168,3	73,0	140					
1 1/2	1/2	48,3	21,3	64						8	6	219,1	168,3	152					
2	1 1/2	60,3	48,3	76						8	5	219,1	141,3	152					
2	1 1/4	60,3	42,2	76						8	4	219,1	114,3	152					
2	1	60,3	33,4	76						8	3 1/2	219,1	101,6	152					
2	3/4	60,3	26,7	76						10	8	273,0	219,1	178					
2 1/2	2	73,0	60,3	89						10	6	273,0	168,3	178					
2 1/2	1 1/2	73,0	48,3	89						10	5	273,0	141,3	178					
2 1/2	1 1/4	73,0	42,2	89						10	4	273,0	114,3	178					
2 1/2	1	73,0	33,4	89						12	10	323,8	273,0	203					
3	2 1/2	88,9	73,0	89						12	8	323,8	219,1	203					
3	2	88,9	60,3	89						12	6	323,8	168,3	203					
3	1 1/2	88,9	48,3	89						12	5	323,8	141,3	203					
3	1 1/4	88,9	42,2	89						14	12	355,6	323,8	330					
3 1/2	3	101,6	88,9	102						14	10	355,6	273,0	330					
3 1/2	2 1/2	101,6	73,0	102						14	8	355,6	219,1	330					
3 1/2	2	101,6	60,3	102						14	6	355,6	168,3	330					
3 1/2	1 1/2	101,6	48,3	102						16	14	406,4	355,6	356	16	14	406,4	355,6	356
3 1/2	1 1/4	101,6	42,2	102						16	12	406,4	323,8	356	16	12	406,4	323,8	356
4	3 1/2	114,3	101,6	102						16	10	406,4	273,0	356	16	10	406,4	273,0	356
4	3	114,3	88,9	102						16	8	406,4	219,1	356	16	8	406,4	219,1	356
4	2 1/2	114,3	73,0	102						18	16	457,2	406,4	381	18	16	457,2	406,4	381
4	2	114,3	60,3	102						18	14	457,0	355,6	381	18	14	457,0	355,6	381
4	1 1/2	114,3	48,3	102						18	12	457,0	323,8	381	18	12	457,0	323,8	381
										18	10	457,0	273,0	381	18	10	457,0	273,0	381

NOTE: LE = Large End
SE = Small End

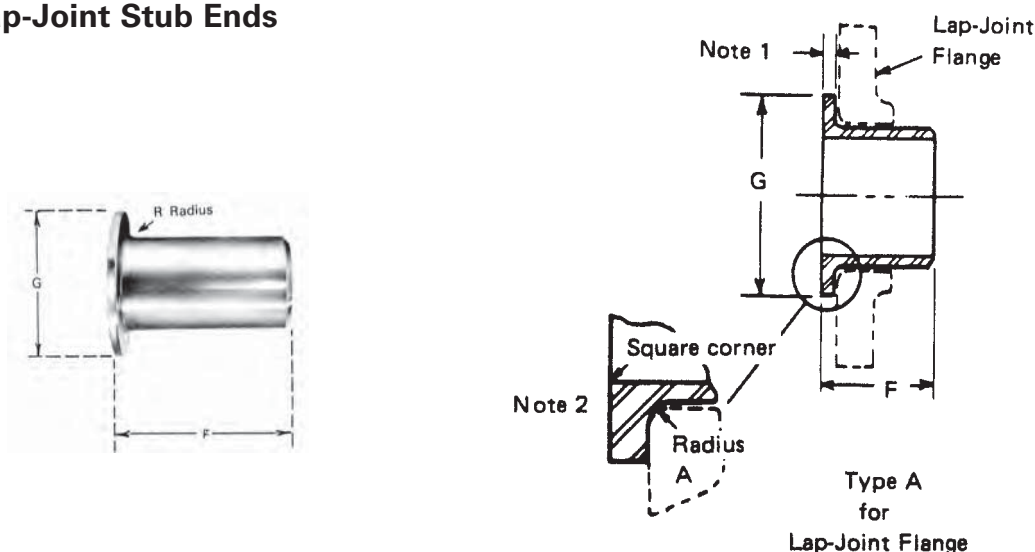
REDUCERS (dimensions in mm) - continued

ASME B16.9					MSS SP-75					ASME B16.9					MSS SP-75				
N.B.		O.D. at Bevel			N.B.		O.D. at Bevel			N.B.		O.D. at Bevel			N.B.		O.D. at Bevel		
L.E.	S.E.	L.E.	S.E.	H	L.E.	S.E.	L.E.	S.E.	H	L.E.	S.E.	L.E.	S.E.	H	L.E.	S.E.	L.E.	S.E.	H
20	18	508	457	508	20	18	508	457	508	40	38	1016	965	610	40	38	1016	965	610
20	16	508	406,4	508	20	16	508	406,4	508	40	36	1016	914	610	40	36	1016	914	610
20	14	508	355,6	508	20	14	508	355,6	508	40	34	1016	864	610	40	34	1016	864	610
20	12	508	323,8	508	20	12	508	323,8	508	40	32	1016	813	610	40	32	1016	813	610
22	20	559	508	508	22	20	559	508	508	40	30	1016	762	610	40	30	1016	762	610
22	18	559	457	508	22	18	559	457	508						40	28	1016	711	610
22	16	559	406,4	508	22	16	559	406,4	508						40	26	1016	660	610
22	14	559	355,6	508	22	14	559	355,6	508						40	24	1016	610	610
24	22	610	559	508	24	22	610	559	508						40	22	1016	559	610
24	20	610	508	508	24	20	610	508	508						40	20	1016	508	610
24	18	610	457	508	24	18	610	457	508	42	40	1067	1016	610	42	40	1067	1016	610
24	16	610	406,4	508	24	16	610	406,4	508	42	38	1067	965	610	42	38	1067	965	610
26	24	660	610	610	26	24	660	610	610	42	36	1067	914	610	42	36	1067	914	610
26	22	660	559	610	26	22	660	559	610	42	34	1067	864	610	42	34	1067	864	610
26	20	660	508	610	26	20	660	508	610	42	32	1067	813	610	42	32	1067	813	610
26	18	660	457	610	26	18	660	457	610	42	30	1067	762	610	42	30	1067	762	610
28	26	711	660	610	28	26	711	660	610						42	28	1067	711	610
28	24	711	610	610	28	24	711	610	610						42	26	1067	660	610
					28	22	711	559	610						42	24	1067	610	610
28	20	711	508	610	28	20	711	508	610						42	22	1067	559	610
28	18	711	457	610	28	18	711	457	610	44	42	1118	1067	610	44	42	1118	1067	610
30	28	762	711	610	30	28	762	711	610	44	40	1118	1016	610	44	40	1118	1016	610
30	26	762	660	610	30	26	762	660	610	44	38	1118	965	610	44	38	1118	965	610
30	24	762	610	610	30	24	762	610	610	44	36	1118	914	610	44	36	1118	914	610
					30	22	762	559	610						44	34	1118	864	610
30	20	762	508	610	30	20	762	508	610						44	32	1118	813	610
32	30	813	762	610	32	30	813	762	610						44	30	1118	762	610
32	28	813	711	610	32	28	813	711	610						44	28	1118	711	610
32	26	813	660	610	32	26	813	660	610						44	26	1118	660	610
32	24	813	610	610	32	24	813	610	610						44	24	1118	610	610
34	32	864	813	610	34	32	864	813	610						44	22	1118	559	610
34	30	864	762	610	34	30	864	762	610	46	44	1168	1118	711	46	44	1168	1118	711
					34	28	864	711		46	42	1168	1067	711	46	42	1168	1067	711
34	26	864	660	610	34	26	864	660	610	46	40	1168	1016	711	46	40	1168	1016	711
34	24	864	610	610	34	24	864	610	610	46	38	1168	965	711	46	38	1168	965	711
36	34	914	864	610	36	34	914	864	610						46	36	1168	914	711
36	32	914	813	610	36	32	914	813	610						46	34	1168	864	711
36	30	914	762	610	36	30	914	762	610						46	32	1168	813	711
					36	28	914	711	610						46	30	1168	762	711
36	26	914	660	610	36	26	914	660	610						46	28	1168	711	711
36	24	914	610	610	36	24	914	610	610						46	26	1168	660	711
38	36	965	914	610	38	36	965	914	610						46	24	1168	610	711
38	34	965	864	610	38	34	965	864	610	48	46	1219	1168	711	48	46	1219	1168	711
38	32	965	813	610	38	32	965	813	610	48	44	1219	1118	711	48	44	1219	1118	711
38	30	965	762	610	38	30	965	762	610	48	42	1219	1067	711	48	42	1219	1067	711
38	28	965	711	610	38	28	965	711	610	48	40	1219	1016	711	48	40	1219	1016	711
38	26	965	660	610	38	26	965	660	610						48	38	1219	965	711
					38	24	965	610	610						48	36	1219	914	711
					38	22	965	559	610						48	34	1219	864	711
					38	20	965	508	610						48	32	1219	813	711
															48	30	1219	762	711
															48	28	1219	711	711
															48	26	1219	660	711
															48	24	1219	610	711

NOTE: LE = Large End
SE = Small End

Stub Ends

Lap-Joint Stub Ends



LAP-JOINT STUB ENDS (dimensions in mm)

ASME B16.9 - long type							ASME B16.9 - Short type / MSS SP 43 Type A						
N.B.	O.D. at Bevel	F	RAD. of Fillet R	DIA. of Lap G	O.D. of Barrel		N.B.	O.D. at Bevel	F	RAD. of Fillet R	DIA. of Lap G	O.D. of Barrel	
					Max.	Min.						Max.	Min.
1/2	21,3	76	3	35	22,8	20,5	1/2	21,3	51	3	35	22,8	20,5
3/4	26,7	76	3	43	28,1	25,9	3/4	26,7	51	3	43	28,1	25,9
1	33,4	102	3	51	35,0	32,6	1	33,4	51	3	51	35,0	32,6
1 ¼	42,2	102	5	64	43,6	41,4	1¼	42,2	51	5	64	43,6	41,4
1 ½	48,3	102	6	73	49,9	47,5	1½	48,3	51	6	73	49,9	47,5
2	60,3	152	8	92	62,4	59,5	2	60,3	64	8	92	62,4	59,5
2 ½	73,0	152	8	105	75,3	72,2	2½	73,0	64	8	105	75,3	72,2
3	88,9	152	10	127	91,3	88,1	3	88,9	64	10	127	91,3	88,1
3 ½	101,6	152	10	140	104,0	100,8	3½	101,6	76	10	140	104,0	100,8
4	114,3	152	11	157	116,7	113,5	4	114,3	76	11	157	116,7	113,5
5	141,3	203	11	186	144,3	140,5	5	141,3	76	11	186	144,3	140,5
6	168,3	203	13	216	171,3	167,5	6	168,3	89	13	216	171,3	167,5
8	219,1	203	13	270	222,1	218,3	8	219,1	102	13	270	222,1	218,3
10	273,0	254	13	324	277,2	272,3	10	273,0	127	13	324	277,2	272,3
12	323,8	254	13	381	328,0	323,1	12	323,8	152	13	381	328,0	323,1
14	355,6	305	13	413	359,9	354,8	14	355,6	152	13	413	359,9	354,8
16	406,4	305	13	470	411,0	405,6	16	406,4	152	13	470	411,0	405,6
18	457,0	305	13	533	462,0	456,0	18	457,0	152	13	533	462,0	456,0
20	508,0	305	13	584	514,0	507,0	20	508,0	152	13	584	514,0	507,0
22	559,0	305	13	641	565,0	558,0	22	559,0	152	13	641	565,0	558,0
24	610,0	305	13	692	616,0	609,0	24	610,0	152	13	692	616,0	609,0

When used with the higher pressure flanges, it may be necessary to increase the length of stub ends in sizes 12in and larger. Such increase in length shall be a matter of agreement between the manufacturer and purchaser.

R – These dimensions conform to the radius established for lap-joint flanges in American National Standard Steel Pipe Flanges and Flanged Fittings ANSI B16.5.

G – The dimension conform to standard machined facings shown in the American National Standard Steel Pipe Flanges and Flanged Fittings ANSI B16.5. The back face of the lap shall be machined to conform to the surface on which it seats. Where ring joint facings are to be applied use dimension 'K' as given in ANSI B16.5.

F – When special facings such as tongue-groove, male-female, etc. are employed, additional lap thickness must be provided and such additional thickness shall be in addition to (not included in) the basic length 'F'.

End Caps



END CAPS (dimensions in mm)

ASME B16.9					MSS SP-75				
N.B.	O.D. at Bevel	# E	Limiting W.T. for Length E	³ E ₁	N.B.	O.D. at Bevel	# E	Limiting W.T. for Length E	E ₁
1/2	21,3	25	4,57	25					
3/4	26,7	25	3,81	25					
1	33,4	38	4,57	38					
1 1/4	42,2	38	4,83	38					
1 1/2	48,3	38	5,08	38					
2	60,3	38	5,59	44					
2 1/2	73,0	38	7,11	51					
3	88,9	51	7,62	64					
3 1/2	101,6	64	8,13	76					
4	114,3	64	8,64	76					
5	141,3	76	9,65	89					
6	168,3	89	10,92	102					
8	219,1	102	12,70	127					
10	273,0	127	12,70	152					
12	323,8	152	12,70	178					
14	355,6	165	12,70	191					
16	406,4	178	12,70	203	16	406,4	178	25,4	203
18	457	203	12,70	229	18	457	203	25,4	229
20	508	229	12,70	254	20	508	229	25,4	254
22	559	254	12,70	254	22	559	254	25,4	279
24	610	267	12,70	305	24	610	267	25,4	305
26	660	267	—	—	26	660	267	25,4	305
28	711	267	—	—	28	711	267	25,4	305
30	762	267	—	—	30	762	267	25,4	305
32	813	267	—	—	32	813	267	25,4	305
34	864	267	—	—	34	864	267	25,4	305
36	914	267	—	—	36	914	267	25,4	305
38	965	305	—	—	38	965	305	25,4	343
40	1016	305	—	—	40	1016	305	25,4	343
42	1067	305	—	—	42	1067	305	25,4	343
44	1118	343	—	—	44	1118	343	25,4	381
46	1168	343	—	—	46	1168	343	25,4	381
48	1219	343	—	—	48	1219	343	25,4	381

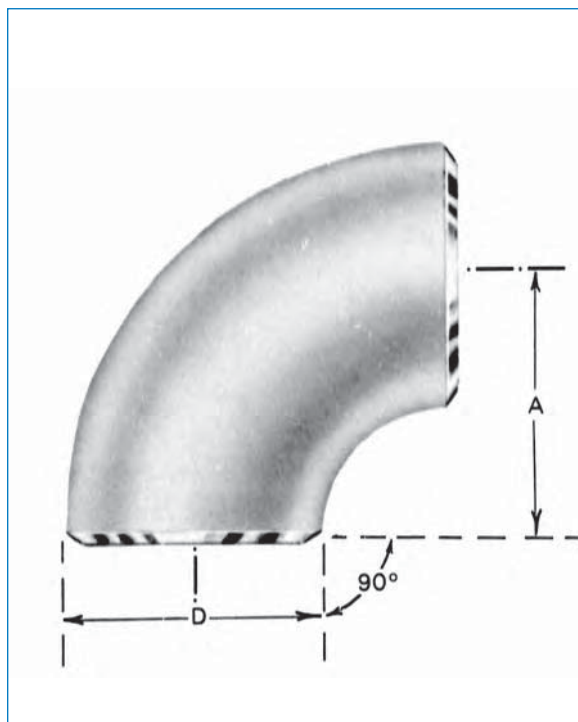
*The shape of these caps shall be ellipsoidal and shall conform to the shape requirements as given in ASME Boiler and Pressure Vessel Code.

#Length E applies for thickness not exceeding that given in column "Limiting Wall Thickness for Length E".

*3 Length E1, applies for thickness greater than that given in column "Limiting Wall Thickness" for sizes 24in. and smaller.

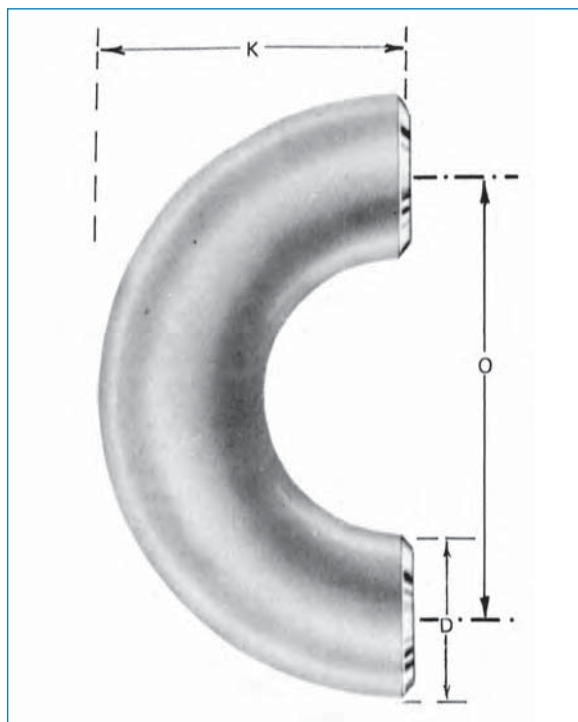
For type B16.9 sizes 26in. and larger the length E1, shall be by agreement between manufacturer and purchaser.

Short radius elbows



ASME B16.28 [mm]						
N.B. (inch)	O.D. at Bevel - D			Center to End dim. - A		
	Min.	Nom.	Max.	Min.	Nom.	Max.
1	32	33	34	23	25	27
1 ¼	41	42	43	30	32	34
1 ½	47	48	49	36	38	40
2	59	60	61	49	51	53
2 ½	72	73	74	62	64	66
3	88	89	90	74	76	78
3 ½	101	102	103	87	89	91
4	113	114	116	100	102	104
5	140	141	144	125	127	129
6	167	168	171	150	152	154
8	217	219	221	201	203	205
10	270	273	277	252	254	256
12	321	324	328	302	305	308
14	353	356	360	353	356	359
16	403	406	410	403	406	409
18	454	457	461	454	457	460
20	503	508	514	505	508	511
22	554	559	565	556	559	562
24	605	610	616	607	610	613

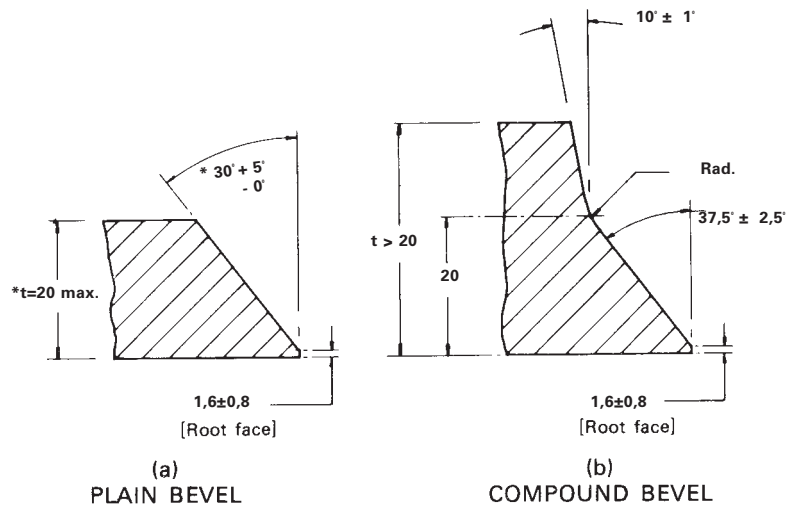
Short radius 180° returns



ASME B16.28 [mm]								
N.B. (inch)	O.D. at Bevel - D			Center to Center - O			Back to Bevel Face - K	
	Min.	Nom.	Max.	Min.	Nom.	Max.	Min.	Max.
1	32	33	34	44	51	58	34	48
1 ¼	41	42	43	57	64	71	45	59
1 ½	47	48	49	69	76	83	55	69
2	59	60	61	95	102	109	74	88
2 ½	72	73	74	120	127	134	93	107
3	88	89	90	145	152	159	114	128
3 ½	101	102	103	171	178	185	133	147
4	113	114	116	196	203	210	152	166
5	140	141	144	247	254	261	190	204
6	167	168	171	298	305	312	230	244
8	217	219	221	399	406	413	306	320
10	270	273	277	498	508	518	384	398
12	321	324	328	600	610	620	460	474
14	353	356	360	701	711	721	526	540
16	403	406	410	803	813	823	603	617
18	454	457	461	904	914	924	679	693
20	503	508	514	1006	1016	1026	755	769
22	554	559	565	1108	1118	1128	831	845
24	605	610	616	1209	1219	1229	907	921

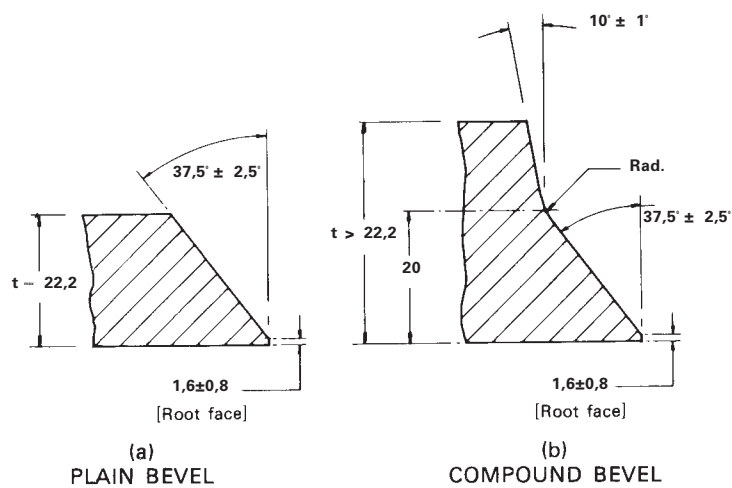
Bevel types

Welding Bevel For Fittings – MSS SP – 75 (mm)

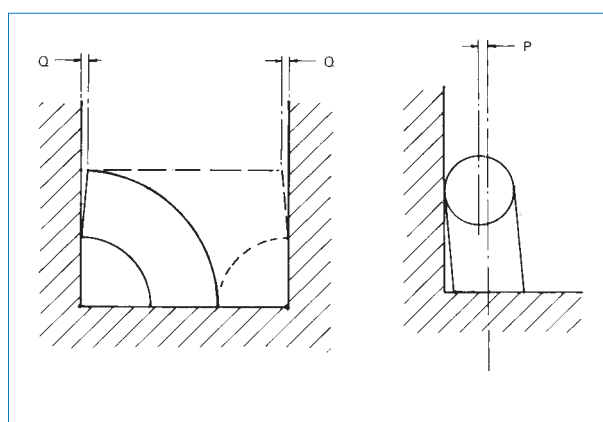
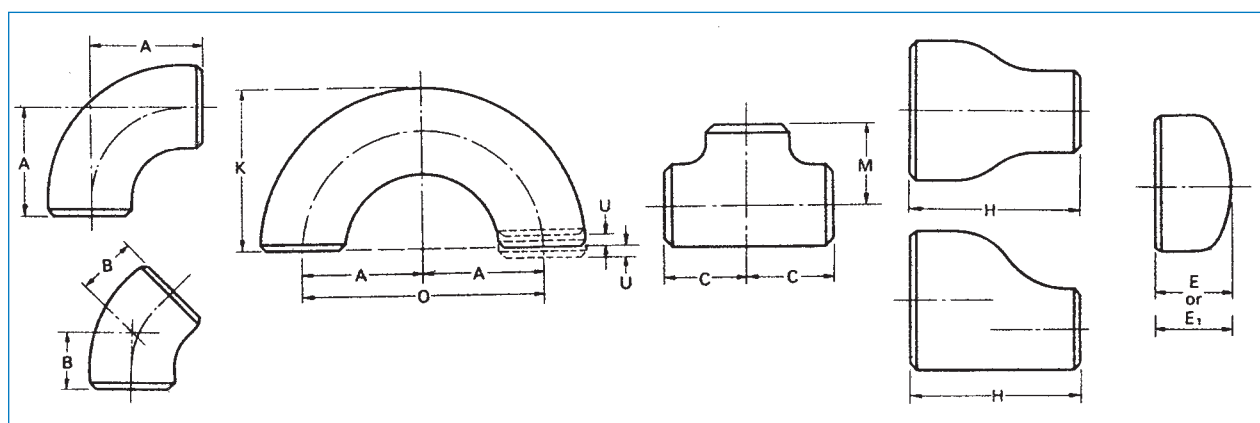


*NOTE: Plain bevel up to $t \leq 25,4$ mm at manufacturers option.
 Plain bevel may be $37,5^\circ$ up to $\leq 24"$ at manufacturers option.

Welding Bevel For Fittings – ANSI B16.9/B16.28 (mm)



Tolerances



TOLERANCE (mm) FOR MSS SP-75

All Fittings													
Nominal Pipe Size		Inside Diameter at End	Wall Thickness	Out-of-roundness		Center-to-end Dimensions A, B, C, M			Overall Length H	Overall Length E	Angularity Off Angle Q	Elbows Off Plane P	Reducers Off Plane P
				At ends of fittings		Throughout Body of Elbows	Tees & 1.5R elbows	3R elbows	Reducers	Caps			
				Elbows	Other								
16 to 24		± 2.3	- 0.3	4.8	3.1	2.5%	± 2.3	± 3.1	± 2.3	± 6.4	1.6	6.4	2.5%
26 to 36		± 2.3	- 0.3	Note 5	3.1	2.5%	± 3.1	± 6.4	± 4.8	± 9.7	2.3	12.7	2.5%
38 to 48		± 3.1	- 0.3	Note 5	3.1	2.5%	± 4.8	± 9.7	± 9.7	± 9.7	3.1	19.1	2.5%

- NOTE: ¹⁾ The inside diameter at end shall be determined by circumferential measurements, and the tolerance refers to variations from nominal I.D. calculations by (OD nom - "nom).
- ²⁾ Out-of-roundness tolerances shall be the difference between the maximum and minimum diameters measured on any radial cross-section.
- ³⁾ Minus 0.3 mm except that isolated non-continuous reduction are permitted in accordance with subsection 13.2.1 Excess thickness whether on inside or outside is to be treated in accordance with sketch given in Figure 3.
- ⁴⁾ When elbows are intended for field segmenting, out-of-roundness tolerance may be furnished to 1% by agreement between the manufacturer and the purchaser. It is recognized that extra thickness, if any, may be on the I.D.
- ⁵⁾ Out-of-roundness tolerances at ends shall be 1% of diameter for NPS 26 and larger.
- ⁶⁾ Percent of O.D.

NOTE: Outside diameter may be tapered at angle to 30° beyond weld bevel.

TOLERANCES - ASME B16.9/B16.28

All Fittings				90-Deg and 45-Deg Elbows and Tees	Reducers and Lap-Joint Stub Ends	Caps	180-Deg Returns			Lap-Joint Ends	
Nominal Pipe Size (inch)	Outside* Diameter at Bevel (1), (2)	Inside Diameter at End (1), (3), (4)	Wall Thickness (3)	Centre-to-End Dimension A, B, C, M	Overall Length F, H	Overall Length E	Centre-to-Centre Dimension O	Back-to-Face Dimension K	Alignment of Ends U	Outside Diameter of Lap G	Fillet Radius of Lap R
1/2 - 2 1/2	+1.6 -0.8	±0.8	Not less than 87.5% of nominal thickness	±2	±2	±3	±6	±6	±1	+0 -1	+0 -1
3 - 3 1/2	±1.6	±1.6		±2	±2	±3	±6	±6	±1	+0 -1	+0 -1
4	±1.6	±1.6		±2	±2	±3	±6	±6	±1	+0 -1	+0 -2
5 - 8	+2.4 -1.6	±1.6		±2	±2	±6	±6	±6	±1	+0 -1	+0 -2
10 - 18	+4.0 -3.2	±3.2		±2	±2	±6	±10	±6	±2	+0 -2	+0 -2
20 - 24	+6.4 -4.8	±4.8		±2	±2	±6	±10	±6	±2	+0 -2	+0 -2
26 - 30	+6.4 -4.8	±4.8		±3	±5	±10	-	-	-	-	-
32 - 48	+6.4 -4.8	±4.8		±5	±5	±10	-	-	-	-	-

NOTE: ¹⁾ Out-of-round is the sum of absolute values of plus and minus tolerance.

²⁾ This tolerance may be exceeded in localized areas of formed fittings where increased wall thickness is required to meet design requirements of para. 2.2.

³⁾ The inside diameter and the nominal wall thicknesses at ends are to be specified by the purchaser.

⁴⁾ Unless otherwise specified by the purchaser, these tolerances apply to the nominal inside diameter, which equals the difference between the nominal outside and twice the nominal wall thickness.

Nominal Pipe Size (inch)	Angularity Tol.	
	Off Angle Q (mm)	Off Plane P (mm)
1/2 - 4	1	2
5 - 8	2	4
10 - 12	3	5
14 - 16	3	6
18 - 24	4	10
26 - 30	5	10
32 - 42	5	13
44 - 48	5	19

FLANGES

ASME/ANSI B16.5, ASME/ANSI B16.47 Series A & B

MSS-SP-44

API 605/API6A

AWWA C207

DIN/UNI/EN 1092-1/BS 4504/BS10/ISO/NS/NFE29203

JIS B2220/KS B1503

SAS 1123 / SANS 1123





Table Flanges



Raised Face Weld Neck Flanges



Threaded Flanges



**Raised Face Slip-On (left)
and Socketweld Flanges**



Raised Face Blind Flanges



Blind Plate Flanges

TYPES AND APPLICATIONS

Slip-On Weld Flange – The flange is slipped over the pipe or tube and welded (usually both inside and outside) to provide strength and to prevent leaks. These flanges are at the low cost end of the scale, and do not require high accuracy when cutting the pipe or tube to length. They can sometimes have a boss or hub, and can be made with a bore to suit pipe or tube.

Weld Neck Flange – This flange is designed to be joined to a piping system by butt welding. It is relatively expensive because of its long neck, but is preferred for high stress applications. The neck transmits stresses to the pipe, reducing stress concentrations at the base of the flange. The gradual transition of thickness from the base to the neck to the wall thickness at the butt weld provides important reinforcement of the flange. The bore of the flange matches the bore of the pipe, reducing turbulence and erosion.

Threaded Flange – This is similar to the slip-on flange in outline, but the bore is threaded, thus enabling assembly without welding. This obviously limits its application to relatively low pressure piping systems. The flange may be welded around the joint after assembly, but this is not considered a satisfactory method of increasing its use in pressure applications.

Socketweld Flange – This is similar to a slip-on flange in outline, but the bore is counter-bored to accept the pipe. The diameter of the remaining bore is the same as the inside diameter of the pipe. The flange is attached to the pipe by a fillet weld around the hub of the flange. An optional internal weld may be applied in high stress applications. Its biggest use is in high pressure systems such as hydraulic and steam lines.

Lap Joint Flange – This is again similar to a slip-on flange, but it has a radius at the intersection of the bore and the flange face, and no raised face, to accommodate a lap joint stub end. The face of the stub end forms the gasket face of the flange. This type of flange is used in applications where sections of the piping system need to be dismantled quickly and easily for inspection or replacement, because the stub end is welded to the pipe, not the flange. As the flange is not welded to the pipe, this allows for easy alignment to the mating flange.

Blind Flange – This is a flange without a bore and is used to shut off a piping system or vessel opening. It also permits easy access to vessels or piping systems for inspection purposes.

Loose Flange – This is usually used with a pressed collar, where the flange is placed behind the collar before the collar is welded to the pipe or tube. The flange is not welded, and thus allows for easy alignment. As the flange is not in direct contact with the liquid, alternative materials can be used for the flange.



Lap Joint



Flanged Butt Weld Outlets and
Flanged Butt Weld Nipple Outlets

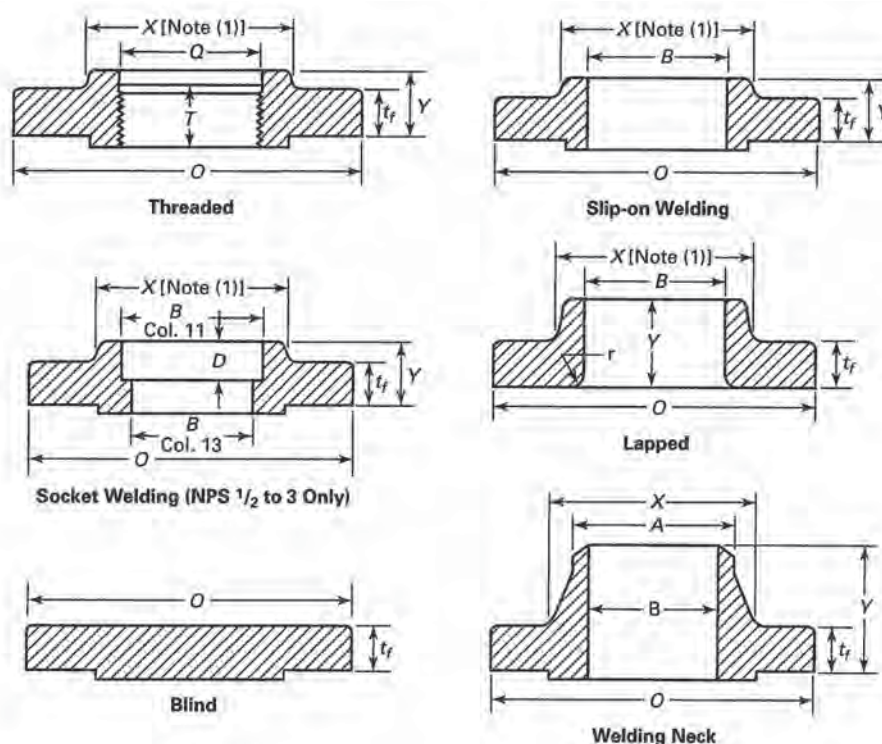


Forged Flanges Class 150 – Class 2500



Spectacle Blind

CLASS 150 FLANGES



DIMENSIONS OF CLASS 150 FLANGES (mm)

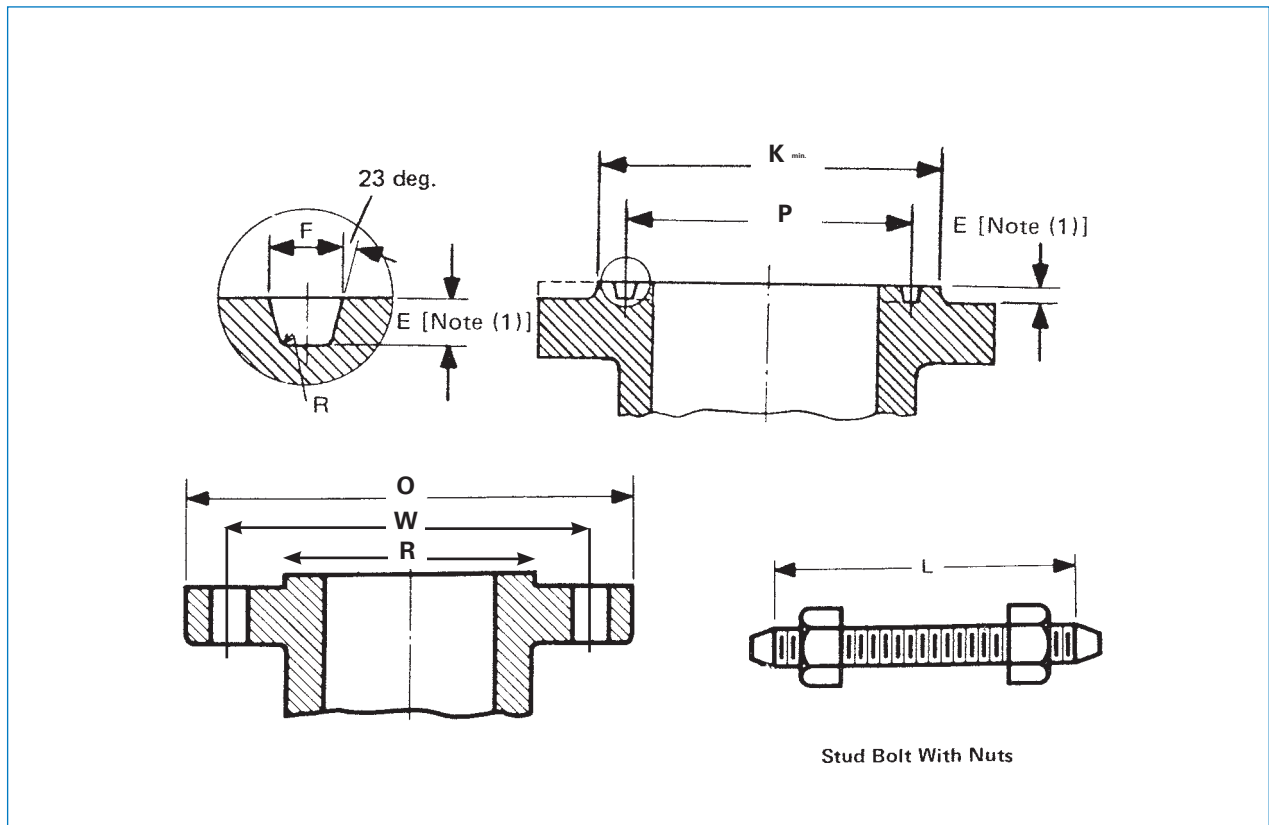
1	2	3	4	5	6	7	8	9	10	11	12	13	14
	Flange dimensions		HUB dimensions		Length Through HUB			Threaded flange		SW	Bore		
Nominal Pipe Size	OD flange	Thickn.	Large end	Small end	Thr. Slip, Sw	Lapped	Weld neck	Counter bore	Thread length	Socket depth	Slip-On, SW	Lapped	Weld neck
NPS	O	tf min.#	X	A	Y	Y	Y	Q min.	T min.	D	B min.	B min.	B
1/2	90,0	9,6	30,0	21,3	14,0	16,0	46,0	...	16,0	10,0	22,2	22,9	15,8
3/4	100,0	11,2	38,0	26,7	14,0	16,0	51,0	...	16,0	11,0	27,7	28,2	20,9
1	110,0	12,7	49,0	33,4	16,0	17,0	54,0	...	17,0	13,0	34,5	34,9	26,6
1 1/4	115,0	14,3	59,0	42,2	19,0	21,0	56,0	...	21,0	14,0	43,2	43,7	35,1
1 1/2	125,0	15,9	65,0	48,3	21,0	22,0	60,0	...	22,0	16,0	49,5	50,0	40,9
2	150,0	17,5	78,0	60,3	24,0	25,0	62,0	...	25,0	17,0	61,9	62,5	52,5
2 1/2	180,0	20,7	90,0	73,0	27,0	29,0	68,0	...	29,0	19,0	74,6	75,4	62,7
3	190,0	22,3	108,0	88,9	29,0	30,0	68,0	...	30,0	21,0	90,7	91,4	77,9
3 1/2	215,0	22,3	122,0	101,6	30,0	32,0	70,0	...	32,0	...	103,4	104,1	90,1
4	230,0	22,3	135,0	114,3	32,0	33,0	75,0	...	33,0	...	116,1	116,8	102,3
5	255,0	22,3	164,0	141,3	35,0	36,0	87,0	...	36,0	...	143,8	144,4	128,2
6	280,0	23,9	192,0	168,3	38,0	40,0	87,0	...	40,0	...	170,7	171,4	154,1
8	345,0	27,0	246,0	219,1	43,0	44,0	100,0	...	44,0	...	221,5	222,2	202,7
10	405,0	28,6	305,0	273,0	48,0	49,0	100,0	...	49,0	...	276,2	277,4	254,6
12	485,0	30,2	365,0	323,8	54,0	56,0	113,0	...	56,0	...	327,0	328,2	304,8
14	535,0	33,4	400,0	355,6	56,0	79,0	125,0	...	57,0	...	359,2	360,2	To be
16	595,0	35,0	457,0	406,4	62,0	87,0	125,0	...	64,0	...	410,5	411,2	specified
18	635,0	38,1	505,0	457,0	67,0	97,0	138,0	...	68,0	...	461,8	462,3	by
20	700,0	41,3	559,0	508,0	71,0	103,0	143,0	...	73,0	...	513,1	514,4	purchaser
24	815,0	46,1	663,0	610,0	81,0	111,0	151,0	...	83,0	...	616,0	616,0	

NOTE: All dimensions except NPS and bolt diameter are in millimeters. The dimensions B_2 for SW flange equals B for Weld Neck.

(1) the tolerance for E is only applicable for groove depth

Lapped flange shall be 1.6 mm thicker than table value.

CLASS 150 FLANGES



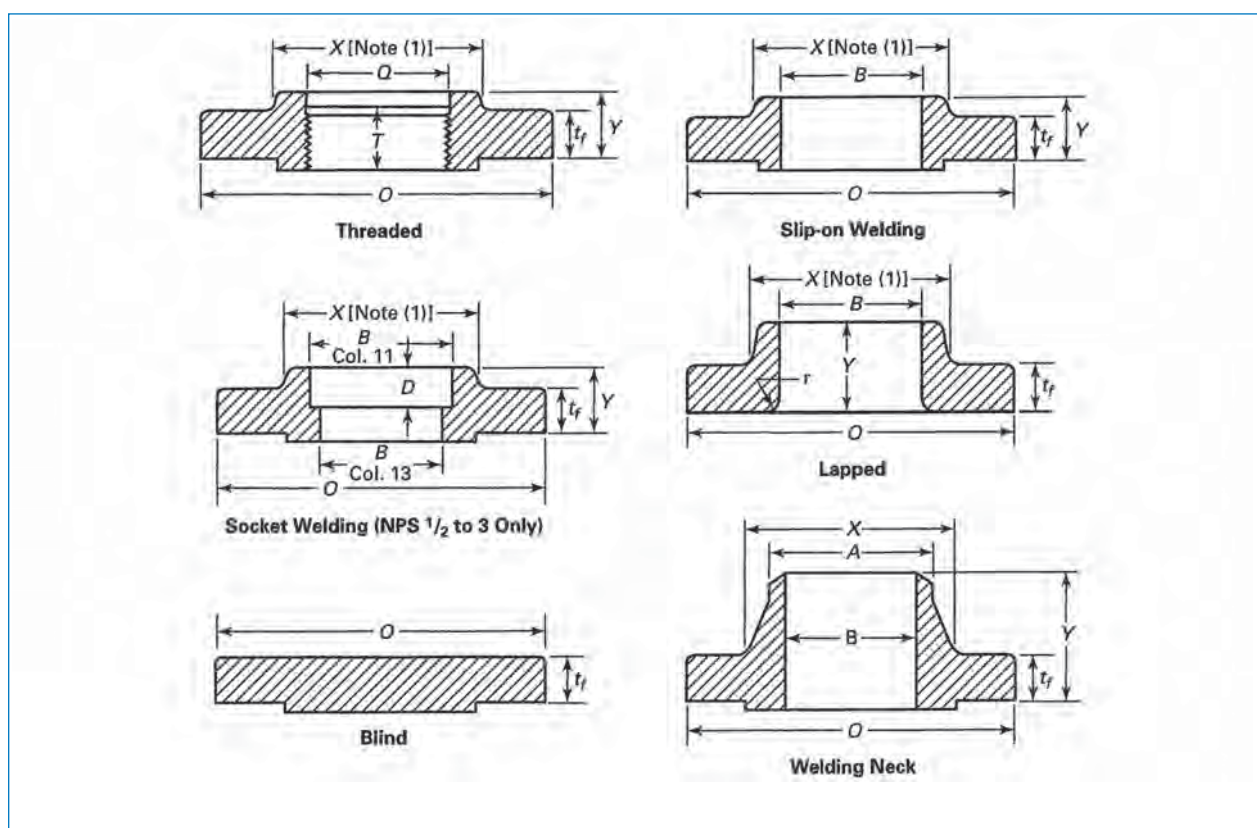
DIMENSIONS OF CLASS 150 FLANGES (mm)

15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
Nominal Pipe Size	RF dimensions		RTJ dimensions						Bolt hole drilling				Stud bolt length	
	OD	Height	OD	Height	Groove number	Groove Pitch	Groove Depth	Groove Width	Bolt Circle	Bolt hole	No of bolts	Bolt diam.	2,0mm RF	Ring Joint
	NPS	R	K	E		P	E	F	W	Bh			L	L
1/2	34,9	2,0	...	...	...	...	...	...	60,3	15,9	4	1/2	55,0	...
3/4	42,9	2,0	...	...	...	...	...	...	69,9	15,9	4	1/2	65,0	...
1	50,8	2,0	63,5	6,35	R15	47,63	6,35	8,74	79,4	15,9	4	1/2	65,0	75,0
1 ¼	63,5	2,0	73,0	6,35	R17	57,15	6,35	8,74	88,9	15,9	4	1/2	70,0	85,0
1 ½	73,0	2,0	82,5	6,35	R19	65,07	6,35	8,74	98,4	15,9	4	1/2	70,0	85,0
2	92,1	2,0	102,0	6,35	R22	82,55	6,35	8,74	120,7	19,1	4	5/8	85,0	95,0
2 ½	104,8	2,0	121,0	6,35	R25	101,60	6,35	8,74	139,7	19,1	4	5/8	90,0	100,0
3	127,0	2,0	133,0	6,35	R29	114,30	6,35	8,74	152,4	19,1	4	5/8	90,0	100,0
3 ½	139,7	2,0	154,0	6,35	R33	131,78	6,35	8,74	177,8	19,1	8	5/8	90,0	100,0
4	157,2	2,0	171,0	6,35	R36	149,23	6,35	8,74	190,5	19,1	8	5/8	90,0	100,0
5	185,7	2,0	194,0	6,35	R40	171,45	6,35	8,74	215,9	22,2	8	3/4	95,0	110,0
6	215,9	2,0	219,0	6,35	R43	193,68	6,35	8,74	241,3	22,2	8	3/4	100,0	115,0
8	269,9	2,0	273,0	6,35	R48	247,65	6,35	8,74	298,5	22,2	8	3/4	110,0	120,0
10	323,8	2,0	330,0	6,35	R52	304,80	6,35	8,74	362,0	25,4	12	7/8	115,0	125,0
12	381,0	2,0	406,0	6,35	R56	381,00	6,35	8,74	431,8	25,4	12	7/8	120,0	135,0
14	412,8	2,0	425,0	6,35	R59	396,88	6,35	8,74	476,3	28,6	12	1	135,0	145,0
16	469,9	2,0	483,0	6,35	R64	454,03	6,35	8,74	539,8	28,6	16	1	135,0	145,0
18	533,4	2,0	546,0	6,35	R68	517,53	6,35	8,74	577,9	31,8	16	1 ¼	145,0	160,0
20	584,2	2,0	597,0	6,35	R72	558,80	6,35	8,74	635,0	31,8	20	1 ¼	160,0	170,0
24	692,2	2,0	711,0	6,35	R76	673,10	6,35	8,74	749,3	34,9	20	1 ¼	170,0	185,0

NOTE: All dimensions except NPS and bolt diameter are in millimeters. The dimensions B₂ for SW flange equals B for Weld Neck.

(1) the tolerance for E is only applicable for groove depth

CLASS 300 FLANGES



DIMENSIONS OF CLASS 300 FLANGES (mm)

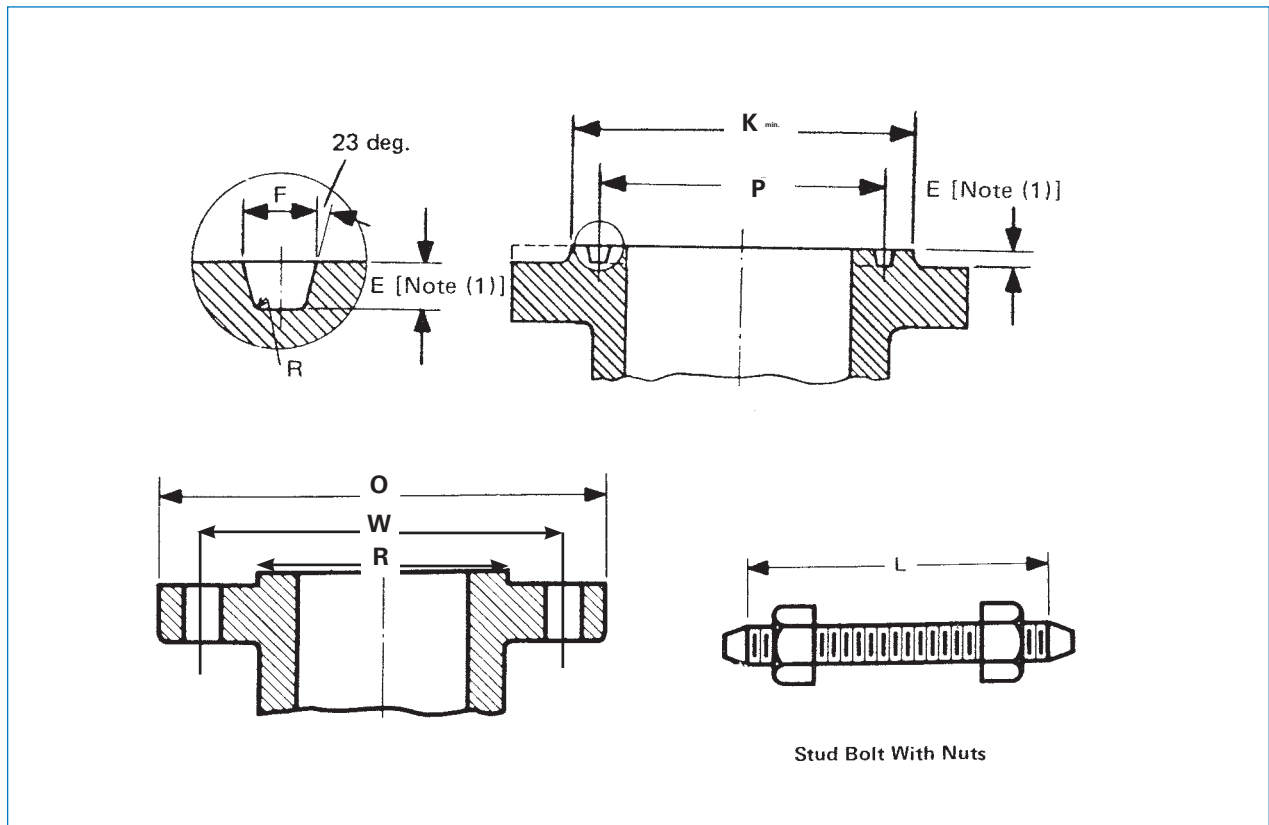
1	2	3	4	5	6	7	8	9	10	11	12	13	14
	Flange dimensions		HUB dimensions		Length Through HUB			Threaded flange		SW	Bore		
Nominal Pipe Size	OD flange	Thickn.	Large end	Small end	Thr. Slip, Sw.	Lapped	Weld neck	Counter bore	Thread length	Socket depth	Slip-On, SW	Lapped	Weld neck
NPS	O	tf min.#	X	A	Y	Y	Y	Q min.	T min.	D	B min.	B min.	B
1/2	95,0	12,7	38,0	21,3	21,0	22,0	51,0	23,6	16,0	10,0	22,2	22,9	15,8
3/4	115,0	14,3	48,0	26,7	24,0	25,0	56,0	29,0	16,0	11,0	27,7	28,2	20,9
1	125,0	15,9	54,0	33,4	25,0	27,0	60,0	35,8	18,0	13,0	34,5	34,9	26,6
1 1/4	135,0	17,5	64,0	42,2	25,0	27,0	64,0	44,4	21,0	14,0	43,2	43,7	35,1
1 1/2	155,0	19,1	70,0	48,3	29,0	30,0	67,0	50,3	23,0	16,0	49,5	50,0	40,9
2	165,0	20,7	84,0	60,3	32,0	33,0	68,0	63,5	29,0	17,0	61,9	62,5	52,5
2 1/2	190,0	23,9	100,0	73,0	37,0	38,0	75,0	76,2	32,0	19,0	74,6	75,4	62,7
3	210,0	27,0	117,0	88,9	41,0	43,0	78,0	92,2	32,0	21,0	90,7	91,4	77,9
3 1/2	230,0	28,6	133,0	101,6	43,0	44,0	79,0	104,9	37,0	...	103,4	104,1	90,1
4	255,0	30,2	146,0	114,3	46,0	48,0	84,0	117,6	37,0	...	116,1	116,8	102,3
5	280,0	33,4	178,0	141,3	49,0	51,0	97,0	144,4	43,0	...	143,8	144,4	128,2
6	320,0	35,0	206,0	168,3	51,0	52,0	97,0	171,4	47,0	...	170,7	171,4	154,1
8	380,0	39,7	260,0	219,1	60,0	62,0	110,0	222,2	51,0	...	221,5	222,2	202,7
10	445,0	46,1	321,0	273,0	65,0	95,0	116,0	276,2	56,0	...	276,2	277,4	254,6
12	520,0	49,3	375,0	323,8	71,0	102,0	129,0	328,6	61,0	...	327,0	328,2	304,8
14	585,0	52,4	425,0	355,6	75,0	111,0	141,0	360,4	64,0	...	359,2	360,2	To be
16	650,0	55,6	483,0	406,4	81,0	121,0	144,0	411,2	69,0	...	410,5	411,2	specified
18	710,0	58,8	533,0	457,0	87,0	130,0	157,0	462,0	70,0	...	461,8	462,3	by
20	775,0	62,0	587,0	508,0	94,0	140,0	160,0	512,8	74,0	...	513,1	514,4	purchaser
24	915,0	68,3	702,0	610,0	105,0	152,0	167,0	614,4	83,0	...	616,0	616,0	

NOTE: All dimensions except NPS and bolt diameter are in millimeters. The dimensions B₂ for SW flange equals B for Weld Neck.

(1) the tolerance for E is only applicable for groove depth

Lapped flange shall be 1.6 mm thicker than table value.

CLASS 300 FLANGES



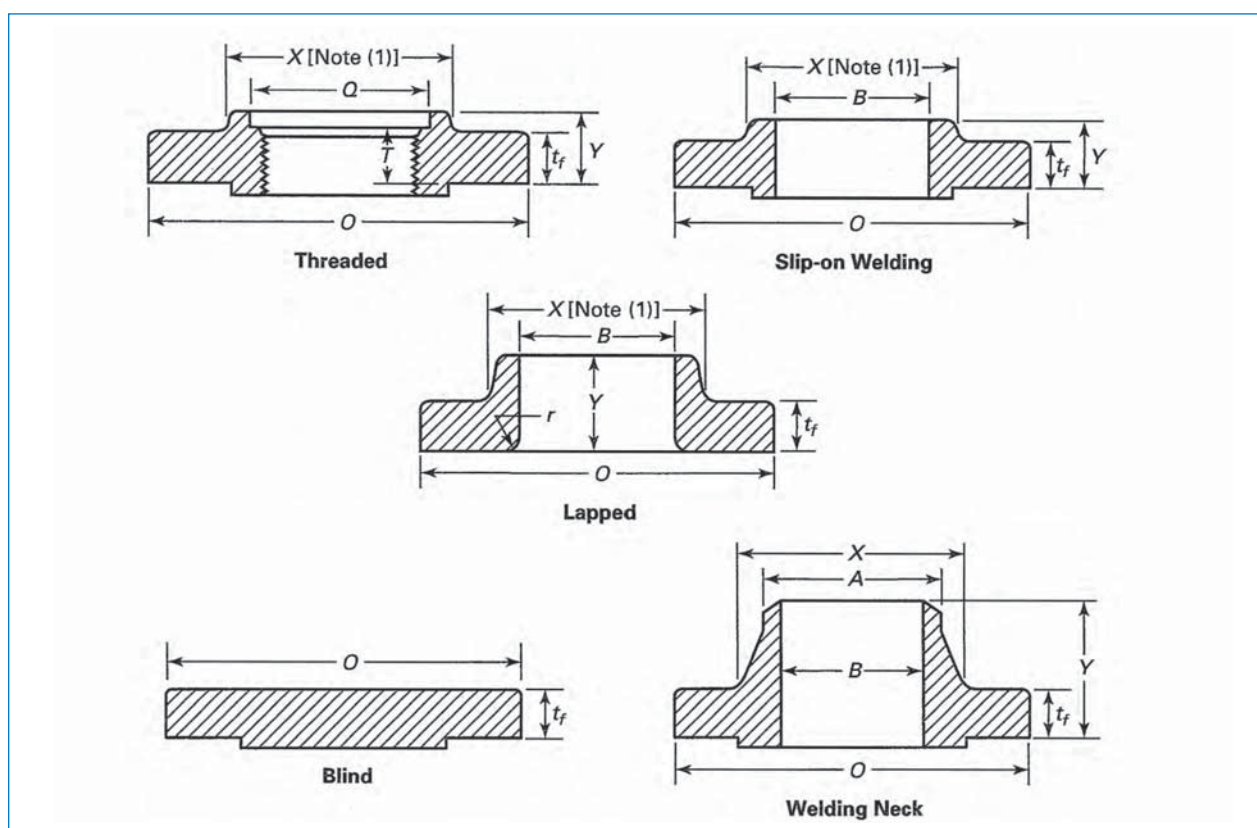
DIMENSIONS OF CLASS 300 FLANGES (mm)

15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
Nominal Pipe Size	RF dimensions		RTJ dimensions						Bolt hole drilling				Stud bolt length	
	OD	Height	OD	Height	Groove number	Groove Pitch	Groove Depth	Groove Width	Bolt Circle	Bolt hole	No of bolts	Bolt diam.	2,0mm RF	Ring Joint
	NPS	R	K	E		P	E	F	W	Bh			L	L
1/2	34,9	2,0	51,0	5,54	R11	34,14	5,54	7,14	66,7	15,9	4	1/2	65,0	75,0
3/4	42,9	2,0	63,5	6,35	R13	42,88	6,35	8,74	82,6	19,1	4	5/8	75,0	90,0
1	50,8	2,0	70,0	6,35	R16	50,80	6,35	8,74	88,9	19,1	4	5/8	75,0	90,0
1 1/4	63,5	2,0	79,5	6,35	R18	60,33	6,35	8,74	98,4	19,1	4	5/8	85,0	95,0
1 1/2	73,0	2,0	90,5	6,35	R20	68,27	6,35	8,74	114,3	22,2	4	3/4	90,0	100,0
2	92,1	2,0	108,0	7,92	R23	82,55	7,92	11,91	127,0	19,1	8	5/8	90,0	100,0
2 1/2	104,8	2,0	127,0	7,92	R26	101,60	7,92	11,91	149,2	22,2	8	3/4	100,0	115,0
3	127,0	2,0	146,0	7,92	R31	123,83	7,92	11,91	168,3	22,2	8	3/4	110,0	120,0
3 1/2	139,7	2,0	159,0	7,92	R34	131,78	7,92	11,91	184,2	22,2	8	3/4	110,0	125,0
4	157,2	2,0	175,0	7,92	R37	149,23	7,92	11,91	200,0	22,2	8	3/4	115,0	125,0
5	185,7	2,0	210,0	7,92	R41	180,98	7,92	11,91	235,0	22,2	8	3/4	120,0	135,0
6	215,9	2,0	241,0	7,92	R45	211,12	7,92	11,91	269,9	22,2	12	3/4	120,0	140,0
8	269,9	2,0	302,0	7,92	R49	269,88	7,92	11,91	330,2	25,4	12	7/8	140,0	150,0
10	323,8	2,0	356,0	7,92	R53	323,85	7,92	11,91	387,4	28,6	16	1	160,0	170,0
12	381,0	2,0	413,0	7,92	R57	381,00	7,92	11,91	450,8	31,8	16	1 1/4	170,0	185,0
14	412,8	2,0	457,0	7,92	R61	419,10	7,92	11,91	514,4	31,8	20	1 1/4	180,0	190,0
16	469,9	2,0	508,0	7,92	R65	469,90	7,92	11,91	571,5	34,9	20	1 1/4	190,0	205,0
18	533,4	2,0	575,0	7,92	R69	533,40	7,92	11,91	628,6	34,9	24	1 1/4	195,0	210,0
20	584,2	2,0	635,0	9,53	R73	584,20	9,53	13,49	685,8	34,9	24	1 1/4	205,0	220,0
24	692,2	2,0	749,0	11,13	R77	692,15	11,13	16,66	812,8	41,3	24	1 1/2	230,0	255,0

NOTE: All dimensions except NPS and bolt diameter are in millimeters. The dimensions B₂ for SW flange equals B for Weld Neck.

(1) the tolerance for E is only applicable for groove depth

CLASS 400 FLANGES



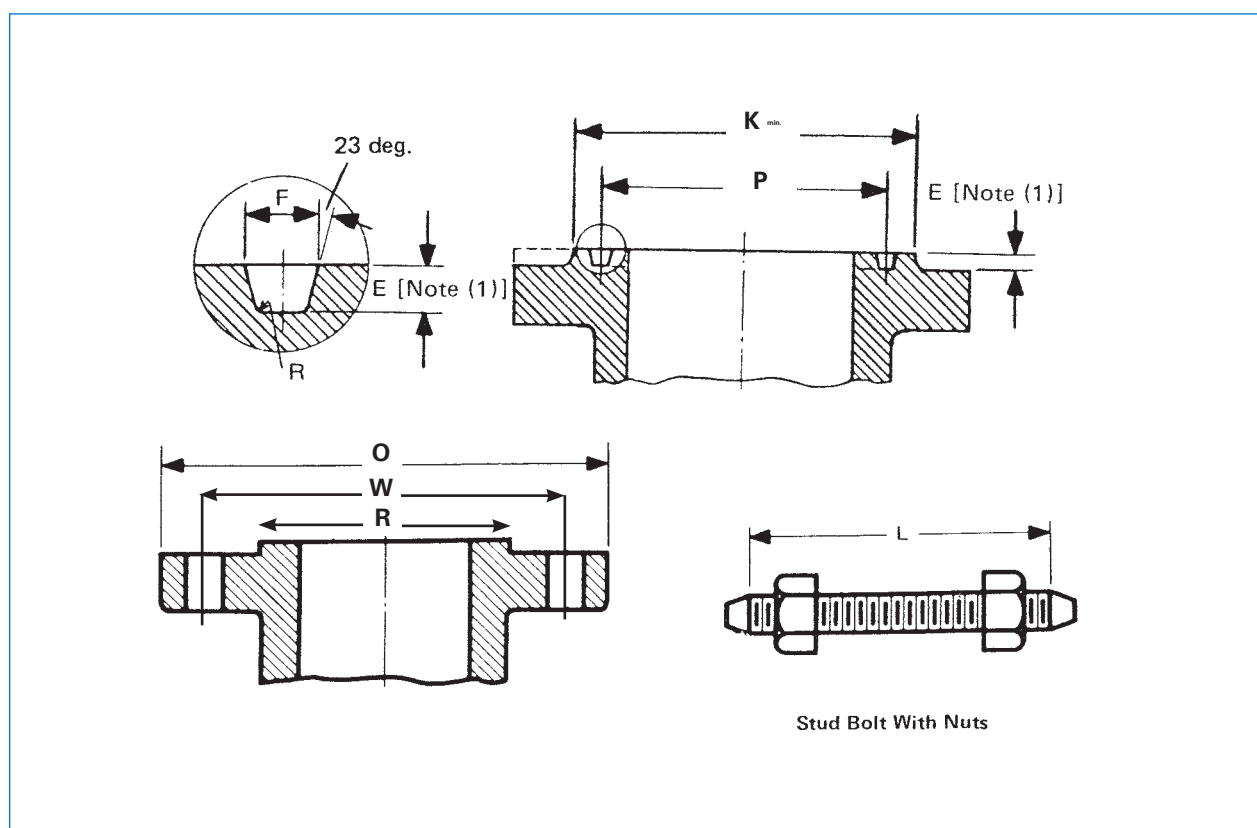
DIMENSIONS OF CLASS 400 FLANGES (mm)

1	2	3	4	5	6	7	8	9	10	11	12	13	14
	Flange dimensions		HUB dimensions		Length Through HUB			Threaded flange		SW	Bore		
Nominal Pipe Size	OD flange	Thickn.	Large end	Small end	Thr. Slip.	Lapped	Weld neck	Counter bore	Thread length	Socket depth	Slip-On,	Lapped	Weld neck
NPS	O	tf min.	X	A	Y	Y	Y	Q min.	T min.	D	B min.	B min.	B
1/2													
3/4													
1													
1 1/4					Use Class 600 dimensions in these sizes								
1 1/2													
2													
2 1/2													
3													
3 1/2													
4	255,0	35,0	146,0	114,3	51,0	51,0	89,0	117,6	37,0	...	116,1	116,8	
5	280,0	38,1	178,0	141,3	54,0	54,0	102,0	144,4	43,0	...	143,8	144,5	To be
6	320,0	41,3	206,0	168,3	57,0	57,0	103,0	171,4	46,0	...	170,7	171,4	specified
8	380,0	47,7	260,0	219,1	68,0	68,0	117,0	222,2	51,0	...	221,5	222,2	by
10	445,0	54,0	321,0	273,0	73,0	102,0	124,0	276,2	56,0	...	276,2	277,4	purchaser
12	520,0	57,2	375,0	323,8	79,0	108,0	137,0	328,6	61,0	...	327,0	328,2	
14	585,0	60,4	425,0	355,6	84,0	117,0	149,0	360,4	64,0	...	359,2	360,2	
16	650,0	63,5	483,0	406,4	94,0	127,0	152,0	411,2	69,0	...	410,5	411,2	
18	710,0	66,7	533,0	457,0	98,0	137,0	165,0	462,0	70,0	...	461,8	462,3	
20	775,0	69,9	587,0	508,0	102,0	146,0	168,0	512,8	74,0	...	513,1	514,4	
24	915,0	76,2	702,0	610,0	114,0	159,0	175,0	614,4	83,0	...	616,0	616,0	

NOTE: All dimensions except NPS and bolt diameter are in millimeters.

(1) the tolerance for E is only applicable for groove depth

CLASS 400 FLANGES



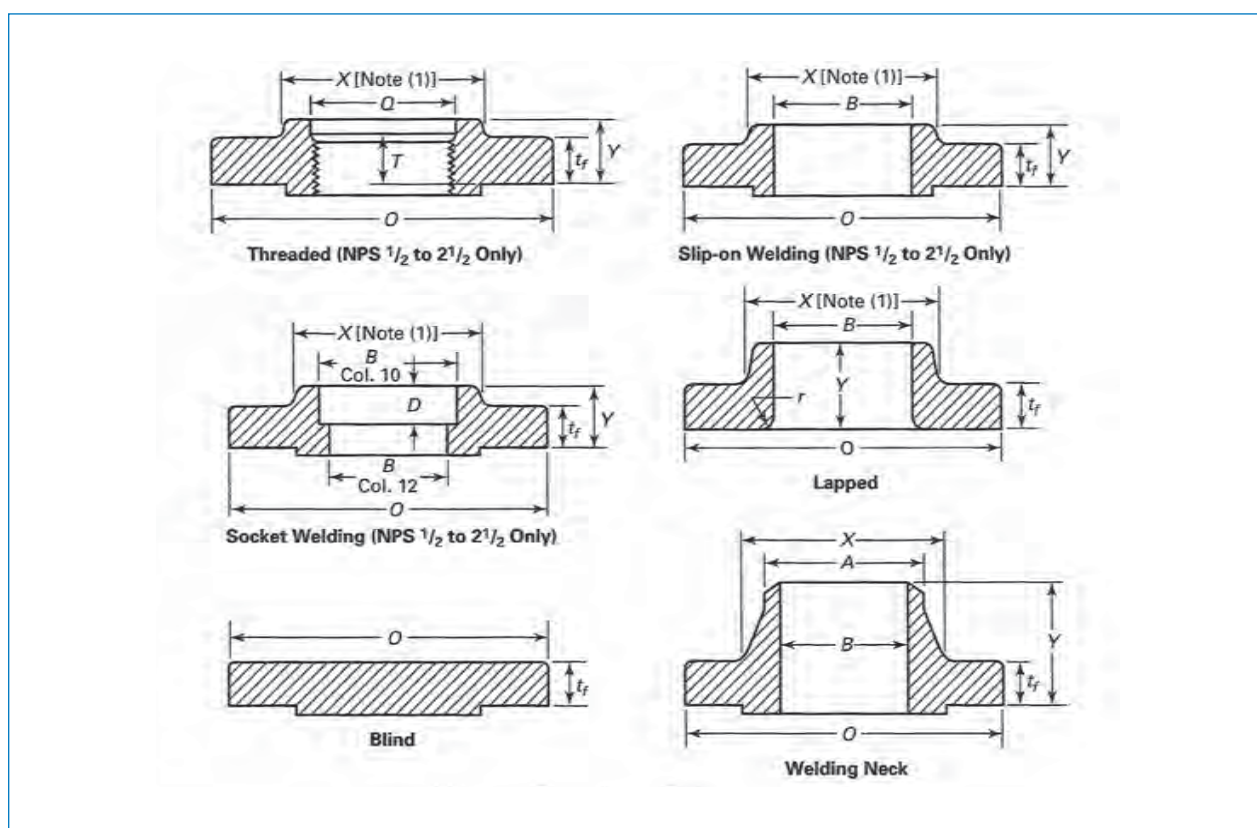
DIMENSIONS OF CLASS 400 FLANGES (mm)

15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
RF dimensions			RTJ dimensions						Bolt hole drilling				Stud bolt length	
Nominal Pipe Size	OD	Height	OD	Height	Groove number	Groove Pitch	Groove Depth	Groove Width	Bolt Circle	Bolt hole	No of RF	Bolt diam.	7,0 mm RF	Ring Joint
NPS	R		K	E		P	E	F	W	Bh			L	L
1/2														
3/4														
1														
1 1/4														
1 1/2														
2														
2 1/2														
3														
3 1/2														
4	157,2	7,0	175,0	7,92	R37	149,23	7,92	11,91	200,0	25,4	8	7/8	140,0	140,0
5	185,7	7,0	210,0	7,92	R41	180,98	7,92	11,91	235,0	25,4	8	7/8	145,0	145,0
6	215,9	7,0	241,0	7,92	R45	211,12	7,92	11,91	269,9	25,4	12	7/8	150,0	150,0
8	269,9	7,0	302,0	7,92	R49	269,88	7,92	11,91	330,0	28,6	12	1	170,0	170,0
10	323,8	7,0	356,0	7,92	R53	323,85	7,92	11,91	387,4	31,8	16	1 1/8	190,0	190,0
12	381,0	7,0	413,0	7,92	R57	381,00	7,92	11,91	450,8	34,9	16	1 1/4	205,0	205,0
14	412,8	7,0	457,0	7,92	R61	419,10	7,92	11,91	514,4	34,9	20	1 1/4	210,0	210,0
16	469,9	7,0	508,0	7,92	R65	469,90	7,92	11,91	571,5	38,1	20	1 3/8	220,0	220,0
18	533,4	7,0	575,0	7,92	R69	533,40	7,92	11,91	628,6	38,1	24	1 3/8	230,0	230,0
20	584,2	7,0	635,0	9,53	R73	584,20	9,53	13,49	685,8	41,3	24	1 1/2	240,0	250,0
24	692,2	7,0	749,0	11,13	R77	692,15	11,13	16,66	812,8	47,6	24	1 3/4	265,0	280,0

NOTE: All dimensions except NPS and bolt diameter are in millimeters.

(1) the tolerance for E is only applicable for groove depth

CLASS 600 FLANGES

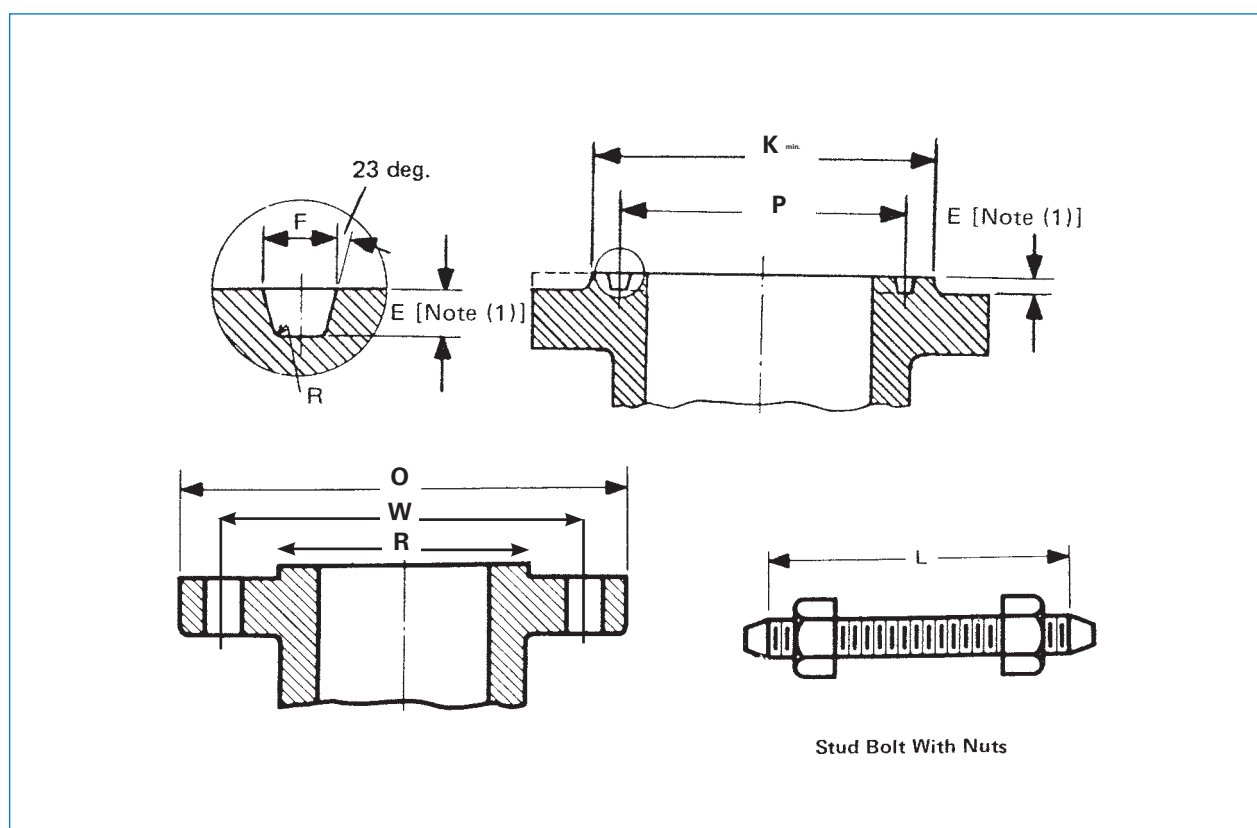


DIMENSIONS OF CLASS 600 FLANGES (mm)

1	2	3	4	5	6	7	8	9	10	11	12	13	14
	Flange dimensions		HUB dimensions		Length Through HUB			Threaded flange			SW Bore		
Nominal Pipe Size	OD flange	Thickn.	Large end	Small end	Thr. Slip. SW	Lapped	Weld neck	Counter bore	Thread length	Socket depth	Slip-On, SW	Lapped	Weld neck
NPS	O	tf min.	X	A	Y	Y	Y	Q min.	T min.	D	B min.	B min.	B
1/2	95,0	14,3	38,0	21,3	22,0	22,0	52,0	23,6	16,0	10,0	22,2	22,9	
3/4	115,0	15,9	48,0	26,7	25,0	25,0	57,0	29,0	16,0	11,0	27,7	28,2	
1	125,0	17,5	54,0	33,4	27,0	27,0	62,0	35,8	18,0	13,0	34,5	34,9	
1 1/4	135,0	20,7	64,0	42,2	29,0	29,0	67,0	44,4	21,0	14,0	43,2	43,7	
1 1/2	155,0	22,3	70,0	48,3	32,0	32,0	70,0	50,6	23,0	16,0	49,5	50,0	
2	165,0	25,4	84,0	60,3	37,0	37,0	73,0	63,5	29,0	17,0	61,9	62,5	
2 1/2	190,0	28,6	100,0	73,0	41,0	41,0	79,0	76,2	32,0	19,0	74,6	75,4	
3	210,0	31,8	117,0	88,9	46,0	46,0	83,0	92,2	35,0	21,0	90,7	91,4	
3 1/2	230,0	35,0	133,0	101,6	49,0	49,0	86,0	104,9	40,0	...	103,4	104,1	
4	275,0	38,1	152,0	114,3	54,0	54,0	102,0	117,6	42,0	...	116,1	116,8	To be
5	330,0	44,5	189,0	141,3	60,0	60,0	114,0	144,4	48,0	...	143,8	144,4	specified
6	355,0	47,7	222,0	168,3	67,0	67,0	117,0	171,4	51,0	...	170,7	171,4	by
8	420,0	55,6	273,0	219,1	76,0	76,0	133,0	222,2	58,0	...	221,5	222,2	purchaser
10	510,0	63,5	343,0	273,0	86,0	111,0	152,0	276,2	66,0	...	276,2	277,4	
12	560,0	66,7	400,0	323,8	92,0	117,0	156,0	328,6	70,0	...	327,0	328,2	
14	605,0	69,9	432,0	355,6	94,0	127,0	165,0	360,4	74,0	...	359,2	360,2	
16	685,0	76,2	495,0	406,4	106,0	140,0	178,0	411,2	78,0	...	410,5	411,2	
18	745,0	82,6	546,0	457,0	117,0	152,0	184,0	462,0	80,0	...	461,8	462,3	
20	815,0	88,9	610,0	508,0	127,0	165,0	190,0	512,8	83,0	...	513,1	514,4	
24	940,0	101,6	718,0	610,0	140,0	184,0	203,0	614,4	93,0	...	616,0	616,0	

NOTE: All dimensions except NPS and bolt diameter are in millimeters. The dimensions B₂ for SW flange equals B for Weld Neck.
 (1) the tolerance for E is only applicable for groove depth

CLASS 600 FLANGES



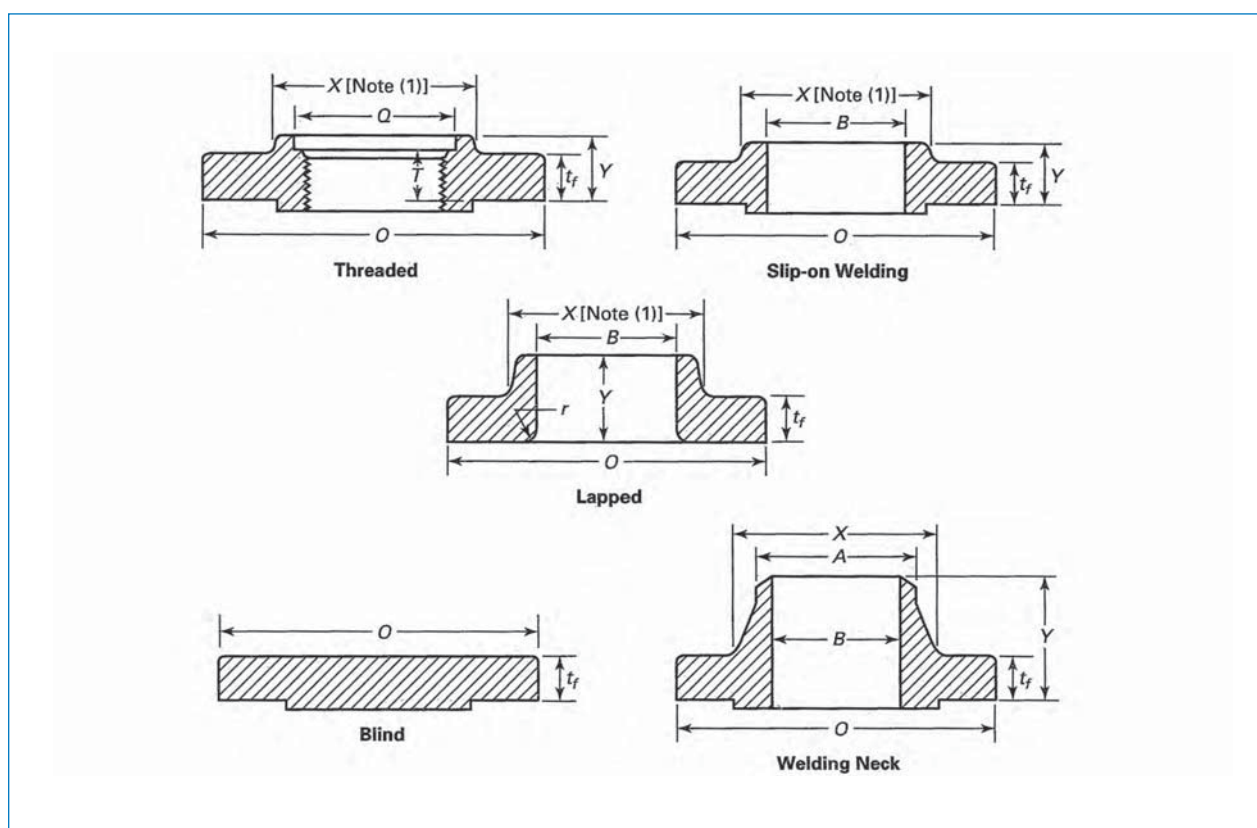
DIMENSIONS OF CLASS 600 FLANGES (mm)

15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
	RF dimensions		RTJ dimensions						Bolt hole drilling				Stud bolt length	
Nominal Pipe Size	OD	Height	OD	Height	Groove number	Groove Pitch	Groove Depth	Groove Width	Bolt Circle	Bolt hole	No of bolts	Bolt diam.	7.0 mm RF	Ring Joint
NPS	R		K	E		P	E	F	W	Bh			L	L
1/2	34,9	7,0	51,0	5,54	R11	34,14	5,54	7,14	66,7	15,9	4	1/2	75,0	75,0
3/4	42,9	7,0	63,5	6,35	R13	42,88	6,35	8,74	82,6	19,1	4	5/8	90,0	90,0
1	50,8	7,0	70,0	6,35	R16	50,80	6,35	8,74	88,9	19,1	4	5/8	90,0	90,0
1 ¼	63,5	7,0	79,5	6,35	R18	60,33	6,35	8,74	98,4	19,1	4	5/8	95,0	95,0
1 ½	73,0	7,0	90,5	6,35	R20	68,27	6,35	8,74	114,3	22,2	4	3/4	110,0	110,0
2	92,1	7,0	108,0	7,92	R23	82,55	7,92	11,91	127,0	19,1	8	5/8	110,0	110,0
2 ½	104,8	7,0	127,0	7,92	R26	101,60	7,92	11,91	149,2	22,2	8	3/4	120,0	120,0
3	127,0	7,0	146,0	7,92	R31	123,83	7,92	11,91	168,3	22,2	8	3/4	125,0	125,0
3 ½	139,7	7,0	159,0	7,92	R34	131,78	7,92	11,91	184,2	25,4	8	7/8	140,0	140,0
4	157,2	7,0	175,0	7,92	R37	149,23	7,92	11,91	215,9	25,4	8	7/8	145,0	145,0
5	185,7	7,0	210,0	7,92	R41	180,98	7,92	11,91	266,7	28,6	8	1	165,0	165,0
6	215,9	7,0	241,0	7,92	R45	211,12	7,92	11,91	292,1	28,6	12	1	170,0	170,0
8	269,9	7,0	302,0	7,92	R49	269,88	7,92	11,91	349,2	31,8	12	1 ½	190,0	195,0
10	323,8	7,0	356,0	7,92	R53	323,85	7,92	11,91	431,8	34,9	16	1 ¼	215,0	215,0
12	381,0	7,0	413,0	7,92	R57	381,00	7,92	11,91	489,0	34,9	20	1 ¼	220,0	220,0
14	412,8	7,0	457,0	7,92	R61	419,10	7,92	11,91	527,0	38,1	20	1 ¾	235,0	235,0
16	469,9	7,0	508,0	7,92	R65	469,90	7,92	11,91	603,2	41,3	20	1 ½	255,0	255,0
18	533,4	7,0	575,0	7,92	R69	533,40	7,92	11,91	654,0	44,5	20	1 ½	275,0	275,0
20	584,2	7,0	635,0	9,53	R73	584,20	9,53	13,49	723,9	44,5	24	1 ¾	285,0	290,0
24	692,2	7,0	749,0	11,13	R77	692,15	11,13	16,66	838,2	50,8	24	1 ¾	330,0	335,0

NOTE: All dimensions except NPS and bolt diameter are in millimeters. The dimensions B for SW flange equals B for Weld Neck.

(1) the tolerance for E is only applicable for groove depth

CLASS 900 FLANGES



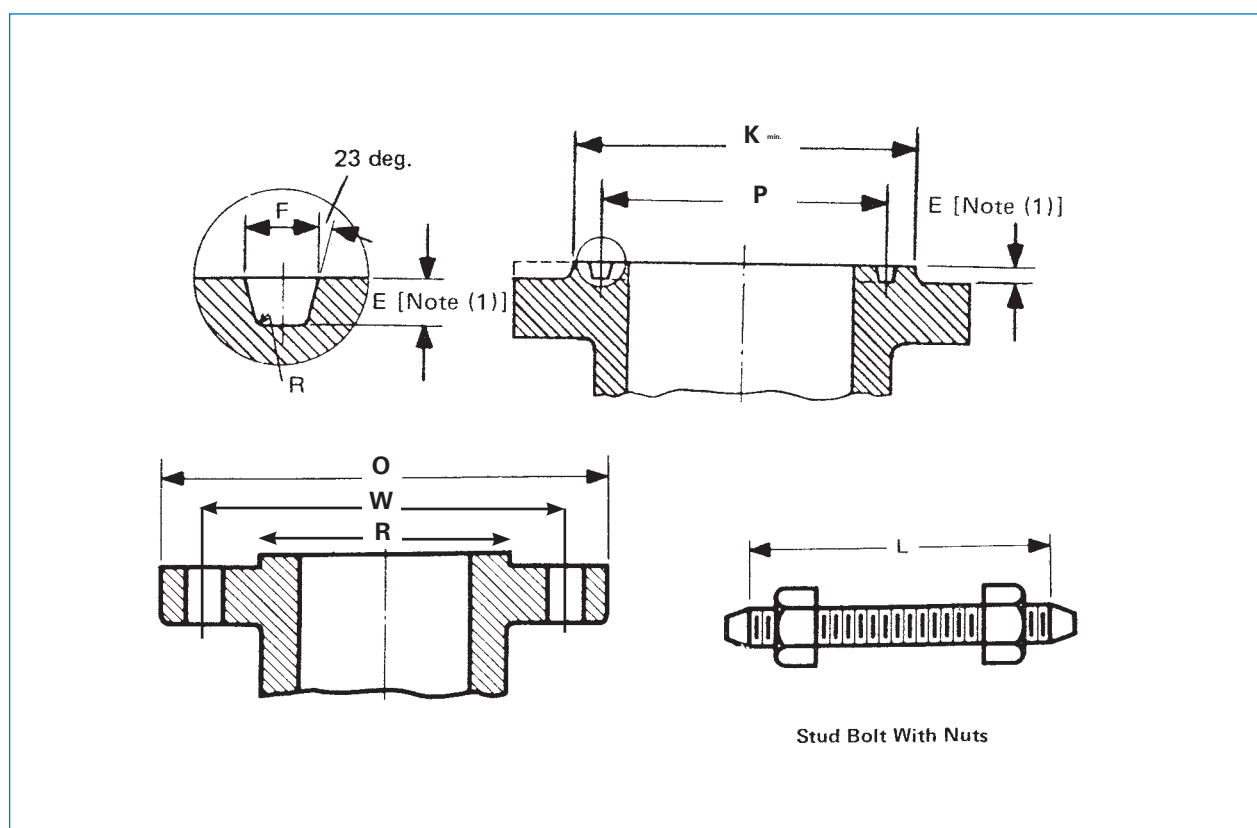
DIMENSIONS OF CLASS 900 FLANGES (mm)

1	2	3	4	5	6	7	8	9	10	11	12	13	14
	Flange dimensions		HUB dimensions		Length Through HUB			Threaded flange		SW	Bore		
Nominal Pipe Size	OD flange	Thickn.	Large end	Small end	Thr. Slip.	Lapped	Weld neck	Counter bore	Thread length	Socket depth	Slip-On	Lapped	Weld neck
NPS	O	tf min.	X	A	Y	Y	Y	Q min.	T min.	D	B min.	B min.	B
1/2													
3/4													
1													
1 1/4													
1 1/2					Use Class 1500 dimensions in these sizes								
2													
2 1/2													
3	240,0	38,1	127,0	88,9	54,0	54,0	102,0	92,2	42,0	...	90,7	91,4	
4	290,0	44,5	159,0	114,3	70,0	70,0	114,0	117,6	48,0	...	116,1	116,8	To be
5	350,0	50,8	190,0	141,3	79,0	79,0	127,0	144,4	54,0	...	143,8	144,4	specified
6	380,0	55,6	235,0	168,3	86,0	86,0	140,0	171,4	58,0	...	170,7	171,4	by
8	470,0	63,5	298,0	219,1	102,0	114,0	162,0	222,2	64,0	...	221,5	222,2	purchaser
10	545,0	69,9	368,0	273,0	108,0	127,0	184,0	276,2	72,0	...	276,2	277,4	
12	610,0	79,4	419,0	323,8	117,0	143,0	200,0	328,6	77,0	...	327,0	328,2	
14	640,0	85,8	451,0	355,6	130,0	156,0	213,0	360,4	83,0	...	359,2	360,2	
16	705,0	88,9	508,0	406,4	133,0	165,0	216,0	411,2	86,0	...	410,5	411,2	
18	785,0	101,6	565,0	457,0	152,0	190,0	229,0	462,0	89,0	...	461,8	462,3	
20	855,0	108,0	622,0	508,0	159,0	210,0	248,0	512,8	93,0	...	513,1	514,4	
24	1040,0	139,7	749,0	610,0	203,0	267,0	292,0	614,4	102,0	...	616,0	616,0	

NOTE: All dimensions except NPS and bolt diameter are in millimeters.

(1) the tolerance for E is only applicable for groove depth

CLASS 900 FLANGES



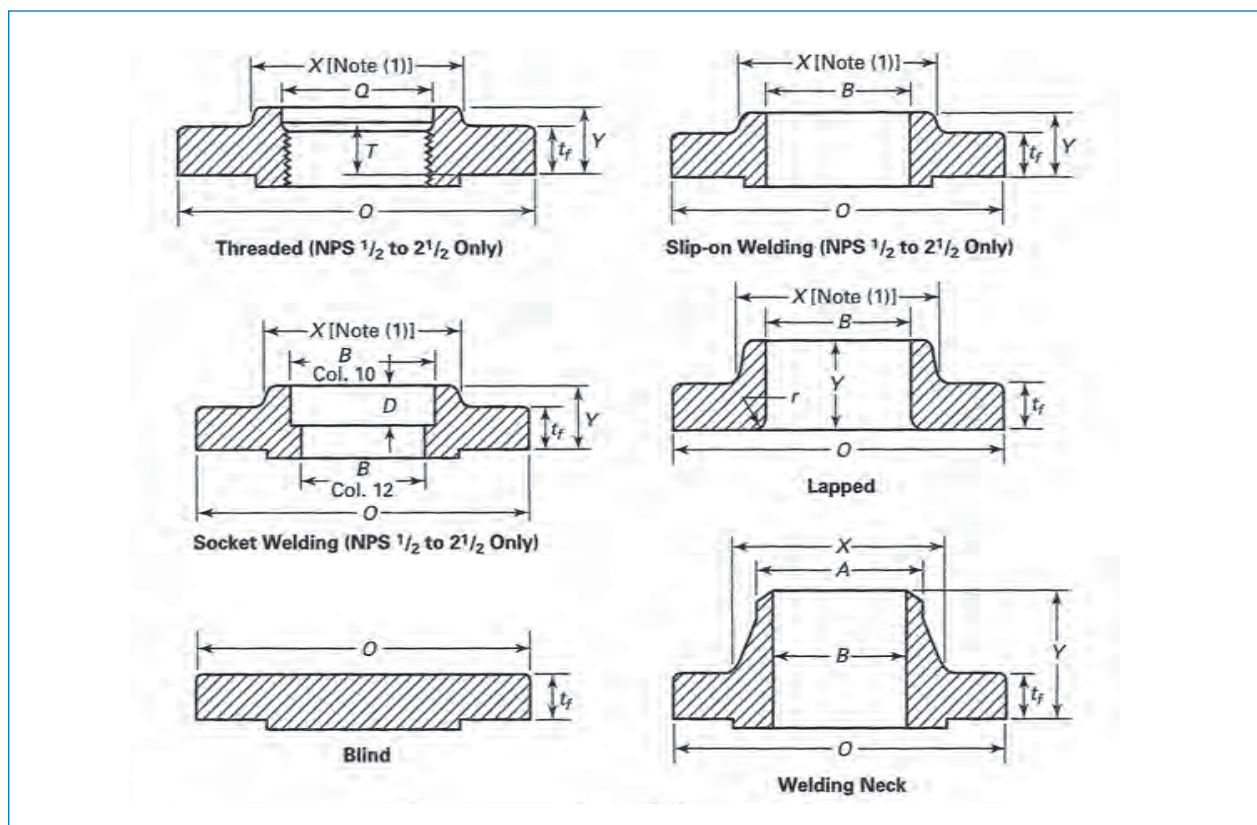
DIMENSIONS OF CLASS 900 FLANGES (mm)

15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
	RF dimensions		RTJ dimensions						Bolt hole drilling				Stud bolt length	
Nominal Pipe Size	OD	Height	OD	Height	Groove number	Groove Pitch	Groove Depth	Groove Width	Bolt Circle	Bolt hole	No of bolts	Bolt diam.	7,0 mm RF	Ring Joint
NPS	R		K	E		P	E	F	W	Bh			L	L
1/2														
3/4														
1														
1 ¼														
1 ½			Use Class 1500 dimensions in these sizes											
2														
2 ½														
3	127,0	7,0	156,0	7,92	R31	123,83	7,92	11,91	190,5	25,4	8	7/8	145,0	145,0
4	157,2	7,0	181,0	7,92	R37	149,23	7,92	11,91	235,0	31,8	8	1 ⅝	170,0	170,0
5	185,7	7,0	216,0	7,92	R41	180,98	7,92	11,91	279,4	34,9	8	1 ¾	190,0	190,0
6	215,9	7,0	241,0	7,92	R45	211,12	7,92	11,91	317,5	31,8	12	1 ⅝	190,0	195,0
8	269,9	7,0	308,0	7,92	R49	269,88	7,92	11,91	393,7	38,1	12	1 ⅝	220,0	220,0
10	323,8	7,0	362,0	7,92	R53	323,85	7,92	11,91	469,9	38,1	16	1 ⅝	235,0	235,0
12	381,0	7,0	419,0	7,92	R57	381,00	7,92	11,91	533,4	38,1	20	1 ⅝	255,0	255,0
14	412,8	7,0	467,0	11,13	R62	419,10	11,13	16,66	558,8	41,3	20	1 ½	275,0	280,0
16	469,9	7,0	524,0	11,13	R66	469,90	11,13	16,66	616,0	44,5	20	1 ⅝	285,0	290,0
18	533,4	7,0	594,0	12,70	R70	533,40	12,70	19,84	685,8	50,8	20	1 ⅞	325,0	335,0
20	584,2	7,0	648,0	12,70	R74	584,20	12,70	19,84	749,3	54,0	20	2	350,0	360,0
24	692,2	7,0	772,0	15,88	R78	692,15	15,88	26,97	901,7	66,7	20	2 ½	440,0	455,0

NOTE: All dimensions except NPS and bolt diameter are in millimeters.

(1) the tolerance for E is only applicable for groove depth

CLASS 1500 FLANGES

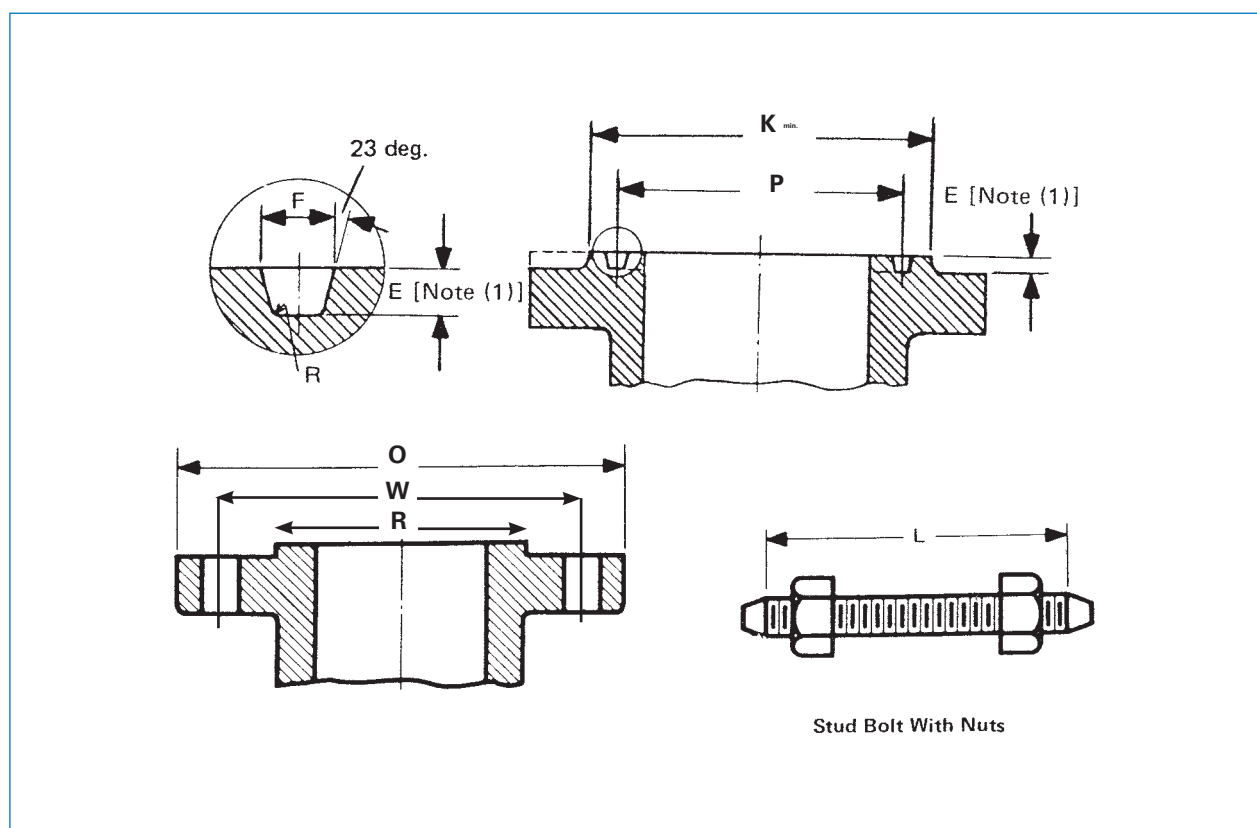


DIMENSIONS OF CLASS 1500 FLANGES (mm)

1	2	3	4	5	6	7	8	9	10	11	12	13	14
	Flange dimensions		HUB dimensions		Length Through HUB			Threaded flange		SW	Bore		
Nominal Pipe Size	OD flange	Thickn.	Large end	Small end	Thr. Slip. Sw.	Lapped	Weld neck	Counter bore	Thread length	Socket depth	Slip-On, SW	Lapped	Weld neck
NPS	O	tf min.	X	A	Y	Y	Y	Q min.	T min.	D	B min.	B min.	B
1/2	120,0	22,3	38,0	21,3	32,0	32,0	60,0	23,6	23,0	10,0	22,2	22,9	
3/4	130,0	25,4	44,0	26,7	35,0	35,0	70,0	29,0	26,0	11,0	27,7	28,2	
1	150,0	28,6	52,0	33,4	41,0	41,0	73,0	35,8	29,0	13,0	34,5	34,9	
1 1/4	160,0	28,6	64,0	42,2	41,0	41,0	73,0	44,4	31,0	14,0	43,2	43,7	
1 1/2	180,0	31,8	70,0	48,3	44,0	44,0	83,0	50,6	32,0	16,0	49,5	50,0	
2	215,0	38,1	105,0	60,3	57,0	57,0	102,0	63,5	39,0	17,0	61,9	62,5	
2 1/2	245,0	41,3	124,0	73,0	64,0	64,0	105,0	76,2	48,0	19,0	74,6	75,4	
3	265,0	47,7	133,0	88,9	...	73,0	117,0	...	...	...	...	91,4	
4	310,0	54,0	162,0	114,3	...	90,0	124,0	...	...	...	...	116,8	To be
5	375,0	73,1	197,0	141,3	...	105,0	156,0	...	...	...	...	144,4	specified
6	395,0	82,6	229,0	168,3	...	119,0	171,0	...	...	...	...	171,4	by
8	485,0	92,1	292,0	219,1	...	143,0	213,0	...	...	...	...	222,2	purchaser
10	585,0	108,0	368,0	273,0	...	178,0	254,0	...	...	...	...	277,4	
12	675,0	123,9	451,0	323,8	...	219,0	283,0	...	...	...	...	328,2	
14	750,0	133,4	495,0	355,6	...	241,0	298,0	...	...	...	...	360,2	
16	825,0	146,1	552,0	406,4	...	260,0	311,0	...	...	...	...	411,2	
18	915,0	162,0	597,0	457,0	...	276,0	327,0	...	...	...	...	462,3	
20	985,0	177,8	641,0	508,0	...	292,0	356,0	...	...	...	...	514,4	
24	1170,0	203,2	762,0	610,0	...	330,0	406,0	...	...	...	...	616,0	

NOTE: All dimensions except NPS and bolt diameter are in millimeters. The dimensions B_2 for SW flange equals B for Weld Neck.
 (1) the tolerance for E is only applicable for groove depth

CLASS 1500 FLANGES



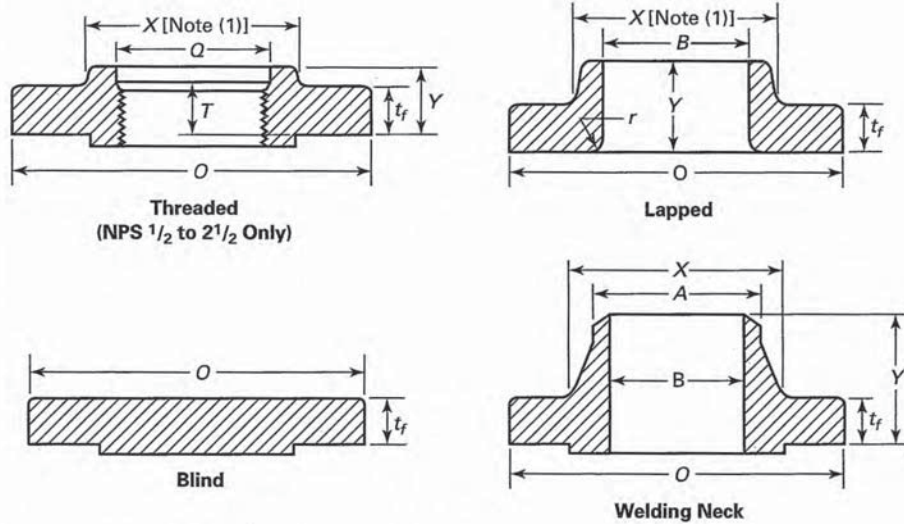
DIMENSIONS OF CLASS 1500 FLANGES (mm)

15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
	RF dimensions		RTJ dimensions						Bolt hole drilling				Stud bolt length	
Nominal Pipe Size	OD	Height	OD	Height	Groove number	Groove Pitch	Groove Depth	Groove Width	Bolt Circle	Bolt hole	No of bolts	Bolt diam.	7.0 mm RF	Ring Joint
NPS	R		K	E		P	E	F	W	Bh			L	L
1/2	34,9	7,0	60,5	6,35	R12	39,67	6,35	8,74	82,6	22,2	4	3/4	110,0	110,0
3/4	42,9	7,0	66,5	6,35	R14	44,45	6,35	8,74	88,9	22,2	4	3/4	115,0	115,0
1	50,8	7,0	71,5	6,35	R16	50,80	6,35	8,74	101,6	25,4	4	7/8	125,0	125,0
1 ¼	63,5	7,0	81,0	6,35	R18	60,33	6,35	8,74	111,1	25,4	4	7/8	125,0	125,0
1 ½	73,0	7,0	92,0	6,35	R20	68,27	6,35	8,74	123,8	28,6	4	1	140,0	140,0
2	92,1	7,0	124,0	7,92	R24	95,25	7,92	11,91	165,1	25,4	8	7/8	145,0	145,0
2 ½	104,8	7,0	137,0	7,92	R27	107,95	7,92	11,91	190,5	28,6	8	1	160,0	160,0
3	127,0	7,0	168,0	7,92	R35	136,53	7,92	11,91	203,2	31,8	8	1 ¼	180,0	180,0
4	157,2	7,0	194,0	7,92	R39	161,93	7,92	11,91	241,3	34,9	8	1 ¼	195,0	195,0
5	185,7	7,0	229,0	7,92	R44	193,68	7,92	11,91	292,1	41,3	8	1 ½	250,0	250,0
6	215,9	7,0	248,0	9,53	R46	211,14	9,53	13,49	317,5	38,1	12	1 ¾	260,0	265,0
8	269,9	7,0	318,0	11,13	R50	269,88	11,13	16,66	393,7	44,5	12	1 ¾	290,0	325,0
10	323,8	7,0	371,0	11,13	R54	323,85	11,13	16,66	482,6	50,8	12	1 ¾	335,0	345,0
12	381,0	7,0	438,0	14,27	R58	381,00	14,27	23,01	571,5	54,0	16	2	375,0	385,0
14	412,8	7,0	489,0	15,88	R63	419,10	15,88	26,97	635,0	60,3	16	2 ¼	405,0	425,0
16	469,9	7,0	546,0	17,48	R67	469,90	17,48	30,18	704,8	66,7	16	2 ½	445,0	470,0
18	533,4	7,0	613,0	17,48	R71	533,40	17,48	30,18	774,7	73,0	16	2 ¾	495,0	525,0
20	584,2	7,0	673,0	17,48	R75	584,20	17,48	33,32	831,8	79,4	16	3	540,0	565,0
24	692,2	7,0	794,0	20,62	R79	692,15	20,62	36,53	990,6	92,1	16	3 ½	615,0	650,0

NOTE: All dimensions except NPS and bolt diameter are in millimeters. The dimensions B₂ for SW flange equals B for Weld Neck.

(1) the tolerance for E is only applicable for groove depth

CLASS 2500 FLANGES



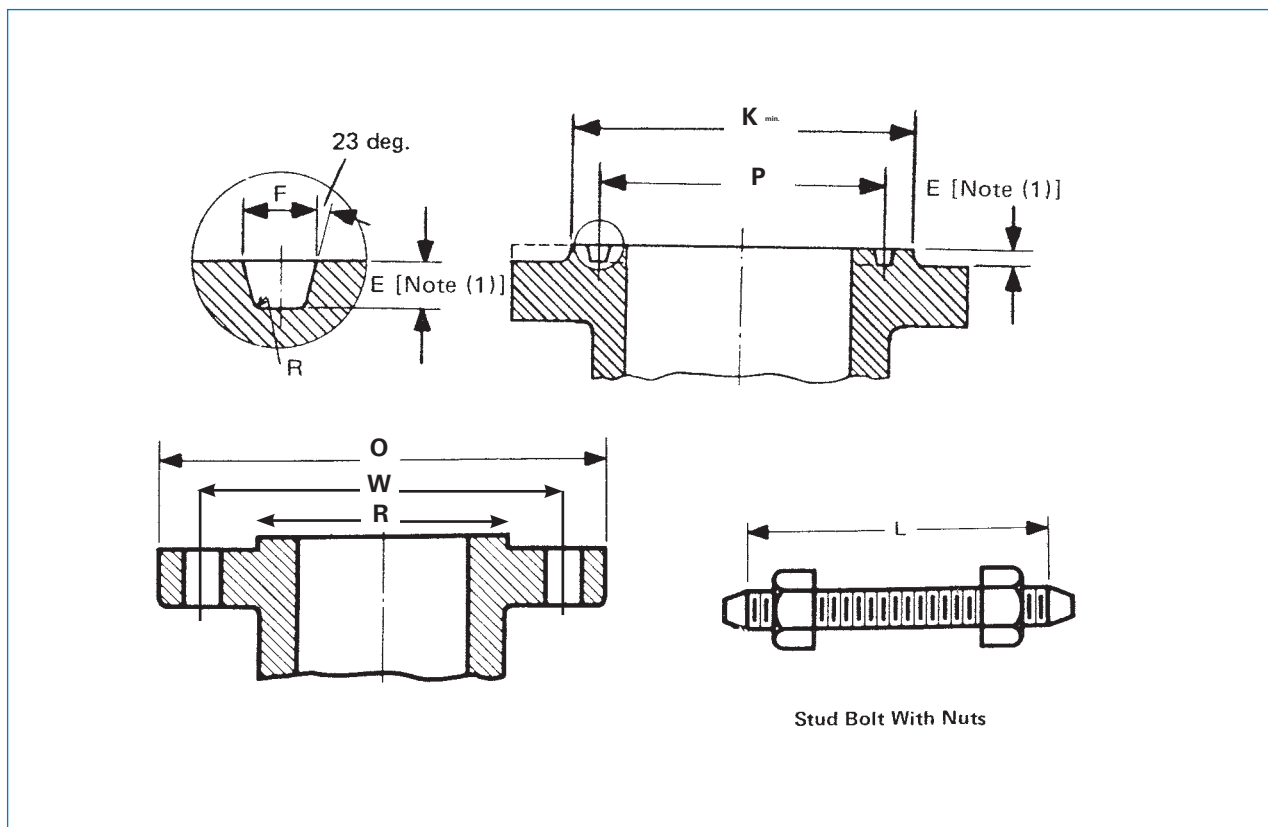
DIMENSIONS OF CLASS 2500 FLANGES (mm)

1	2	3	4	5	6	7	8	9	10	11	12	13	14
	Flange dimensions		HUB dimensions		Length Through HUB			Threaded flange		SW	Bore		
Nominal Pipe Size	OD flange	Thickn.	Large end	Small end	Thr.	Lapped	Weld neck	Counter bore	Thread length	Socket depth	Slip-On, SW	Lapped	Weld neck
NPS	O	tf min.	X	A	Y	Y	Y	Q min.	T min.	D	B min.	B min.	B
1/2	135,0	30,2	43,0	21,3	40,0	40,0	73,0	23,6	29,0	...	...	22,9	
3/4	140,0	31,8	51,0	26,7	43,0	43,0	79,0	29,0	32,0	...	...	28,2	
1	160,0	35,0	57,0	33,4	48,0	48,0	89,0	35,8	35,0	...	...	34,9	
1 1/4	185,0	38,1	73,0	42,2	52,0	52,0	95,0	44,4	39,0	...	...	43,7	
1 1/2	205,0	44,5	79,0	48,3	60,0	60,0	111,0	50,6	45,0	...	...	50,0	
2	235,0	50,9	95,0	60,3	70,0	70,0	127,0	63,5	51,0	...	...	62,5	
2 1/2	265,0	57,2	114,0	73,0	79,0	79,0	143,0	76,2	58,0	...	...	75,4	
3	305,0	66,7	133,0	88,9	...	92,0	168,0	...	...	...	...	91,4	
4	355,0	76,2	165,0	114,3	...	108,0	190,0	...	...	...	...	116,8	To be
5	420,0	92,1	203,0	141,3	...	130,0	229,0	...	...	...	...	144,4	specified
6	485,0	108,0	235,0	168,3	...	152,0	273,0	...	...	...	...	171,4	by
8	550,0	127,0	305,0	219,1	...	178,0	318,0	...	...	...	...	222,2	purchaser
10	675,0	165,1	375,0	273,0	...	229,0	419,0	...	...	...	...	277,4	
12	760,0	184,2	441,0	323,8	...	254,0	464,0	...	...	...	...	328,2	

NOTE: All dimensions except NPS and bolt diameter are in millimeters.

(1) the tolerance for E is only applicable for groove depth

CLASS 2500 FLANGES



DIMENSIONS OF CLASS 2500 FLANGES (mm)

15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
	RF dimensions		RTJ dimensions						Bolt hole drilling				Stud bolt length	
Nominal Pipe Size	OD	Height	OD	Height	Groove number	Groove Pitch	Groove Depth	Groove Width	Bolt Circle	Bolt hole	No of bolts	Bolt diam.	7,0 mm RF	Ring Joint
NPS	R		K	E		P	E	F	W	Bh			L	L
1/2	34,9	7,0	65,0	6,35	R13	42,88	6,35	8,74	88,9	22,2	4	3/4	120,0	120,0
3/4	42,9	7,0	73,0	6,35	R16	50,80	6,35	8,74	95,2	22,2	4	3/4	125,0	125,0
1	50,8	7,0	82,5	6,35	R18	60,33	6,35	8,74	108,0	25,4	4	7/8	140,0	140,0
1 ¼	63,5	7,0	102,0	7,92	R21	72,23	7,92	11,91	130,2	28,6	4	1	150,0	150,0
1 ½	73,0	7,0	114,0	7,92	R23	82,55	7,92	11,91	146,0	31,8	4	1 ⅝	170,0	170,0
2	92,1	7,0	133,0	7,92	R26	101,60	7,92	11,91	171,4	28,6	8	1	180,0	180,0
2 ½	104,8	7,0	149,0	9,52	R28	111,13	9,52	13,49	196,8	31,8	8	1 ⅝	195,0	205,0
3	127,0	7,0	168,0	9,53	R32	127,00	9,53	13,49	228,6	34,9	8	1 ¾	220,0	230,0
4	157,2	7,0	203,0	11,13	R38	157,18	11,13	16,66	273,0	41,3	8	1 ½	255,0	260,0
5	185,7	7,0	241,0	12,70	R42	190,50	12,70	19,84	323,8	47,6	8	1 ¾	300,0	310,0
6	215,9	7,0	279,0	12,70	R47	228,60	12,70	19,84	368,3	54,0	8	2	345,0	355,0
8	269,9	7,0	340,0	14,27	R51	279,40	14,27	23,01	438,2	54,0	12	2	380,0	395,0
10	323,8	7,0	425,0	17,48	R55	342,90	17,48	30,18	539,8	66,7	12	2 ½	490,0	510,0
12	381,0	7,0	495,0	17,48	R60	406,40	17,48	33,32	619,1	73,0	12	2 ¾	540,0	560,0

NOTE: All dimensions except NPS and bolt diameter are in millimeters.

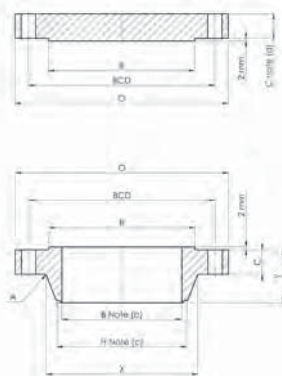
(1) the tolerance for E is only applicable for groove depth

Tolerances B16.5 - 2003

DENOMINATION	DESCRIPTION	SIZE RANGE	TOLERANCE
O	Outside diameter flange ring 1)	$\leq 24''$ $\geq 26''$	$\pm 1.6 \text{ mm}$ $\pm 3.2 \text{ mm}$
B	Inside diameter / bore	Weld neck: $\leq 10''$ $12'' - 18''$ $\geq 20''$ Slip-on, lap joint, socket weld, threaded $\leq 10''$ $\geq 12''$	$\pm 1.0 \text{ mm}$ $\pm 1.5 \text{ mm}$ $+ 3.0 / -1.5 \text{ mm}$ $+ 1.0 / -0.0 \text{ mm}$ $+ 1.5 / -0.0 \text{ mm}$
A	Diameter small end of HUB / WN end	$\leq 5''$ $\geq 6''$	$+ 2.0 / -1.0 \text{ mm}$ $+ 4.0 / -1.0 \text{ mm}$
X	Diameter of HUB base	$\leq 24''$ (dimension X) $\geq 26''$ (dimension X)	$+ 1.6 / -0.8 \text{ mm}$ $+ 3.2 / -0.8 \text{ mm}$
W	Drilling and facing	Bolt circle diameter Center to center adjacent bolt holes Max eccentricity between bolt circle diameter and machining facing diameter: $\leq 2 \frac{1}{2}''$ $\geq 3''$	$\pm 1.5 \text{ mm}$ $\pm 0.8 \text{ mm}$ 0.8 mm 1.5 mm
Y	Overall HUB length of WN flanges	$\leq 4''$ $5'' - 10''$ $\geq 12''$	$\pm 1.5 \text{ mm}$ $+ 1.5 / -3.0 \text{ mm}$ $+ 3.0 / -5.0 \text{ mm}$
tf	Thickness of flange ring	$\leq 18''$ $\geq 20''$	$+ 3.0 / -0.0 \text{ mm}$ $+ 5.0 / -0.0 \text{ mm}$
E	Groove depth	Applicable for groove depth only	$+ 0.4 / -0.0 \text{ mm}$
F	Groove width		$\pm 0.2 \text{ mm}$
P	Groove pitch		$\pm 0.13 \text{ mm}$
K	RTJ raised portion		$+ 0.50 / -0.00 \text{ mm}$
R	RF raised portion	2.0 mm RF height 7.0 mm RF height	$\pm 1.0 \text{ mm}$ $\pm 0.5 \text{ mm}$

1) These tolerances are not covered by ANSI B 16.5

MSS SP-44 CLASS 150 FLANGES

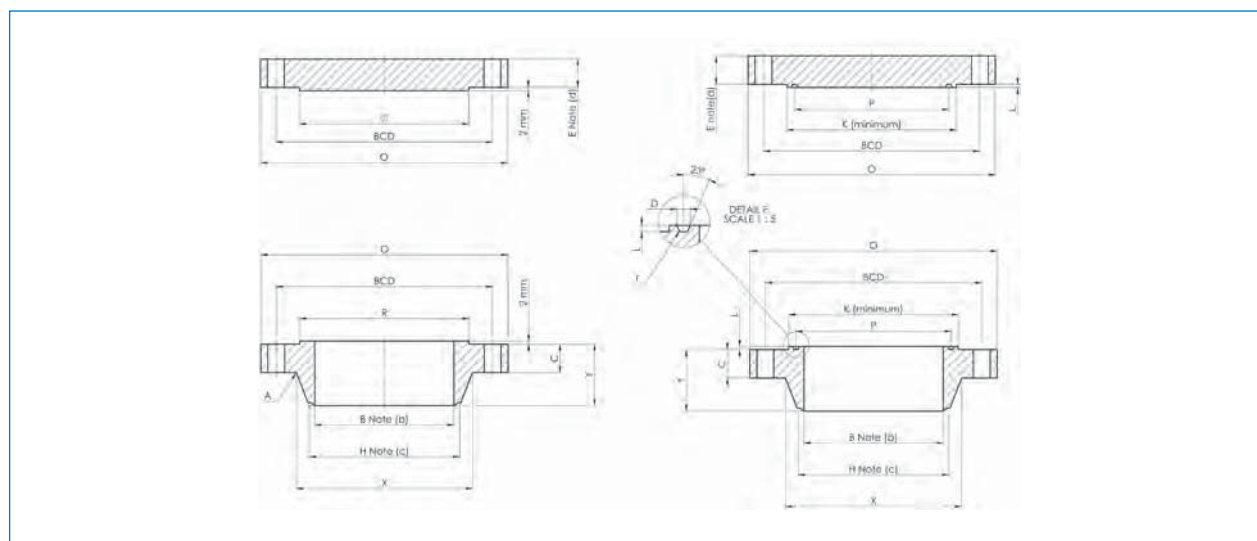


DIMENSIONS FOR MSS SP-44 CLASS 150 FLANGES (mm)

Nominal Pipe size	Flange dim.		Hub dimension		RF dimensions		RTJ dimensions					Bolt hole drilling		
	OD flange O	Thickness C min.	OD Large end X	Length through Y	OD R	Height	OD K	Groove number	Pitch P	Depth L	Width D	Bolt Circle Bc	Bolt Hole Bh	No of bolts
26"	870	66,7	676	119	749,3	2,0	-	-	-	-	-	806,4	35,1	24
28"	925	69,9	727	124	800,1	2,0	-	-	-	-	-	863,6	35,1	28
30"	985	73,1	781	135	857,2	2,0	-	-	-	-	-	914,4	35,1	28
32"	1060	79,4	832	143	914,4	2,0	-	-	-	-	-	977,9	41,2	28
34"	1110	81,0	883	148	965,2	2,0	-	-	-	-	-	1028,7	41,2	32
36"	1170	88,9	933	156	1022,4	2,0	-	-	-	-	-	1085,8	41,2	32
38"	1240	85,8	991	156	1073,2	2,0	-	-	-	-	-	1149,4	41,2	32
40"	1290	88,9	1041	162	1124,0	2,0	-	-	-	-	-	1200,2	41,2	36
42"	1345	95,3	1092	170	1193,8	2,0	-	-	-	-	-	1257,3	41,2	36
44"	1405	100,1	1143	176	1244,6	2,0	-	-	-	-	-	1314,4	41,2	40
46"	1455	101,6	1197	184	1295,4	2,0	-	-	-	-	-	1365,2	41,2	40
48"	1510	106,4	1248	190	1358,9	2,0	-	-	-	-	-	1422,4	41,2	44
50"	1570	109,6	1302	202	1409,7	2,0	-	-	-	-	-	1479,6	47,8	44
52"	1625	114,3	1353	208	1460,5	2,0	-	-	-	-	-	1536,7	47,8	44
54"	1685	119,1	1403	214	1511,3	2,0	-	-	-	-	-	1593,8	47,8	44
56"	1745	122,3	1457	227	1574,8	2,0	-	-	-	-	-	1651,0	47,8	48
58"	1805	127,0	1508	233	1625,6	2,0	-	-	-	-	-	1708,2	47,8	48
60"	1855	130,2	1559	238	1676,4	2,0	-	-	-	-	-	1759,0	47,8	52

NOTES: Bore (B) to be specified by purchaser
OD of HUB at WN end (H) depends on material properties of flange versus joining piping - see section 5.3 of MSS SP-44.

MSS SP-44 CLASS 300 FLANGES



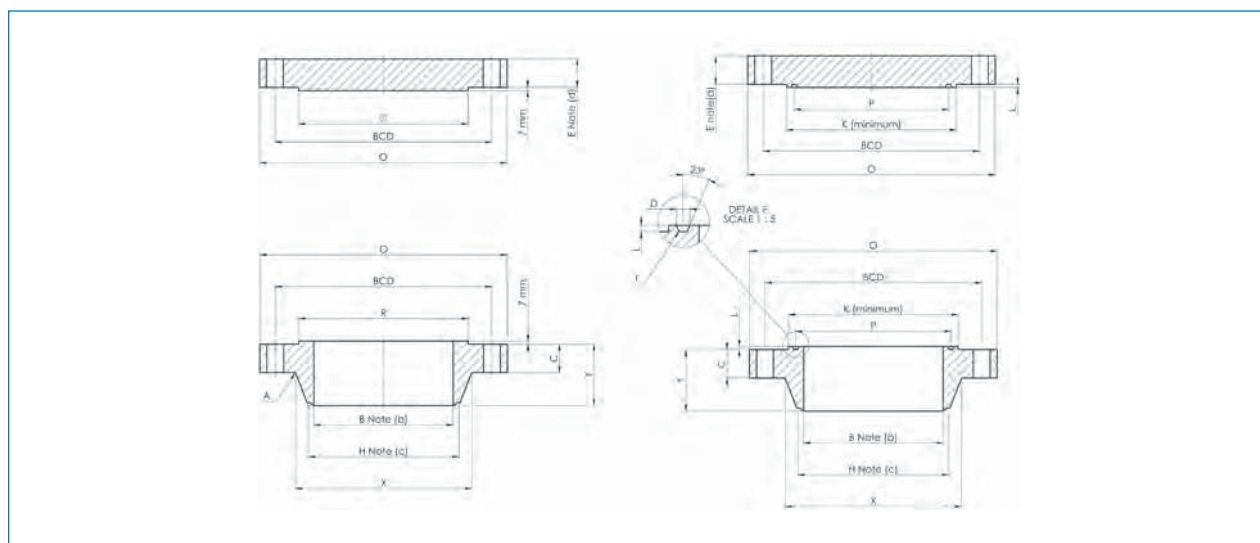
DIMENSIONS FOR MSS SP-44 CLASS 300 FLANGES (mm)

Nominal Pipe size	Flange dimension			Hub dimension		RF dimensions		RTJ dimensions					Bolt hole drilling		
	OD flange O	Thickn. WN C min.	Thickn. Blind E. min	OD Large end X	Length through Y	OD R	Height	OD K	Groove number	Pitch P	Depth L	Width D	Bolt Circle Bc	Bolt Hole Bh	No of bolts
26"	970	77,8	82,6	721	183	749,3	2,0	810	R93	749,3	12,70	19,84	876,3	44,5	28
28"	1035	84,2	88,9	775	195	800,1	2,0	861	R94	800,1	12,70	19,84	939,8	44,5	28
30"	1090	90,5	93,7	827	208	857,2	2,0	917	R95	857,3	12,70	19,84	997,0	47,8	28
32"	1150	96,9	98,5	881	221	914,4	2,0	984	R96	914,4	14,27	23,01	1054,1	50,8	28
34"	1205	100,1	103,2	937	230	965,2	2,0	1035	R97	965,2	14,27	23,01	1104,9	50,8	28
36"	1270	103,2	109,6	991	240	1022,4	2,0	1092	R98	1022,4	14,27	23,01	1168,4	53,9	32
38"	1170	106,4	106,4	994	179	1028,7	2,0	-	-	-	-	-	1092,2	41,2	32
40"	1240	112,8	112,8	1048	192	1085,8	2,0	-	-	-	-	-	1155,7	44,5	32
42"	1290	117,5	117,5	1099	198	1136,6	2,0	-	-	-	-	-	1206,5	44,5	32
44"	1355	122,3	122,3	1149	205	1193,8	2,0	-	-	-	-	-	1263,6	47,8	32
46"	1415	127,0	127,0	1203	214	1244,6	2,0	-	-	-	-	-	1320,8	50,8	28
48"	1465	131,8	131,8	1254	222	1301,8	2,0	-	-	-	-	-	1371,6	50,8	32
50"	1530	138,2	138,2	1305	230	1358,9	2,0	-	-	-	-	-	1428,8	53,9	32
52"	1580	142,9	142,9	1356	237	1409,7	2,0	-	-	-	-	-	1479,6	53,9	32
54"	1660	150,9	150,9	1410	251	1466,8	2,0	-	-	-	-	-	1549,4	60,5	28
56"	1710	152,4	152,4	1464	259	1517,6	2,0	-	-	-	-	-	1600,2	60,5	28
58"	1760	157,2	157,2	1514	265	1574,8	2,0	-	-	-	-	-	1651,0	60,5	32
60"	1810	162,0	162,0	1565	271	1625,6	2,0	-	-	-	-	-	1701,8	60,5	32

NOTES: Bore (B) to be specified by purchaser

OD of HUB at WN end (H) depends on material properties of flange versus joining piping - see section 5.3 of MSS SP-44.

MSS SP-44 CLASS 400 FLANGES



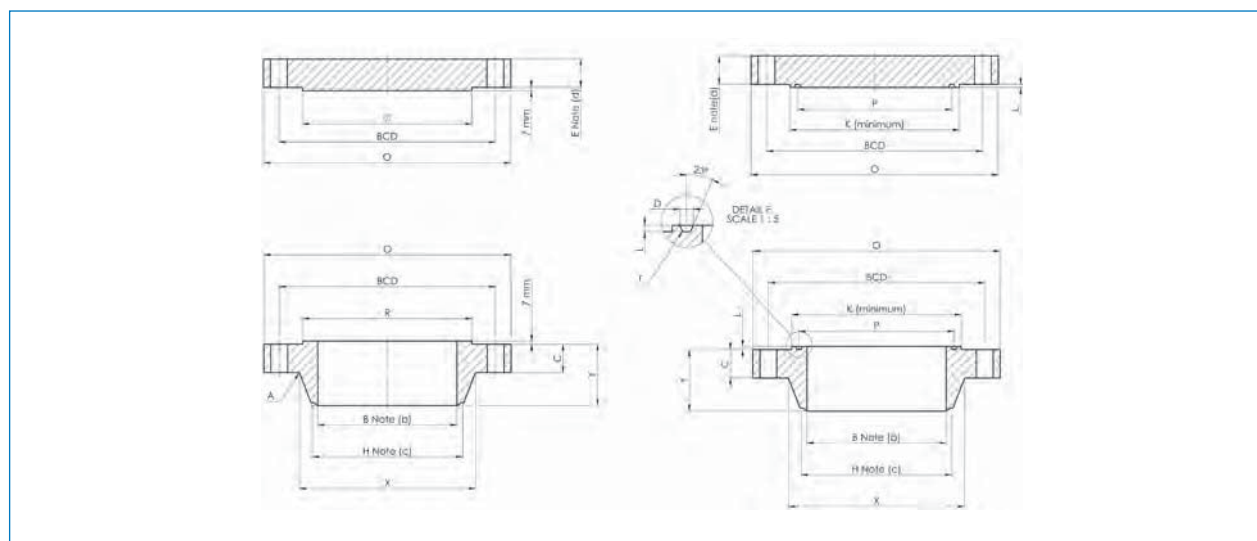
DIMENSIONS FOR MSS SP-44 CLASS 400 FLANGES (mm)

Nominal Pipe size	Flange dimension			Hub dimension		RF dimensions		RTJ dimensions					Bolt hole drilling		
	OD flange O	Thickn. WN C min.	Thickn. Blind E. min	OD Large end X	Length through Y	OD R	Height	OD K	Groove number	Pitch P	Depth L	Width D	Bolt Circle Bc	Bolt Hole Bh	No of bolts
26"	970	88,9	98,5	727	194	749,3	7,0	810	R93	749,3	12,70	19,84	876,3	47,8	28
28"	1035	95,3	104,8	783	206	800,1	7,0	861	R94	800,1	12,70	19,84	939,8	50,8	28
30"	1090	101,6	111,2	837	219	857,2	7,0	917	R95	857,3	12,70	19,84	997,0	53,9	28
32"	1150	108,0	115,9	889	232	914,4	7,0	984	R96	914,4	14,27	23,01	1054,1	53,9	28
34"	1205	111,2	122,3	945	241	965,2	7,0	1035	R97	965,2	14,27	23,01	1104,9	53,9	28
36"	1270	114,3	128,6	1000	251	1022,4	7,0	1092	R98	1022,4	14,27	23,01	1168,4	53,9	32
38"	1205	123,9	123,9	1003	206	1035,0	7,0	-	-	-	-	-	1117,6	47,8	32
40"	1270	130,2	130,2	1054	216	1092,2	7,0	-	-	-	-	-	1174,8	50,8	32
42"	1320	133,4	133,4	1108	224	1143,0	7,0	-	-	-	-	-	1225,6	50,8	32
44"	1385	139,7	139,7	1159	233	1200,2	7,0	-	-	-	-	-	1282,7	53,9	32
46"	1440	146,1	146,1	1213	244	1257,3	7,0	-	-	-	-	-	1339,8	53,9	36
48"	1510	152,4	152,4	1267	257	1308,1	7,0	-	-	-	-	-	1403,4	60,5	28
50"	1570	157,2	158,8	1321	268	1362,1	7,0	-	-	-	-	-	1460,5	60,5	32
52"	1620	162,0	163,6	1372	276	1412,9	7,0	-	-	-	-	-	1511,3	60,5	32
54"	1700	169,9	171,5	1426	289	1470,0	7,0	-	-	-	-	-	1581,2	66,6	28
56"	1755	174,7	176,3	1480	298	1527,2	7,0	-	-	-	-	-	1632,0	66,6	32
58"	1805	177,8	181,0	1530	306	1578,0	7,0	-	-	-	-	-	1682,8	60,6	32
60"	1885	185,8	189,0	1584	319	1635,1	7,0	-	-	-	-	-	1752,6	73,2	32

NOTES: Bore (B) to be specified by purchaser

OD of HUB at WN end (H) depends on material properties of flange versus joining piping - see section 5.3 of MSS SP-44.

MSS SP-44 CLASS 600 FLANGES



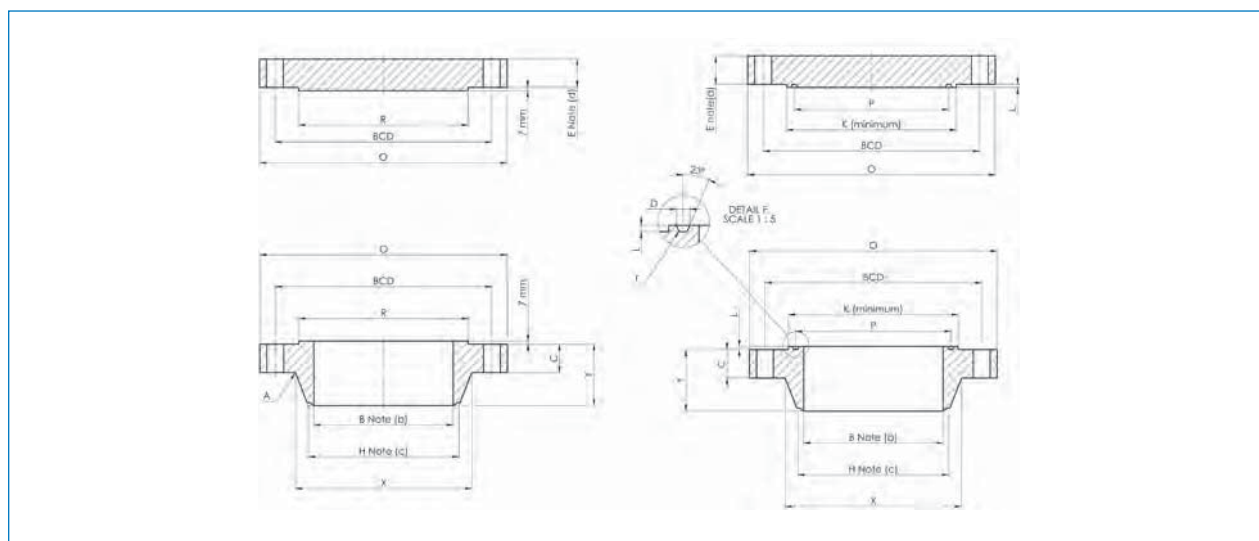
DIMENSIONS FOR MSS SP-44 CLASS 600 FLANGES (mm)

Nominal Pipe size	Flange dimension			Hub dimension		RF dimensions		RTJ dimensions					Bolt hole drilling		
	OD flange O	Thickn. WN C min.	Thickn. Blind E. min	OD Large end X	Length through Y	OD R	Height	OD K	Groove number	Pitch P	Depth L	Width D	Bolt Circle Bc	Bolt Hole Bh	No of bolts
26"	1015	108,0	125,5	748	222	749,3	7,0	810	R93	749,3	12,70	19,84	914,4	50,8	28
28"	1075	111,2	131,8	803	235	800,1	7,0	861	R94	800,1	12,70	19,84	965,2	53,9	28
30"	1130	114,3	139,7	862	248	857,2	7,0	917	R95	857,3	12,70	19,84	1022,4	53,9	28
32"	1195	117,5	147,7	918	260	914,4	7,0	984	R96	914,4	14,27	23,01	1079,5	60,5	28
34"	1245	120,7	154,0	973	270	965,2	7,0	1035	R97	965,2	14,27	23,01	1130,3	60,5	28
36"	1315	123,9	162,0	1032	283	1022,4	7,0	1092	R98	1022,4	14,27	23,01	1193,8	66,6	28
38"	1270	152,4	155,6	1022	254	1054,1	7,0	-	-	-	-	-	1162,0	60,5	28
40"	1320	158,8	162,0	1073	264	1111,2	7,0	-	-	-	-	-	1212,8	60,5	32
42"	1405	168,3	171,5	1127	279	1168,4	7,0	-	-	-	-	-	1282,7	66,6	28
44"	1455	173,1	177,8	1181	289	1225,6	7,0	-	-	-	-	-	1333,5	66,6	32
46"	1510	179,4	185,8	1235	300	1276,4	7,0	-	-	-	-	-	1390,6	66,6	32
48"	1595	189,0	195,3	1289	316	1333,5	7,0	-	-	-	-	-	1460,5	73,2	32
50"	1670	196,9	203,2	1343	329	1384,3	7,0	-	-	-	-	-	1524,0	79,3	28
52"	1720	203,2	209,6	1394	337	1435,1	7,0	-	-	-	-	-	1574,8	79,3	32
54"	1780	209,6	217,5	1448	349	1492,2	7,0	-	-	-	-	-	1632,0	79,3	32
56"	1855	217,5	225,5	1502	362	1543,0	7,0	-	-	-	-	-	1695,4	85,9	32
58"	1905	222,3	231,8	1553	370	1600,2	7,0	-	-	-	-	-	1746,2	85,9	32
60"	1995	233,4	242,9	1610	389	1657,4	7,0	-	-	-	-	-	1822,4	92,0	28

NOTES: Bore (B) to be specified by purchaser

OD of HUB at WN end (H) depends on material properties of flange versus joining piping - see section 5.3 of MSS SP-44.

MSS SP-44 CLASS 900 FLANGES



DIMENSIONS FOR MSS SP-44 CLASS 900 FLANGES (mm)

Nominal Pipe size	Flange dimension			Hub dimension		RF dimensions		RTJ dimensions					Bolt hole drilling		
	OD flange O	Thickn. WN C min.	Thickn. Blind E. min	OD Large end X	Length through Y	OD R	Height	OD K	Groove number	Pitch P	Depth L	Width D	Bolt Circle Bc	Bolt Hole Bh	No of bolts
26"	1085	139,7	160,4	775	286	749,3	7,0	832	R100	749,3	17,48	30,18	952,5	73,2	20
28"	1170	142,9	171,5	832	298	800,1	7,0	889	R101	800,1	17,48	33,32	1022,4	79,3	20
30"	1230	149,3	182,6	889	311	857,2	7,0	946	R102	857,3	17,48	33,32	1085,8	79,3	20
32"	1315	158,8	193,7	946	330	914,4	7,0	1003	R103	914,4	17,48	33,32	1155,7	85,9	20
34"	1395	165,1	204,8	1006	349	965,2	7,0	1067	R104	965,2	20,62	36,52	1225,6	92,0	20
36"	1460	171,5	214,4	1064	362	1022,4	7,0	1124	R105	1022,4	20,62	36,52	1289,0	92,0	20
38"	1460	190,5	215,9	1073	352	1098,6	7,0	-	-	-	-	-	1289,0	92,0	20
40"	1510	196,9	223,9	1127	364	1162,8	7,0	-	-	-	-	-	1339,8	92,0	24
42"	1560	206,4	231,8	1176	371	1212,8	7,0	-	-	-	-	-	1390,6	92,0	24
44"	1650	214,4	242,9	1235	391	1270,0	7,0	-	-	-	-	-	1463,7	98,6	24
46"	1735	225,5	255,6	1292	411	1333,5	7,0	-	-	-	-	-	1536,7	104,7	24
48"	1785	233,4	263,6	1343	419	1384,3	7,0	-	-	-	-	-	1587,5	104,7	24

NOTES: Bore (B) to be specified by purchaser

OD of HUB at WN end (H) depends on material properties of flange versus joining piping - see section 5.3 of MSS SP-44.

TOLERANCES MSS SP-44 - 2006

Denomination	Description	Size range	Tolerance
O	Outside diameter flange ring - note 1	($\geq 26''$)	± 3.2 mm
B	Inside diameter / bore	($\geq 20''$)	+ 3.0 / -1.5 mm
H	Diameter small end of HUB / WN end	($\geq 26''$)	+ 5.0 / -1.5 mm
X	Diameter of HUB base - note 1 Drilling and facing	($\geq 26''$ dimension X) Bolt circle diameter Center to center adjacent bolt holes Max eccentricity between bolt circle diam. and machining facing diameter	+ 3.2 / -0.8 mm ± 1.5 mm ± 0.8 mm 2.0 mm
Y	Overall HUB length	($\geq 26''$)	± 5.0 mm
C or E	Thickness of flange ring	($\geq 20''$)	+ 5.0 / -0.0 mm
L	Groove depth - note 2	Applicable for groove depth only	+ 0.4 / -0.0 mm
D	Groove width - note 2		± 0.2 mm
P	Groove pitch - note 2		± 0.13
K	RTJ raised portion - note 2		+ 0.50 / -0.00 mm
R	RF raised portion	2.0 mm RF height ($\geq 26''$) 7.0 mm RF height ($\geq 26''$)	± 2.0 mm ± 1.0 mm

NOTES: 1) These tolerances are not covered by MSS SP-44, and are for guidance only.
 2) These tolerances are not covered by MSS SP-44 - taken from ASME B16.5.

API 6A - type 6B flanges

Weld neck, Threaded and Integral flanges are available in 2000, 3000 and 5000 psi rating

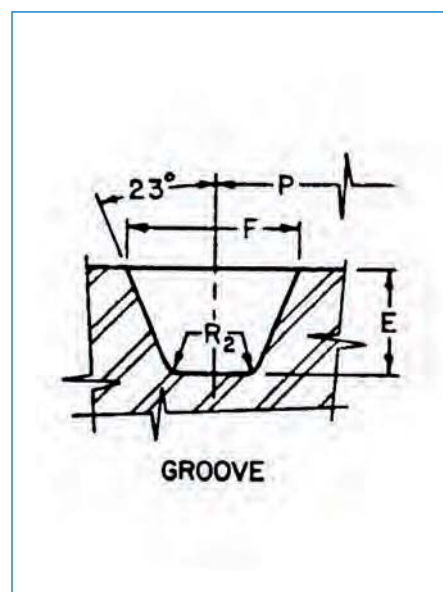
TYPE 6B WELD NECK FLANGES - 5000PSI

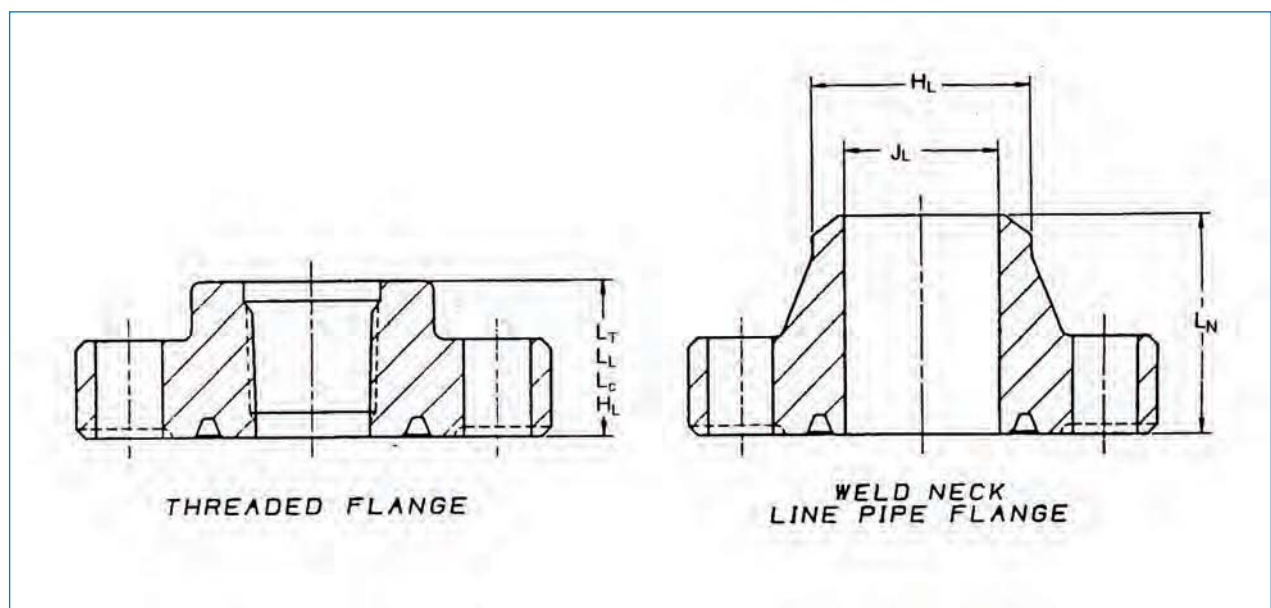
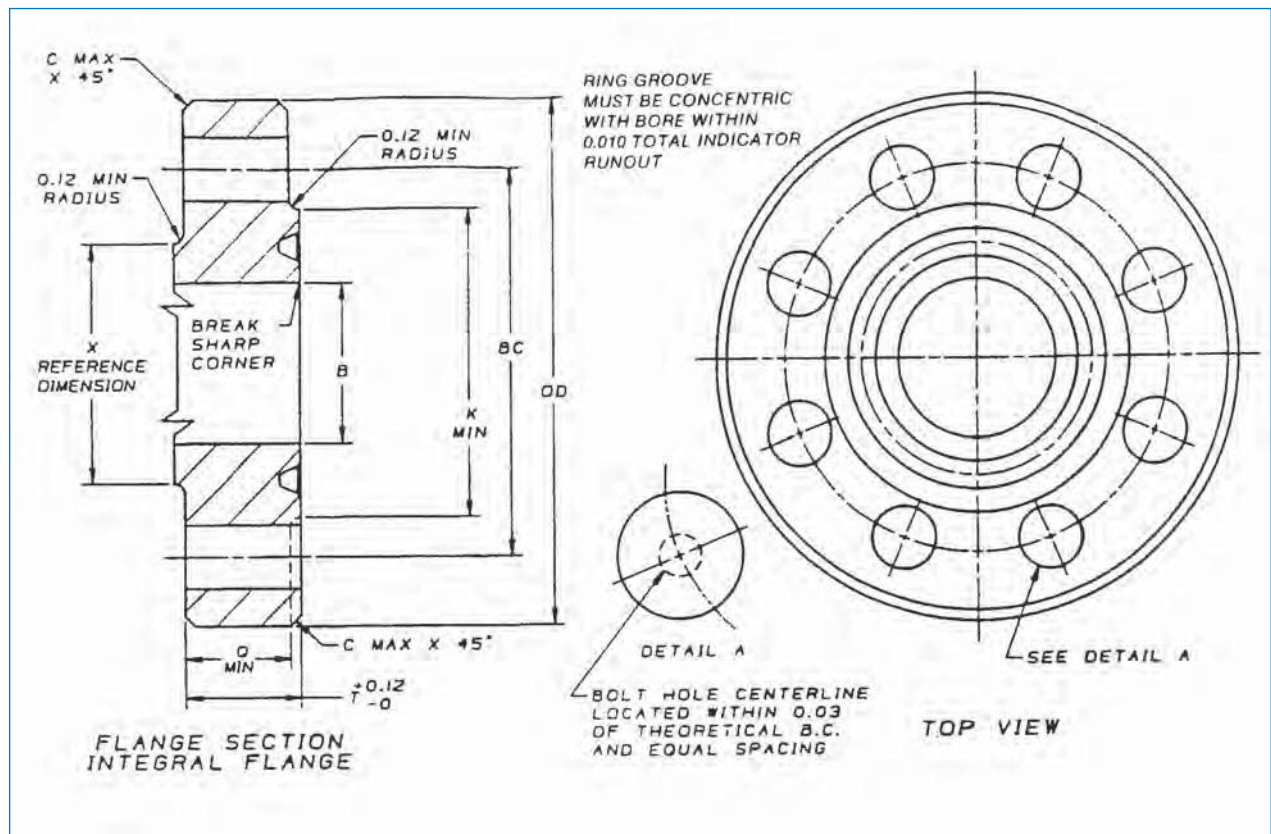
Nominal size	Nom. bore	Max bore	OD flange	Raised face OD	Total thickn.	Basic thickn. diam.	Large HUB diam.	Small HUB	HUB length	OD bolt circle	No. of bolts	Bolt diam.	Bolt hole diam.	Stud bolt length	Ring number	Pitch of groove	Width of groove	Depth of groove
(inch)		JL	OD	K	T	Q	X	HL	LN	BC		(inch)		Lssb	R/ RX	P	F	E
2 1/6	52	43,7	215	124	46,1	38,1	104,8	60,3	109,5	165,1	8	7/8	26	150	24	95,25	11,91	7,9
2 3/8	65	54,9	245	137	49,3	41,3	123,8	73,0	112,7	190,5	8	1	29	165	27	107,95	11,91	7,9
3 1/8	79	67,5	265	168	55,6	47,7	133,3	88,9	125,4	203,2	8	1 1/8	32	185	35	136,53	11,91	7,9
4 1/8	103	88,1	310	194	62,0	54,0	161,9	114,3	131,8	241,3	8	1 1/4	35	205	39	161,93	11,91	7,9
5 1/8	130	110,3	375	229	81,0	73,1	196,8	141,3	163,5	292,1	8	1 1/2	42	255	44	193,68	11,91	7,9
7 1/8	178	132,6	395	248	92,1	82,6	228,6	168,3	181,0	317,5	12	1 3/8	39	275	46	211,15	13,49	9,7
9	228	173,8	485	318	103,2	92,1	292,1	219,1	223,8	393,7	12	1 3/4	45	305	50	269,88	16,66	11,2
11	279	216,7	585	371	119,1	108	368,3	273,1	265,1	482,6	12	1 7/8	51	350	54	323,85	16,66	11,2

NOTE: All dimensions except NPS and bolt diameter in millimeters

TOLERANCES:

OD	2 1/16 to 5 1/8	+/- 2mm
OD	7 1/16 to 11	+/- 3mm
LN		+/- 1.6mm
HL	2 1/16 to 5 1/8	+2.3/-0.8mm
HL	7 1/16 to 11	+4.0/-0.8mm
T		+3/-0mm
K		/-0mm
Q		/-0mm
Bolt holes	2 1/16 to 7 1/16	+2.0/-0.5mm
Bolt holes	9 to 11	+2.5/-0.5mm
P		+/-0.13mm
F		+/-0.20mm
E		+0.5/-0mm
All other dimension - as X.X		+/-0.5mm
All other dimension - as X.XX		+/-0.1mm





API 6A - type 6BX flanges

Weld neck, Blind and Test flanges are available in 10.000, 15.000 and 20.000 psi rating

Integral flanges are available in 2000, 3000, 5000, 10.000, 15.000 and 20.000 psi rating

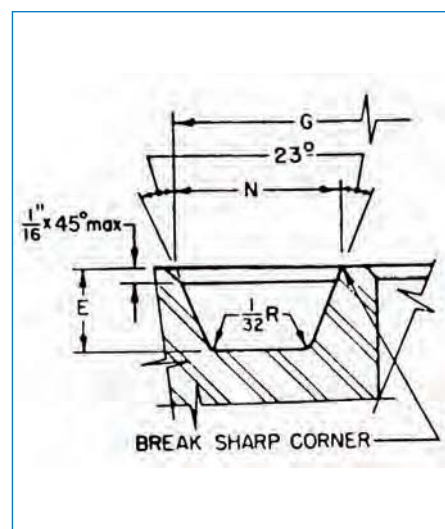
TYPE 6BX WELD NECK FLANGES - 10.000/15.000/20.000 PSI

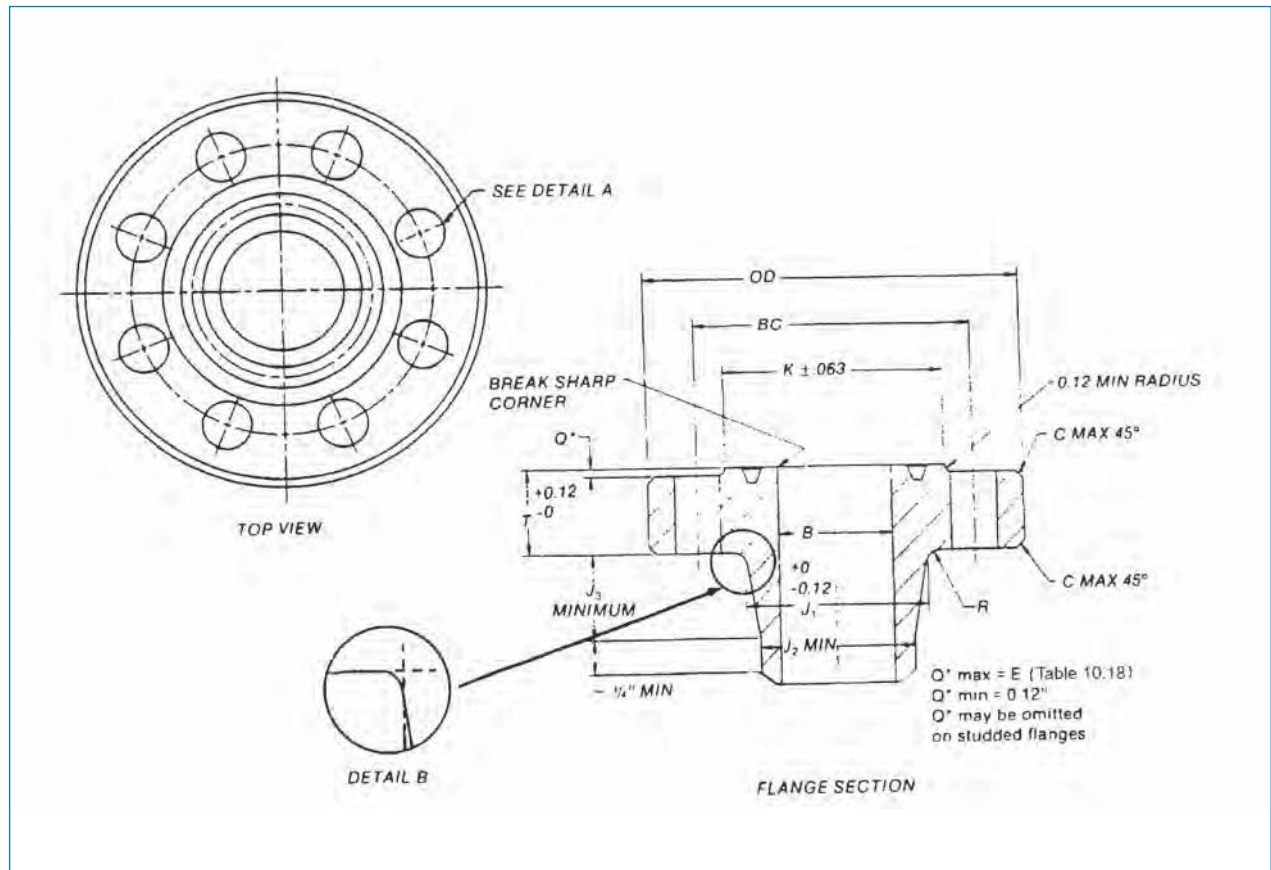
Nominal size	Nom. bore	Max bore	OD flange	Raised face OD	Total thickn.	Large HUB diam.	Small HUB diam.	HUB length	OD bolt circle	No. of bolts	Bolt diam.	Bolt hole diam.	Stud bolt length	Ring number	OD of groove	Width of groove	Depth of groove
(inch)	B	B	OD	K	T	J1	J2	J3	BC		(inch)		Lssb	BX	G	N	E
10.000 psi																	
1 1/16	46	46,8	185	105	42,1	88,9	65,1	48,4	146,0	8	3/4	23	125	151	77,77	11,84	5,56
2 1/16	52	53,2	200	111	44,1	100,0	74,6	51,6	158,8	8	3/4	23	135	152	86,23	12,65	5,95
2 3/16	65	65,9	230	132	51,2	120,7	92,1	57,2	184,2	8	7/8	26	150	153	102,77	14,07	6,75
3 1/16	78	78,6	270	152	58,4	142,1	110,3	63,5	215,9	8	1	29	170	154	119,00	15,39	7,54
4 1/16	103	104,0	315	185	70,3	182,6	146,1	73,0	258,8	8	1 1/8	32	205	155	150,62	17,73	8,33
5 1/8	130	131,0	360	221	79,4	223,8	182,6	81,0	300,0	12	1 1/8	32	220	169	176,66	16,92	9,53
7 1/8	179	180,2	480	302	103,2	301,6	254,0	95,2	403,2	12	1 1/2	42	285	156	241,83	23,39	11,11
9	228	229,4	550	359	123,9	374,7	327,1	93,7	476,2	16	1 1/2	42	330	157	299,06	26,39	12,70
11	279	280,2	655	429	141,3	450,9	400,1	103,2	565,2	16	1 3/4	48	380	158	357,23	29,18	14,29
13 5/8	346	346,9	770	518	168,3	552,5	495,3	114,3	673,1	20	1 7/8	51	440	159	432,64	32,49	15,88
16 3/4	425	426,2	870	576	168,3	655,6	601,7	76,2	776,3	24	1 7/8	51	445	162	478,33	17,91	8,33
15.000 psi																	
1 1/16	46	46,8	210	106	45,3	97,6	71,4	47,6	160,3	8	7/8	26	140	151	77,77	11,84	5,56
2 1/16	52	53,2	220	114	50,8	111,1	82,6	54,0	174,6	8	7/8	26	150	152	86,23	12,65	5,95
2 3/16	65	65,9	255	133	57,2	128,6	100,0	57,2	200,0	8	1	29	170	153	102,77	14,07	6,75
3 1/16	78	78,6	290	154	64,3	154,0	122,2	63,5	230,2	8	1 1/8	32	190	154	119,00	15,39	7,54
4 1/16	103	104,0	360	194	78,6	195,3	158,8	73,0	290,5	8	1 3/8	39	235	155	150,62	17,73	8,33
5 1/8	130	131,0	420	225	98,5	244,5	200,0	81,8	342,9	12	1 1/2	42	290	169	176,66	16,92	9,53
7 1/8	179	180,2	505	305	119,1	325,4	276,2	92,1	428,6	16	1 1/2	42	325	156	241,83	23,39	11,11
20.000 psi																	
1 1/16	46	46,8	255	117	63,5	133,4	109,5	49,2	203,2	8	1	29	190	151	77,77	11,84	5,56
2 1/16	52	53,2	285	132	71,5	154,0	127,0	52,4	230,2	8	1 1/8	32	210	152	86,23	12,65	5,95
2 3/16	65	65,9	325	151	79,4	173,0	144,5	58,7	261,9	8	1 1/4	35	235	153	102,77	14,07	6,75
3 1/16	78	78,6	355	171	85,8	192,1	160,3	63,5	287,3	8	1 3/8	39	255	154	119,00	15,39	7,54
4 1/16	103	104,0	445	219	106,4	242,9	206,4	73,0	357,2	8	1 3/4	48	310	155	150,62	17,73	8,33
7 1/8	179	180,2	655	352	165,1	385,8	338,1	96,8	554,0	16	2	54	445	156	241,83	23,39	11,11

NOTE: All dimensions except NPS and bolt diameter in millimeters

TOLERANCES:

OD	1 13/16 to 5 1/8	+/- 2mm
OD	7 1/16 to 16 3/4	+/- 3mm
J1		+0/-3mm
J2		-0mm
J3		-0mm
T		+3/-0mm
K		+/-1.6mm
Bolt holes	1 13/16 to 5 1/8	+2.0/-0.5mm
Bolt holes	7 1/16 to 16 3/4	+2.5/-0.5mm
G		+0.1/-0mm
N		+0.1/-0mm
E		+0.5/-0mm
All other dimension - as X.X		+/-0.5mm
All other dimension - as X.XX		+/-0.1mm





FORGED FITTINGS

ASME B16.11

BS3799

MSS SP 79

MSS SP 83



COUPLINGS

Full Coupling -
CL3000



Half Coupling -
CL3000



Reducing Coupling -
CL3000

ELBOWS

45° Elbow -
CL3000



90° Elbow -
CL3000

TEE

Equal Tee -
CL3000



Reducing Tee -
CL3000

UNION

Union - CL3000

CROSS

Cross - CL3000
(Available on Request)

CAP

Cap - CL3000

REDUCING INSERTS

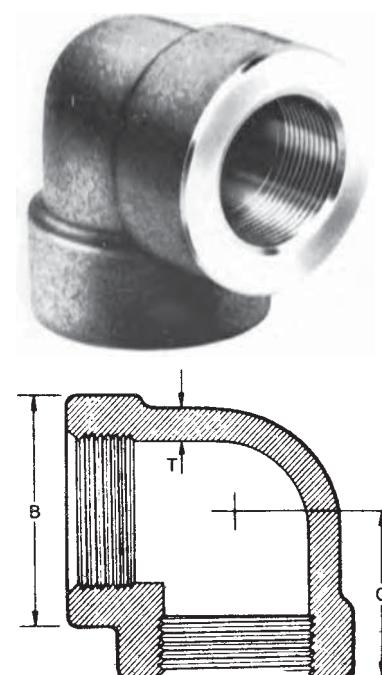
Reducing Insert -
CL3000



90° ELBOWS - THREADED - B16.11

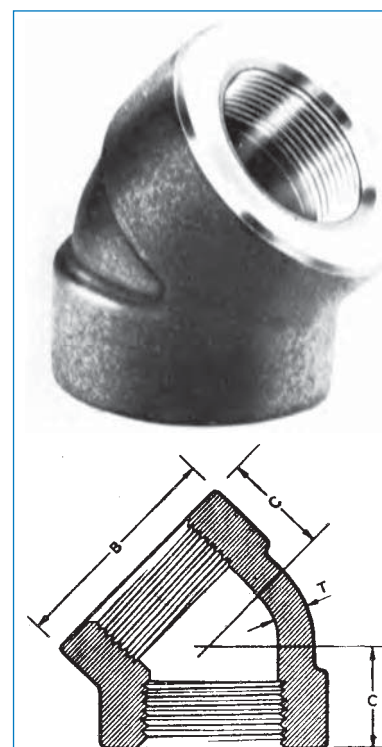
Rating	Dims	1/8"	1/4"	3/8"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"
2000 LB	B	22	22	25	33	38	46	56	62	75	92	109	146
	C	21	21	25	28	33	38	44	51	60	76	86	106
	T	3,18	3,18	3,18	3,18	3,18	3,68	3,89	4,01	4,27	5,61	5,99	6,55
	Appt Wt	0,08	0,08	0,11	0,23	0,28	0,46	0,80	1,00	1,60	2,30	4,35	10,25
	Kg												
3000 LB	B	22	25	33	38	46	56	62	75	84	102	121	152
	C	21	25	28	33	38	44	51	60	64	83	95	114
	T	3,18	3,30	3,51	4,09	4,32	4,98	5,28	5,56	7,14	7,65	8,84	11,18
	Appt Wt	0,14	0,14	0,27	0,37	0,60	1,08	1,22	2,45	2,50	5,25	7,40	13,00
	Kg												
6000 LB	B	25	33	38	46	56	62	75	84	102	121	146	152
	C	25	28	33	38	44	51	60	64	83	95	106	114
	T	6,35	6,60	6,98	8,15	8,53	9,93	10,59	11,07	12,09	15,29	16,64	18,67
	App Wt	0,31	0,31	0,50	0,69	1,25	1,65	2,75	3,22	6,25	10,00	17,00	18,00
	Kg												

90° elbows



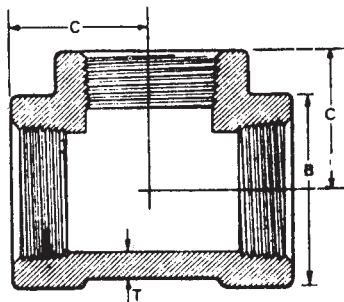
45° ELBOWS - THREADED - B16.11

Rating	Dims	1/8"	1/4"	3/8"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"
2000 LB	B	22	22	25	33	38	46	56	62	75	92	109	146
	C	17	17	19	22	25	28	33	35	43	52	64	79
	T	3,18	3,18	3,18	3,18	3,18	3,68	3,89	4,01	4,27	5,61	5,99	6,55
	App Wt	0,10	0,10	0,11	0,21	0,24	0,39	0,70	0,85	1,23	3,00	3,50	9,00
	Kg												
3000 LB	B	22	25	33	38	46	56	62	75	84	102	121	152
	C	17	19	22	25	28	33	35	43	44	52	64	79
	T	3,18	3,30	3,51	4,09	4,32	4,98	5,28	5,56	7,14	7,65	8,84	11,18
	App Wt	0,13	0,13	0,25	0,36	0,53	0,78	1,02	1,70	2,35	5,40	6,00	10,50
	Kg												
6000 LB	B	25	33	38	46	56	62	75	84	102	121	146	152
	C	19	22	25	28	33	35	43	44	52	64	79	79
	T	6,35	6,60	6,98	8,15	8,53	9,93	10,59	11,07	12,09	15,29	16,64	18,67
	App Wt	0,25	0,25	0,35	0,60	0,95	1,22	1,35	2,55	5,60	8,00	15,50	13,00
	Kg												



TEES - THREADED - B16.11

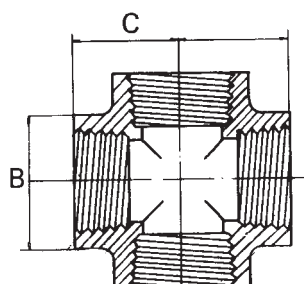
Tees – Equal and reducing



Rating	Dims	1/8"	1/4"	3/8"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"
2000 LB	B	22	22	25	33	38	46	56	62	75	92	109	146
	C	21	21	25	28	33	38	44	51	60	76	86	106
	T	3,18	3,18	3,18	3,18	3,18	3,68	3,89	4,01	4,27	5,61	5,99	6,55
	App Wt	0,12	0,12	0,18	0,29	0,39	0,55	0,93	1,30	1,80	3,00	5,50	14,00
	Kg												
3000 LB	B	22	25	33	38	46	56	62	75	84	102	121	152
	C	21	25	28	33	38	44	51	60	64	83	95	114
	T	3,18	3,30	3,51	4,09	4,32	4,98	5,28	5,56	7,14	7,65	8,84	11,18
	App Wt	0,21	0,21	0,31	0,49	0,80	1,31	1,61	3,20	3,55	6,50	9,25	17,00
	Kg												
6000 LB	B	25	33	38	46	56	62	75	84	102	121	146	152
	C	25	28	33	38	44	51	60	64	83	95	106	114
	T	6,35	6,60	6,98	8,15	8,53	9,93	10,59	11,07	12,09	15,29	16,64	18,67
	App Wt	0,41	0,41	0,60	0,94	1,59	2,14	3,39	4,50	10,00	13,00	19,50	18,00
	Kg												

CROSSES - THREADED - B16.11

Crosses

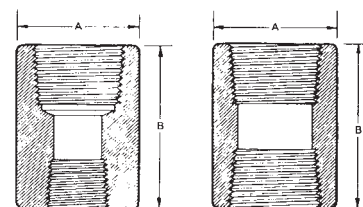


Rating	Dims	1/8"	1/4"	3/8"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"
2000 LB	B	22	22	25	33	38	46	56	62	75	92	109	146
	C	21	21	25	28	33	38	44	51	60	76	86	106
	T	3,18	3,18	3,18	3,18	3,18	3,68	3,89	4,01	4,27	5,61	5,99	6,55
	App Wt	0,14	0,14	0,19	0,34	0,42	0,75	1,15	1,45	2,25	4,50	7,15	15,00
	Kg												
3000 LB	B	22	25	33	38	46	56	62	75	84	102	121	152
	C	21	25	28	33	38	44	51	60	64	83	95	114
	T	3,18	3,30	3,51	4,09	4,32	4,98	5,28	5,56	7,14	7,65	8,84	11,18
	App Wt	0,22	0,22	0,40	0,63	0,99	1,63	1,97	3,70	4,90	10,50	11,50	21,70
	Kg												
6000 LB	B	25	33	38	46	56	62	75	84	102	121	146	152
	C	25	28	33	38	44	51	60	64	83	95	106	114
	T	6,35	6,60	6,98	8,15	8,53	9,93	10,59	11,07	12,09	15,29	16,64	18,67
	App Wt	0,45	0,45	0,70	1,16	1,80	2,50	4,10	5,20	12,30	14,00	25,00	23,00
	Kg												

COUPLINGS - THREADED - B16.11

Rating	Dims	1/8"	1/4"	3/8"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"
3000 LB	A	16	19	22	28	35	44	57	64	76	92	108	140
	B	32	35	38	48	51	60	67	79	86	92	108	121
	App Wt	0,05	0,05	0,06	0,14	0,20	0,39	0,73	1,03	1,35	2,30	3,15	5,80
	Kg												
6000 LB	A	22	25	32	38	44	57	64	76	92	108	127	159
	B	32	35	38	48	51	60	67	79	86	92	108	121
	App Wt	0,10	0,10	0,12	0,37	0,45	1,00	1,65	1,85	2,80	4,00	5,50	10,00
	Kg												

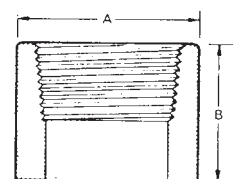
Couplings Equal & Reducing



HALF COUPLINGS - THREADED - B16.11

Rating	Dims	1/8"	1/4"	3/8"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"
3000 LB	A	16	19	22	28	35	44	57	64	76	92	108	140
	B	16,0	17,5	19,0	24,0	25,5	30,0	33,5	39,5	43,0	46,0	54,0	60,5
	Appt Wt	0,02	0,03	0,03	0,07	0,11	0,20	0,37	0,51	0,66	1,15	1,57	2,90
	Kg												
6000 LB	A	22	25	32	38	44	57	64	76	92	108	127	159
	B	16,0	17,5	19,0	24,0	25,5	30,0	33,5	39,5	43,0	46,0	54,0	60,5
	App Wt	0,04	0,05	0,06	0,19	0,23	0,50	0,83	0,92	1,40	2,00	2,75	5,00
	Kg												

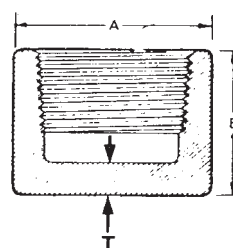
Half Couplings



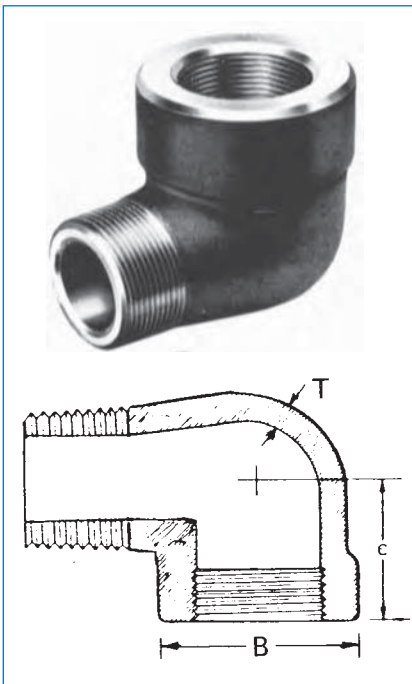
CAPS - THREADED - B16.11

Rating	Dims	1/8"	1/4"	3/8"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"
3000 LB	A	16	19	22	28	35	44	57	64	76	92	108	140
	B	19,0	25,0	25,0	32,0	37,0	41,0	44,0	44,0	48	60,0	65,0	68,0
	T	4,8	4,8	4,8	6,4	6,4	9,7	9,7	11,2	12,7	15,7	19,0	22,4
	Appt Wt	0,04	0,05	0,06	0,13	0,21	0,37	0,60	0,73	1,10	2,31	3,00	4,50
	Kg												
6000 LB	A		25	32	38	44	57	64	76	92	108	127	159
	B		27,0	27,0	33,0	38,0	43,0	46,0	48,0	51,0	64,0	68,0	75,0
	T		6,4	6,4	7,9	7,9	11,2	11,2	12,7	15,7	19,0	22,4	28,4
	App Wt		0,16	0,20	0,29	0,40	0,70	1,10	1,35	2,10	3,50	4,80	7,50
	Kg												

Caps



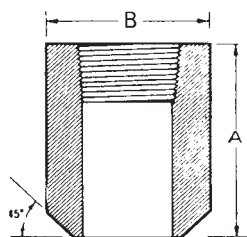
STREET ELBOWS - MALE/ FEMALE - THREADED - B16.11



Rating	Dims	1/8"	1/4"	3/8"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"
3000 LB	B	19	25	32	38	44	51	62	70	84
	C	19	22	25	28	35	44	51	64	64
	T	3,18	3,30	3,51	4,09	4,32	4,98	5,28	5,56	7,14
	App Wt		0,13	0,23	0,33	0,53	0,94	1,30	1,47	2,30
	Kg									
6000 LB	B	25	32	38	44	51	62	70	84	102
	C	22	25	28	35	44	51	54	64	83
	T	5,08	5,66	6,98	8,15	8,53	9,93	10,59	11,07	12,09
	App Wt									
	Kg									

NOTE: At manufacturer option, the dimensions C of the table for threaded Tees (previous page) may be used instead of C in above table

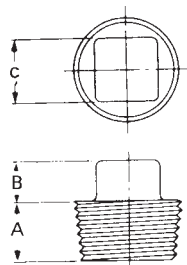
Welding Boss



WELDING BOSS - THREADED - BS3799

Rating	Dims	1/8"	1/4"	3/8"	1/2"	3/4"	1"	1 1/2"	2"
3000 LB	A	38	41	45	51	51	51	51	51
	B	16	19	22	29	35	45	64	76
6000 LB	B	22	26	32	38	45	60	76	95
	App Wt	0,20	0,24	0,30	0,37	0,50	0,80	1,29	1,78
	Kg (6000lb)								

Square Head

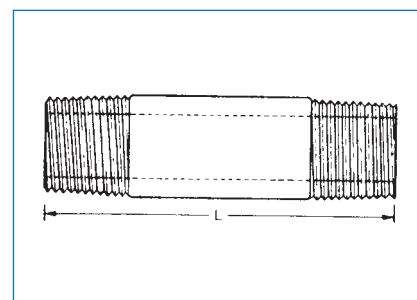


SQUARE HEAD PLUG (ASME B16.11)

Rating	Dims	1/8"	1/4"	3/8"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"
3000 LB	A	10	11	13	14	16	19	21	21	22	27	28	32
	B	6	6	8	10	11	13	14	16	18	19	21	25
	C	7	10	11	14	16	21	24	28	32	36	41	65
6000 LB	App Wt	0,01	0,02	0,03	0,05	0,09	0,17	0,27	0,40	0,60	0,89	1,25	3,10
	Kg												

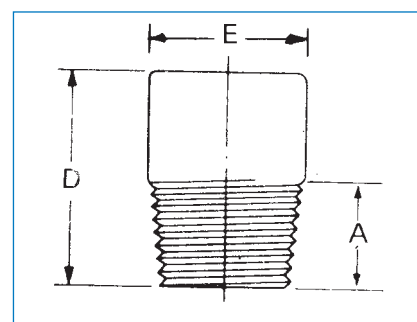
PIPE NIPPLES - THREADED - BS3799

	1/8"	1/4"	3/8"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"
Length 'L'	100 mm is our standard, but any length will be provided on request.											
Pipe wall:	Available in any standard Schedule, e.g. Sch80 -3000 lb,SchXXS - 6000 lb.											
End Types	Threaded, bevelled or plain.											
3000lbs - XS	0,07	0,08	0,11	0,16	0,22	0,31	0,44	0,53	0,74	1,12	1,46	2,15
6000lbs - XXS				0,25	0,36	0,54	0,77	0,95	1,31	2,00	2,65	4,00



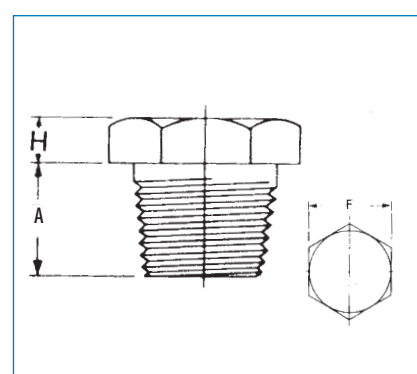
ROUND HEAD PLUG - THREADED - B16.11

Rating	Dims	1/8"	1/4"	3/8"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"
3000 LB	A	10	11	13	14	16	19	21	21	22	27	28	32
	D	35	41	41	44	44	51	51	51	64	70	70	76
+	E	10	14	18	21	27	33	43	48	60	73	89	114
6000 LB	App Wt	0,04	0,05	0,07	0,13	0,22	0,32	0,50	0,72	1,35	2,20	3,30	6,00
	Kg												



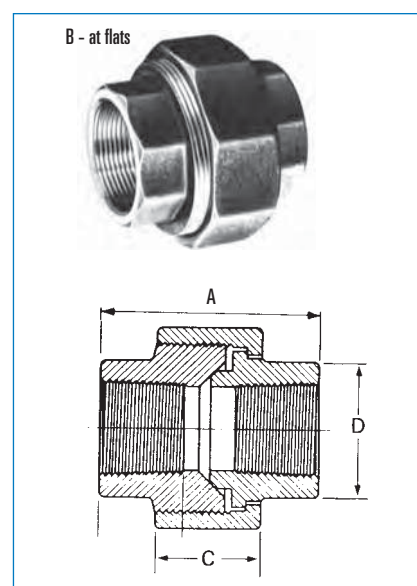
HEXAGON HEAD PLUG - THREADED - B16.11

Rating	Dims	1/8"	1/4"	3/8"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"
3000 LB	A	10	11	13	14	16	19	21	21	22	27	28	32
	H	6	6	8	8	10	10	14	16	18	19	21	25
6000 LB	F	11	16	18	22	27	36	46	50	65	75	90	115
	App Wt	0,02	0,03	0,05	0,07	0,13	0,22	0,41	0,49	0,77	1,61	1,94	4,50
	Kg												



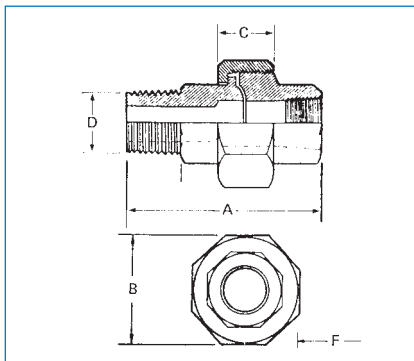
UNIONS - THREADED - BS3799 (1974)

Rating	Dims	1/8"	1/4"	3/8"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"
3000 LB	A	40	43	48	51	57	64	70	79	89	118	121	-
	B	32	32	36	43	50	60	70	78	95	125	140	-
	C	16	18	19	21	24	25	29	30	37	48	51	-
	D	17	19	22	30	36	41	50	60	70	85	100	-
	App Wt	0,14	0,17	0,21	0,31	0,49	0,83	1,22	1,53	2,30	5,00	6,25	-
	Kg												
6000 LB	A	44,5	44,5	50,8	60,5	57,2	57,2	76,2	88,9	108,0	108,0	127,0	-
	B	39,6	39,6	42,9	53,8	58,4	73,2	79,2	88,9	120,7	152,4	190,5	-
	C	22,4	22,4	26,9	26,9	26,9	34,8	34,8	34,8	47,8	53,8	50,8	-
	D	23,9	23,9	31,8	36,6	44,5	55,6	63,5	76,2	88,9	108,0	127,0	-
	App Wt	0,20	0,30	0,50	1,12	1,60	2,15	2,42	4,73	6,50	9,50	19,20	-
	Kg												



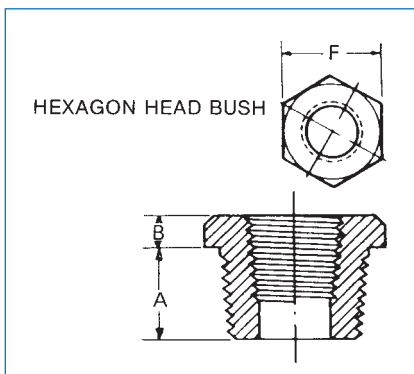
NOTE: The 6000 lbs is typical manufacturer standard - not included in BS3799

UNIONS - MALE X FEMALE (MF), THREADED X 2,
THREADED + SOCKET WELDED



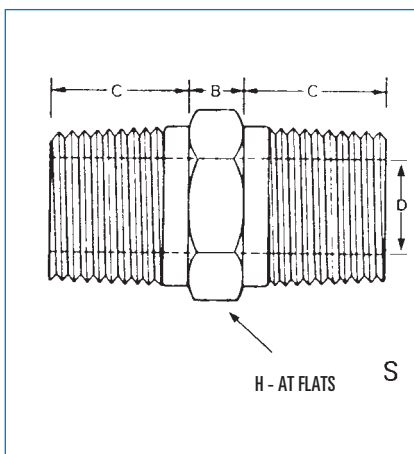
Rating	Dims	1/8"	1/4"	3/8"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"
3000 LB	A	49,5	54,1	60,7	65,0	72,6	83,1	90,7	99,6	111,3
	B	32,0	32,0	36,1	42,9	50,0	59,9	70,1	78,0	95,0
	C	16,0	18,0	19,1	21,1	23,9	24,9	29,0	30,0	37,1
	D	17,0	19,1	22,1	30,0	36,1	40,9	50,0	59,9	70,1
	App Wt Kg	0,16	0,21	0,27	0,46	0,61	0,99	1,55	1,9	2,9

HEXAGON HEAD BUSHING - THREADED - B16.11



Rating	Dims	1/8"	1/4"	3/8"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"
3000 LB + 6000 LB	A	—	11	13	14	16	19	21	21	22	27	28	32
	B	—	3	4	5	6	6	7	8	9	10	10	13
	F	—	16	18	22	27	36	46	50	65	75	90	115
	Av App Wt Kg	—	0,02	0,03	0,06	0,10	0,17	0,33	0,42	0,62	1,27	1,65	3,10

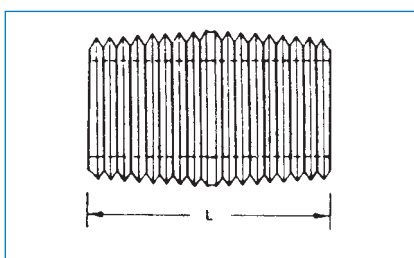
HEXAGON NIPPLES - THREADED - BS3799



Rating	Dims	1/8"	1/4"	3/8"	1/2"	3/4"	1"	1 1/2"	2"
BS3799 (min) 3000 LB 6000 LB	B	6	6	8	8	10	10	16	17
	C	10	15	16	20	21	25	26	27
	D	5	8	11	14	19	24	38	49
	D	2	6	8	11	13	17	30	39
	H	11	15	18	22	27	35	50	62
	App Wt Kg	0,02	0,03	0,06	0,08	0,15	0,24	0,37	0,45

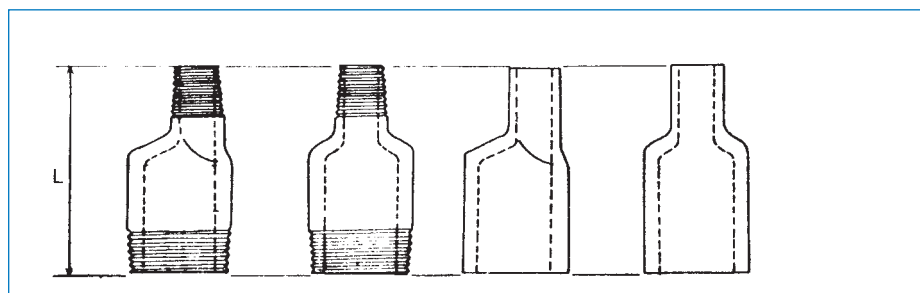
NOTE: Reducing sizes is also available, but not included in above table

CLOSE TAPER NIPPLES



	1/8"	1/4"	3/8"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"
Standard 'L' Length	19,1	25,4	28,6	31,8	38,1	44,5	50,8	50,8	50,8	60,3	76,2	88,9
Available in any Standard Production Schedule Wall Thickness, e.g. Sch 40, 80, 160, XXS												

SWAGED NIPPLES



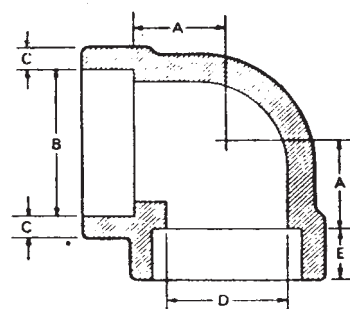
Large end dimensions	3/8"	1/2"	3/4"	1"	1 1/2"	2"	2 1/2"	3"	4"
Length	76	89	95	102	114	165	178	203	229

NOTE: 3000 lbs minimum from thickness Sch80, 6000 lbs from thickness Sch160 / XXS respectively for plain vs screwed

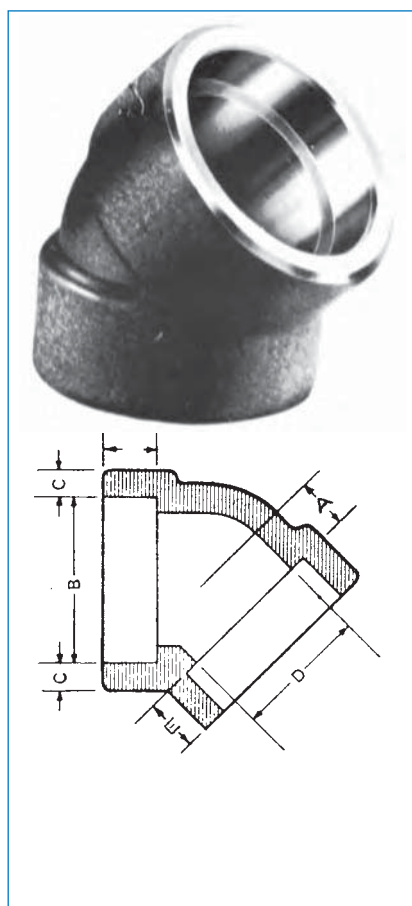
90° ELBOWS - SOCKET WELD - B16.11

Rating	Dims	1/8"	1/4"	3/8"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"
3000 LB	A	11,0	11,0	13,5	15,5	19,0	22,5	27,0	32,0	38,0	41,0	57,0	66,5
	B min	10,8	14,2	17,6	21,8	27,2	33,9	42,7	48,8	61,2	73,9	89,8	115,2
	B max	11,2	14,6	18,0	22,2	27,6	34,3	43,1	49,2	61,7	74,4	90,3	115,7
	C min	3,18	3,30	3,50	4,09	4,27	4,98	5,28	5,54	6,04	7,67	8,30	9,35
	D min	6,1	8,5	11,8	15,0	20,2	25,9	34,3	40,1	51,7	61,2	76,4	100,7
	D max	7,6	10,0	13,3	16,6	21,7	27,4	35,8	41,6	53,3	64,2	79,4	103,8
	E	9,5	9,5	9,5	9,5	12,5	12,5	12,5	16,0	16,0	16,0	16,0	19,0
	App Wt	0,08	0,08	0,12	0,24	0,29	0,48	0,75	0,95	1,65	2,50	4,30	9,70
	Kg												
6000 LB	A	11,0	13,5	15,5	19,0	22,5	27,0	32,0	38,0	41,0	-	-	-
	B min	10,8	14,2	17,6	21,8	27,2	33,9	42,7	48,8	61,2	-	-	-
	B max	11,2	14,6	18,0	22,2	27,6	34,3	43,1	49,2	61,7	-	-	-
	C min	3,43	4,01	4,37	5,18	6,04	6,93	6,93	7,80	9,50	-	-	-
	D min	3,2	5,6	8,4	11,0	14,8	19,9	28,7	33,2	42,1	-	-	-
	E	4,8	7,1	9,9	12,5	16,3	21,5	30,2	34,7	43,6	-	-	-
	E	9,5	9,5	9,5	9,5	12,5	12,5	12,5	12,5	16,0	-	-	-
	App W	0,15	0,17	0,30	0,43	0,66	1,14	1,60	2,70	2,95	-	-	-
	Kg												

90° elbow

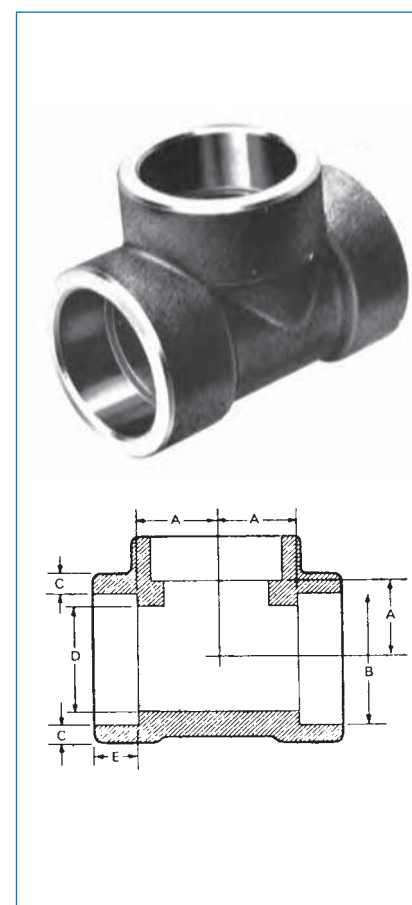


45°ELBOWS - SOCKET WELD - B16.11



Rating	Dims	1/8"	1/4"	3/8"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"
3000 LB	A	8,0	8,0	8,0	11,0	13,0	14,0	17,5	20,5	25,5	28,5	32,0	41,0
	B min	10,8	14,2	17,6	21,8	27,2	33,9	42,7	48,8	61,2	73,9	89,8	115,2
	B max	11,2	14,6	18,0	22,2	27,6	34,3	43,1	49,2	61,7	74,4	90,3	115,7
	C min	3,18	3,30	3,50	4,09	4,27	4,98	5,28	5,54	6,04	7,67	8,30	9,35
	D min	6,1	8,5	11,8	15,0	20,2	25,9	34,3	40,1	51,7	61,2	76,4	100,7
	D max	7,6	10,0	13,3	16,6	21,7	27,4	35,8	41,6	53,3	64,2	79,4	103,8
	E	9,5	9,5	9,5	9,5	12,5	12,5	12,5	12,5	16,0	16,0	16,0	19,0
	App Wt	0,08	0,08	0,10	0,19	0,38	0,38	0,58	0,83	1,15	2,05	3,40	9,00
	Kg												
6000 LB	A	8,0	8,0	11,0	12,5	14,0	17,5	20,5	25,5	28,5	-	-	-
	B min	10,8	14,2	17,6	21,8	27,2	33,9	42,7	48,8	61,2	-	-	-
	B max	11,2	14,6	18,0	22,2	27,6	34,3	43,1	49,2	61,7	-	-	-
	C min	3,43	4,01	4,37	5,18	6,04	6,93	6,93	7,80	9,50	-	-	-
	D min	3,2	5,6	8,4	11,0	14,8	19,9	28,7	33,2	42,1	-	-	-
	D max	4,8	7,1	9,9	12,5	16,3	21,5	30,2	34,7	43,6	-	-	-
	E	9,5	9,5	9,5	9,5	12,5	12,5	12,5	12,5	16,0	-	-	-
	App Wt	0,12	0,12	0,24	0,30	0,53	0,86	1,07	1,90	2,35	-	-	-
	Kg												

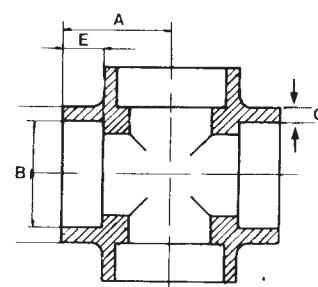
TEES - EQUAL & REDUCING - SOCKET WELD - B16.11



Rating	Dims	1/8"	1/4"	3/8"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"
3000 LB	A	11,0	11,0	13,5	15,5	19,0	22,5	27,0	32,0	38,0	41,0	57,0	66,5
	B min	10,8	14,2	17,6	21,8	27,2	33,9	42,7	48,8	61,2	73,9	89,8	115,2
	B max	11,2	14,6	18,0	22,2	27,6	34,3	43,1	49,2	61,7	74,4	90,3	115,7
	C min	3,18	3,30	3,50	4,09	4,27	4,98	5,28	5,54	6,04	7,67	8,30	9,35
	D min	6,1	8,5	11,8	15,0	20,2	25,9	34,3	40,1	51,7	61,2	76,4	100,7
	D max	7,6	10,0	13,3	16,6	21,7	27,4	35,8	41,6	53,3	64,2	79,4	103,8
	E	9,5	9,5	9,5	9,5	12,5	12,5	12,5	12,5	16,0	16,0	16,0	19,0
	App Wt	0,12	0,12	0,19	0,31	0,40	0,58	0,91	1,25	2,10	3,15	5,25	13,50
	Kg												
6000 LB	A	11,0	13,5	15,5	19,0	22,5	27,0	32,0	38,0	41,0	-	-	-
	B min	10,8	14,2	17,6	21,8	27,2	33,9	42,7	48,8	61,2	-	-	-
	B max	11,2	14,6	18,0	22,2	27,6	34,3	43,1	49,2	61,7	-	-	-
	C min	3,43	4,01	4,37	5,18	6,04	6,93	6,93	7,80	9,50	-	-	-
	D min	3,2	5,6	8,4	11,0	14,8	19,9	28,7	33,2	42,1	-	-	-
	D max	4,8	7,1	9,9	12,5	16,3	21,5	30,2	34,7	43,6	-	-	-
	E	9,5	9,5	9,5	9,5	12,5	12,5	12,5	12,5	16,0	-	-	-
	App Wt	0,21	0,21	0,40	0,56	0,91	1,41	1,75	3,56	4,10	-	-	-
	Kg												

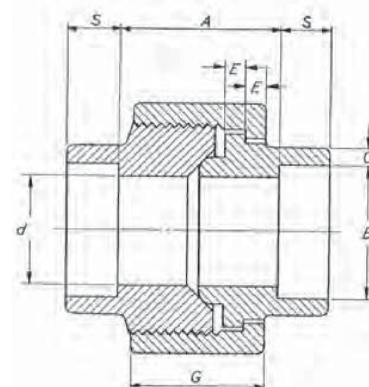
CROSSES - SOCKET WELD - B16.11

Rating	Dims	1/8"	1/4"	3/8"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"
3000 LB	A	11,0	11,0	13,5	15,5	19,0	22,5	27,0	32,0	38,0	41,0	57,0	66,5
	B min	10,8	14,2	17,6	21,8	27,2	33,9	42,7	48,8	61,2	73,9	89,8	115,2
	B max	11,2	14,6	18,0	22,2	27,6	34,3	43,1	49,2	61,7	74,4	90,3	115,7
	C min	3,18	3,30	3,50	4,09	4,27	4,98	5,28	5,54	6,04	7,67	8,30	9,35
	D min	6,1	8,5	11,8	15,0	20,2	25,9	34,3	40,1	51,7	61,2	76,4	100,7
	D max	7,6	10,0	13,3	16,6	21,7	27,4	35,8	41,6	53,3	64,2	79,4	103,8
	E	9,5	9,5	9,5	9,5	12,5	12,5	12,5	12,5	16,0	16,0	16,0	19,0
	App Wt Kg	0,14	0,14	0,21	0,34	0,47	0,80	1,25	1,50	2,23	3,95	6,50	16,00
6000 LB	A	11,0	13,5	15,5	19,0	22,5	27,0	32,0	38,0	41,0	-	-	-
	B min	10,8	14,2	17,6	21,8	27,2	33,9	42,7	48,8	61,2	-	-	-
	B max	11,2	14,6	18,0	22,2	27,6	34,3	43,1	49,2	61,7	-	-	-
	C min	3,43	4,01	4,37	5,18	6,04	6,93	6,93	7,80	9,50	-	-	-
	D min	3,2	5,6	8,4	11,0	14,8	19,9	28,7	33,2	42,1	-	-	-
	D max	4,8	7,1	9,9	12,5	16,3	21,5	30,2	34,7	43,6	-	-	-
	E	9,5	9,5	9,5	9,5	12,5	12,5	12,5	12,5	16,0	-	-	-
	App Wt Kg	0,26	0,26	0,50	0,67	1,06	1,79	2,15	4,45	5,40	-	-	-


UNIONS - SOCKET WELD - BS3799

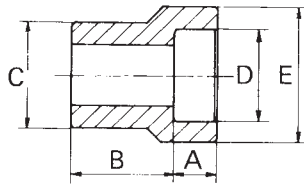
Rating	Dims	1/8"	1/4"	3/8"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"
3000 LB	A	17	17	17	18	20	26	28	30	36	57	70
	B	10,7	14,1	17,6	21,8	27,4	34,1	42,9	49,0	61,0	73,8	89,7
	C	3,2	3,3	3,5	4,1	4,3	5,0	5,3	5,6	6,1	7,7	8,3
	D	6,8	9,2	12,5	15,5	21,0	26,5	35,0	40,5	52,0	62,0	78,0
	E	3,2	3,2	3,2	4,0	4,8	4,8	5,6	5,6	6,4	9,6	12,7
	F	32	32	36	41	50	60	70	78	95	125	140
	S	10	10	10	10	13	13	13	13	16	16	16
	App Wt Kg	0,14	0,18	0,23	0,39	0,52	0,73	1,20	1,56	2,30	5,00	7,15

NOTE: 6000 lbs is available with manufacturer standard dimensions

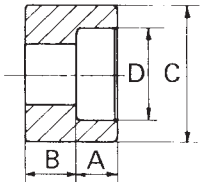


REDUCING INSERT 3000LB - SOCKET WELD

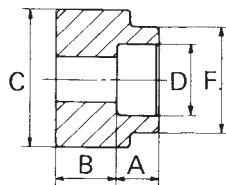
Type 1



Type 2



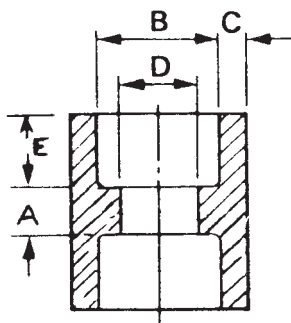
Type 3



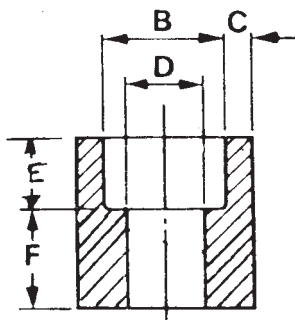
NB	C	D	A	B	E	F	Type
1/2" x 3/8"	47,0	17,5	10,9	23,9	25,9		1
1/2" x 1/4"	47,0	14,0	9,4	16,0			2
3/4" x 1/2"	26,9	21,6	12,4	25,4	32,0		1
3/4" x 3/8"	26,9	17,5	10,9	14,0			2
3/4" x 1/4"	26,9	14,0	9,4	16,0		22,1	3
1" x 3/4"	33,5	27,2	14,5	28,4	38,1		1
1" x 1/2"	33,5	21,6	12,4	20,6			2
1" x 3/8"	33,5	16,5	10,9	22,1		25,9	3
1" x 1/4"	33,5	14,0	9,4	23,9		22,1	3
1 1/4" x 1"	42,4	33,8	16,0	32,0	45,0		1
1 1/4" x 3/4"	42,4	27,2	14,5	20,6			2
1 1/4" x 1/2"	42,4	21,6	12,4	22,1		32,0	3
1 1/4" x 1 1/4"	48,4	42,5	17,5	33,0	56,9		1
1 1/4" x 1"	48,4	33,8	16,0	20,6			2
1 1/2" x 3/4"	48,4	27,2	14,5	22,1		38,1	3
1 1/2" x 1/2"	48,4	21,6	12,4	24,1		32,0	3
2" x 1 1/2"	60,6	48,8	19,1	20,6			2
2" x 1 1/4"	60,6	42,7	17,5	22,1		56,9	3
2" x 1"	60,6	33,8	16,0	24,1		45,0	3
2" x 3/4"	60,6	27,2	14,5	25,4		38,1	3
2" x 1/2"	60,6	21,6	12,4	26,9		32,0	3

COUPLING & HALF COUPLING - SOCKET WELD - B16.11

Coupling

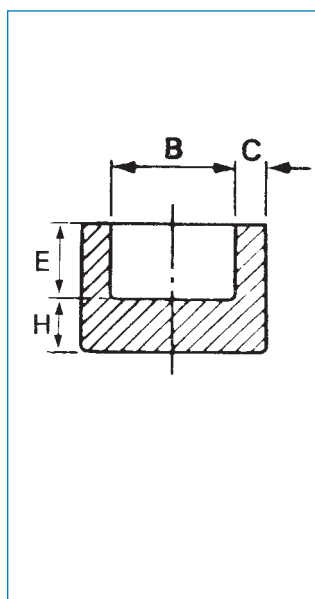


Half Coupling



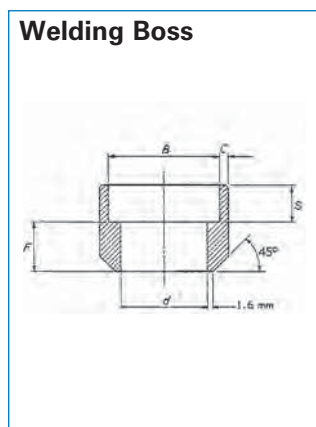
Rating	Dims	1/8"	1/4"	3/8"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"
3000 LB	A	6,5	6,5	6,5	9,5	9,5	12,5	12,5	12,5	19,0	19,0	19,0	19,0
	B min	10,8	14,2	17,6	21,8	27,2	33,9	42,7	48,8	61,2	73,9	89,8	115,2
	B max	11,2	14,6	18,0	22,2	27,6	34,3	43,1	49,2	61,7	74,4	90,3	115,7
	C min	3,18	3,30	3,50	4,09	4,27	4,98	5,28	5,54	6,04	7,67	8,30	9,35
	D min	6,1	8,5	11,8	15,0	20,2	25,9	34,3	40,1	51,7	61,2	76,4	100,7
	D max	7,6	10,0	13,3	16,6	21,7	27,4	35,8	41,6	53,3	64,2	79,4	103,8
	E	9,5	9,5	9,5	9,5	12,5	12,5	12,5	12,5	16,0	16,0	16,0	19,0
	F	16,0	16,0	17,5	22,5	24,0	28,5	30,0	32,0	41,0	43,0	44,5	48,0
	App Wt	0,05	0,05	0,07	0,11	0,15	0,26	0,37	0,42	0,77	1,10	1,40	2,35
	Kg												
6000 LB	A	6,5	6,5	6,5	9,5	9,5	12,5	12,5	12,5	19,0	-	-	-
	B min	10,8	14,2	17,6	21,8	27,2	33,9	42,7	48,8	61,2	-	-	-
	B max	11,2	14,6	18,0	22,2	27,6	34,3	43,1	49,2	61,7	-	-	-
	C min	3,43	4,01	4,37	5,18	6,04	6,93	6,93	7,80	9,50	-	-	-
	D min	3,2	5,6	8,4	11,0	14,8	19,9	28,7	33,2	42,1	-	-	-
	D max	4,8	7,1	9,9	12,5	16,3	21,5	30,2	34,7	43,6	-	-	-
	E	9,5	9,5	9,5	9,5	12,5	12,5	12,5	12,5	16,0	-	-	-
	F	16,0	16,0	17,5	22,5	24,0	28,5	30,0	32,0	41,0	-	-	-
	App Wt	0,07	0,07	0,10	0,15	0,34	0,37	0,49	0,68	1,24	-	-	-
	Kg												

CAPS -SOCKET WELD - B16.11



Rating	Dims	1/8"	1/4"	3/8"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"
3000 LB	B min	10,8	14,2	17,6	21,8	27,2	33,9	42,7	48,8	61,2	73,9	89,8	115,2
	B max	11,2	14,6	18,0	22,2	27,6	34,3	43,1	49,2	61,7	74,4	90,3	115,7
	C min	3,18	3,30	3,50	4,09	4,27	4,98	5,28	5,54	6,04	7,67	8,30	9,35
	E	9,5	9,5	9,5	9,5	12,5	12,5	12,5	12,5	16,0	16,0	16,0	19,0
	H	4,8	4,8	4,8	6,4	6,4	9,6	9,6	11,2	12,7	15,7	19,0	22,4
	App Wt Kg	0,03	0,04	0,06	0,14	0,18	0,30	0,51	0,65	0,92	1,40	2,50	3,50
6000 LB	B min	10,8	14,2	17,6	21,8	27,2	33,9	42,7	48,8	61,2	-	-	-
	B max	11,2	14,6	18,0	22,2	27,6	34,3	43,1	49,2	61,7	-	-	-
	C min	3,43	4,01	4,37	5,18	6,04	6,93	6,93	7,80	9,50	-	-	-
	E	9,5	9,5	9,5	9,5	12,5	12,5	12,5	12,5	16,0	-	-	-
	H	6,4	6,4	6,4	7,9	7,9	11,2	11,2	12,7	15,7	-	-	-
	App Wt Kg	0,08	0,08	0,14	0,18	0,21	0,46	0,70	0,89	1,20	-	-	-

WELDING BOSS - SOCKET WELD .- BS3799

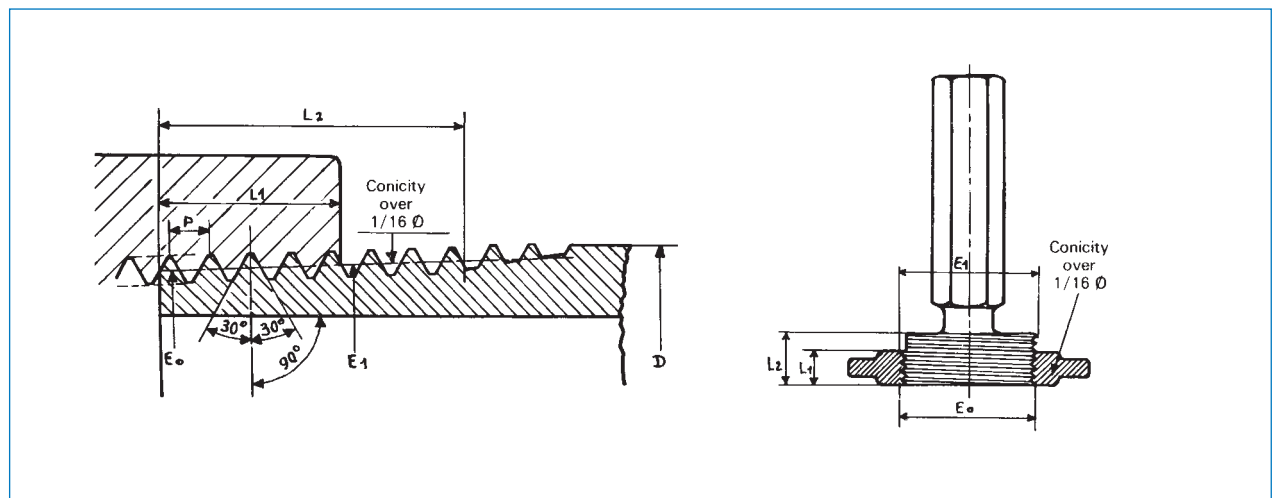


Rating	Dims	1/8"	1/4"	3/8"	1/2"	3/4"	1	1 1/2"	2"
3000 LB	B	10,7	14,1	17,6	21,8	27,4	34,1	49,0	61,0
	C	3,2	3,3	3,5	4,1	4,3	5,0	5,6	6,1
6000 LB	C	-	-	-	5,2	6,1	7,0	7,8	9,5
	D	THROUGH BORE, Sch 40 - 3000 lb, Sch 160 - 6000 lb							
	F	28,0	32	34	38	38	35	32	29
	S	10	10	11	13	13	16	19	22
	App Wt Kg	0,20	0,23	0,29	0,38	0,53	0,83	1,31	1,86

TAPER PIPE THREADS, NPT

Nominal size of tube	Outside diameter of the tube		Number of threads per inch	Diameter of Pitch		Diameter of the pitch of the bolt at the outside end of the thread		the pitch of the bolt at the inside end of the thread		Efficient length of the thread		Length of the hand packing		Increase of the diameter per rotation	
	mm	In.		mm	In.	mm	In.	mm	In.	mm	In.	mm	In.	mm	In.
1/8	10,29	0,405	27	0,94	0,03704	9,233	0,36351	9,489	0,3736	6,703	0,2639	4,102	0,1615	0,0586	0,00231
1/4	13,72	0,54	18	1,411	0,05556	12,126	0,47739	12,487	0,49163	10,205	0,4018	5,786	0,2278	0,0881	0,00347
3/8	17,14	0,675	18	1,411	0,05556	15,545	0,61201	15,929	0,62701	10,358	0,4078	6,096	0,24	0,0881	0,00347
1/2	21,34	0,84	14	1,814	0,07143	19,264	0,75843	19,772	0,77843	13,556	0,5337	8,128	0,32	0,1132	0,00446
3/4	26,67	1,05	14	1,814	0,07143	24,579	0,96768	25,117	0,98887	13,86	0,5457	8,61	0,339	0,1132	0,00446
1	33,4	1,315	11 1/2	2,209	0,08696	30,826	1,21363	31,461	1,23863	17,343	0,6828	10,16	0,4	0,1379	0,00543
1 1/4	42,16	1,66	11 1/2	2,209	0,08696	39,551	1,55713	40,218	1,58338	17,952	0,7068	10,668	0,42	0,1379	0,00543
1 1/2	48,26	1,9	11 1/2	2,209	0,08696	45,621	1,79609	46,287	1,82234	18,377	0,7235	10,668	0,42	0,1379	0,00543
2	60,32	2,375	11 1/2	2,209	0,08696	57,633	2,26902	58,325	2,29627	19,215	0,7565	11,074	0,436	0,1379	0,00543
2 1/2	73,02	2,875	8	3,175	0,125	69,076	2,71953	70,159	2,76216	28,892	1,1375	17,322	0,682	0,1983	0,00781
3	88,9	3,5	8	3,175	0,125	84,852	3,34062	86,068	3,3885	30,48	1,2	19,456	0,766	0,1983	0,00781
3 1/2	101,6	4	8	3,175	0,125	97,472	3,8375	98,776	3,88881	31,75	1,25	20,853	0,821	0,1983	0,00781
4	114,3	4,5	8	3,175	0,125	110,093	4,33438	111,433	4,38712	33,02	1,3	21,437	0,844	0,1983	0,00781

NOTE: All sizes in the table correspond to the ASME B1.20.1 and API 5 L Standards, excepted for the nominal sizes 1/8" and 1/4" for which E1 and L1 are not measured on the same plane according to API 5L. However, these sizes are the same when brought on the same plane.



O-LETS

MSS-SP-97

Outlet Fittings

PIPESTEC manufactures, stocks and supplies a range of Buttweld, Socketweld, Threaded and Flanged reinforced branch fittings from 8 (1/4") NB upwards to suit any size run pipe. These fittings are available in Class 3000 and Class 6000 and all pipe schedules in a variety of materials. The fittings are manufactured to conform to American and British design specifications.



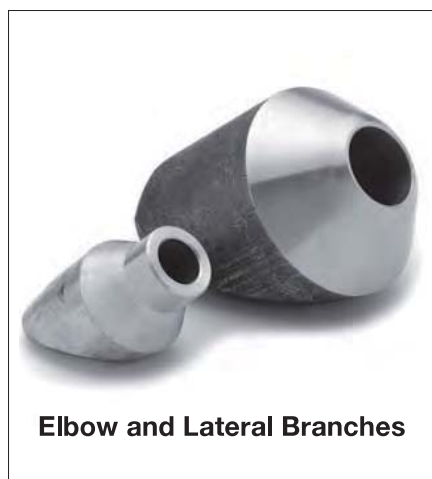
Buttweld Branches



Socketweld Branches



Threaded Branches



Elbow and Lateral Branches



**Flanged Buttweld Outlets and
Flanged Buttweld Nipple Outlets**



BRANCH OUTLETS – O’LETS.

BASIS FOR DESIGN OF O’LETS:

MANUFACTURER STANDARD:

The O’lets in this catalogue are based on a single manufacturer’s standard design and denominations. The standard design is based on ASME B31.3, but O’lets may be designed, manufactured and verified to other requirements at the client’s request.

HEIGHT STANDARDISATION:

The table-listed heights (A) of reducing weldolets – butt weld, socket weld and threaded outlets – are identical to the heights standardised in MSS SP-97, except the 3000lbs socket weld outlets in sizes 2 ½” – 4”. However, it should be noted that the height stated as standard may have to be changed due to the actual/ specific design required for specific size/ wall thickness combinations.

DESIGN OPTIMISATION:

O’lets may be designed and manufactured to the customer’s specific design requirements, i.e. O’lets can be designed to specific design parameters (e.g. PCS) and/ or Norsok EDS NOL1 so as to reduce the welding required in the crotch area.

DESIGN DETAILS REQUIRED FOR OPTIMISATION OF O’LETS:

- Design code
- Design pressure & rating
- Design temperature
- Material grade / allowable stress
- Wall thickness – for header and branch pipes
- Corrosion allowance
- Wall thickness tolerance

DESIGN VERIFICATION:

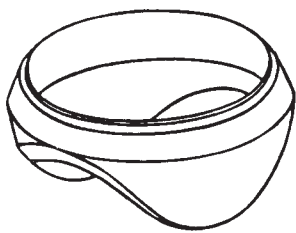
Drawings and calculations for each individual O’let may be provided, if requested by the client at the enquiry stage.

DIMENSION UNIFICATION:

O’lets may also be designed to fit a range of run header dimensions – i.e., each O’let will be suitable for use on various header pipe sizes. This design will, however, require more welding during fabrication, as the O’let dimensions cannot be optimised to a specific size and the actual design parameters.

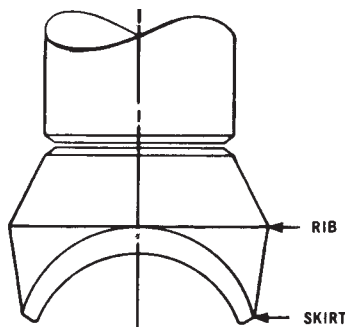
TYPES OF O’LETS

- Butt weld Outlet (O’let) – Butt welded / Socket Welded / Threaded
- Elbow Outlet – Butt welded / Socket Welded / Threaded
- Lateral Outlet – Butt welded / Socket Welded / Threaded
- Nipple Outlet – Butt welded / Threaded / Plain end
- Insert Branch Outlet
- Flanged Butt weld Outlet
- Flanged Nipple Outlet



Ready to Weld

Every fitting is shaped to fit the pipe and it self-aligning.

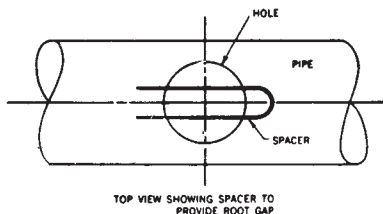


butt-welding of the branch pipe for shop or field fabrication.



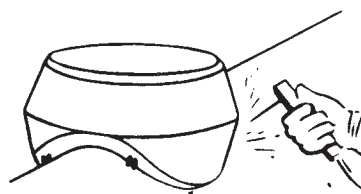
Layout The template is the inside of the fitting. Cut Hole The hole in the run pipe on reducing sizes can be cut out either before or after the fitting is welded on.

The hole can be cut with a torch, a drill or a hole saw. Welding the fitting to the run pipe prior to cutting the hole helps prevent distortion on the run and can be done generally on outlet sizes over two inches.



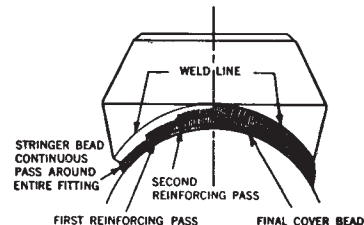
«Space» for Welding The Weldolet is raised off run pipe to establish proper weld gap by placing spacers, e.g. welding rods, under the fitting.

This provides a uniform welding gap between the curvature of the run and base of fitting.



Tack Weld The base joint is tack welded, preferably at four points, each half way between the crotch and skirt sections of the fitting.

The spacers are then removed.

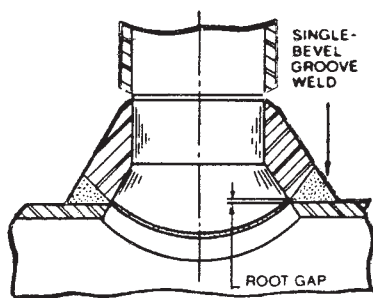
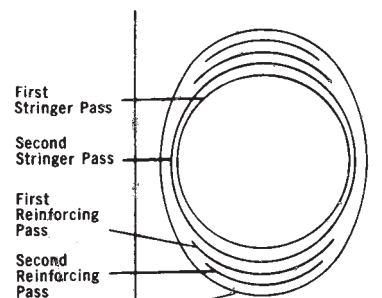


Stringer Bead The stringer bead is applied completely around the base of the fitting. The established weld gap ensures full penetration.

Reinforcing Beads Reinforcing welds should be made at the crotch bevel areas of the fitting to provide maximum weld at the crotch tapering to minimum at the skirt. Particular care should be taken to weld only the bevel portion of the fitting. (See «weld lines» on above drawing)

This eliminates the unnecessary use of continuous passes and prevents the erroneous practice of welding up to the rib on the skirt portion of the fitting. A continuous cover bead should be added to fill the bevel and provide a smooth tapered weld.

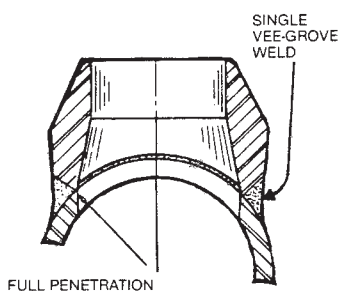
EXAMPLE OF WELD SEQUENCE



Longitudinal Section

Fig. 1

Wide bases or footings at crotch section distribute internal and external stresses. Gradual changes of section eliminate stress concentration. Funnel shaped opening provides improved flow conditions. The outlet is machine bevelled for quick easy



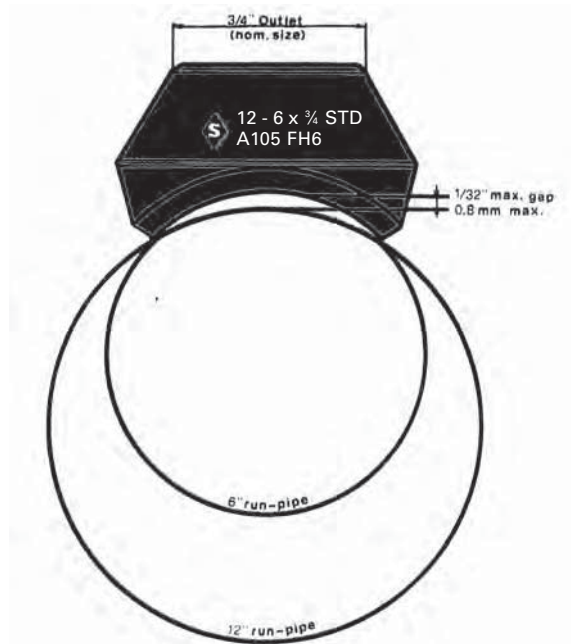
Transverse Section

Fig. 2

Note the blending of the skirt section of the Weldolet to the run pipe to avoid abrupt change in intersection. Throat of weld at this point is designated by the welding bevel.

DIMENSIONS UNIFICATION

In order to reduce warehouse inventory, our outlets have been unified to fit on different run-pipe sizes with gap maximum of 1/32" between the run-pipe and outlet. This does not cause any problems during welding.


**BUTTWELD-OUTLETS, STANDARD AND EXTRA STRONG,
 SOCKET-OUTLETS & THREADED-OUTLETS 3000LBS.**

OUTLET SIZE		RUN-PIPE SIZES								
1/2	1/2	3/4	1	1 1/2-1 1/4	2 1/2-2	8-3	36-10			
3/4	3/4	1	1 1/2-1 1/4	2 1/2-2	5-3	12-6	36-14			
1	1	1 1/4	1 1/2	2	2 1/2	3 1/2-3	5-4	10-6	36-12	
1 1/4	1 1/4	1 1/2	2	2 1/2	3 1/2-3	5-4	8-6	18-10	36-20	
1 1/2	1 1/2	2	2 1/2	3	4-3 1/2	6-5	12-8	24-14	36-26	
2	2	2 1/2	3	3 1/2	4	5	6	10-8	18-12	36-20
2 1/2	2 1/2	3	3 1/2	4	5	6	8	12-10	18-14	36-20
3	3	3 1/2	4	5	6	8	10	14-12	20-16	36-24
3 1/2	3 1/2	4	5	6	8	10	14-12	20-16	36-24	
4	4	5	6	8	10	14-12	20-16	36-24		

Outlet over 4" order to specific run-pipe size

BUTTWELD-OUTLETS SCH. 160 AND XXS

OUTLET SIZE		RUN - PIPE SIZES								
1/2	1/2	1 1/4 - 3/4	36 - 1 1/2							
3/4	1 - 3/4	2 - 1 1/4	6 - 2 1/2	36 - 8						
1	1	2 1/2 - 1 1/4	10 - 3	36 - 12						
1 1/4	1 1/2 - 1 1/4	2 1/2 - 2	10 - 3	36 - 12						
1 1/2	1 1/2	2 1/2 - 2	3 1/2 - 3	8 - 4	20 - 10	36 - 24				
2	2	2 1/2	3 1/2 - 3	5 - 4	8 - 6	18 - 10	36 - 20			

Outlet over 2" order to specific run-pipe size

BUTTWELD-OUTLETS & THREADED-OUTLETS 6000LBS.

OUTLET SIZE		RUN - PIPE SIZES								
1/2	1 - 3/4	2 - 1 1/4	6 - 2 1/2	36 - 8						
3/4	1	2 1/2 - 1 1/4	10 - 3	36 - 12						
1	1 1/4 - 1 1/2	2 1/2 - 2	10 - 3	36 - 12						
1 1/4	1 1/2	2 1/2 - 2	3 1/2 - 3	8 - 4	20 - 10	36 - 24				
1 1/2	2	2 1/2	3 1/2 - 3	5 - 4	8 - 6	18 - 10	36 - 20			
2	2 1/2	3	4	5	6	10 - 8	20 - 12	36 - 24		

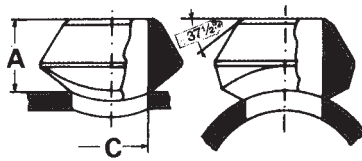


BUTTWELD OUTLETS - STANDARD

OUTLET SIZE [inch]	REDUCED SIZES			FULL SIZES			
	A [mm]	C [mm]	Approx. Weight	A [mm]	C [mm]	D [mm]	Approx. Weight
1/2	19,0	24,0	0,1	19,0	24,0	15,8	0,1
3/4	22,2	30,0	0,1	22,2	30,0	21,0	0,1
1	27,0	36,5	0,3	27,0	36,5	26,6	0,2
1 ¼	31,5	44,5	0,4	31,5	44,5	35,0	0,3
1 ½	33,4	51,0	0,5	33,4	51,0	40,9	0,4
2	38,0	65,0	0,8	38,0	65,0	52,5	0,7
2 ½	41,2	76,2	1,1	41,2	76,2	62,8	1,0
3	44,5	93,5	1,8	44,5	93,5	78,0	1,7
3 ½	47,5	112,6	2,5	47,5	112,6	90,2	2,3
4	51,0	120,5	2,9	51,0	120,5	102,2	3,1
5	57,0	141,3	4,7	57,0	141,3	128,2	3,9
6	60,3	170,0	6,5	60,3	170,0	154,0	6,7
8	69,8	220,5	10,7	69,8	220,5	202,5	13,0
10	78,0	274,0	18,0	78,0	274,0	254,0	16,0
12	86,0	324,0	27,0	86,0	324,0	304,5	27,0
14	89,0	356,0	30,0	89,0	356,0	336,5	32,0

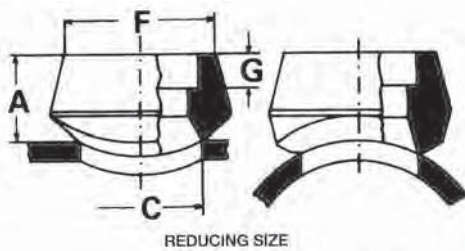
BUTTWELD OUTLETS - EXTRA STRONG

OUTLET SIZE [inch]	REDUCED SIZES			FULL SIZES			
	A [mm]	C [mm]	Approx. Weight	A [mm]	C [mm]	D [mm]	Approx. Weight
1 / 2	19,0	24,0	0,1	19,0	24,0	13,9	0,1
3 / 4	22,2	30,0	0,1	22,2	30,0	18,9	0,1
1	27,0	36,5	0,2	25,4	36,5	24,3	0,2
1 ¼	31,5	44,5	0,4	28,5	44,5	32,8	0,3
1 ½	33,4	51,0	0,5	31,5	51,0	38,1	0,4
2	38,0	65,0	0,8	38,0	65,0	49,3	0,8
2 ½	41,2	76,2	1,2	41,2	76,2	59,0	1,2
3	44,5	93,5	1,9	44,5	93,5	73,7	1,9
3 ½	47,5	112,6	2,6	47,5	112,6	85,4	2,3
4	51,0	120,5	3,0	51,0	120,5	97,2	3,5
5	57,0	141,3	4,8	57,0	141,3	122,3	4,3
6	78,0	170,0	10,5	78,0	170,0	146,3	6,8
8	98,5	220,0	17,0	98,5	220,0	194,0	14,6
10	94,0	265,0	21,0	95,3	265,0	247,5	21,0
12	103,0	316,0	28,0	100,0	320,0	298,0	28,0
14	100,0	351,0	32,0	105,5	355,0	330,0	34,5

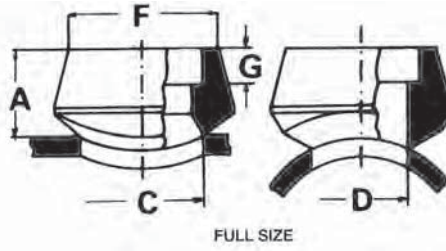


BUTTWELD OUTLETS • SCH. 160 AND XXS

OUTLET SIZE [inch]	REDUCED SIZES			FULL SIZES		
	A [mm]	C [mm]	Approx. Weight	A [mm]	C [mm]	Approx. Weight
1/2	28,5	14,3	0,1	28,5	14,3	0,1
3/4	31,5	19,0	0,3	31,5	19,0	0,3
1	38,0	25,5	0,4	38,0	25,5	0,4
1 1/4	44,5	33,4	0,6	44,5	33,4	0,6
1 1/2	50,7	38,0	0,8	50,7	38,0	0,8
2	55,5	42,9	1,0	55,5	42,9	1,0
2 1/2	61,8	53,9	1,6	61,8	53,9	1,6
3	73,0	73,0	2,9	73,0	73,0	2,9
4	84,0	98,4	4,8	84,0	98,4	4,8
5	93,5	122,2	6,5	93,5	122,2	6,5
6	104,7	146,0	12,8	104,7	146,0	13,8



REDUCING SIZE



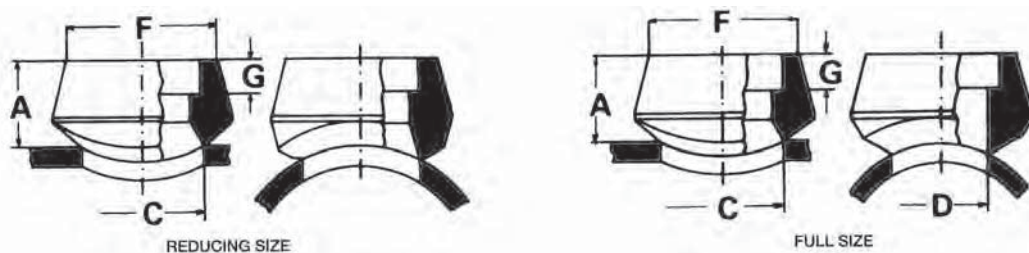
FULL SIZE

SOCKETWELD OUTLETS • 3000 LBS (SOCKET WELD TO ASME/ANSI B 16.11)

OUTLET SIZE [inch]	REDUCED SIZES					FULL SIZES					
	A [mm]	C [mm]	F [mm]	G [mm]	Approx. Weight	A [mm]	C [mm]	D [mm]	F [mm]	G [mm]	Approx. Weight
1/2	25,5	24,0	31,8	10,0	0,1	25,5	22,4	16,0	31,8	10,0	0,1
3/4	27,0	30,0	36,6	13,0	0,2	27,0	30,0	21,0	36,6	13,0	0,1
1	33,4	36,5	46,1	13,0	0,3	33,4	36,5	26,7	46,1	13,0	0,3
1 1/4	33,4	44,5	55,6	13,0	0,4	33,4	44,5	35,0	55,6	13,0	0,3
1 1/2	34,8	51,0	62,0	13,0	0,5	34,8	51,0	40,9	62,0	13,0	0,4
2	38,0	65,0	74,7	16,0	0,7	38,0	65,0	52,5	74,7	16,0	0,6
2 1/2	46,0	76,2	87,4	16,0	1,3	46,0	76,2	62,8	87,4	16,0	1,0
3	50,7	93,5	104,8	16,0	1,7	50,7	93,5	77,9	104,8	16,0	1,7
3 1/2	53,8	101,5	122,3	19,0	2,0	53,3	112,8	90,1	117,5	19,0	2,0
4	57,0	120,5	130,2	19,0	3,3	55,5	127,0	102,2	130,2	19,0	3,0

SOCKETWELD OUTLETS • 6000 LBS (SOCKET WELD TO ASME/ANSI B 6.11)

OUTLET SIZE [inch]	REDUCING SIZES				
	A [mm]	C [mm]	F [mm]	G [mm]	Approx. Weight
1/2	31,5	19,0	40,0	10,0	0,3
3/4	36,5	25,5	46,0	13,0	0,4
1	39,6	33,4	57,2	13,0	0,6
1 1/4	41,0	38,0	65,1	13,0	0,8
1 1/2	42,7	49,3	76,3	13,0	0,9
2	52,1	70,0	92,1	16,0	2,4



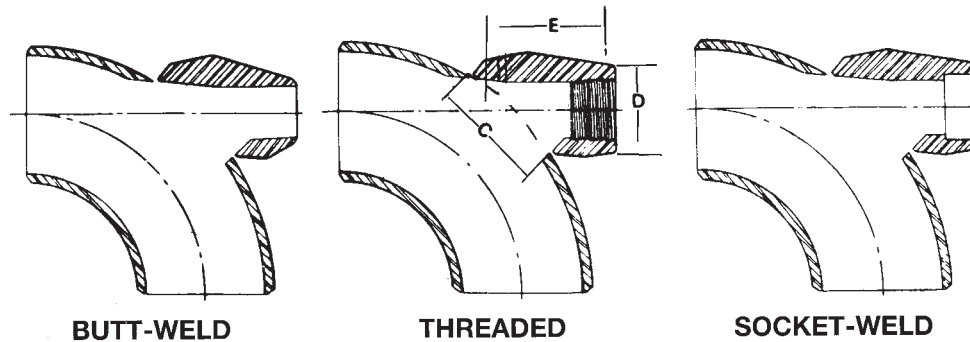
THREADED OUTLETS • 3000 LBS

OUTLET SIZE [inch]	REDUCED SIZES					FULL SIZES					
	A [mm]	C [mm]	F [mm]		Approx. Weight	A [mm]	C [mm]	D [mm]	F [mm]		Approx. Weight
1 / 2	25,5	24,0	31,8		0,1	25,5	24,0	16,0	31,80		0,1
3 / 4	27,0	30,0	36,6		0,2	27,0	30,0	20,7	36,6		0,1
1	33,4	36,5	46,1		0,3	33,4	36,5	27,0	46,1		0,2
1 ¼	33,4	44,5	55,6		0,4	33,4	44,5	34,9	55,6		0,3
1 ½	34,8	51,0	62,0		0,5	34,8	51,0	41,2	62,0		0,4
2	38,0	65,0	74,7		0,8	38,0	65,0	52,4	74,7		0,7
2 ½	46,0	76,2	87,4		1,4	46,0	76,2	63,5	87,4		1,1
3	50,7	93,5	104,8		2,0	50,7	93,5	77,8	104,8		2,0
3 ½	53,8	101,5	122,3		2,6	53,3	112,8	90,5	117,5		2,1
4	57,0	120,5	130,2		3,2	55,5	120,5	103,2	130,2		3,1

THREADED OUTLETS • 6000 LBS

OUTLET SIZE [inch]	REDUCING SIZES				Approx. Weight
	A [mm]	C [mm]	F [mm]		
1 / 2	31,5	19,0	40,0		0,2
3 / 4	36,5	25,5	46,0		0,4
1	39,6	33,4	57,2		0,6
1 ¼	41,0	38,0	65,1		0,7
1 ½	42,7	49,3	76,3		0,9
2	52,1	70,0	92,1		2,3

Elbow Outlet

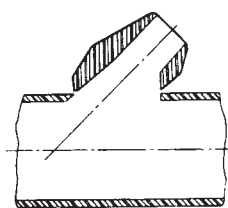


Dimensions for all three styles are the same except for the "D" dimension on the butt welding outlet which matches the proper schedule on the branch pipe.

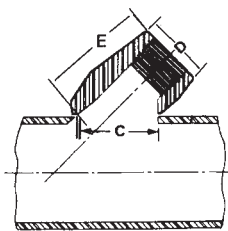
3000 LBS THREADED AND SOCKETWELD STANDARD AND EXTRA STRONG BUTT-WELD 6000 LBS THREADED AND SOCKETWELD SCHEDULE 160 AND DOUBLE EXTRA STRONG BUTT-WELD

Nominal Elbow Size (Inch) 3000 lb	Nominal Elbow Size (Inch) 6000 lb	Outlet Size- Inches	DIMENSIONS						WEIGHT	
			3000 lb C mm	6000lb C mm	3000 lb D mm	6000lb D mm	3000 lb E mm	6000lb E mm	3000 lb Approx. Wt. Kg.	6000lb Approx.Wt. Kg.
36-1 ¼	36-1 ¼	1/4	38,1	38,1	31,8	31,8	38,1	38,1	0,23	0,34
36-1 ¼	36-1 ¼	3/8	38,1	38,1	31,8	31,8	38,1	38,1	0,23	0,34
36-1 ¼	36-1 ¼	1/2	38,1	43,6	31,8	35,7	38,1	45,2	0,30	0,39
36-1 ¼	36-2	3/4	43,6	54,0	35,7	45,2	45,2	54,4	0,34	0,57
36-2	36-2	1	54,0	73,0	45,2	54,8	52,4	55,6	0,52	1,00
36-2	36-2	1 ¼	73,0	79,4	54,8	63,5	55,6	58,8	0,86	1,77
36-2	36-3	1 ½	79,4	106,4	63,5	82,6	58,8	69,9	1,20	2,80
36-3	-	2	106,4	-	82,6	-	69,9	-	2,39	-

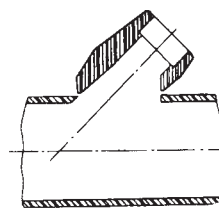
Lateral Outlet



BUTT-WELD



THREADED



SOCKET-WELD

Dimensions for all three styles are the same except for the "D" dimension on the butt welding outlet which matches the proper schedule on the branch pipe.

3000 LBS THREADED AND SOCKETWELD STANDARD AND EXTRA STRONG BUTT-WELD 6000 LBS THREADED AND SOCKETWELD SCHEDULE 160 AND DOUBLE EXTRA STRONG BUTT-WELD

Nominal Elbow Size (Inch) 3000 lb	Nominal Elbow Size (Inch) 6000 lb	Outlet Size- Inches	DIMENSIONS						WEIGHT	
			3000 lb C (mm)	6000lb C (mm)	3000 lb D (mm)	6000lb D (mm)	3000 lb E (mm)	6000lb E (mm)	3000 lb Approx. Wt. Kg.	6000lb Approx. Wt. Kg.
12 - 1 ¼	12 - 2 ½	1 / 4	36,5	36,5	31,8	31,8	39,7	39,7	0,23	0,34
12 - 1 ¼	12 - 1 ¼	3 / 8	36,5	36,5	31,8	31,8	39,7	39,7	0,23	0,34
12 - 1 ¼	12 - 1 ¼	1 / 2	36,5	43,6	31,8	35,7	39,7	47,6	0,30	0,39
12 - 1 ¼	12 - 2	3 / 4	43,6	54	35,7	45,2	47,6	57,2	0,34	0,57
12 - 2	12 - 2	1	54	67,5	45,2	54,8	57,2	61,9	0,52	1,00
12 - 2	12 - 2	1 ¼	67,5	76,2	54,6	63,5	61,9	66,7	0,86	1,32
12 - 2	12 - 4	1 ½	76,2	104,8	63,5	82,6	66,7	81,0	1,20	2,80
12 - 4	-	2	104,8	-	82,6	-	81	-	3,29	-

NOTE: Other Outlet sizes available on request.

FLANGED NIPPLE OUTLETS

The height (A) is 150mm for all sizes, except 2" 2500# that is 165mm. The bore (F) equals the nominal bore of the branch pipe.

FLANGED NIPPLE OUTLET - 150#

Outlet size					
	B	E	C Std/XS	C 160/XXS	Type 1
1/2	88,9	11,2	24,0	14,3	1
3/4	98,6	12,7	30,0	19,0	1
1	108,0	14,3	36,5	25,5	1
1 ¼	117,5	15,9	44,5	33,4	1
1 ½	127,0	17,5	51,0	38,0	1
2	152,4	19,1	65,0	42,9	1

FLANGED NIPPLE OUTLET - 300#

Outlet size						
	B	E	C Std/XS	C 160/XXS	Type Std/XS	Type 160/XXS
1/2	95,3	14,3	24,0	14,3	2	2
3/4	117,5	15,9	30,0	19,0	2	2
1	123,8	17,5	36,5	25,5	1	2
1 ¼	133,4	19,0	44,5	33,4	1	2
1 ½	155,6	20,6	51,0	38,0	1	1
2	165,1	22,2	65,0	42,9	1	2

FLANGED NIPPLE OUTLET - 600#

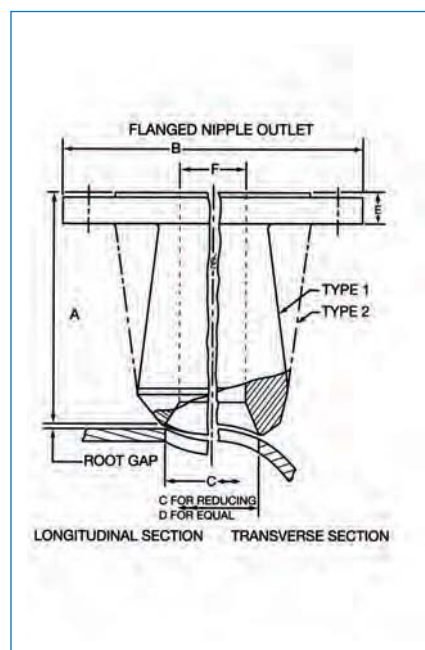
Outlet size						
	B	E	C Std/XS	C 160/XXS	Type Std/XS	Type 160/XXS
1/2	95,3	20,7	24,0	14,3	2	2
3/4	117,5	22,3	30,0	19,0	2	2
1	123,8	23,9	36,5	25,5	1	2
1 ¼	133,4	27,0	44,5	33,4	1	2
1 ½	155,6	28,6	51,0	38,0	1	1
2	165,1	31,8	65,0	42,9	1	2

FLANGED NIPPLE OUTLET - 900# / 1500#

Outlet size						
	B	E	C Std/XS	C 160/XXS	Type Std/XS	Type 160/XXS
1/2	120,7	28,6	24,0	14,3	2	2
3/4	130,2	31,8	30,0	19,0	1	1
1	149,2	35,0	36,5	25,5	1	2
1 ¼	158,8	35,0	44,5	33,4	1	2
1 ½	177,8	38,1	51,0	38,0	1	1
2	215,9	44,5	65,0	42,9	2	2

FLANGED NIPPLE OUTLET - 2500#

Outlet size					
	B	E	C Std/XS	C 160/XXS	Type
1/2	133,4	36,6	24,0	14,3	2
3/4	139,7	38,1	30,0	19,0	2
1	158,8	41,3	36,5	25,5	2
1 ¼	184,2	44,5	44,5	33,4	2
1 ½	203,2	50,8	51,0	38,0	2
2	235,0	57,2	65,0	42,9	2



FLANGED BUTTWELD OUTLET

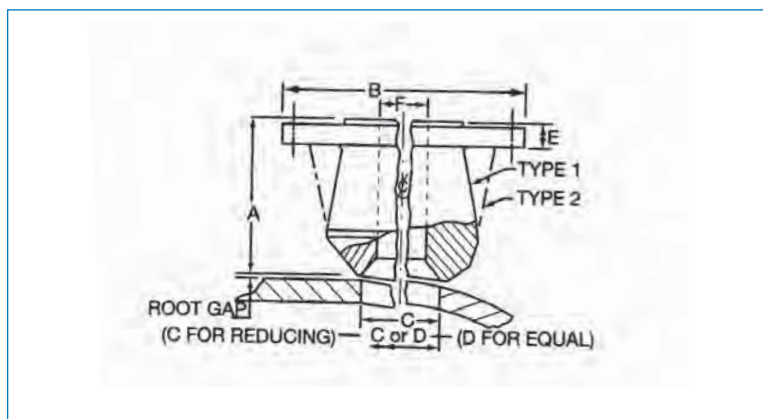
Flanged Buttweld Outlet is available also for larger sizes than listed below (up to 24" for 150# to 1500#).

Flanged Buttweld Outlet is available in all pressure classes - below listed 150# and 2500# are typical
- others available at request.

The dimensions below are based on RF type flanges.

Other facings may be supplied at request. The C dimensions listed are based on Std wall for header and branch pipe.

Any wall may be supplied at request. The bore (F) equals the nominal bore of the branch pipe.



FLANGED BUTTWELD OUTLET - 150#

Outlet size	B	E	A	C	Type
1/2	88,9	11,2	65,0	24,0	1
3/4	98,6	12,7	75,0	30,0	1
1	108,0	14,3	85,0	36,5	1
1 ¼	117,5	15,9	90,0	44,5	1
1 ½	127,0	17,5	95,0	51,0	1
2	152,4	19,1	105,0	65,0	1
2 ½	177,8	22,3	112,0	76,2	1
3	190,5	23,8	115,0	93,5	1
3 ½	215,9	23,8	120,0	112,6	1
4	228,6	23,8	130,0	120,5	1
5	254,0	23,8	146,0	141,3	1
6	279,4	25,4	150,0	170,0	1
8	342,9	28,6	175,0	220,5	1
10	406,4	30,2	180,0	274,0	1
12	482,6	31,8	200,0	324,0	1

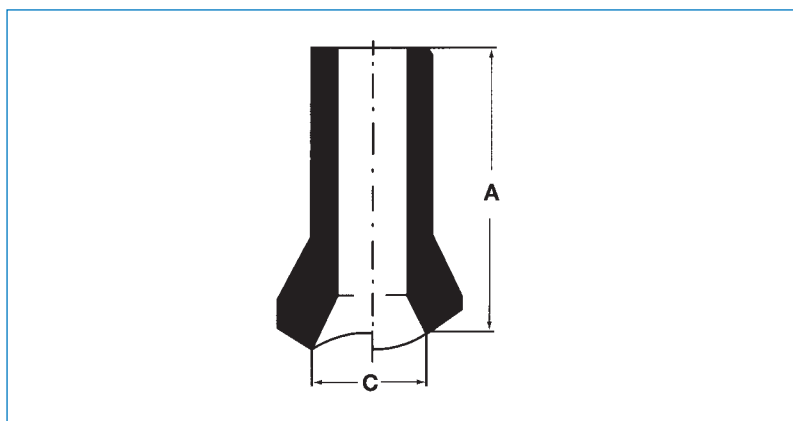
FLANGED BUTTWELD OUTLET - 2500#

Outlet size	B	E	A	C	Type
1/2	133,4	36,5	100,0	24,0	2
3/4	139,7	38,1	110,0	30,0	2
1	158,8	41,3	125,0	36,5	2
1 ¼	184,2	44,5	135,0	44,5	2
1 ½	203,2	50,8	150,0	51,0	2
2	235,0	57,2	170,0	65,0	2
2 ½	266,7	63,5	190,0	76,2	2
3	304,8	73,0	220,0	93,5	2
4	355,6	82,6	250,0	120,5	2
5	419,1	98,4	290,0	141,3	2
6	482,6	114,3	340,0	170,0	2
8	552,5	133,4	395,0	220,5	2
10	673,1	171,5	505,0	274,0	2
12	762,0	190,5	555,0	324,0	2

NIPPLE OUTLET - 3000 / 6000 LB

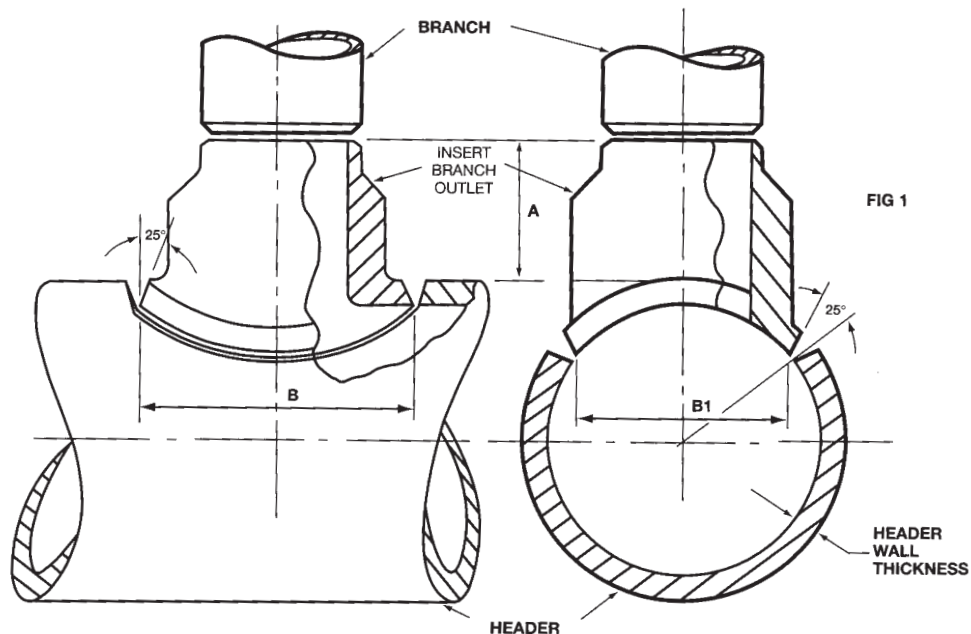
Available with plain / bevel / threaded end

Outlet size	A 3000 lb	C 6000lb	C
1/2	89,0	24,0	14,5
3/4	89,0	30,0	19,0
1	89,0	36,5	25,5
1 ¼	89,0	44,5	33,4
1 ½	89,0	51,0	38,0
2	89,0	65,0	43,0



INSERT BRANCH OUTLET

Insert Branch Outlets are available for any header wall thickness. The below dimensions are applicable for header wall thickness up to and including XS.



Outlet size			
	A	Min. header pipe size	
1/2	32,0	1 ½	Other dimensions available at specific request
3/4	32,0	2	
1	32,0	2	
1 ¼	32,0	2	
1 ½	38,0	2 ½	
2	44,0	3	
3	51,0	4	
4	60,0	6	
6	68,0	8	
8	76,0	10	
10	79,0	12	
12	86,0	16	
14	92,0	18	
16	95,0	20	
18	117,0	22	
20	130,0	24	
24	143,0	30	

WEIGHTS



NOTE:
All weights listed in this section are approximate weights for steel.
All weights are given in kilograms (kg)

PIPES B36.10 / B36.19

Weights are given in tables in section 2 of this catalogue.

SCREWED FITTINGS - B16.11 / BS3799

PRODUCT	RATING	1/8"	1/4"	3/8"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"
90° elbows	2000 lbs	0,08	0,08	0,11	0,23	0,28	0,46	0,80	1,00	1,60	2,30	4,35	10,25
	3000 lbs	0,14	0,14	0,27	0,37	0,60	1,08	1,22	2,45	2,50	5,25	7,40	13,00
	6000 lbs	0,31	0,31	0,50	0,69	1,25	1,65	2,75	3,22	6,25	10,00	17,00	18,00
45° elbows	2000 lbs	0,10	0,10	0,11	0,21	0,24	0,39	0,70	0,85	1,23	3,00	3,50	9,00
	3000 lbs	0,13	0,13	0,25	0,36	0,53	0,78	1,02	1,70	2,35	5,40	6,00	10,50
	6000 lbs	0,25	0,25	0,35	0,60	0,95	1,22	1,35	2,55	5,60	8,00	15,50	13,00
Tees	2000 lbs	0,12	0,12	0,18	0,29	0,39	0,55	0,93	1,30	1,80	3,00	5,50	14,00
	3000 lbs	0,21	0,21	0,31	0,49	0,80	1,31	1,61	3,20	3,55	6,50	9,25	17,00
	6000 lbs	0,41	0,41	0,60	0,94	1,59	2,14	3,39	4,50	10,00	13,00	19,50	18,00
Crosses	2000 lbs	0,14	0,14	0,19	0,34	0,42	0,75	1,15	1,45	2,25	4,50	7,15	15,00
	3000 lbs	0,22	0,22	0,40	0,63	0,99	1,63	1,97	3,70	4,90	10,50	11,50	21,70
	6000 lbs	0,45	0,45	0,70	1,16	1,80	2,50	4,10	5,20	12,30	14,00	25,00	23,00
Couplings	3000 lbs	0,05	0,05	0,06	0,14	0,20	0,39	0,73	1,03	1,35	2,30	3,15	5,80
	6000 lbs	0,10	0,10	0,12	0,37	0,45	1,00	1,65	1,85	2,80	4,00	5,50	10,00
Half couplings	3000 lbs	0,02	0,03	0,03	0,07	0,11	0,20	0,37	0,51	0,66	1,15	1,57	2,90
	6000 lbs	0,04	0,05	0,06	0,19	0,23	0,50	0,83	0,92	1,40	2,00	2,75	5,00
Caps	3000 lbs	0,04	0,05	0,06	0,13	0,21	0,37	0,60	0,73	1,10	2,31	3,00	4,50
	6000 lbs	-	0,16	0,20	0,29	0,40	0,70	1,10	1,35	2,10	3,50	4,80	7,50
Street elbows	3000 lbs	-	0,13	0,23	0,33	0,53	0,94	1,30	1,47	2,30	-	-	-
Welding boss		0,20	0,23	0,29	0,38	0,53	0,83	1,31	1,86	-	-	-	-
Pipe nipple - 100mm	3000 (XS)	0,07	0,08	0,11	0,16	0,22	0,31	0,44	0,53	0,74	1,12	1,46	2,15
	6000 (XXS)	-	-	-	0,25	0,36	0,54	0,77	0,95	1,31	2,00	2,65	4,00
Plug - square head		0,01	0,02	0,03	0,05	0,09	0,17	0,27	0,40	0,60	0,89	1,25	3,10
Plug - round head		0,04	0,05	0,07	0,13	0,22	0,32	0,50	0,72	1,35	2,20	3,30	6,00
Plug - hex. head		0,02	0,03	0,05	0,07	0,13	0,22	0,41	0,49	0,77	1,61	1,94	4,50
Unions - FF	3000 lbs	0,14	0,17	0,21	0,31	0,49	0,83	1,22	1,53	2,30	5,00	6,25	-
	6000 lbs	0,20	0,30	0,50	1,12	1,60	2,15	2,42	4,73	6,50	9,50	19,20	-
Unions - MF	3000 lbs	0,16	0,21	0,27	0,46	0,61	0,99	1,55	1,9	2,9	-	-	-
Hex. head bushing		-	0,02	0,03	0,06	0,10	0,17	0,33	0,42	0,62	1,27	1,65	3,10
Hex. Nipples		0,02	0,03	0,06	0,08	0,15	0,24	0,37	0,45	-	-	-	-
Swage nipples	3000 lbs	0,04	0,05	0,09	0,14	0,17	0,32	0,49	0,60	0,93	-	-	-
	plain 6000 lbs	0,11	0,13	0,18	0,23	0,29	0,55	0,80	1,10	1,40	-	-	-
	screwed 6000 lbs	0,17	0,22	0,29	0,33	0,50	0,75	0,95	1,60	2,10	-	-	-

SOCKET WELD FITTINGS - B16.11 / BS3799

PRODUCT	RATING	1/8"	1/4"	3/8"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"
90° elbows	3000 lbs	0,08	0,08	0,12	0,24	0,29	0,48	0,75	0,95	1,65	2,50	4,30	9,70
	6000 lbs	0,15	0,17	0,30	0,43	0,66	1,14	1,60	2,70	2,95	-	-	-
45° elbows	3000 lbs	0,08	0,08	0,10	0,19	0,25	0,38	0,58	0,83	1,15	2,05	3,40	9,00
	6000 lbs	0,12	0,12	0,24	0,30	0,53	0,86	1,07	1,90	2,35	-	-	-
Tees	3000 lbs	0,12	0,12	0,19	0,31	0,40	0,58	0,91	1,25	2,10	3,15	5,25	13,50
	6000 lbs	0,21	0,21	0,40	0,56	0,91	1,41	1,75	3,56	4,10	-	-	-
Crosses	3000 lbs	0,14	0,14	0,21	0,34	0,47	0,80	1,25	1,50	2,23	3,95	6,50	16,00
	6000 lbs	0,26	0,26	0,50	0,67	1,06	1,79	2,15	4,45	5,40	-	-	-
Unions	3000 lbs	0,14	0,18	0,23	0,39	0,52	0,73	1,20	1,56	2,30	5,00	7,15	-
Couplings	3000 lbs	0,05	0,05	0,07	0,11	0,15	0,26	0,37	0,42	0,77	1,10	1,40	2,35
	6000 lbs	0,07	0,07	0,10	0,15	0,34	0,37	0,49	0,68	1,24	-	-	-
Caps	3000 lbs	0,03	0,04	0,06	0,14	0,18	0,30	0,51	0,65	0,92	1,40	2,50	3,50
	6000 lbs	0,08	0,08	0,14	0,18	0,21	0,46	0,70	0,89	1,20	-	-	-
Welding boss		0,20	0,23	0,29	0,38	0,53	0,83	1,31	1,86	-	-	-	-

90° ELBOWS, BUTT-WELD FITTINGS (LONG RADIUS)

N.B. SIZE		APPROXIMATE WEIGHTS IN Kg																
		Sch 5s	Sch 10s	Sch 10	Sch 20	Sch 30	Sch 40s	Std. Wall	Sch 40	Sch 60	Sch 80s	XS	Sch 80	Sch 100	Sch 120	Sch 140	Sch 160	XXS
Inches	Metric																	
1 / 2	15	0,03	0,05				0,06	0,06			0,09	0,09					0,12	0,12
3 / 4	20	0,04	0,07				0,08	0,08			0,11	0,11					0,15	0,15
1	25	0,07	0,14				0,15	0,15			0,2	0,2					0,28	0,38
1 ¼	32	0,1	0,23				0,26	0,26			0,35	0,35					0,44	0,6
1 ½	40	0,15	0,3				0,4	0,4			0,55	0,55					0,65	0,95
2	50	0,3	0,5				0,7	0,7			0,95	0,95					1,4	1,7
2 ½	65	0,55	0,85				1,4	1,4			1,5	1,5					2,5	3,2
3	80	1	1,25				2,5	2,5			2,9	2,9					3,75	5,5
3 ¼	90	1,2	1,65				3	3			4	4					–	8
4	100	1,6	2,1				4	4			6	6			7,5		9	12
5	125	2,7	3,65				6,8	6,8			9,3	9,3			12,7		15	18
6	150	4,4	5,45				11	11			16,8	16,8			23		26	29,5
8	200	8,8	10,2		17,25	19	22	22		27,25	34,8	34,8		38	40,5	52	55	54
10	250	16,8	18,15		25,85	33,15	41,5	41,5		53,9	53,9	53,9	61,16	75	85	97	109	
12	300	24	27,25		37,2	49	60	60	61,25	81,7	80	80	107,4	123	140	157	180	
14	350	28	39,95	50	59	70	70	70	83	109	94	94	135	188	190	224	247,45	
16	400	38	51,6	64	78,3	95	95	95	125	162	125	125	202	260	274	323	367	
18	450	48	65,4	82	99,85	139,15	120	120	176,15	231,5	158	158	290,55	390	405	422	545	
20	500	58,4	84,9	100	146	194	146	146	228,35	311	194	194	390,45	476	508	607	770	
22	550	–	–	120	–	–	–	177,97	–	–	–	236	–	–	–	–	–	
24	600	88	146	146	220	318,25	220	220	363,15	532,5	282	282	657,85	820	954	1100	1270	

90° ELBOWS, BUTT-WELD FITTINGS (SHORT RADIUS)

N.B. SIZE		APPROXIMATE WEIGHTS IN Kg																
		Sch 5s	Sch 10s	Sch 10	Sch 20	Sch 30	Sch 40s	Std. Wall	Sch 40	Sch 60	Sch 80s	XS	Sch 80	Sch 100	Sch 120	Sch 140	Sch 160	XXS
Inches	Metric																	
1 / 2	15	0,02	0,04				0,05	0,05			0,07	0,07						
3 / 4	20	0,03	0,05				0,06	0,06			0,08	0,08						
1	25	0,05	0,1				0,11	0,11			0,15	0,15						
1 ¼	32	0,08	0,17				0,18	0,18			0,26	0,26						
1 ½	40	0,11	0,23				0,3	0,3			0,39	0,39						
2	50	0,23	0,38				0,53	0,53			0,67	0,67						
2 ½	65	0,41	0,64				1,05	1,05			1,05	1,05						
3	80	0,75	0,94				1,88	1,88			2,03	2,03						
3 ½	90	0,9	1,24				2,25	2,25			2,8	2,8						
4	100	1,2	1,58				3	3			4,2	4,2			4,5			
5	125	2,03	2,74				5,1	5,1			6,5	6,5			9			
6	150	3,3	4,09				8,25	8,25			11,75	11,75			13,5			
8	200	6,6	7,65		11,1	11,35	16,5	16,5		18,15	24,35	24,35		26,35	29	32		
10	250	12,45	13,61		17,35	21,35	31,13	31,13		37,7	37,7	37,7	40,85	50	53	62		
12	300	18	20,44		25	33,15	45	45	48	54,5	56	56	68	81,25	92	99		
14	350	21	29,96	37,5	39,5	52,5	52,5	52,5	54,45	74	66	66	93,5	124	120	138,8		
16	400	28,5	38,7	48	52,2	71,25	71,25	71,25	104,3	106,7	104,3	104,3	138	171,5	166	198		
18	450	36	49,05	61,5	65,35	92,15	90	90	118	154,35	110,6	110,6	193	257,4	283	387		
20	500	43,8	63,68	75	109,5	135,8	109,5	109,5	154,35	208	135,8	135,8	261	332	376	430		
22	550	–	–	90	–	–	–	–	–	–	–	–	–	–	–	–		
24	600	66	109,5	109,5	165	214,3	165	165	256,5	355,5	197,5	197,5	443,5	530	621	680		

45° ELBOWS, BUTT-WELD FITTINGS

N.B. SIZE		APPROXIMATE WEIGHTS IN Kg																
Inches	Metric	Sch 5s	Sch 10s	Sch 10	Sch 20	Sch 30	Sch 40s	Std. Wall	Sch 40	Sch 60	Sch 80s	XS	Sch 80	Sch 100	Sch 120	Sch 140	Sch 160	XXS
1 / 2	15	0,02	0,03				0,03	0,03			0,05	0,05					0,06	0,06
3 / 4	20	0,02	0,04				0,04	0,04			0,06	0,06					0,08	0,08
1	25	0,04	0,07				0,08	0,08			0,1	0,1					0,14	0,19
1 ¼	32	0,05	0,11				0,13	0,13			0,18	0,18					0,22	0,3
1 ½	40	0,08	0,15				0,2	0,2			0,28	0,28					0,33	0,48
2	50	0,15	0,25				0,35	0,35			0,46	0,46					0,7	0,85
2 ½	65	0,28	0,43				0,7	0,7			0,75	0,75					1,25	1,6
3	80	0,5	0,63				1,25	1,25			1,45	1,45					1,88	2,75
3 ½	90	0,6	0,83				1,5	1,5			2	2					–	4
4	100	0,8	1,05				2	2			3	3			3,75		4,5	5,1
5	125	1,35	1,83				3,4	3,4			4,65	4,65			6,35		7,5	9
6	150	2,2	2,73				5,5	5,5			8,4	8,4			11,5		13	14,75
8	200	4,4	5,1		10	10	11	11		13,6	17,4	17,4		19	20,25	26	27,5	27
10	250	8,3	9,08		18,5	15,85	20,75	20,75		26,95	26,95	26,95	30,58	37,5	42,5	48,5	54,4	
12	300	12	13,63		24,75	24,5	30	30	30,85	40,85	40	40	53,7	61,5	70	78,5	90	
14	350	14	20	25	37	35	35	35	40,85	54,5	47	47	67,5	94	95	112	123,73	
16	400	19	25,8	32	46,5	47,5	47,5	47,5	62,5	81	62,5	62,5	101	130	137	161,5	183	
18	450	24	32,7	41	56	69,45	60	60	87,15	115,75	79	79	145,25	195	202,5	211	272,5	
20	500	29,2	42,45	50	73	97	73	73	113,5	155,5	97	97	195,23	238	254	303,5	385	
22	550	–	–	60	–	–	–	88,98	–	–	–	118	–	–	–	–	–	
24	600	44	73	73	110	159	110	110	190,65	266,5	141	141	333,93	410	477	545	635	

END CAPS, BUTT-WELD FITTINGS

N.B. SIZE		APPROXIMATE WEIGHTS IN Kg																
Inches	Metric	Sch 5s	Sch 10s	Sch 10	Sch 20	Sch 30	Sch 40s	Std. Wall	Sch 40	Sch 60	Sch 80s	XS	Sch 80	Sch 100	Sch 120	Sch 140	Sch 160	XXS
1 / 2	15	0,01	0,01				0,03	0,03			0,05	0,05						
3 / 4	20	0,02	0,02				0,06	0,06			0,09	0,09						
1	25	0,04	0,05				0,1	0,1			0,13	0,13					0,15	0,2
1 ¼	32	0,05	0,07				0,14	0,14			0,19	0,19					0,23	0,3
1 ½	40	0,08	0,1				0,2	0,2			0,23	0,23					0,3	0,35
2	50	0,1	0,13				0,25	0,25			0,3	0,3					0,55	0,6
2 ½	65	0,14	0,18				0,35	0,35			0,45	0,45					0,9	1
3	80	0,25	0,36				0,7	0,7			0,85	0,85					1,45	1,8
3 ½	90	0,4	0,5				1	1			1,3	1,3					–	2,75
4	100	0,43	0,55				1,1	1,1			1,6	1,6			2,5		2,75	3,5
5	125	0,8	1				2	2			2,7	2,7			4		5	5,5
6	150	1,2	1,5				3	3			4,4	4,4			6		7,5	8,1
8	200	2,2	2,75		4,5	5	5,5	5,5		7	8,35	8,35		11	15,5	18,5	15,45	13,15
10	250	3,6	4,45		6	8	9	9		13,6	13,6	13,6	16,25	21	30	28	28,5	
12	300	6	7,5		10	13	15	15	19	25,5	22,5	22,5	29,5	32,5	41	42	44,5	
14	350	6,4	8,17	14	13,5	16	16	16	24,5	38	27	27	36,3	50	47	52	59,6	
16	400	8,4	10,67	18	18	21	21	21	31,5	52,5	31,5	31,5	52,25	64	59	73	79	
18	450	10,4	13	22	22	30	26	26	42	66	36	36	72,5	75	88	93	104	
20	500	13,6	17	29	34	42	34	34	56,75	94,5	42	42	98,5	96	105	153	170	
22	550	–	–	35,5	–	–	–	42	–	–	–	51	–	–	–	–	–	
24	600	20,8	26	44	52	74,5	52	52	96,5	120	60	60	150	118	200	250	285	

EQUAL TEES, BUTT-WELD FITTINGS

N.B. SIZE		APPROXIMATE WEIGHTS IN Kg																
		Sch 5s	Sch 10s	Sch 10	Sch 20	Sch 30	Sch 40s	Std. Wall	Sch 40	Sch 60	Sch 80s	XS	Sch 80	Sch 100	Sch 120	Sch 140	Sch 160	XXS
Inches	Metric																	
1/2	15	0,07	0,09				0,16	0,16			0,25	0,25					0,27	0,27
3/4	20	0,09	0,11				0,23	0,23			0,38	0,38					0,47	0,47
1	25	0,14	0,27				0,35	0,35			0,5	0,5					0,86	0,65
1 ¼	32	0,35	0,45				0,9	0,9			1,05	1,05					1,25	1,18
1 ½	40	0,55	0,65				1,35	1,35			1,5	1,5					1,85	2
2	50	0,68	1,7				1,7	1,7			2,15	2,15					3,18	3
2 ½	65	1,06	2,18				2,7	2,7			3	3					4	4,5
3	80	1,5	3				3,75	3,75			3,8	3,8					6,58	7,1
3 ½	90	2	4,05				5	5			5,25	5,25						10,9
4	100	2,6	4,4				6,5	6,5			7,65	7,65			9		17	15
5	125	4	7,42				10	10			13,5	13,5			17,5		25	24
6	150	6,35	12,35				16	16			19,3	19,3			24		39,5	37,6
8	200	10,7	20		23	24,6	27	27		31,75	33	33		43,6	49,5	54	70,35	68
10	250	18	28,15		34,7	40	45	45		60	60	60	67,5	74	93	98,5	120,3	
12	300	26	47,45		59	56,6	65	65	70,5	95	78	78	115	136,2	150	176,5	183,85	
14	350	40,7	69,9	87,16	94,5	102	102	102	105	135	115	115	165	206	240	275	300	
16	400	43,95	72,65	90,8	100	110	110	110	167	206,5	167	167	249	335	330	385	425	
18	450	53,95	101,7	127,12	127	164	135	135	237,45	277	190	190	322	380	450	500	590	
20	500	67,2	169,8	199,76	168	245	168	168	320	378,65	245	245	459	540	590	720	790	
22	550	–	-	220	–	–	–	220	–	–		280	–	–	–	–	–	
24	600	95,9	306,45	310	240	373	240	240	570,65	653,75	350	350	748	910	1100	1180	1310	

REDUCING TEES, BUTT-WELD FITTINGS

N.B. SIZE		APPROXIMATE WEIGHTS IN Kg																
		Sch 5s	Sch 10s	Sch 10	Sch 20	Sch 30	Sch 40s	Std. Wall	Sch 40	Sch 60	Sch 80s	XS	Sch 80	Sch 100	Sch 120	Sch 140	Sch 160	XXS
Inches	Metric																	
1 / 2	15	0,07	0,09				0,16	0,16			0,25	0,25					0,27	0,27
3 / 4	20	0,09	0,11				0,23	0,23			0,38	0,38					0,47	0,47
1	25	0,14	0,27				0,35	0,35			0,5	0,5					0,86	0,65
1 ¼	32	0,35	0,45				0,9	0,9			1,05	1,05					1,25	1,18
1 ½	40	0,55	0,65				1,35	1,35			1,5	1,5					1,85	2
2	50	0,68	1,7				1,7	1,7			2,15	2,15					3,18	3
2 ½	65	1,06	2,18				2,7	2,7			3	3					3,85	4,2
3	80	1,5	3				3,75	3,75			3,8	3,8					6,13	6,6
3 ½	90	2	4,05				5	5			5,25	5,25						10,9
4	100	2,6	4,4				6,5	6,5			7,65	7,65			9		15,9	15
5	125	4	7,42				10	10			13,5	13,5			17,5		23	23,15
6	150	5,6	12,35				14	14			19,3	19,3			24		32,7	37,6
8	200	10,7	20		23	24,6	27	27		31,75	33	33		43,6	49,5	49,25	55,6	51,3
10	250	17,45	26,3		33,15	38,6	43,5	43,5		55	55	55	65,83	63,5	88,5	95	113	
12	300	25,25	47,45		59	56,6	63	63	70,5	95	78	78	106,24	124,85	140,85	158	163,45	
14	350	40,7	69,9	87,16	94,5	102	102	102	105	135	115	115	162,28	206	235	275	300	
16	400	43,95	72,65	90,8	100	110	110	110	167	206,5	167	167	200	335	320	360	410	
18	450	53,95	101,7	127,12	127	164	135	135	237,45	256,5	190	190	278,87	380	440	475	550	
20	500	67,2	169,8	199,76	168	218	168	168	265,1	350,5	218	218	405,42	540	570	680	770	
22	550	–	–	220	–	–	–	220	–	–	–	280	–	–	–	–	–	
24	600	94,45	268,99	272	227	373	237	237	390,45	544,8	350	350	606,1	910	1060	1140	1270	

CONCENTRIC REDUCERS, BUTT-WELD FITTINGS

N.B. SIZE		APPROXIMATE WEIGHTS IN Kg																
		Sch 5s	Sch 10s	Sch 10	Sch 20	Sch 30	Sch 40s	Std. Wall	Sch 40	Sch 60	Sch 80s	XS	Sch 80	Sch 100	Sch 120	Sch 140	Sch 160	XXS
Inches	Metric																	
1 / 2	15																	
3 / 4	20	0,03	0,03				0,07	0,07			0,1	0,1					0,15	0,14
1	25	0,05	0,07				0,13	0,13			0,16	0,16					0,23	0,2
1 ¼	32	0,07	0,09				0,18	0,18			0,22	0,22					0,27	0,3
1 ½	40	0,12	0,14				0,26	0,26			0,35	0,35					0,48	0,45
2	50	0,15	0,23				0,41	0,41			0,57	0,57					0,95	0,9
2 ½	65	0,32	0,41				0,77	0,77			1,01	1,01					1,35	1,35
3	80	0,4	0,5				1	1			1,35	1,35					1,9	1,8
3 ½	90	0,55	0,68				1,3	1,3			1,89	1,89					–	3,2
4	100	0,65	0,82				1,6	1,6			2,27	2,27			3,65		3,65	3,85
5	125	1,1	1,35				2,75	2,75			3,92	3,92			6,35		6,35	6,35
6	150	1,6	2				3,95	3,95			5,94	5,94			7,5		10	9
8	200	2,6	3,27		5	5,58	6,5	6,5		8	9,86	9,86		11,8	13,5	16,35	16,5	14,5
10	250	4,3	5,45		7,25	8,99	10,7	10,7		14,48	14,48	14,48	17,25	20,45	24,5	28,5	29,5	
12	300	6	7,7		9,7	13,21	15	15	16,35	22,25	19,79	19,79	28,15	32,65	38,15	44,25	49	
14	350	10,75	13,6	23	22,25	26,85	26,85	26,85	31,3	41,75	35,55	35,55	52,25	64	73	78	86	
16	400	13,25	16,35	28	27,5	33,15	33,15	33,15	44	56,75	44	44	73,5	83	97	112	121	
18	450	16	19,98	34	33,5	46,76	40	40	59,5	77,4	53,12	53,12	97,6	116	136	145	159	
20	500	23,8	29,75	50	59,45	79	59,45	59,45	93	124,85	79	79	159	163	178	305	340	
22	550	–	–	57	–	–	–	65,35	–	–	–	86,71	–	–	–	–	–	
24	600	28,7	36,32	63	71,7	107,14	71,7	71,7	129,4	180,7	95,34	95,34	228	241	295	540	610	

N.B. Weights are of the smallest reduction, i.e. the heaviest.

ECCENTRIC REDUCERS, BUTT-WELD FITTINGS

N.B. SIZE		APPROXIMATE WEIGHTS IN Kg																
		Sch 5s	Sch 10s	Sch 10	Sch 20	Sch 30	Sch 40s	Std. Wall	Sch 40	Sch 60	Sch 80s	XS	Sch 80	Sch 100	Sch 120	Sch 140	Sch 160	XXS
Inches	Metric																	
1/2	15																	
3/4	20	0,03	0,03				0,07	0,07			0,1	0,1					0,15	0,14
1	25	0,05	0,07				0,13	0,13			0,16	0,16					0,23	0,2
1 ¼	32	0,07	0,09				0,18	0,18			0,22	0,22					0,27	0,3
1 ½	40	0,12	0,14				0,26	0,26			0,35	0,35					0,48	0,45
2	50	0,15	0,23				0,41	0,41			0,57	0,57					0,95	0,9
2 ½	65	0,32	0,41				0,77	0,77			1,01	1,01					1,35	1,35
3	80	0,4	0,5				1	1			1,35	1,35					1,9	1,8
3 ½	90	0,55	0,68				1,3	1,3			1,89	1,89					–	3,2
4	100	0,65	0,82				1,6	1,6			2,27	2,27			3,65		3,65	3,85
5	125	1,1	1,35				2,75	2,75			3,92	3,92			6,35		6,35	6,35
6	150	1,6	2				3,95	3,95			5,94	5,94			7,5		10	9
8	200	2,6	3,27		5	5,58	6,5	6,5		8	9,86	9,86		11,8	13,5	16,35	16,5	14,5
10	250	4,3	5,45		7,25	8,99	10,7	10,7		14,48	14,48	14,48	17,75	20,45	24,5	28,5	29,5	
12	300	6	7,7		9,7	13,21	15	15	16,35	22,25	19,79	19,79	28,15	32,65	38,15	44,25	49	
14	350	10,75	13,6	23	22,25	26,85	26,85	26,85	31,3	41,75	35,55	35,55	52,25	64	73	78	86	
16	400	13,25	16,35	28	27,5	33,15	33,15	33,15	44	56,75	44	44	73,5	83	97	112	121	
18	450	16	19,98	34	33,5	46,76	40	40	59,5	77,4	53,12	53,12	97,6	116	136	145	159	
20	500	23,8	29,75	50	59,45	79	59,45	59,45	93	124,85	79	79	159	163	178	305	340	
22	550	–	–	57	–	–	–	65,35	–	–	–	86,71	–	–	–	–	–	
24	600	28,7	36,32	63	71,7	107,14	71,7	71,7	129,4	180,7	95,34	95,34	228	241	295	540	610	

N.B. Weights are of the smallest reduction, i.e. the heaviest.

STUB ENDS, BUTT-WELD FITTINGS (ANSI B16.9)

N.B. SIZE		APPROXIMATE WEIGHTS IN Kg												
Inches	Metric	Sch 10	Sch 20	Sch 30	Std. Wall	Sch 40	Sch 60	XS	Sch 80	Sch 100	Sch 120	Sch 140	Sch 160	XXS
1/2	15				0,13			0,14						0,3
3/4	20				0,18			0,2						0,35
1	25				0,29			0,38					0,5	0,66
1 ¼	32				0,41			0,54					0,67	0,95
1 ½	40				0,54			0,67					0,9	1,2
2	50				0,98			1,34					2,01	2,46
2 ½	65				1,54			2,05					2,69	3,71
3	80				2,1			2,8					3,93	5,18
3 ½	90				2,47			2,94						6,25
4	100				2,99			4,17			5,27		6,29	7,68
5	125				5,22			7,41			9,6		11,79	13,84
6	150				6,79			10,27			13,04		16,25	19,2
8	200		7,99	8,84	10,28		12,81	15,63		18,21	21,83	24,55	26,79	26,16
10	250		12,1	14,87	17,86		23,8	23,94	28,13	33,57	38,98	45,54	50,45	
12	300		14,64	19,29	21,88	23,21	32,23	29,38	38,84	47,32	55,8	62,05	71,43	
14	350	18	15,8	28,57	28,57	32,59	44,2	39,73	54,92					
16	400	19,75	16,65	32,14	32,14	43,3	56,7	42,86	71,88					
18	450	24,25	21,3	44,2	38	56,25	74,2	50	91,52					
20	500	36	31,7	55,8	41,96	65,63	88,4	55,81	112,1					
22	550	42,95	37	65	46,88	78	109	62,07	142					
24	600	50,05	45,55	75,9	50,45	91,52	128,6	67,41	160					

STUB ENDS, BUTT-WELD FITTINGS (MSS SP-43)

N.B. SIZE		APPROXIMATE WEIGHTS IN Kg			
Inches	Metric	Sch 5s	Sch 10s	Sch 40s	Sch 80s
1 / 2	15	0,03	0,04	0,09	0,12
3 / 4	20	0,04	0,06	0,12	0,16
1	25	0,06	0,08	0,15	0,22
1 ¼	32	0,08	0,1	0,2	0,31
1 ½	40	0,11	0,14	0,28	0,39
2	50	0,17	0,2	0,41	0,69
2 ½	65	0,25	0,33	0,66	1,05
3	80	0,35	0,44	0,89	1,46
3 ½	90	0,5	0,63	1,26	1,54
4	100	0,61	0,76	1,52	2,49
5	125	1,06	1,33	2,66	3,55
6	150	1,2	1,51	3,02	5,49
8	200	2,09	2,61	5,22	9,97
10	250	3,63	4,54	9,08	13,75
12	300	5,33	6,67	13,25	19,64
14	350	5,81	7,26	14,53	29
16	400	6,54	8,17	16,34	37,5
18	450	7,72	9,65	19,3	49,25
20	500	8,54	10,67	21,34	60
22	550	9,8	11,6	23	77,5
24	600	10,26	12,83	25,65	88,25

150 lb PIPE FLANGES

N.B.		APPROXIMATE WEIGHTS IN Kg				
		Weld Neck	Blind	Slip-on	Lap Joint	Threaded and Socket Weld
Inches	Metric					
1/2	15	0,5	0,4	0,4	0,4	0,4
3/4	20	0,7	0,7	0,7	0,7	0,7
1	25	1,1	0,9	0,8	0,8	0,9
1 ¼	32	1,5	1,3	1,1	1,1	1,2
1 ½	40	1,8	1,6	1,4	1,4	1,5
2	50	2,7	2,6	2,2	2,2	2,3
2 ½	65	4,4	4,1	3,6	3,6	3,7
3	80	5,2	5,0	4,1	4,1	4,2
3 ½	90	6,4	6,4	5,2	5,2	5,3
4	100	7,5	7,1	5,6	5,6	5,9

N.B.		APPROXIMATE WEIGHTS IN Kg				
		Weld Neck	Blind	Slip-on	Lap Joint	Threaded
Inches	Metric					
5	125	9,2	9,0	6,3	6,3	7,0
6	150	11,0	11,8	7,5	7,5	8,4
8	200	18,3	21,0	12,6	12,6	13,0
10	250	25,0	30,0	18,5	18,5	17,8
12	300	39,0	45,0	28,0	28,0	29,5
14	350	51,0	59,0	36,0	42,0	39,0
16	400	60,0	79,0	46,0	52,0	42,0
18	450	71,0	97,0	50,0	58,0	54,0
20	500	88,0	124,0	64,0	74,0	68,0
24	600	119,0	188,0	89,0	101,0	93,0

300 lb PIPE FLANGES

N.B.		APPROXIMATE WEIGHTS IN Kg				
		Weld Neck	Blind	Slip-on	Lap Joint	Threaded and Socket Weld
Inches	Metric					
1/2	15	0,9	0,7	0,7	0,7	0,7
3/4	20	1,5	1,2	1,1	1,1	1,2
1	25	1,9	1,5	1,4	1,4	1,4
1 ¼	32	2,6	2,0	1,8	1,8	1,9
1 ½	40	3,3	2,9	2,6	2,6	2,8
2	50	3,6	3,4	3,4	3,4	3,3
2 ½	65	5,4	5,1	4,4	4,4	4,6
3	80	7,4	7,0	6,1	6,1	6,3
3 ½	90	8,9	8,9	7,5	7,5	7,8
4	100	11,9	11,8	10,1	10,1	10,2

N.B.		APPROXIMATE WEIGHTS IN Kg				
		Weld Neck	Blind	Slip-on	Lap Joint	Threaded
Inches	Metric					
5	125	16,0	15,5	12,5	12,5	12,9
6	150	20,2	21,3	14,1	14,1	18,0
8	200	31,0	35,2	24,8	24,8	26,0
10	250	44,3	57,0	37,1	42,0	37,5
12	300	64,0	82,0	50,0	64,0	52,0
14	350	88,0	106,0	70,0	87,0	72,0
16	400	113,0	140,0	90,0	114,0	100,0
18	450	134,0	178,0	112,0	134,0	126,0
20	500	171,0	223,0	133,0	168,0	148,0
24	600	238,0	345,0	208,0	250,0	222,0

400 lb PIPE FLANGES

N.B.		APPROXIMATE WEIGHTS IN Kg				
		Weld Neck	Blind	Slip-on	Lap Joint	Threaded
Inches	Metric					
4	100	14,0	14,0	11,5	11,5	12,5
5	125	19,0	19,0	14,5	14,5	15,5
6	150	25,5	26,0	19,0	19,0	21,0
8	200	39,5	43,0	29,0	32,0	31,0
10	250	54,0	65,0	39,5	44,0	42,0
12	300	78,0	95,0	58,0	65,0	61,0

N.B.		APPROXIMATE WEIGHTS IN Kg				
		Weld Neck	Blind	Slip-on	Lap Joint	Threaded
Inches	Metric					
14	350	105,0	126,0	82,0	91,0	85,0
16	400	131,0	163,0	105,0	115,0	110,0
18	450	159,0	206,0	126,0	139,0	131,0
20	500	190,0	270,0	152,0	170,0	157,0
24	600	275,0	410,0	232,0	260,0	225,0

WEIGHTS OF FLANGES

600 lb PIPE FLANGES

N.B.		APPROXIMATE WEIGHTS IN Kg				
		Weld Neck	Blind	Slip-on	Lap Joint	Threaded and Socket Weld
Inches	Metric					
1/2	15	0,9	0,7	0,8	0,8	1,0
3/4	20	1,5	1,2	1,4	1,4	1,6
1	25	1,9	1,5	1,6	1,6	1,8
1 ¼	32	2,6	2,0	2,1	2,1	2,6
1 ½	40	3,3	3,2	3,1	3,1	3,3
2	50	4,7	4,3	3,7	3,7	3,9
2 ½	65	6,5	6,0	5,4	5,4	6,0
3	80	8,7	8,0	7,3	7,3	7,4
3 ½	90	11,2	10,5	8,9	8,9	9,5
4	100	18,1	18,0	15,8	15,8	17,0

N.B.		APPROXIMATE WEIGHTS IN Kg				
		Weld Neck	Blind	Slip-on	Lap Joint	Threaded
Inches	Metric					
5	125	30,5	28,5	24,5	24,5	26,5
6	150	36,2	35,5	29,5	29,5	32,0
8	200	56,0	58,0	43,0	43,0	46,0
10	250	91,0	98,0	70,1	77,0	74,0
12	300	105,0	125,0	86,0	92,0	90,0
14	350	127,0	151,0	100,0	114,0	108,0
16	400	178,0	215,0	142,0	160,0	150,0
18	450	216,0	287,0	175,0	192,0	188,0
20	500	268,0	366,0	232,0	260,0	230,0
24	600	380,0	532,0	330,0	368,0	325,0

900 lb PIPE FLANGES

N.B.		APPROXIMATE WEIGHTS IN Kg				
		Weld Neck	Blind	Slip-on	Lap Joint	Threaded
Inches	Metric					
3	80	15,0	13,1	11,6	11,6	11,9
4	100	24,0	22,1	19,8	19,8	20,0
5	125	37,0	36,5	32,0	32,0	32,5
6	150	50,0	47,4	41,2	41,2	41,7
8	200	85,0	82,5	78,0	75,0	77,5
10	250	127,0	123,0	110,0	115,0	110,0

N.B.		APPROXIMATE WEIGHTS IN Kg				
		Weld Neck	Blind	Slip-on	Lap Joint	Threaded
Inches	Metric					
12	300	170,0	174,0	149,0	155,0	149,0
14	350	198,0	225,0	181,0	170,0	181,0
16	400	224,0	280,0	194,0	210,0	194,0
18	450	300,0	400,0	274,0	298,0	274,0
20	500	374,0	503,0	332,0	370,0	332,0
24	600	680,0	953,0	637,0	710,0	637,0

1500 lb PIPE FLANGES

N.B.		APPROXIMATE WEIGHTS IN Kg				
		Weld Neck	Blind	Slip-on	Lap Joint	Threaded and Socket Weld
Inches	Metric					
1/2	15	1,9	1,8	1,7	1,7	1,7
3/4	20	2,6	2,4	2,3	2,3	2,4
1	25	3,8	3,6	3,4	3,4	3,5
1 ¼	32	4,4	4,1	3,9	3,9	4,0
1 ½	40	6,1	5,8	5,4	5,4	5,5
2	50	11,1	10,1	9,8	9,8	10,0
2 ½	65	15,5	14,0	13,7	13,7	13,9
3	80	20,4	19,0	-	18,0	-
4	100	30,5	30,0	-	27,8	-
5	125	58,0	58,0	-	52,0	-

N.B.		APPROXIMATE WEIGHTS IN Kg				
		Weld Neck	Blind	Slip-on	Lap Joint	Threaded
Inches	Metric					
6	150	70,0	72,0	-	61,0	-
8	200	125,0	122,0	-	104,0	-
10	250	204,0	210,0	-	220,0	-
12	300	303,0	315,0	-	287,0	-
14	350	427,0	423,0	-	405,0	-
16	400	570,0	590,0	-	525,0	-
18	450	740,0	795,0	-	670,0	-
20	500	935,0	930,0	-	810,0	-
24	600	1510,0	1510,0	-	1282,0	-

2500 lb PIPE FLANGES

N.B.		APPROXIMATE WEIGHTS IN Kg				
		Weld Neck	Blind	Slip-on	Lap Joint	Threaded
Inches	Metric					
1/2	15	3,6	3,0	-	3,0	3,0
3/4	20	4,0	4,5	-	4,0	4,0
1	25	6,0	5,0	-	5,0	5,0
1 ¼	32	9,0	8,0	-	8,0	8,0
1 ½	40	13,0	11,0	-	11,0	11,0
2	50	19,0	17,0	-	17,0	17,0
2 ½	65	24,0	25,0	-	25,0	25,0

N.B.		APPROXIMATE WEIGHTS IN Kg				
		Weld Neck	Blind	Slip-on	Lap Joint	Threaded
Inches	Metric					
3	80	43,0	39,0	-	38,0	-
4	100	66,0	60,0	-	58,0	-
5	125	111,0	101,0	-	95,0	-
6	150	172,0	156,0	-	146,0	-
8	200	261,0	242,0	-	220,0	-
10	250	485,0	465,0	-	420,0	-
12	300	730,0	665,0	-	500,0	-

ROUND BAR - metric

SIZE mm	WEIGHTS IN Kg	
	Wt per ft	Wt per M
0,5	0,0004	0,0015
1,0	0,0018	0,0062
1,5	0,0042	0,014
2	0,0076	0,025
2,5	0,012	0,039
3	0,017	0,055
3,5	0,023	0,076
4	0,03	0,099
4,5	0,038	0,125
5	0,047	0,154
5,5	0,057	0,187
6	0,068	0,222
6,5	0,079	0,26
7	0,092	0,302
7,5	0,106	0,347
8	0,12	0,395
8,5	0,136	0,445
9	0,152	0,499
9,5	0,169	0,556
10	0,188	0,617
11	0,227	0,746
12	0,271	0,888
13	0,317	1,04
14	0,369	1,21
15	0,424	1,39
16	0,482	1,58
17	0,543	1,78
18	0,61	2
19	0,68	2,23
20	0,753	2,47

SIZE mm	WEIGHTS IN Kg	
	Wt per ft	Wt per M
21	0,829	2,72
22	0,908	2,98
23	0,994	3,26
24	1,08	3,55
25	1,17	3,85
26	1,27	4,17
27	1,37	4,5
28	1,47	4,83
30	1,69	5,55
32	1,92	6,31
33	2,-05	6,71
35	2,3	7,55
36	2,44	7,99
38	2,71	8,9
39	2,86	9,38
40	3,01	9,86
42	3,32	10,88
45	3,8	12,48
48	4,33	14,21
50	4,7	15,41
52	5,08	16,67
55	5,69	18,65
56	5,89	19,33
58	6,32	20,74
60	6,77	22,2
62	7,22	23,7
64	7,7	25,25
65	7,94	26,05
68	8,69	28,51
70	9,21	30,21

SIZE mm	WEIGHTS IN Kg	
	Wt per ft	Wt per M
72	9,74	31,96
75	10,57	34,68
80	12,03	39,46
90	15,22	49,94
100	18,79	61,65
110	22,74	74,6
120	27,07	88,8
130	31,7	104
140	36,88	121
150	42,37	139
160	48,16	158
170	54,26	178
180	60,96	200
190	67,97	223
200	75,3	247
220	90,8	298
240	108	355
250	117	385
260	127	417
280	147	483
300	169	555
320	192	631
340	217	713
350	230	755
360	244	799
380	271	890
400	301	986
500	469	1540

PLATE- metric

THICKNESS	WEIGHTS IN Kg						
	Wt per sq ft	Wt per sq m	2000 x 1000 mm	2500 x 1250 mm	3000 x 1500 mm	4000 x 2000 mm	6000 x 2000mm
5 mm	3,802	40,925	82	128	184	327	491
6 mm	4,563	49,111	98	153	221	393	589
8 mm	6,084	65,483	131	205	295	524	786
10 mm	7,604	81,845	164	256	368	655	982
12 mm	9,125	98,222	196	307	442	786	1179
15 mm	11,406	122,778	246	384	553	982	1473
20 mm	15,207	163,689	327	512	737	1310	1964
25 mm	19,01	204,622	409	639	921	1637	2456
30 mm	22,813	245,556	491	767	1105	1964	2947
40 mm	30,414	327,378	655	1023	1473	2619	3929
50 mm	38,02	409,244	819	1279	1842	3274	4911

Pipes ANSI B.36.10 see page 4-13 - Pipes ANSI B.36.19 see page 3 - Flanges MSS SP44 see page 67-71



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