



RISHABH
METAL & ENGINEERING CO.

Stockist of:
Pipe & Pipe Fittings
Ferrous & Non Ferrous Metal



www.rishabhmetalexport.com

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Company Profile



Rishabh Metal & Engineering Co. established nearly two decade ago in Mumbai, have come a long way from a trading House to manufacturer of Fittings & Flanges. Today **Rishabh Metal & Engineering Co.** has its own State of the art manufacturing facilities and testing facility under one roof. The company is managed by dedicated, Technically capable & highly qualified engineer along with the skilled work force.

Today **Rishabh Metal & Engineering Co.** is a well known manufacturer of Fittings & Flanges and also a leading supplier of various raw industrial materials applicable in many core industries like Pharmacy Industries, Food Industries, Sugar Industries, Paper & Pulp Mills, Oil & Gas Industries, Water Piping Systems, Chemical, Fertilizers, Beverage Industries, Cement Industries etc. **Rishabh Metal & Engineering Co.** has put in more emphasis on Quantity & personalized service over the years. This is achieved by maintaining the requirements of the customers and maintaining the quality standards right from raw materials to finished products by our technically efficient team.

Our strength is in understanding the market trends, Selection of products / materials as per the changing needs of the customers. With our integrated fast & efficient global supply chain, we provide customers our alternative, cost competitive & reliable solution to support their business . This has enabled us to establish long standing partnership with our National & International customers.

All our materials we supply carry Test Certificates and the testing shall be done in Govt. approved laboratory. We can also supply under third party inspection agencies like **DNV, PDIL, TUV, SGS, EIL, I.B.R., BUREAU VERITAS, JH&G, LLOYD'S REGISTER** etc.

We hope the information provided is useful to you & will forward us your regular enquiries and requirements & provide us with an opportunity to work with your esteemed organisation.

If you have any suggestion or query, on how we can serve you better please do inform us. Your suggestions are heartily welcomed.

QUALITY ASSURANCE PLAN

Quality Assurance plans are prepared in accordance with specific requirements stated by the customer and respective ASTM specifications, Mandatory and supplementary requirements are translated to special instructions and audits performed during manufacture and inspection.

Inspection stages and check hold points are decided to carry out in process inspection and record important stages of inspection and tests.

ORGANISATION:

A separate Quality Assurance/Control Department functions under the control of management, independent of production. The Quality Assurance Department oversees all important quality functions and performs the following activities.

MATERIAL CONTROL SYSTEM:

This system controls the quality of all incoming material. The incoming material specifications are co-related with Raw Material test certificates of the material. The checks and test are documented. The material is given internal control No. and same is recorded for future reference.

PROCESS CONTROL SYSTEMS:

During forming, Forging and Heat treatment, process control system outlines in process checks and controls to be followed during heat treatment and testing. Forging and interim heat treatment in the process control reduces the chances of introduction of variables in the process.

Each lot of fittings as defined in ASTM specifications are subjected to heat treatment and testing. Testing is performed in accordance with specification requirements. Test data is evaluated by QA department and recorded in appropriate format, supplementary test like radiography, ultrasonic, corrosion testing etc. is done as per code guide lines.

MACHINING AND DIMENSIONAL CONTROL:

Suitable fixtures and templates are used to maintain dimensional accuracy. Necessary gauges and callipers are calibrated periodically to maintain their accuracy.

CERTIFICATION & SUPPLEMENTARY TEST:

Fittings supplied to the QAP are supplied with test certificate. Test certificate incorporates, Chemical, Mechanical and Hardness properties, also it gives details of Heat treatment, Hydro test pressure, Supplementary test and stamping details.

Additional information and test data is furnished as per customer requirement.

FINISHING PAINTING & MARKING:

Carbon and alloy steel fitting are shot ballasted or pickled and painted. Stainless steel fittings are pickled and passivated. All fittings are marked with size, schedule, specification and manufacturer stamp. Equipment calibration and audits are done as per quality plans.



PRODUCT RANGE

Stainless Steel : ASTM A403 WP 304/ 304L/ 304H/316/ 316L/ 317/ 317L/ 321/ 310/ 347/ 904L etc.

Carbon Steel : ASTM A234 WPB / A420 WPL3/ A420 WPL6/ MSS-SP-75 WPHY 42/46/52 /56/60/65/70

Alloy Steel : ASTM A234 WP1/ WP5/ WP9/ WP11/ WP22/ WP91 etc.

Others : Monel, Nickel, Inconel, Hastalloy, Copper, Brass, Bronze, Titanium, Tantalum, Bismuth, Aluminium, High Speed Steel, Zinc, Lead, Duplex Steel etc.

Types : Elbow, Tee, Reducer, Return Bends, Stub-Ends, Cap, Collar, Cross, Insert etc.

Size : 15" NB TO 600" NB. (Seamless)

Size : 150 NB TO 1200 NB (Welded as per ASME)

Wall Thickness : Sch. 5 To Sch. XXS

BUTT WELD FITTINGS :



FORGED SOCKETWELD 3& SCREWED FITTINGS



Stainless Steel: ASTM A182 F304/ 304L/ 304H/ 316/ 316L/ 317/ 317L/ 321/ 310/ 347/ 904L etc.

Carbon Steel: ASTM A105 / A694 F42/46/ 52/56/ 60/ 65/70 / A350 LF3/ A350 LF2.

Alloy Steel: ASTM A182 F1/ F5/ F9/ F11/ F22/ F91 etc.

Others: Monel, Nickel, Inconel, Hastalloy, Copper, Brass, Bronze, Titanium, Tantalum, Bismuth, Aluminium, High Speed Steel, Zinc, Lead, etc.

Types: Elbow, Tee, Union, Cross, Coupling, Cap, Bushing, Plug, Swage Nipple, Welding Boss, Barrel Nipple, Parallel Nipple, Hose Nipple, Adapter, Insert, Weldolet, Elbowlet, Sockolet, Thredolet, Nipolet, Letrolet, etc.

Size: 15" NB TO 100" NB. (Socketweld & Threaded)

Class: 3000#, 6000#, 9000#.

Stainless Steel: ASTM A182 F304/ 304L/ 304H/ 316/ 316L/ 317/ 317L/ 321/ 310/ 347/ 904L etc.

Carbon Steel: ASTM A105/ A694 F42/46/52/56/60/65/70/ A350 LF3/ A350 LF2, etc.

Alloy Steel: ASTM A182 F1/ F5/ F9/ F11/ F22/ F91 etc.

Others: Monel, Nickel, Inconel, Hastalloy, Copper, Brass, Bronze, Titanium, Tantalum, Bismuth, Aluminium, High Speed Steel, Zinc, Lead, etc.

Types: Weldneck, Slipon, Blind, Socket Weld, Lap Joint, Spectacles, Ring Joint, Oriface, Long Weldneck, RTJ, Flange

Size: 15" NB TO 1500" NB.

Class : 150#, 300#, 400#, 600#, 900#, 1500# & 2500#. As Per Customer Requirement or drawing.

FLANGES



PIPES



Stainless Steel: ASTM A312 TP 304/ 304L/ 304H/ 316/ 316L/ 317/ 317L/ 321/ 310/ 347/ 904L etc.

Carbon Steel: ASTM A53 GR. B/ A106 GR. B/ API 5L GRADE B/ API 5L GR. X42/46/52/56/60/65/70/ Low Temperature, Carbon Steel A333 Gr.3/ Gr.6 etc.

Alloy Steel: ASTM A335 GR. P1/ P5/ P9/ P11/ P22/ P91 etc.

Nickel Alloys: Monel, Nickel, Inconel, Hastalloy, Titanium, Tantalum, Bismuth, Aluminium, High Speed Steel,

Non Ferrous Metal: Copper, Brass, Bronze, Zinc, Lead etc.

Types: Round, Square, Rectangular.

Size: Upto 24" NB. (Seamless & Welded)

Wall Thickness: Sch. 5S to Sch. XXS

S. S. Sheets & Plates : as per ASTM A240, Gr. TP 304, 304L, 304LN, 309, 309S, 309H, 310H, 316, 316L, 316H, 316LN, 316Ti, 317, 317L, 321, 321H, 347, 348, 3487H, 409, 410, 420, 430 etc.

Alloy Steel Plates : as per ASTM A387 Gr. 2, 5, 9, 11, 12 & 22, 91 in class 1 & 2 ASTM A 204 Gr. A & B, DIN 17175 Gr. 15Mo3 & 16Mo3 with IBR Test Certificate.

Carbon Steel / Boiler Quality Plates : as per IS 2062 Gr. A, B & C, IS 2002 Gr. 1 & 2 ASTM A 516 Gr. 60 & 70, ASTM A 515 Gr.70

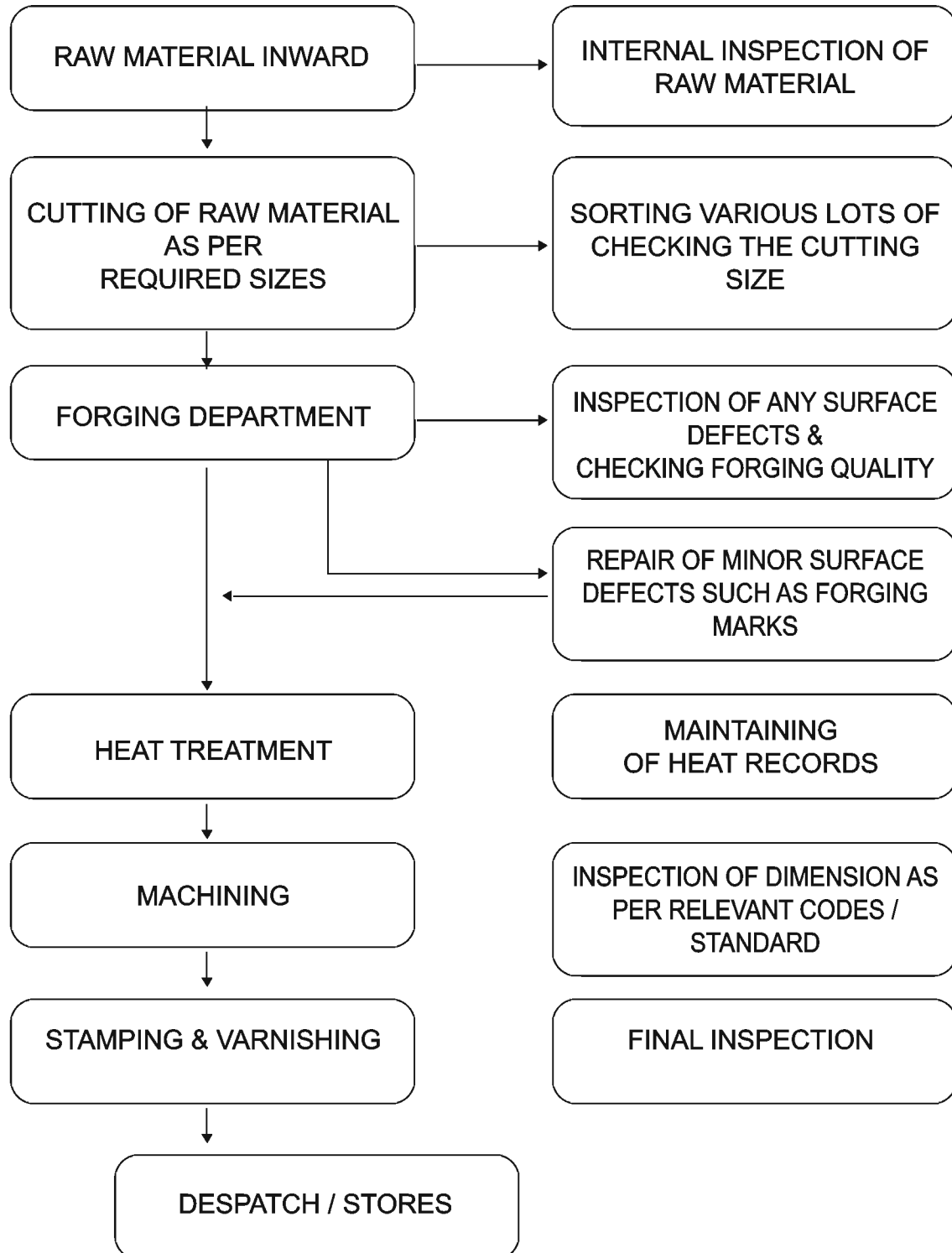
High Nickel Alloy : Monel, Nickel, Inconel, Hastalloy

Others : Copper, Brass, Bronze, Titanium, Tantalum, Bismuth, Aluminium, High Speed Steel, Zinc, Lead, etc.

SHEETS, PLATES COILS & RODS



MATERIAL / MANUFACTURING FLOW CHART



IN HOUSE TESTING FACILITY

List of Testing Machines

- 01) Hardness Testing
- 02) D. P. Testing Facility
- 03) Calibrated set of Vernier upto 12"
- 04) Calibrated set of Scales
- 05) Calibrated Gauges for S/W Fitting & NPT Fitting
- 06) 90° & 45° Angle Platform

All There are in House Testing & Inspection Facility.

Material Testing at Laboratories

- 01) Chemical Analysis
- 02) Physical Analysis
- 03) Micro
- 04) RadioGraphy
- 05) Ultrasonic
- 06) Spectra etc.

IN HOUSE INSPECTION



Visual & Dimensional inspection in progress



Visual & Dimensional inspection in progress



UT test witness in progress



Visual & Dimensional inspection in progress



Fittings : Importing from Following mills



Tube Products Inc.



TECTUBI RACCORDI

BUTT WELD FITTINGS TO ANSI B16.9 & 16.28

Dimensions

Dimensions of Elbows, Tees, Caps and Reducers from ½" NB to 60" short Radius Elbows and Return Bends from Bends from 1" to 24" N.B. and Long Radius Bends from ½" N.B. to 24 are as stated in the current editions of ANSI B 16.9 and B-16.28 wall thickness are as listed ANSI B 36.10M.

Material

Stainless Steel : ASTM A403, WP 304 / 304L / 304H / 316 / 316L / 317 / 317L / 321 / 310 / 347 / 904L etc.

Carbon Steel : ASTM A234 WPB / A420 WPL3 / A420 / WPL6 / MSS-SP-75 WPHY 42 / 46 / 52 / 56 / 60 / 65 / 70

Alloy Steel : ASTM A234 WP1 / WP5 / WP9 / WP11 / WP22 / WP91 etc.

Manufacture & Heat Treatment

In accordance with the relevant ASTM or MSS Specification.

Weld Preparation

All fittings have a weld preparation to ANSI B 16.25

Marking

Fittings are marked with : the nominal size (or sizes) ; schedule or wall thickness; material grade; that reference manufacturer's mark. Where the size of fittings does not permit full marking then nominal size(s); schedule or wall thickness; and material grade are omitted.

Test Certificate

Fittings test certificates are available and are supplied with all goods. Test Certificates include full chemical analysis and Mechanical Properties with 3.1 Certificate, Impact Test & NACE MR 0175 / MR 0103 in addition as per requirement.

Inspection

All stock is statically sample inspected on receipt. The sampling plan is selected from BS6001.

OTHER PRODUCTS AVAILABLE

Other Schedules / wall thicknesses Nickel base alloys, Copper, Nickel & Duplex are available from short delivery time.

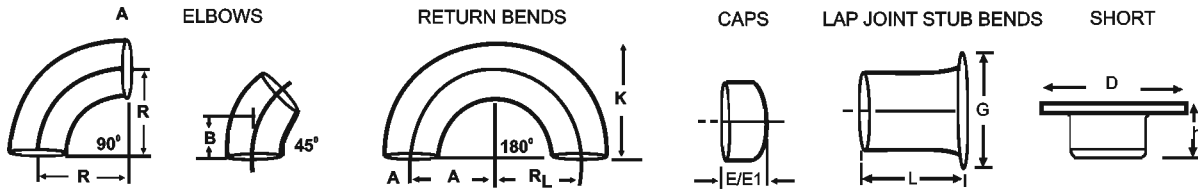


BUTT-WELDING FITTING ASTM

MATERIAL SPECIFICATION FOR SEAMLESS / WELDED BUTT-WELDING PIPE FITTINGS

SPECIFICATION (ASTM-2002)	CHEMICAL PROPERTIES					MECHANICAL PROPERTIES					OTHERS	
	C%	Min%	P% (Max)	S% (Max)	Si%	Cr%	Mo%	Ni%	U.T.S. (Min) Mpa	Y.S. (Min) Mpa		ELONG. (Min) L
STAINLESS STEEL												
A 403 Gr. WP 304	0.080 Max	2.00 Max	0.045	0.030	1.00 Max	18.0-20.0	-	8.0-11.0	515	205	28	20
A 403 Gr. WP 304L	0.030 Max	2.00 Max	0.045	0.030	1.00 Max	18.0-20.0	-	8.0-12.0	485	170	28	20
A 403 Gr. WP 304H	0.04-0.10	2.00 Max	0.045	0.030	1.00 Max	18.0-20.0	-	8.0-11.0	515	205	28	20
A 403 Gr. WP 304LN	0.030 Max	2.00 Max	0.045	0.030	1.00 Max	18.0-20.0	-	8.0-11.0	515	205	28	20
A 403 Gr. WP 309	0.20 Max	2.00 Max	0.045	0.030	1.00 Max	22.0-24.0	-	12.0-15.0	515	205	28	20
A 403 Gr. WP 310S	0.080 Max	2.00 Max	0.045	0.030	1.00 Max	24.0-26.0	-	19.0-22.0	515	205	28	20
A 403 Gr. WP 316	0.080 Max	2.00 Max	0.045	0.030	1.00 Max	16.0-18.0	2.0-3.0	10.0-14.0	515	205	28	20
A 403 Gr. WP 316L	0.030 Max	2.00 Max	0.045	0.030	1.00 Max	16.0-18.0	2.0-3.0	10.0-14.0	485	170	28	20
A 403 Gr. WP 316H	0.04-0.10	2.00 Max	0.045	0.030	1.00 Max	16.0-18.0	2.0-3.0	10.0-14.0	515	205	28	20
A 403 Gr. WP 316LN	0.030 Max	2.00 Max	0.045	0.030	1.00 Max	16.0-18.0	2.0-3.0	10.0-13.0	515	205	28	20
A 403 Gr. WP 317	0.080 Max	2.00 Max	0.045	0.030	1.00 Max	18.0-20.0	3.0-4.0	11.0-15.0	515	205	28	20
A 403 Gr. WP 317L	0.030 Max	2.00 Max	0.045	0.030	1.00 Max	18.0-20.0	3.0-4.0	11.0-15.0	515	205	28	20
A 403 Gr. WP 321	0.080 Max	2.00 Max	0.045	0.030	1.00 Max	17.0-19.0	-	9.0-12.0	515	205	28	20
A 403 Gr. WP 321H	0.04-0.10	2.00 Max	0.045	0.030	1.00 Max	17.0-19.0	-	9.0-12.0	515	205	28	20
A 403 Gr. WP 347	0.080 Max	2.00 Max	0.045	0.030	1.00 Max	17.0-19.0	-	9.0-12.0	515	205	28	20
A 403 Gr. WP 347H	0.04-0.10	2.00 Max	0.045	0.030	1.00 Max	17.0-19.0	-	9.0-12.0	515	205	28	20
CARBON STEEL												
A 234 Gr. WPB	0.30 Max	0.29-1.06	0.050	0.058	0.10 Min	0.40 Max	0.15 Max	0.40 Max	415-655	240	30	197
A 234 Gr. WPC	0.35 Max	0.29-1.06	0.050	0.058	0.10 Min	0.40 Max	0.15 Max	0.40 Max	485-655	275	30	197
LOW TEMPERATURE CARBON STEEL												
A 420 Gr. WPL6	0.30 Max	0.50-1.35	0.035	0.040	0.15-0.40	0.30 Max	0.12 Max	0.40 Max	415-655	240	30	16.5
A 420 Gr. WPL 3	0.20 Max	0.31-0.64	0.050	0.050	0.13-0.37	-	-	3.20-3.80	450-620	240	30	197
ALLOY STEEL												
A 234 Gr. WP 1	0.28 Max	0.30-0.90	0.045	0.045	0.10-0.50	-	0.44-0.65	-	380-550	205	30	197
A 234 Gr. WP 5	0.15 Max	0.30-0.60	0.040	0.030	0.50 Max	4.0-6.0	0.44-0.65	-	415-585	205	30	217
A 234 Gr. WP 9	0.15 Max	0.30-0.60	0.030	0.030	1.00 Max	8.0-10.0	0.90-1.10	-	415-585	205	30	217
A 234 Gr. WP 11 CL1	0.05-0.15	0.30-0.60	0.030	0.030	0.50-1.0	1.0-1.5	0.44-0.65	-	415-585	205	30	197
A 234 Gr. WP 11 CL2	0.05-0.20	0.30-0.80	0.040	0.040	0.50-1.0	1.0-1.5	0.44-0.65	-	485-655	275	30	197
A 234 Gr. WP 11 CL3	0.05-0.20	0.30-0.80	0.040	0.040	0.50-1.0	1.0-1.5	0.44-0.65	-	520-690	310	30	197
A 234 Gr. WP 12 CL1	0.05-0.20	0.30-0.80	0.045	0.045	0.60 Max	0.80-1.25	0.44-0.65	-	415-585	220	30	197
A 234 Gr. WP 12 CL2	0.05-0.20	0.30-0.80	0.045	0.045	0.60 Max	0.80-1.25	0.44-0.65	-	485-655	275	30	197
A 234 Gr. WP 22 CL1	0.05-0.15	0.30-0.60	0.040	0.040	0.50 Max	1.90-2.60	0.87-1.13	-	415-585	205	30	197
A 234 Gr. WP 22 CL3	0.05-0.15	0.30-0.60	0.040	0.040	0.50 Max	1.90-2.60	0.87-1.13	-	520-690	310	30	197
A 234 Gr. WP 91	0.08-0.12	0.30-0.60	0.020	0.010	0.20-0.50	8.0-9.5	0.85-1.05	0.40 Max	585-760	415	20	248

DIMENSION OF BUTT WELDING FITTINGS TO ANSI B 16.9/MSS SP 43

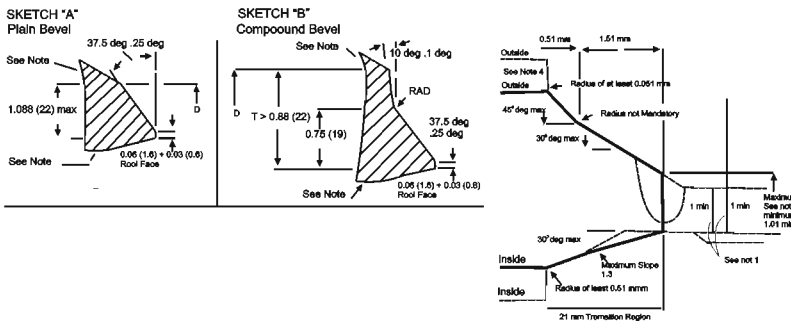


NOM BORE	PIPE OD	RADIUS 'R'		B 1.5 D	K	E/E1	G	LENGTH 'L'			
		1 D	1.5 D					MSS SP 43	ANSI B 16.9	D	H
1/2	21.3	12.7	38.1	15.9	48	25.4	34.9	50.8	76.2	45	8
3/4	26.7	19.05	38.1	19.0	51	25.4	42.8	50.8	76.2	54	8
1	33.4	25.4	38.1	22.2	56	38.1	50.8	50.8	101.6	64	10
1 1/4	42.1	31.75	47.6	25.0	70	38.1	63.5	50.8	101.6	74	12
1 1/2	48.3	38.1	57.15	28.6	83	38.1	73.0	50.8	101.6	84	12
2	60.3	50.8	76.2	35.0	106	44*	92.0	63.5	152.4	102	16
2 1/2	73.0	63.5	95.25	44.0	132	51	106	63.5	152.4	122	16
3	88.9	76.2	114.3	50.8	159	64*	127.0	63.5	152.4	138	18
3 1/2	101.6	88.9	133.35	57.2	184	76*	139.7	76.2	152.4	148	18
4	114.3	101.3	152.4	63.5	210	76*	157.2	76.2	152.4	158	20
5	141.3	127.0	190.5	79.4	262	89*	185.7	76.2	208.2	188	20
6	168.3	152.4	228.6	95.3	313	102*	218	88.9	203.2	212	25
8	219.1	203.2	304.8	127.0	414	127*	270.0	101.6	203.2	270	30
10	373.1	254.0	381.0	158.7	518	152*	324.0	127.0	254.0	325	30
12	323.9	304.8	457.2	190.5	619	178*	381.0	152.4	254.0	380	35
14	355.6	355.6	533.4	222.2	711	191*	412.8	152.4	305.0	415	40
16	406.4	406.4	609.6	254.0		203*	470.0	152.4	305.0	470	40

NOM BORE	PIPE OD	RADIUS 'R'		B 1.5 D	K	E/E1	G	LENGTH 'L'			
		1 D	1.5 D					MSS SP 43	ANSI B 16.9	D	H
18	457.2	457.2	685.8	285.7	914	229*	533.4	152.4	305.0	535	40
22	558.8	558.8	838.2	343.0	1118	254*	641.4	152.4	305.0	642	40
26	660.0	660.0	991.0	405.0	—	267.0	—	—	—	—	—
30	762.0	762.0	1143.0	470.0	—	267.0	—	—	—	—	—
34	864.0	864.0	1295.0	533.0	—	267.0	—	—	—	—	—
38	965.0	965.0	1448.0	600.0	—	305.0	—	—	—	—	—
42	1067.0	1067.0	1600.0	660.0	—	305.0	—	—	—	—	—
46	1168.0	1168.0	1753.0	727.0	—	343.0	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—

* All dimensions are in mm

EDGE PREPARATION AS PER ANSI B 16.9 - B 16.25

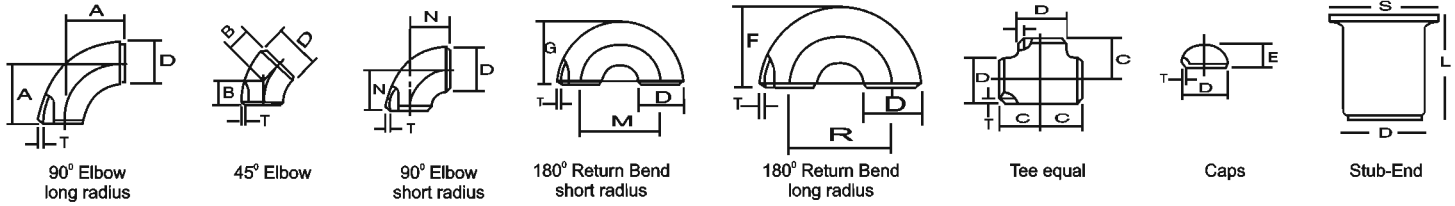


Normal Wall Thickness	End Preparation
Less than x*	Cut square or slightly Chamfer, at mrf's option
X* to 0.88 incl (22)	Chamfer, at mrf's option A above
More than 0.88 (22)	Compound bevel as in sketch B above
	X* = 0.19 (5) for Carbon Steel or Ferritic Alloy Steel and 0.12 (4) For Austenitic Alloy Steel

- The Value 1 min is whichever of the following is applicable
 - the minimum ordered wall thickness of the pipe;
 - 0.875 times the nominal wall thickness of pipe ordered to a pipe schedule wall thickness which has as under tolerance of 12.5%
 - The Maximum thickness at the end of the component is :
 - the greater of 1 min, + 0.15 in, (4 mm) or 1.15 in, (4 mm) or 1.15 t min, when ordered on a minimum wall basis
 - the greater of t min, +0.15 in (4 mm) or 1.10 t nom. When ordered on a nominal wall basis
 - Weld bevel is shown for illustration only.
 - When transitions using maximum slope do not intersect outside surface, as shown by phantom outline, maximum Slopes shown or alternate radii shown in phantom outlines shall be used.
 - Dimension in parenthesis are in millimeters. Other are in inches.
- Note : 2. The shape of cap shall be ellipsoidal
 Note : 2. Of Specification ANSI b 16.9 for cap E1 & e2 to be consider
 Length E1 applies for thickness greater than that given in column " Limiting Wall Thickness" for NPS 24 (DIN 600) & Smaller, For NPS 26 (DN 650) and larger, length E1 Shall by agreement between manufacturer and purchaser

* E1 Height

BUTT WELDING PIPE FITTING DIMENSIONAL STANDARD ANSI B-16.9 / 16.28 / MSS SP-43

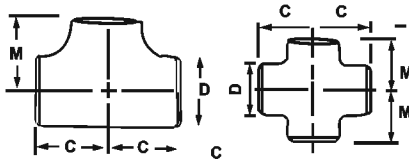


Nominal Pipe Size		Outside Diameter D	Center to Face				Back to Face			Center to Center			Length 'L'	
Inch.	mm		A	B	C	N	E	F	G	R	M	S	MSS SP43	ANSI B 16.9
1/2	15	21.3	19	16	25	—	25	48	—	38	—	34.9	50.8	76.2
3/4	20	26.7	29	11	29	—	25	43	—	57	—	42.8	50.8	76.2
1	25	33.4	38	22	38	25	38	56	41	76	51	50.8	50.8	101.6
1 1/4	32	42.2	48	25	48	32	38	70	52	95	64	63.5	50.8	101.6
1 1/2	40	48.3	57	29	57	38	38	83	62	114	76	73	50.8	101.6
2	50	60.3	76	35	64	51	38	106	81	152	102	92	63.5	152.4
2 1/2	65	73.0	95	44	76	64	38	132	100	191	127	104.8	63.5	152.4
3	80	88.9	114	51	86	76	51	159	121	229	152	127	63.5	152.4
3 1/2	90	101.6	133	57	95	89	64	184	140	267	178	139.7	76.2	152.4
4	100	114.3	152	64	105	102	64	210	159	305	203	157.2	76.2	152.4
5	125	141.3	190	79	124	127	76	262	197	381	254	185.7	76.2	203.2
6	150	168.3	229	95	143	152	89	313	237	457	305	215.9	88.9	203.2
8	200	219.1	305	127	178	203	102	414	313	610	406	270	101.6	203.2
10	250	273.1	381	159	216	254	127	518	391	762	508	324	127.0	254.0
12	300	323.9	457	190	254	305	152	619	467	914	610	381	152.4	254.0
14	350	355.6	533	222	279	356	165	711	533	1067	711	412.8	152.4	305.0
16	400	406.4	610	254	305	406	178	813	610	1219	813	470	152.4	305.0
18	450	457.2	686	286	343	457	203	914	686	1372	914	533.4	152.4	305.0
20	500	508.0	762	318	381	508	229	1016	762	1524	1016	584.2	152.4	305.0
22	550	559.0	838	343	419	559	254	1118	838	1676	1118	614.4	152.4	305.0
24	600	610.0	914	381	432	610	267	1219	914	1829	1219	692.2	152.4	305.0
26	650	660.0	991	406	495	660	267	—	—	—	—	—	—	—
28	700	711.0	1067	438	521	711	267	—	—	—	—	—	—	—
30	750	762.0	1143	470	559	762	267	—	—	—	—	—	—	—
32	800	813.0	1219	502	597	813	267	—	—	—	—	—	—	—
34	850	864.0	1295	533	635	864	267	—	—	—	—	—	—	—
36	900	914.0	1372	565	673	914	267	—	—	—	—	—	—	—
38	950	965.0	1448	600	711	965	305	—	—	—	—	—	—	—
40	1000	1016.0	1524	632	749	1016	305	—	—	—	—	—	—	—
42	1050	1067.0	1600	660	762	1067	305	—	—	—	—	—	—	—
44	1100	1118.0	1676	695	813	1118	343	—	—	—	—	—	—	—
46	1150	1168.0	1753	727	851	1168	343	—	—	—	—	—	—	—
48	1200	1219.0	1829	759	889	1219	343	—	—	—	—	—	—	—

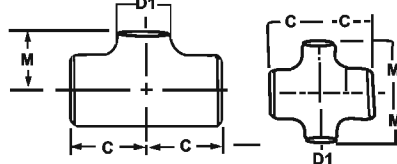


DIMENSIONS OF BUTT WELDING FITTINGS TO ANSI B 16.9 (upto 48") / MSS SP 43 (upto 24")

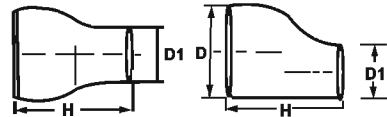
EQUAL TEE & CROSS



UNEQUAL TEE & CROSS



CONCENTRIC & ECCENTRIC REDUCERS



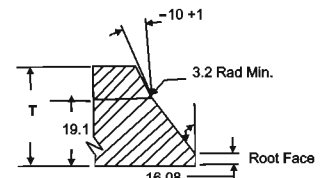
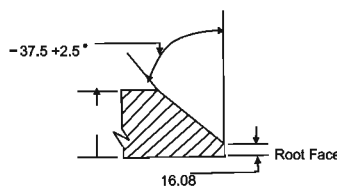
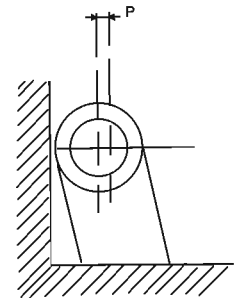
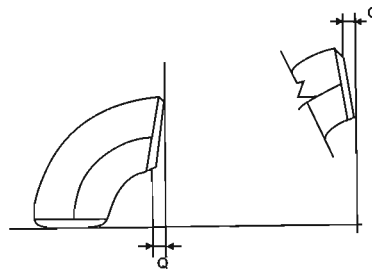
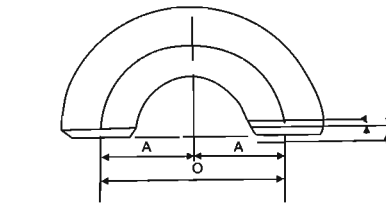
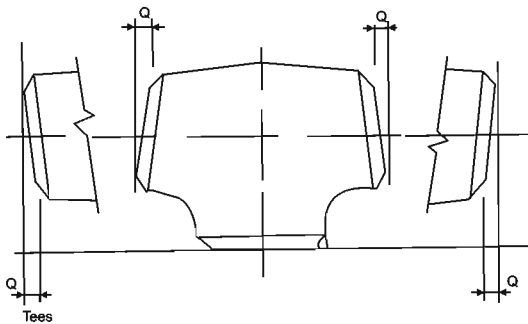
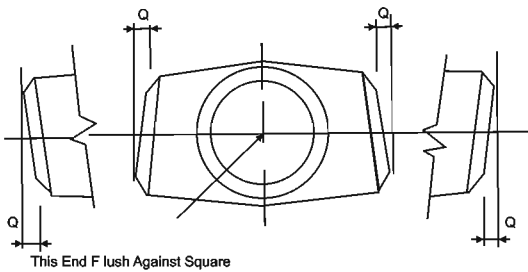
Nominal Pipe Size	Center to End Run	Center to End Branch	Length	Nominal Pipe Size	Center to End Run	Center to End Branch	Length	Nominal Pipe Size	Center to End Run	Center to End Branch	Length	Nominal Pipe Size	Center to End Run	Center to End Branch	Length	Nominal Pipe Size	Center to End Run	Center to End Branch	Length	Nominal Pipe Size	Center to End Run	Center to End Branch	Length
D X D1	C	M	H	D X D1	C	M	H	D X D1	C	M	H	D X D1	C	M	H	D X D1	C	M	H	D X D1	C	M	H
1x1	38	38	-	5x5	124	124	-	18X18	343	343	-	30X30	559	559	-	38X38	711	711	-	44X44	813	762	-
1x1/2	38	38	51	5x2	124	105	127	18X16	343	330	381	30X28	559	546	610	38X36	711	711	610	44X42	813	762	610
1x3/4	38	38	51	5X2 1/2	124	108	127	18X14	343	330	381	30X26	559	546	610	38X34	711	698	610	44X40	813	749	610
1 1/4x1 1/4	48	48	51	5X3	124	111	127	18X12	343	321	381	30X24	559	533	610	38X32	711	686	610	44X38	813	737	610
1 1/4x1 1/2	48	48	51	5X3 1/2	124	114	127	18X10	343	308	381	30X22	559	521	610	38X30	711	673	610	44X36	813	724	610
1 1/4x3/4	48	48	51	5X4	124	117	127	18X8	343	298	(381)	30X20	559	(508)	(610)	38X28	711	648	610	44X34	813	724	(610)
1 1/4x1	48	48	51	6x6	143	143	-	20x20	381	381	-	30X18	559	(495)	(610)	38X26	711	648	610	44X32	813	711	(610)
1 1/2x1 1/2	57	57	-	6x2 1/2	143	121	140	20x18	381	368	508	30X16	559	(483)	(610)	38X24	711	635	(610)	44X30	813	711	(610)
1 1/2x1/2	57	57	64	6x3	143	124	140	20x16	381	356	508	30X14	559	(483)	(610)	38X22	711	622	(610)	44X28	813	698	(610)
1 1/2x3/4	57	57	64	6x3 1/2	143	127	140	20x14	381	356	508	30X12	559	(473)	(610)	38X20	711	610	(610)	44X26	813	698	(610)
1 1/2x1	57	57	64	6x4	143	130	140	20x12	381	346	508	30X10	559	460	(610)	38X18	711	597	(610)	44X24	813	698	(610)
1 1/2x1 1/4	57	57	64	6x5	143	137	140	20x10	381	333	(508)	32x32	597	597	-	40x40	749	749	-	44X22	813	686	(610)
2x2	64	64	-	8x8	178	178	-	20x8	381	324	(508)	32x30	597	584	610	40x38	749	749	610	44X20	813	686	(610)
2x3/4	64	44	76	8x6	178	168	152	22x22	419	419	-	32x28	597	572	610	40x36	749	737	610	46x46	851	800	-
2x1	64	51	76	8x5	178	162	152	22x20	419	406	508	32x26	597	572	610	40x34	749	724	610	46x44	851	800	711
2x1 1/4	64	57	76	8x4	178	156	152	22x18	419	384	508	32x24	597	559	610	40x32	749	711	610	46x42	851	787	711
2x1 1/2	64	60	76	8x3 1/2	178	152	152	22x16	419	381	508	32x22	597	546	(610)	40x30	749	698	610	46x40	851	775	711
2 1/2x2 1/2	76	76	-	10x10	216	216	-	22x14	419	381	508	32x20	597	533	(610)	40x28	749	673	(610)	46x38	851	762	711
2 1/2x1	76	57	89	10x8	216	203	178	22x12	419	371	(508)	32x18	597	521	(610)	40x26	794	673	(610)	46x36	851	762	(711)
2 1/2x1 1/4	76	64	89	10x6	216	194	178	22x10	419	359	(508)	32x16	597	508	(610)	40x24	749	660	(610)	46x34	851	749	(711)
2 1/2x1 1/2	76	67	89	10x5	216	191	178	24x24	432	432	-	32x14	597	508	(610)	40x22	749	648	(610)	46x32	851	749	(711)
2 1/2x2	76	70	89	10x4	216	184	178	24x22	432	432	508	34x34	635	635	-	40x20	749	635	(610)	46x30	851	737	(711)
3x3	89	89	-	12x12	254	254	-	24x20	432	432	508	34x32	635	622	610	40x18	749	622	(610)	46x28	851	737	(711)
3x1 1/4	86	70	89	12x10	254	241	203	24x18	432	419	508	34x30	635	610	610	42x42	762	711	-	46x26	851	737	(711)
3x1 1/2	86	73	89	12x8	254	229	203	24x16	432	406	508	34x28	635	597	610	42x40	762	711	610	46x24	851	724	(711)
3x2	86	76	89	12x6	254	219	203	24x14	432	406	(508)	34x26	635	597	610	42x38	762	711	610	46x22	851	724	(711)
3x2 1/2	86	83	89	12x5	254	216	203	24x12	432	397	(508)	34x24	635	584	(610)	42x36	762	711	610	48x48	889	838	-
3 1/2x3 1/2	95	95	-	14x14	279	279	-	24x10	432	384	(508)	34x22	635	572	(610)	42x34	762	711	610	48x46	889	838	711
3 1/2x1 1/2	95	79	102	14x12	279	270	330	26x26	495	495	-	34x20	635	559	(610)	42x32	762	711	610	48x44	889	838	711
3 1/2x2	95	83	102	14x10	279	257	330	26x24	495	483	610	34x18	635	546	(610)	42x30	762	711	610	48x42	889	813	711
3 1/2x2 1/2	95	89	102	14x8	279	248	330	26x22	495	470	610	34x16	635	533	(610)	42x28	762	698	(610)	48x40	889	813	711
3 1/2x3	95	92	102	14x6	279	238	330	26x20	495	457	610	36x36	673	673	-	42x26	762	698	(610)	48x38	889	813	(711)
4x4	105	105	-	16x16	305	305	-	26x18	495	444	610	36x34	673	660	610	42x24	762	660	(610)	48x36	889	787	(711)
4x1 1/2	105	86	102	16x14	305	305	356	26x16	495	432	(610)	36x32	673	648	610	42x22	762	660	(610)	48x34	889	787	(711)
4x2	105	89	102	16x12	305	295	356	26x14	495	432	(610)	36x30	673	635	610	42x20	762	660	(610)	48x32	889	787	(711)
4x2 1/2	105	95	102	16x10	305	283	356	26x12	495	422	(610)	36x28	673	622	610	42x18	762	648	(610)	48x30	889	762	(711)
4x3	105	98	102	16x8	305	273	356	28x28	521	521	-	36x26	673	622	610	42x16	762	635	(610)	48x28	889	762	(711)
4x3 1/2	105	102	102	16x6	305	264	(356)	28x26	521	521	610	36x24	673	610	(610)	48x26	889	762	(711)	48x24	889	737	(711)
								28x24	521	508	610	36x22	673	597	(610)	48x22	889	737	(711)				
								28x22	521	495	610	36x20	673	584	(610)								
								28x20	521	483	610	36x18	673	572	(610)								
								28x18	521	470	(610)	36x16	673	559	(610)								
								28x16	521	457	(610)												
								28x14	521	457	(610)												
								28x12	521	448	(610)												

1. Figures in brackets are as per the Manufacturer's standard
 2. Outlet dimension M For run size NPS 14 (DN 350) and large is recommended but not required

All dimensions are in mm

DIMENSIONAL TOLERANCE ANSI B16.9/B16.28/MSS SP-43

ALL FITTINGS				90°/60°/45° 30° ELBOWS & TEES		REDUCERS		180° RETURNS				CAPS		ANGULARITY TOLERANCE								
Nominal Pipe size INCH/MM	Outside Diameter at Bevel		Inside Dia Meter	Wall Thickness at End		Center to End		Overall Length Dimension		Center to End	Back to Face Dimension		Alignment of End Dimensions		Overall Length		Nominal Pipe Size	Off Angel Inch/mm		Off Plane		
	D			T		A,B,C,M		H		O	K		U		E			Q		P		
	(1) B16.9	MSS Sp43	(2) B16.9	B16.9	MSS SP43	B16.9	MSS SP43	B16.9	MSS SP43	B16.9	MSS SP43	B16.9	MSS SP43	B16.9	MSS SP43	B16.9	MSS SP43		B16.9	MSS SP75	B16.9	
1/2" - 2 1/2" 15 - 65	±1.6 - 0.8		±0.8			FROM 1/2" TO 18 15 TO 600	FROM 3/4"	FROM 1/2" - 24" 15 - 600	FROM 1/2" - 8" 15 - 200							±3	±3.17	1/2" - 4" 15 - 100	±1		±2	
3" - 3 1/2" 80 - 90	±1.6	±0.80																5" - 8" 125 - 200	±2		±4	
4" 100			±1.6			±2	±1.60	±2	±1.60	±6	±6.35	±6.0	±6.4	±1	±0.8			10" - 12" 250 - 300	±3	16" - 24" 400 - 600 1.6	±5	
5" - 6" 125 - 150	+2.4 -1.6	+1.60 -0.80		Not Less Than 87.5% Nominal Thk	Not Less Than 87.5% Nominal Thk											±6	±6.35	14" - 16" 350 - 400	±3		±7	
8" 200																			18" - 24" 450 - 600	±4		±10
10" - 18" 250 - 450	+4 -3.2	+2.38 -0.80	±3.2				±2.40			10" - 24" +2.38 250 - 600		±10	±10			±2.0"	±1.60			26" - 30" 650 - 750	±5	26" - 36" 650 - 900 2.4
20" - 24" 500 - 600	+6.4 -4.8	3.17 0.79																32" - 42" 800 - 1050	±5		±13	
26" - 30" 650 - 750	+6.4 -4.8	±4.8	±4.8			±3		FROM 26" - 48" 650NB - 1200 NB ±5								±10		44" - 48" 1100 - 1200	±5	32" - 48" 950 - 1200 3.2	±20	
32" - 48" 800 - 1200	+6.4 -4.8					±5												42 - 48" 1050 - 1200	±5		±20	



WEIGHTS OF FITTINGS 90 ELBOWS (L.R) BUTT-WELD (ANSI B16.9)

NB INCHES METRIC		(Weights in.KGS.)																
		SCH 5 S	SCH 10 S	SCH 10	SCH 20	SCH 30	SCH 40 S	SCH STD	SCH 40	SCH 60	SCH 80 S	SCH XS	SCH 80	SCH 100	SCH 120	SCH 140	SCH 160	SCH XXS
1/2	15	0.1	0.1	-	-	-	0.1	0.1	-	-	0.1	0.1	-	-	-	-	0.1	0.1
3/4	20	0.1	0.1	-	-	-	0.1	0.1	-	-	0.1	0.1	-	-	-	-	0.2	0.2
1	25	0.1	0.2	-	-	-	0.2	0.2	-	-	0.2	0.2	-	-	-	-	0.3	0.4
1-1/4	32	0.1	0.2	-	-	-	0.3	0.3	-	-	0.4	0.4	-	-	-	-	0.5	0.6
1-1/2	40	0.2	0.3	-	-	-	0.4	0.4	-	-	0.6	0.6	-	-	-	-	0.7	1.0
2	50	0.3	0.5	-	-	-	0.7	0.7	-	-	1.0	1.0	-	-	-	-	1.4	1.7
2-1/2	65	0.6	0.9	-	-	-	1.4	1.4	-	-	1.5	1.5	-	-	-	-	2.5	3.2
3	80	1.0	1.3	-	-	-	2.5	2.5	-	-	2.9	2.9	-	-	-	-	3.8	5.5
3-1/2	90	1.2	1.7	-	-	-	3.0	3.0	-	-	4.0	4.0	-	-	-	-	-	8
4	100	1.6	2.1	-	-	-	4.0	4.0	-	-	6.0	6.0	-	-	7.5	-	9	12
5	125	2.7	3.7	-	-	-	6.8	6.8	-	-	9.3	9.3	-	-	2.7	-	15	18
6	150	4.4	5.5	-	-	-	11	11	-	-	17	17	-	-	23	-	26	30
8	200	9	10	-	17	19	22	22	-	27	35	35	-	38	41	52	55	54
10	250	17	18	-	26	33	42	42	-	54	54	61	-	75	85	97	109	-
12	300	24	27	-	37	49	60	60	61	82	80	80	107	123	140	157	180	-
14	350	28	40	50	59	70	70	70	83	109	94	94	135	188	190	224	248	-
16	400	38	52	64	78	95	95	95	125	162	125	125	202	260	274	323	367	-
18	450	48	65	82	100	139	120	120	176	232	158	158	291	390	405	422	545	-
20	500	58	85	100	146	194	146	146	228	311	194	194	391	476	508	607	770	-
22	550	-	-	120	-	-	-	178	-	-	236	-	-	-	-	-	-	-
24	600	88	146	146	220	318	220	220	383	533	282	282	658	820	954	1100	1270	-

90 ELBOWS (S R) BUTT-WELD (ANSI B16.28)

NB INCHES METRIC		(Weights in.KGS.)																
		SCH 5 S	SCH 10 S	SCH 10	SCH 20	SCH 30	SCH STD	SCH 40	SCH 60	SCH XS	SCH 80	SCH 100	SCH 120	SCH 140	SCH 160	SCH XXS		
1/2	15	0.1	0.1	-	-	-	0.1	-	-	0.1	-	-	-	-	-	-	-	-
3/4	20	0.1	0.1	-	-	-	0.1	-	-	0.1	-	-	-	-	-	-	-	-
1	25	0.1	0.1	-	-	-	0.1	-	-	0.1	-	-	-	-	-	-	-	-
1-1/4	32	0.1	0.2	-	-	-	0.2	-	-	0.3	-	-	-	-	-	-	-	-
1-1/2	40	0.1	0.2	-	-	-	0.3	-	-	0.4	-	-	-	-	-	-	-	-
2	50	0.2	0.4	-	-	-	0.5	-	-	0.7	-	-	-	-	-	-	-	-
2-1/2	65	0.4	0.6	-	-	-	1.1	-	-	1.1	-	-	-	-	-	-	-	-
3	80	0.8	1.0	-	-	-	2.0	-	-	2.0	-	-	-	-	-	-	-	-
3-1/2	90	0.9	1.3	-	-	-	2.3	-	-	3.0	-	-	-	-	-	-	-	-
4	100	1.2	1.6	-	-	-	3.0	-	-	4.2	-	-	4.5	-	-	-	-	-
5	125	2.1	2.7	-	-	-	5.1	-	-	6.5	-	-	9	-	-	-	-	-
6	150	3.3	4.1	-	-	-	8.3	-	-	11.8	-	-	13.5	-	-	-	-	-
8	200	6.6	7.7	-	11.1	11.4	17	-	18.2	24.4	-	26.4	29	32	-	-	-	-
10	250	12.5	13.6	-	17.4	21.4	31	-	37.7	37.7	41	50	53	62	-	-	-	-
12	300	18	20.5	-	25.0	33.2	45	48	54.5	56.0	68	81	92	99	-	-	-	-
14	350	21	30	38	39.5	52.5	52.5	55	74.0	66.0	94	124	120	138	-	-	-	-
16	400	29	38.7	48	52.2	71.3	71.3	104	106.7	104.3	138	171	166	198	-	-	-	-
18	450	36	49.1	62	65.4	92.2	90	118	154.4	110.6	193	257	283	387	-	-	-	-
20	500	44	63.7	75	110	136	110	155	208.0	135.8	261	332	376	430	-	-	-	-
22	550	-	-	90	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24	600	66	110	110	165	214.3	165	257	355.5	197.5	444	530	621	680	-	-	-	-

WEIGHT ARE APPROXIMATE

WEIGHTS FITTINGS 45 DEG. ELBOWS BUTT-WELDED (ANSI B 16.9)

NB INCHES	SIZE MM	SCH 5 S	SCH 10 S	SCH 10	SCH 20	SCH 30	(WEIGHTS IN KGS.)											
							SCH 40 S	SCH STD	SCH 40	SCH 60	SCH 80 S	SCH X S	SCH 80	SCH 100	SCH 120	SCH 140	SCH 160	SCH XXS
1/2	15	0.1	.1	-	-	-	0.1	0.1	-	-	0.1	0.1	-	-	-	-	0.1	0.1
3/4	20	0.1	.1	-	-	-	0.1	0.1	-	-	0.1	0.1	-	-	-	-	0.1	0.1
1	25	0.1	.1	-	-	-	0.1	0.1	-	-	0.1	0.1	-	-	-	-	0.1	0.2
1 1/4	32	0.1	.1	-	-	-	0.1	0.1	-	-	0.2	0.2	-	-	-	-	0.2	0.3
1 1/2	40	0.1	.2	-	-	-	0.2	0.2	-	-	0.3	0.3	-	-	-	-	0.3	0.5
2	50	0.2	.3	-	-	-	0.4	0.4	-	-	0.5	0.5	-	-	-	-	0.7	0.9
2 1/2	65	0.3	.4	-	-	-	0.7	0.7	-	-	0.8	0.8	-	-	-	-	1.3	1.6
3	80	0.5	.6	-	-	-	1.3	1.3	-	-	1.5	1.5	-	-	-	-	2	2.5
3 1/2	90	0.6	.8	-	-	-	1.5	1.5	-	-	2.0	2.0	-	-	-	-	-	4
4	100	0.8	1.1	-	-	-	2.0	2.0	-	-	3.0	3.0	-	-	3.8	-	4.5	5
5	125	1.4	1.6	-	-	-	3.4	3.4	-	-	4.7	4.7	-	-	6.4	-	7.5	9
6	150	2.2	2.7	-	-	-	5.5	5.5	-	-	6.4	6.4	-	-	11.5	-	13	15
8	200	4.4	5.1	-	10	10	11	11	-	13.5	17.4	17.4	-	19	20.3	26	27.5	27
10	250	8.3	9.1	-	18.5	16	21	21	-	27	27	27	31	37.5	42.5	49	54.4	-
12	300	12	13.6	-	24.8	24.5	30	30	31	41	40	40	54	61.5	70	79	90	-
14	350	14	20	25	37	35	35	41	41	54.5	47	47	68	94	95	112	124	-
16	400	19	26	32	46.5	47.5	47.5	47.5	63	81	62.5	62.5	101	130	137	162	183	-
18	450	24	33	41	56	69.5	60	60	87	116	79	79	145	195	203	211	273	-
20	500	29	42.5	50	73	97	73	73	114	156	97	97	195	238	254	304	385	-
22	550	-	-	60	-	-	90	-	-	-	-	118	-	-	-	-	-	-
24	600	44	73	73	110	159	110	110	191	267	141	141	334	410	477	545	635	-

END CAPS BUTT-WELD (ANSI B 16.9)

NB INCHES	SIZE MM	SCH 5 S	SCH 10 S	SCH 10	SCH 20	SCH 30	(WEIGHTS IN KGS.)											
							SCH 40 S	SCH STD	SCH 40	SCH 60	SCH 80 S	SCH X S	SCH 80	SCH 100	SCH 120	SCH 140	SCH 160	SCH XXS
1/2	15	0.1	0.1	-	-	-	0.1	0.1	-	-	0.1	0.1	-	-	-	-	-	-
3/4	20	0.1	0.1	-	-	-	0.1	0.1	-	-	0.1	0.1	-	-	-	-	-	-
1	25	0.1	0.1	-	-	-	0.1	0.1	-	-	0.2	0.1	-	-	-	-	0.2	0.2
1 1/4	32	0.1	0.1	-	-	-	0.2	0.2	-	-	0.2	0.2	-	-	-	-	0.3	0.3
1 1/2	40	0.1	0.1	-	-	-	0.2	0.2	-	-	0.3	0.3	-	-	-	-	0.3	0.4
2	50	0.1	0.1	-	-	-	0.3	0.3	-	-	0.3	0.3	-	-	-	-	0.6	0.6
2 1/2	65	0.2	0.2	-	-	-	0.4	0.4	-	-	0.5	0.5	-	-	-	-	0.9	1
3	80	0.3	0.4	-	-	-	0.7	0.7	-	-	0.9	0.9	-	-	-	-	1.5	1.8
3 1/2	90	0.4	0.5	-	-	-	1	1	-	-	1.3	1.3	-	-	-	-	-	2.8
4	100	0.4	0.6	-	-	-	1.1	1.1	-	-	1.6	1.6	-	-	2.5	-	2.8	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	2.8	-	4.5	5	5.5	5.5	5.5	7	8.4	8.4	15.09	11	12.27	14	19	14.91
10	250	3.6	4.6	-	6	8	9	9	-	13	13.6	13.6	16.25	21	30	30	33	29.30
12	300	6	7.5	-	10	13	15	15	19	25.5	22.5	22.5	29.5	32.5	41	46	53	-
14	350	6.4	8.2	14	13.5	16	16	16	24	38	27	27	36.3	50	59	67	76	-
16	400	8.4	10.7	18	18	21	21	21	31	52	31.5	31.5	52.3	64	75	90	99	-
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	56.8	78	42	42	98.5	122	143	153	170	-
22	550	15	20	35.5	39	42	39	39	-	94.5	51	51	126	154	182	210	240	-
24	600	20.8	26	44	52	74.5	52	52	96.5	120	60	60	150	186	220	250	285	-

WEIGHTS ARE APPROXIMATE

WEIGHTS OF FITTINGS EQUAL / UNEQUAL TEES BUTT-WELD (ANSI B 16.9)

NB INCHES METRIC	SCH 5 S	SCH 10 S	SCH 10	SCH 20	SCH 30	(Weights in.KGS.)					SCH XS	SCH 80	SCH 100	SCH 120	SCH 140	SCH 160	SCH XXS	
						SCH 40 S	SCH STD	SCH 40	SCH 60	SCH 80 S								
1/2	15	0.1	0.1	-	-	-	0.2	0.2	-	-	0.3	0.3	-	-	-	-	0.3	0.3
3/4	20	0.1	0.1	-	-	-	0.2	0.2	-	-	0.4	0.4	-	-	-	-	0.5	0.5
1	25	0.2	0.3	-	-	-	0.4	0.4	-	-	0.5	0.5	-	-	-	-	0.9	0.7
1 1/4	32	0.4	0.5	-	-	-	0.9	0.9	-	-	1.1	1.1	-	-	-	-	1.3	1.2
1 1/2	40	0.6	0.7	-	-	-	1.4	1.4	-	-	1.5	1.5	-	-	-	-	1.9	2.0
2	50	0.7	1.7	-	-	-	1.7	1.7	-	-	2.2	2.2	-	-	-	-	3.2	3.0
2 1/2	65	1.1	2.2	-	-	-	2.7	2.7	-	-	3.0	3.0	-	-	-	-	4.0	4.5
3	80	1.5	3.0	-	-	-	3.8	3.8	-	-	3.8	3.8	-	-	-	-	6.6	7.1
3 1/2	90	2.0	4.1	-	-	-	5.0	5.0	-	-	5.3	5.3	-	-	-	-	-	11
4	100	2.6	4.4	-	-	-	6.5	6.5	-	-	7.7	7.7	-	-	9	-	17	15
5	125	4.0	7.4	-	-	-	10	10	-	-	13.5	13.5	-	-	18	-	25	24
6	150	6.4	12.4	-	-	-	16	16	-	-	19.3	19.3	-	-	24	-	40	38
8	200	10.7	20.0	-	23	25	27	27	-	32	33	33	-	44	50	54	71	68
10	250	18.0	28.2	-	35	40	45	45	-	60	60	60	68	74	93	99	120	-
12	300	26.0	47.5	-	59	57	65	65	71	95	78	78	115	136	150	176	184	-
14	350	40.7	69.9	87.2	95	102	102	102	105	135	115	115	165	206	240	275	300	-
16	400	44	72.7	90.8	100	110	110	110	167	206	167	167	249	335	330	385	420	-
18	450	54	101.7	127.1	127	164	135	135	237	277	190	190	322	380	450	500	500	-
20	500	67	169.8	199.8	168	245	168	168	320	379	245	245	459	540	590	720	790	-
22	550	-	-	220	-	-	-	220	-	-	-	280	-	-	-	-	-	-
24	600	100	306.5	310.0	240	373	240	240	571	654	350	350	748	910	1100	1180	1310	-

CON. / ECC. REDUCER BUTT-WELD (ANSIB16.9)

NB INCHES METRIC	SCH 5 S	SCH 10 S	SCH 10	SCH 20	SCH 30	(Weights in.KGS.)					SCH XS	SCH 80	SCH 100	SCH 120	SCH 140	SCH 160	SCH XXS	
						SCH 40 S	SCH STD	SCH 40	SCH 60	SCH 80 S								
3/4	20	0.1	0.1	-	-	-	0.1	0.1	-	-	0.1	0.1	-	-	-	-	0.2	0.2
1	25	0.1	0.1	-	-	-	0.1	0.1	-	-	0.2	0.2	-	-	-	-	0.2	0.2
1 1/4	32	0.1	0.1	-	-	-	0.2	0.2	-	-	0.2	0.2	-	-	-	-	0.3	0.3
1 1/2	40	0.1	0.2	-	-	-	0.3	0.3	-	-	0.4	0.4	-	-	-	-	0.5	0.5
2	50	0.1	0.2	-	-	-	0.4	0.4	-	-	0.6	0.6	-	-	-	-	1.0	0.9
2 1/2	65	0.3	0.4	-	-	-	0.8	0.8	-	-	1.0	1.0	-	-	-	-	1.4	1.4
3	80	0.4	0.5	-	-	-	1.0	1.0	-	-	1.4	1.4	-	-	-	-	1.9	1.8
3 1/2	90	0.6	0.7	-	-	-	1.3	1.3	-	-	1.9	1.9	-	-	-	-	3.9	3.2
4	100	0.7	0.8	-	-	-	1.6	1.6	-	-	2.3	2.3	-	-	3.7	-	3.7	6.4
5	125	1.1	1.4	-	-	-	2.8	2.8	-	-	3.9	3.9	-	-	6.4	-	6.4	9.0
6	150	1.6	2.0	-	-	-	4.0	4.0	-	-	5.9	5.9	-	-	8	-	10	14.5
8	200	2.8	3.3	-	5.0	6	6.5	6.5	-	8	10	10	-	12	14	16	16.5	-
10	250	4.3	5.5	-	7.3	9	10.7	10.7	-	14.5	15	15	17.7	21	25	28	29.5	-
12	300	6.0	7.7	-	9.7	13	15.0	15.0	16.4	22.3	20	20	28.2	33	38	44	49	-
14	350	10.8	13.8	23	22.3	27	26.9	26.8	31.3	41.8	36	36	52.3	64	73	78	86	-
16	400	13.3	16.4	28	27.5	33	33.2	33.1	44.0	56.6	44	44	73.5	83	97	112	121	-
18	450	16.0	20.3	34	33.5	47	40.0	40.0	59.5	77.4	53	53	97.6	116	136	145	159	-
20	500	23.8	29.8	50	59.5	79	59.4	59.4	93.0	125	79	79	159	163	178	305	340	-
22	550	-	-	57	-	-	-	-	-	-	-	87	-	-	-	-	-	-
24	600	28.7	36.3	63	71.7	107	71.7	71.7	129.4	181	95	95	228	241	295	540	610	-

WEIGHT ARE APPROXIMATE

FLANGES TO ANSI B16.5 / 16.47 / 16.10 / 16.36 / 16.48

Material

Flanges are forged from material conforming to ASTM A 105 NORMALISED ASTM A 350-LF2, ASTM A694 F52, 65 ASTM A 182 and Duplex Steels, B564, B637, B462 etc.

Dimensions

All dimensions comply with the Standard. Flanges are machined on the outside diameter, bore (and weld preparation of weld necks) and joint face. Bolt holes are drilled Weld prep on weldnecks is to ANSI B16.25.

Marking

Flanges are marked with : the nominal size : class number ; material grade heat WT number' manufacturer's mark.

Test Certificate

Flanges test certificates are available and are supplied with all goods. Test Certificates include full chemical analysis and Mechanical With Carbon Equivalent Properties with 3.1 certificate, Impact test & NACE MR 0175 / MR 0103 in addition as per requirement.

Inspection

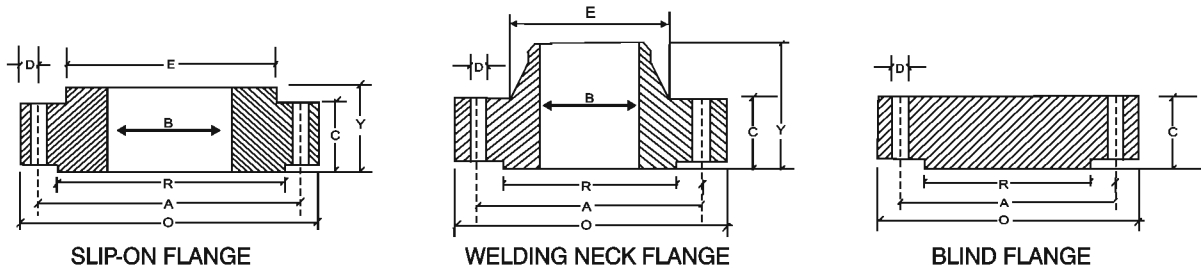
All stock is statically sample inspected on receipt.

Manufacturing Capability

<u>Dimensional Standard</u>	<u>Size Range</u>	<u>Rating</u>
ASME / ANSI / B 16.5	½" to 24"	Class 150 to 2500 Lbs
MSS-SP-44	12" to 60"	Class 150 to 900 Lbs
ASME / B16.47 / API 605	26" to 60"	-
ASME / ANSI / B 16.36	1" to 24"	Class 300 to 2500 Lbs
BS 3293	26" to 48"	Class 150 to 600 Lbs
ASME / B 16.48 / API 590	½" to 24"	Class 150 to 2500 Lbs
API 6A	2 1/16" to 30"	2000 Psi to 20000 Psi
DIN	DN10 to DN3600	PN6 to PN 160



DIMENSIONS OF FORGED FLANGES ANSI 16.5



ASA 150 CLASS

Nominal Pipe Size	Flange Dia	Dia of Bolt Circle	Dia of Bolt Holes	No. of Holes	Thk of Flange	Dia of Hub	Length Through Hub			Dia of Bore		Dia of R/F	Depth of Socket	Pipe Dia	
							S/O & S/W	W/N	L/J	S/O & S/W	L/J				
(MM) (INCH.)	O	A	D		C	E	Y	Y	Y	B	B	R	F	X	
15	1/2	88.9	60.3	15.9	4	11.1	30.2	15.9	47.6	15.9	22.3	22.9	34.9	9.5	21.33
20	3/4	98.4	69.8	15.9	4	12.7	38.1	15.9	52.4	15.9	27.7	28.2	42.9	11.1	26.67
25	1	107.9	79.4	15.9	4	14.3	49.2	17.5	55.6	17.5	34.5	35.0	50.8	12.7	33.40
32	1 1/4	117.5	88.9	15.9	4	15.9	58.7	20.6	57.1	20.6	43.2	43.7	63.5	14.3	42.16
40	1 1/2	127.0	98.4	15.9	4	17.5	65.1	22.2	61.9	22.2	49.5	50.0	73.0	15.9	48.26
50	2	152.4	120.6	19.0	4	19.0	77.8	25.4	63.5	25.4	62.0	62.5	92.1	17.5	60.31
65	2 1/2	177.8	139.7	19.0	4	22.2	90.5	28.6	69.8	28.6	74.7	75.4	104.8	19.0	73.02
80	3	190.5	152.4	19.0	4	23.8	107.9	30.2	69.8	30.2	90.7	91.4	127.0	20.6	88.90
100	4	228.6	190.5	19.0	8	23.8	134.9	33.3	76.2	33.3	116.1	116.8	157.2	23.8	114.30
125	5	254.0	215.9	22.2	8	23.8	163.5	36.5	88.9	36.5	143.8	144.5	185.7	23.8	141.30
150	6	279.4	241.3	22.2	8	25.4	192.1	39.7	88.9	39.7	170.7	171.4	215.9	27.0	168.27
200	8	342.9	298.4	22.2	8	28.6	246.1	44.4	101.6	44.4	221.5	222.2	269.9	31.7	219.07
250	10	406.4	361.9	25.4	12	30.2	304.8	49.2	101.6	49.2	276.3	277.4	323.8	33.3	273.05
300	12	482.6	431.8	25.4	12	31.8	365.1	55.6	114.3	55.6	327.1	328.2	381.0	39.7	323.85
350	14	533.4	476.2	28.6	12	34.9	400.0	57.1	127.0	79.4	359.1	360.2	412.7	41.3	355.60
400	16	596.9	539.7	28.6	16	36.5	457.2	63.5	127.0	87.3	410.5	411.2	469.9	44.4	406.40
450	18	635.0	577.8	31.7	16	39.7	504.8	68.3	139.7	96.8	461.8	462.3	533.4	49.2	457.20
500	20	698.5	635.0	31.7	20	42.9	558.8	73.0	144.5	103.2	513.1	514.3	584.2	54.0	508.00
600	24	812.8	749.3	34.9	20	47.6	663.6	82.5	152.4	111.1	615.9	615.9	692.1	63.5	609.60

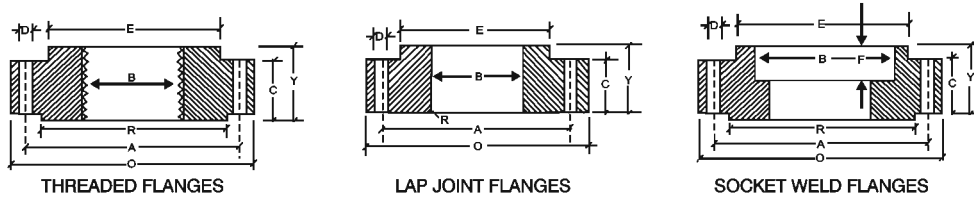
All Dimensions are in Millimeters • Flanges except Lap Joint will be furnished with (1.6mm) Raised Face, which is included in Thickness(C) and Length through Hub(Y).

ASA 300 CLASS

Nominal Pipe Size	Flange Dia	Dia of Bolt Circle	Dia of Bolt Holes	No. of Holes	Thk of Flange	Dia of Hub	Length Through Hub			Dia of Bore		Dia of R/F	Depth of Socket	Pipe Dia	
							S/O & S/W	W/N	L/J	S/O & S/W	L/J				
(MM) (INCH.)	O	A	D		C	E	Y	Y	Y	B	B	R	F	X	
15	1/2	95.2	66.7	15.9	4	14.3	38.1	22.2	52.4	22.2	22.3	22.9	34.9	9.5	21.33
20	3/4	117.5	82.5	19.0	4	15.9	47.6	25.4	57.1	25.4	27.7	28.2	42.9	11.1	26.67
25	1	123.8	88.9	19.0	4	17.5	54.0	27.0	61.9	27.0	34.5	35.0	50.8	12.7	33.40
32	1 1/4	133.3	98.4	19.0	4	19.0	63.5	27.0	65.1	27.0	43.2	43.7	63.5	14.3	42.16
40	1 1/2	155.6	114.3	22.2	4	20.6	69.8	30.2	68.3	30.2	49.5	50.0	73.0	15.9	48.26
50	2	165.1	127.0	19.0	8	22.2	84.1	33.3	69.8	33.3	62.0	62.5	92.1	17.5	60.31
65	2 1/2	190.5	149.2	22.2	8	25.4	100.0	38.1	76.2	38.1	74.7	75.4	104.8	19.0	73.02
80	3	209.5	168.3	22.2	8	28.6	117.5	42.9	79.4	42.9	90.7	91.4	127.0	20.6	88.90
100	4	254.0	200.0	22.2	8	31.8	146.0	47.6	85.7	47.6	116.1	116.8	157.2	23.8	114.30
125	5	279.4	234.9	22.2	8	34.9	177.8	50.8	98.4	50.8	143.8	144.5	185.7	-	141.30
150	6	317.5	269.9	22.2	12	36.5	206.4	52.4	98.4	52.4	170.7	171.4	215.9	-	168.27
200	8	381.0	330.2	25.4	12	41.3	260.3	61.9	111.1	61.9	221.5	222.2	269.9	-	219.07
250	10	444.5	387.3	28.6	16	47.6	320.7	66.7	117.5	95.2	276.3	277.4	323.8	-	273.05
300	12	520.7	450.8	31.7	16	50.8	374.6	73.0	130.2	101.6	327.1	328.2	381.0	-	323.85
350	14	584.2	514.3	31.7	20	54.0	425.4	76.2	142.9	111.1	359.1	360.2	412.7	-	355.60
400	16	647.7	571.5	34.9	20	57.2	482.6	82.5	146.0	120.6	410.5	411.2	469.9	-	406.40
450	18	711.2	628.5	34.9	24	60.3	533.4	88.9	158.7	130.2	461.8	462.3	533.4	-	457.20
500	20	774.7	685.8	34.9	24	63.5	587.4	95.2	161.9	139.7	513.1	514.3	584.2	-	508.00
600	24	914.4	812.8	41.3	24	69.8	701.7	106.4	168.3	152.4	615.9	615.9	692.1	-	609.60

All Dimensions are in Millimeters • Flanges except Lap Joint will be furnished with (1.6mm) Raised Face, which is included in Thickness(C) and Length through Hub(Y).

DIMENSIONS OF FORGED FLANGES ANSI B 16.5



ASA 600 CLASS

Nominal Pipe Size (MM)	Flange Dia O	Dia of Bolt Circle A	Dia of Bolt Holes D	No. of Holes	Thk of Flange C	Dia of Hub E	Lenght through Hub			Dia of Bore		Dia of R/F R	Depth of Socket F	Pipe Dia X
							S/O & S/W	W/N	L/J	S/O & S/W	L/J			
							Y	Y	Y	B	B			
15	95.2	66.7	15.9	4	14.3	38.1	22.2	52.4	22.3	22.3	22.8	34.9	9.5	21.33
20	117.5	82.5	19.0	4	15.9	47.6	25.4	57.1	25.4	27.7	28.1	42.9	11.1	26.67
25	123.8	88.9	19.0	4	17.5	54.0	27.0	61.9	26.9	34.5	35.0	50.8	12.7	33.40
32	133.3	98.4	19.0	4	20.6	63.5	28.6	66.7	28.4	43.2	43.6	63.5	14.2	42.16
40	155.6	114.3	22.2	4	22.2	69.8	31.7	69.8	31.7	49.5	50.0	73.0	15.8	48.26
50	165.1	127.0	19.0	8	25.4	84.1	36.5	73.0	36.5	62.0	62.4	92.1	17.4	60.31
65	190.5	149.2	22.2	8	28.6	100.0	41.3	79.4	41.1	74.7	75.4	104.8	19.0	73.02
80	209.5	168.3	22.2	8	31.8	117.5	46.0	82.5	45.9	90.7	91.4	127.0	-	88.90
100	273.0	215.9	25.4	8	38.1	152.4	54.0	101.6	53.8	116.1	116.8	157.2	-	114.30
125	330.2	266.7	28.6	8	44.4	188.9	60.3	114.3	60.4	143.8	144.5	185.7	-	141.30
150	355.6	292.1	28.6	12	47.6	222.2	66.7	117.5	66.5	170.7	171.4	215.9	-	168.27
200	419.1	349.2	31.7	12	55.6	273.0	76.2	133.3	76.2	221.5	222.2	269.9	-	219.07
250	508.0	431.8	34.9	16	63.5	342.9	85.7	152.4	111.2	276.3	277.4	323.8	-	273.05
300	558.8	488.9	34.9	20	66.7	400.0	92.1	155.6	117.3	327.1	328.2	381.0	-	323.85
350	603.2	527.0	38.1	20	69.9	431.8	93.7	165.1	127.0	359.1	360.1	412.7	-	355.60
400	685.8	603.2	41.3	20	76.2	495.3	106.4	177.8	139.7	410.5	411.2	469.9	-	406.40
450	742.9	654.0	44.4	20	82.6	546.1	117.5	184.1	152.4	461.8	462.3	533.4	-	457.20
500	812.8	723.9	44.4	24	88.9	609.9	127.0	190.5	165.1	513.1	514.3	584.2	-	508.00
600	939.8	838.2	50.8	24	101.6	717.5	139.7	203.2	184.1	615.9	615.9	692.1	-	609.60

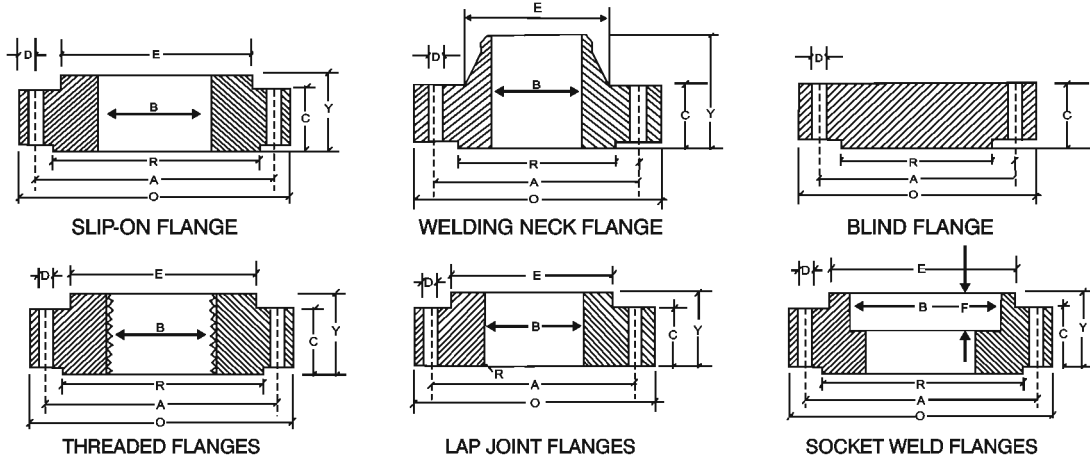
All Dimensions are in Millimeters • Flanges except Lap Joint will be furnished with(6.35mm) Raised Face, which is not included in Thickness(C) and Lenght through Hub(Y).

ASA 900 CLASS

Nominal Pipe Size (MM)	Flange Dia O	Dia of Bolt Circle A	Dia of Bolt Holes D	No. of Holes	Thk of Flange C	Dia of Hub E	Lenght through Hub			Dia of Bore		Dia of R/F R	Depth of Socket F	Pipe Dia X
							S/O & S/W	W/N	L/J	S/O & S/W	L/J			
							Y	Y	Y	B	B			
15	120.6	82.5	22.2	4	22.2	38.1	31.7	60.3	31.7	22.3	22.8	34.9	9.5	21.33
20	130.2	88.9	22.2	4	25.4	44.4	34.9	69.8	35.0	27.7	28.1	42.9	11.1	26.67
25	149.2	101.6	25.4	4	28.6	52.4	41.3	73.0	41.1	34.5	35.0	50.8	12.7	33.40
32	158.7	111.1	25.4	4	28.6	63.5	41.3	73.0	41.1	43.2	43.6	63.5	14.2	42.16
40	177.8	123.8	28.6	4	31.8	69.8	44.4	82.5	44.4	49.5	50.0	73.0	15.8	48.26
50	215.9	165.1	25.4	8	38.1	104.8	57.1	101.6	57.1	62.0	62.4	92.1	17.4	60.31
65	244.5	190.5	28.6	8	41.3	123.8	63.5	104.8	63.5	74.7	75.4	104.8	19.0	73.02
80	241.3	190.5	25.4	8	38.1	127.0	53.9	101.6	53.8	90.7	91.4	127.0	-	88.90
100	292.1	234.9	31.7	8	44.4	158.7	69.8	114.3	69.8	116.0	116.8	157.2	-	114.30
125	349.2	279.4	35.0	8	50.8	190.5	79.3	127.0	79.2	143.7	144.5	185.7	-	141.30
150	381.0	317.5	31.7	12	55.6	234.9	85.8	139.7	85.8	170.6	171.4	215.9	-	168.27
200	469.9	393.7	38.1	12	63.5	298.4	101.6	162.0	114.3	221.4	222.2	269.9	-	219.07
250	546.1	469.9	38.1	16	69.8	368.3	107.9	184.1	127.0	276.3	277.3	323.8	-	273.05
300	609.6	533.4	38.1	20	79.3	419.1	117.4	200.0	142.7	327.1	328.1	381.0	-	323.85

All Dimensions are in Millimeters • Flanges except Lap Joint will be furnished with(6.35mm) Raised Face, which is not included in Thickness(C) and Lenght through Hub(Y).

DIMENSIONS OF FORGED FLANGES ANSI B 16.5



ASA 1500 CLASS

Nominal Pipe Size	Flange Dia	Dia of Bolt Circle	Dia of Bolt Holes	No. of Holes	Thk of Flange	Dia of Hub	Length Through Hub			Dia of Bore		Dia of R/F	Depth of Socket	Pipe Dia	
							S/O & S/W	W/N	L/J	S/O & S/W	L/J				
(MM)	(INCH.)	O	A	D	C	E	Y	Y	Y	B	B	R	F	X	
For Dimensions from 1/2" to 2 1/2" kindly refer ASA 900 LBS Table.															
80	3	266.7	203.2	31.7	8	47.6	133.3	73.0	117.5	73.0	90.7	91.4	127.0	-	88.90
100	4	311.1	241.3	34.9	8	54.0	161.9	90.5	123.0	90.4	116.1	116.8	157.2	-	114.30
125	5	374.6	292.1	41.3	8	73.0	196.8	104.8	155.6	104.8	143.8	144.5	185.7	-	141.30
150	6	393.7	317.5	38.1	12	82.6	228.6	119.1	171.4	119.1	170.7	171.4	215.9	-	168.27
200	8	482.6	393.7	44.4	12	92.1	292.1	142.9	212.7	142.8	221.5	222.2	269.9	-	219.07
250	10	584.2	482.6	50.8	12	107.9	368.3	158.7	254.0	177.8	276.3	277.3	323.8	-	273.05
300	12	673.1	571.5	54.0	16	123.8	450.8	181.0	282.5	218.9	327.1	328.1	381.0	-	323.85

All Dimensions are in Millimeters • Flanges except Lap Joint will be furnished with(6.35mm) Raised Face, which is not included in Thickness(C) and Length through Hub(Y).

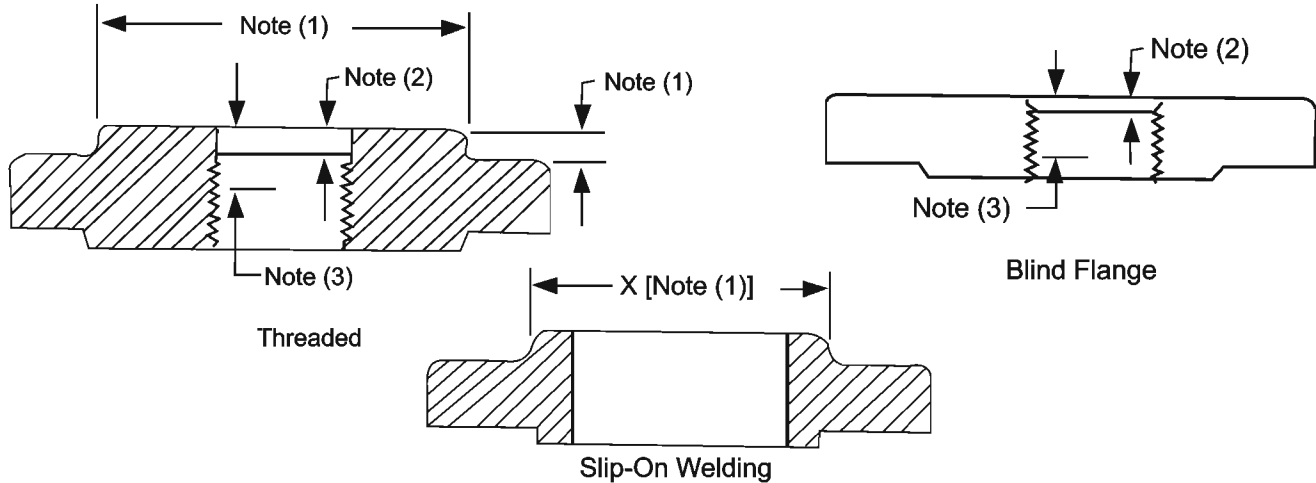
ASA 2500 CLASS

Nominal Pipe Size	Flange Dia	Dia of Bolt Circle	Dia of Bolt Holes	No. of Holes	Thk of Flange	Dia of Hub	Length Through Hub			Dia of Bore		Dia of R/F	Depth of Socket	Pipe Dia	
							S/O & S/W	W/N	L/J	S/O & S/W	L/J				
(MM)	(INCH.)	O	A	D	C	E	Y	Y	Y	B	B	R	F	X	
15	1/2	133.3	88.9	22.2	4	30.2	42.9	39.7	73.0	39.7	22.3	22.3	34.9	-	21.33
20	3/4	139.7	95.3	22.2	4	31.7	50.8	42.9	79.4	42.9	27.7	27.7	42.9	-	26.67
25	1	158.7	107.9	25.4	4	34.9	57.1	47.7	88.9	47.7	34.5	34.5	50.8	-	33.40
32	1 1/4	184.1	130.2	28.6	4	38.1	73.0	52.4	95.2	52.4	43.2	43.2	63.5	-	42.16
40	1 1/2	203.2	146.0	31.7	4	44.4	79.4	60.3	111.1	60.3	49.5	49.5	73.0	-	48.26
50	2	234.9	171.4	28.6	8	50.8	95.2	69.8	127.0	69.8	62.4	62.0	92.1	-	60.31
65	2 1/2	266.7	196.8	31.7	8	57.1	114.3	79.4	142.9	79.4	74.7	74.7	104.8	-	73.02
80	3	304.8	228.6	34.9	8	66.7	133.3	92.1	168.3	92.1	90.7	90.7	127.0	-	88.90
100	4	355.6	273.0	41.2	8	76.2	165.1	107.9	190.5	107.9	116.1	116.1	157.2	-	114.30
125	5	419.1	323.8	47.6	8	92.1	203.2	130.0	228.6	130.0	143.8	143.8	185.7	-	141.30
150	6	482.6	368.3	54.0	8	107.9	234.9	152.4	273.0	152.4	170.7	170.7	215.9	-	168.27
200	8	552.4	438.1	54.0	12	127.0	304.8	177.8	317.5	177.8	221.5	221.5	269.9	-	129.07
250	10	673.1	539.7	66.7	12	165.1	374.6	228.6	419.1	228.6	276.3	276.3	323.8	-	273.05
300	12	762.0	619.1	73.0	12	184.1	441.3	254.0	463.5	254.0	327.1	327.1	381.0	-	323.85

All Dimensions are in Millimeters • Flanges except Lap Joint will be furnished with(6.35mm) Raised Face, which is not included in Thickness(C) and Length through Hub(Y).

ASME B16.5-2009

TABLE 6 REDUCING THREADED AND SLIP-ON PIPE FLANGES FOR CLASSES 150 THROUGH 2500



1	2	3	4	5	6
Nominal Pipe Size [Note (4)]	Smallest Size of Reducing Outlet Requiring Hub Flanges {Note (1)}	Nominal Pipe Size [Note (4)]	Smallest Size of Reducing Outlet Requiring Hub Flanges {Note (1)}	Nominal Pipe Size [Note (4)]	Smallest Size of Reducing Outlet Requiring Hub Flanges {Note (1)}
NPS	NPS	NPS	NPS	NPS	NPS
1	1/2	3 1/2	1 1/2	12	3 1/2
1 1/4	1/2	4	1 1/2	14	3 1/2
1 1/2	1/2	5	1 1/2	16	4
2	1	6	2 1/2	18	4
2 1/2	1 1/4	8	3	20	4
3	1 1/4	10	3 1/2	24	4

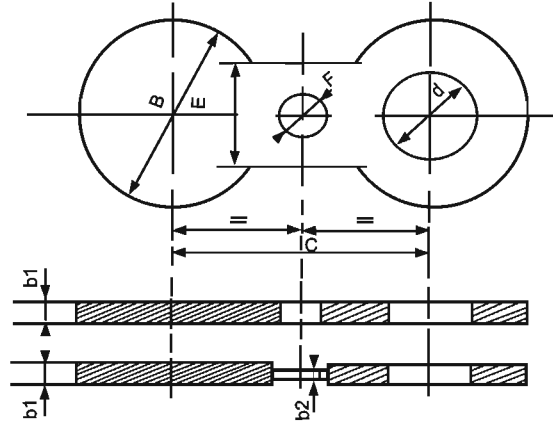
NOTES:

- (1) The hub dimensions shall be at least as large as those of the standard flanges of the sizes to which the reduction is being machined, except flanges reducing to a size smaller than those of Columns 2, 4, and 6 may be made from blind flanges (see Example).
- (2) Class 150 flanges do not have a counterbore. Class 300 and higher pressure flanges will have depth of counterbore Q of 7 mm for NPS 2 and smaller tapping and 9.50 mm for NPS 2 1/2 and larger. The diameter Q of counterbore is the same as that given in the tables of threaded flanges for the corresponding tapping.
- (3) Minimum length of effective threads shall be at least equal dimension T of the corresponding pressure class threaded flange as shown in tables but does not necessarily extend for the face the flange.
- (4) For method of designating reducing threaded and reducing slip-on flanges, and Examples Below.

EXAMPLES :

- (1) The size designation is NPS 6 X 2 1/2 - 300 reducing threaded flange. This flange has the following dimensions:
 NPS 2 1/2 = taper pipe thread tapping (ASME B1.201)
 320 mm = diameter of regular NPS 6 Class 300 threaded flange
 35 mm = thickness of regular NPS 6 Class 300 threaded flange
 178 mm = diameter of hub for regular NPS 5 Class 300 threaded flange. Hub diameter may be one size small to reduce machining, in this example, a hub diameter of NPS 2 1/2 would be the smallest acceptable.
 15.5 mm = height of hub for regular NPS 5 Class 300 threaded flange
- (2) The size designation is NPS 6 X 2 - Class 300 reducing threaded flange. Use regular NPS 6 Class 300 blind flange tapped with NPS 2 taper pipe thread (ASME B1.20.1)

SPECTACLE BLINDS



DN	150lbs							300lbs						
	B	d	C	E	b1	b2	F	B	d	C	E	b1	b2	F
1/2	44	16	60	25	6.5	4	16	51	16	67	30	6.5	4	16
3/4	54	22	70	30	6.5	4	16	63	22	83	35	6.5	4	16
1	63	28.5	79	35	6.5	4	16	70	28.5	89	40	6.5	4	16
1 1/4	73	35	89	40	6.5	4	16	79	35	98	45	6.5	4	16
1 1/2	82	41.5	98	50	6.5	4	16	92	41.5	114	55	6.5	4	23
2	101	54	121	50	6.5	4	19	108	54	127	28	6.5	4	16
2 1/2	120	66.5	140	50	6.5	4	19	127	66.5	149	35	6.5	4	23
3	133	79.5	152	60	6.5	4	19	146	79.5	168	40	9.5	6	23
3 1/2	159	92	178	45	6.5	4	19	162	92	184	45	9.5	6	23
4	171	108	191	50	6.5	4	19	178	108	200	50	12.5	8	23
5	193	133.5	216	55	9.5	6	22	212	133.5	235	60	12.5	8	23
6	219	159	241	60	9.5	6	22	247	159	270	45	16	8	23
8	276	209.5	298	70	12.5	8	22	305	209.5	330	55	19	10	23
10	336	260.5	362	65	16	8	26	359	260.5	387	45	25.5	14	23
12	406	305	432	70	22.5	10	26	419	305	451	50	28.5	18	23
14	441	336.5	476	70	25.5	14	29	476	336.5	514	45	32	20	23
16	505	387.5	540	70	25.5	14	29	530	387.5	572	50	36.5	22	23
18	540	438	578	70	25.5	14	32	587	438	629	45	41.5	24	23
20	597	489	635	65	28.5	18	32	645	489	686	50	44.5	24	23
22	657	546	692	65	35	20	35	702	546	743	50	44.5	24	23
24	708	590.5	750	75	35	20	35	765	590.5	813	60	54	40	23
26	762	641.5	806	70	51	32	35	822	641.5	876	50	73	60	23
28	828	692	864	60	51	32	35	895	692	940	60	73	60	23
30	870	743	914	65	54	34	35	940	743	997	60	85	70	23
32	936	794	978	65	54	34	41	1003	794	1054	65	85	70	23
34	978	844.5	1029	55	57	34	41	1044	844.5	1105	70	98	80	23
36	1035	895.5	1086	60	57	34	41	1105	895.5	1168	55	98	80	23

DN	400lbs							600lbs						
	B	d	C	E	b1	b2	F	B	d	C	E	b1	b2	F
1/2	51	16	67	30	6.5	4	16	51	16	67	30	6.5	4	16
3/4	63	22	83	35	6.5	4	16	63	22	83	35	6.5	4	16
1	70	28.5	89	40	9.5	6	19	70	28.5	89	40	9.5	6	19
1 1/4	79	35	98	45	9.5	6	19	79	35	98	50	9.5	6	19
1 1/2	92	41.5	114	55	9.5	6	23	92	41.5	114	55	9.5	6	23
2	108	54	127	28	9.5	6	16	108	54	127	28	9.5	6	16
2 1/2	127	63.5	149	35	9.5	6	23	127	63.5	149	35	12.5	8	23
3	146	79.5	168	40	12.5	8	23	146	79.5	168	40	16	10	23
3 1/2	159	92	184	45	12.5	8	23	159	92	184	45	16	10	23
4	174	105	200	50	16	10	23	190	105	216	55	16	10	23
5	209	130	235	60	16	10	23	238	130	267	70	22.5	14	23
6	244	155.5	270	45	19	12	23	263	155.5	292	45	25.5	16	23
8	301	203	330	55	22.5	14	23	317	203	349	55	32	20	23
10	355	257	387	45	28.5	16	23	390	257	432	45	38	24	23
12	416	305	451	50	38	24	23	454	305	489	40	44.5	30	23
14	479	336.5	514	45	41.5	26	23	489	336.5	527	40	51	36	23
16	533	387.5	572	50	47.5	30	23	562	387.5	603	50	57	40	23
18	590	438	629	45	57	40	23	609	438	654	55	63	50	23
20	644	489	686	50	57	40	23	679	489	724	50	70	64	23
22	698	540	743	50	70	55	23	730	540	778	55	70	64	23
24	765	590.5	813	60	70	55	23	787	590.5	838	55	82	68	23
26	819	641.5	876	50	85	70	23	851	641.5	915	50	101	85	23
28	889	692.2	940	60	85	70	23	911	692.2	965	55	101	85	23
30	930	743	997	60	98	80	23	959	743	1022	60	110	90	23
32	1000	794	1054	65	98	80	23	1119	794	1080	60	110	90	23
34	1041	844.5	1105	70	105	90	23	1060	844.5	1130	65	117	100	23
36	1105	895.5	1168	55	110	95	23	1117	895.5	1194	65	124	110	23

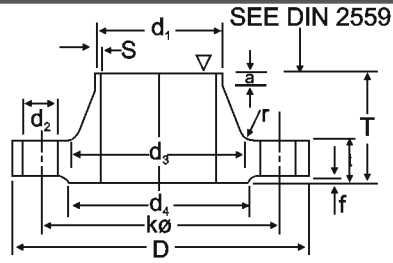
NOTE 1. Preferably one piece except for stainless and allied steels, which can be manufactured in 3 pieces.
 2. Dimension of other standards available on request.

6BAR

DIN 2573 SLIP - ON FLANGES

DIN 2527 BLIND FLANGES

DIN 2631 WELDING NECK FLANGES



WELDING NECK

Unit : mm

Bore		Common Dimension						Hub				Raise Face		Drilling			Approx Weight (kg)		
Nominal Bore	d ₁	D	t			K	T	d ₂	s	r	a	d ₄	f	No. of Bolt	Dia. of Bolt	d ₂	DIN 2573	DIN 2631	
			Welding neck	slip-on	Blind														
10	14 17.2*)	75	12	12	12	50	28	22 26	1.8	4	6	35	2	4	M10	-	11.5	0.036	0.335
15	20 21.3*)	80	12	12	12	55	30	28 30	2.0	4	6	40	2	4	M10	-	11.5	0.410	0.392
20	25 26.9*)	90	14	14	14	65	32	35 38	2.3	4	6	50	2	4	M10	-	11.5	0.600	0.592
25	30 33.7*)	100	14	14	14	75	35	40 42	2.6	4	6	60	2	4	M10	-	11.5	0.740	0.747
32	38 42.4*)	120	14	16	14	90	35	50 55	2.6	6	6	70	2	4	M12	(1/2")	14	1.19	1.05
40	44.5 48.3*)	130	14	16	14	100	38	58 62	2.6	6	7	80	3	4	M12	(1/2")	14	1.39	1.18
50	57 60.3*)	140	14	16	14	110	38	70 74	2.9	6	8	90	3	4	M12	(1/2")	14	1.53	1.34
65	76.1*)	160	14	16	14	130	38	88	2.9	6	9	110	3	4	M12	(1/2")	14	1.89	1.67
80	88.9*)	190	16	18	16	150	42	102	3.2	8	10	128	3	4	M16	(5/8")	18	2.98	2.71
100	108 114.3*)	210	16	18	16	170	45	122 130	3.6	8	10	148	3	4	M16	(5/8")	18	3.46	3.24
125	133 139.7*)	240	18	20	18	200	48	148 155	4.0	8	10	178	3	8	M16	(5/8")	18	4.60	4.49
150	159 168.3*)	265	18	20	18	225	48	172 184	4.5	10	12	202	3	8	M16	(5/8")	18	5.22	5.15
200	216 219.1*)	320	20	22	20	280	55	230 236	5.9	10	15	258	3	8	M16	(5/8")	18	7.15	7.78
250	267 273*)	375	22	24	22	335	60	282 290	6.2	12	15	312	3	12	M16	(5/8")	18	9.61	10.8
300	381 323.9*)	440	22	24	22	395	62	335 342	7.1	12	15	365	4	12	M20	(3/4")	23	12.6	14.0
350	355.6*) 368	490	22	26	22	445	62	385	7.1	12	15	415	4	12	M20	(3/4")	23	15.6	16.1
400	406.4*) 418	540	22	28	22	495	65	438	7.1	12	15	455	4	16	M20	(3/4")	23	18.4	18.3
500	508*) 521	645	24	30	24	600	68	538	7.1	12	15	570	4	20	M20	(3/4")	23	24.5	24.6
600	609.6*) 622	755	24			705	70	640	7.1	12	16	670	5	20	M24	(7/8")	27		
700	711.2*) 720	860	24			810	70	740	7.1	12	16	775	5	24	M24	(7/8")	27		
800	812.8*) 820	975	24			920	70	842	7.1	12	16	880	5	24	M27	(1")	30		
900	914.4*) 920	1075	26			1020	70	942	7.1	12	16	980	5	24	M27	(1")	30		
1000	1016*) 1020	1175	26			1120	70	1045	7.1	16	16	1080	5	28	M27	(1")	30		

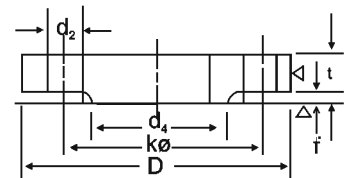
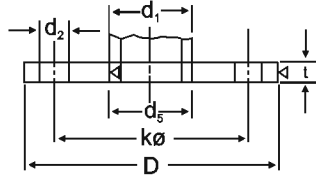
Out side diameter of pipe complies with ISO recommendation R64

10BAR

DIN 2576 SLIP - ON FLANGES

DIN 2527 BLIND FLANGES

DIN 2632 WELDING NECK FLANGES



SLIP-ON

BLIND

Unit : mm

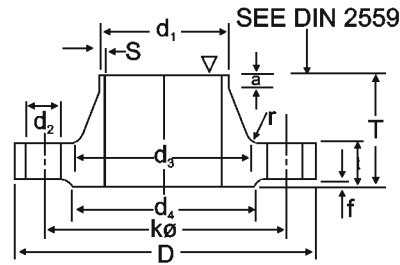
Bore		Common Dimension						Hub				Raise Face		Drilling			Approx Weight (kg)		
Nominal Bore	d ₁	D	t			K	T	d ₃	s	r	a	d ₄	f	No. of Bolt	Dia. of Bolt	d ₅	DIN 2576	DIN 2632	
			Welding neck	slip-on	Blind														
10	14 17.2*)	90	14	14	14	60	35	25 28	1.8	4	6	40	2	4	M12	(1.2")	14	0.163	0.580
15	20 21.3*)	95	14	14	14	65	35	30 32	2.0	4	6	45	2	4	M12	(1.2")	14	0.675	0.648
20	25 26.9*)	105	16	16	16	75	38	38 40	2.3	4	6	58	2	4	M12	(1.2")	14	0.947	0.952
25	30 33.7*)	115	16	16	16	85	38	42 45	2.6	4	6	68	2	4	M12	(1.2")	14	1.14	1.14
32	38 42.4*)	140	16	16	16	100	40	52 56	2.6	6	6	78	2	4	M16	(5/8")	18	1.66	1.69
40	44.5 48.3*)	150	16	16	18	110	42	60 64	2.6	6	7	88	3	4	M16	(5/8")	18	1.89	1.86
50	57 60.3*)	165	18	18	18	125	45	72 75	2.9	6	8	102	3	4	M16	(5/8")	18	2.51	2.53
65	76.1*)	185	18	18	18	145	45	90	2.9	6	10	122	3	4	M16	(5/8")	18	3.00	3.06
80	88.9*)	200	20	20	20	160	50	105	3.2	8	10	138	3	4	M16	(5/8")	18	3.79	3.70
100	108 114.3*)	220	20	20	20	180	52	125 131	3.6	8	12	158	3	8	M16	(5/8")	18	4.20	4.62
125	133 139.7*)	250	22	22	22	210	55	150 156	4.0	8	12	188	3	8	M16	(5/8")	18	5.71	6.30
150	159 168.3*)	285	22	22	22	240	55	175 184	4.5	10	12	212	3	8	M20	(3/4")	23	6.72	7.75
200	216 219.1*)	340	24	24	24	295	62	232 235	5.9	10	16	268	3	8	M20	(3/4")	23	9.50	11.3
250	267 273*)	395	26	26	26	350	68	285 292	6.3	12	16	320	3	12	M20	(3/4")	23	12.5	14.7
300	381 323.9*)	445	26	26	28	400	68	335 344	7.1	12	16	370	4	12	M20	(3/4")	23	14.4	17.6
350	355.6*) 368	505	26	28	30	460	68	385	7.1	12	16	430	4	16	M20	(3/4")	23	20.6	21.4
400	406.4*) 419	565	26	32	32	515	72	440	7.1	12	16	482	4	16	M24	(7/8")	27	27.9	26.1
500	508*) 521	670	28	38	34	620	75	542	7.1	12	16	585	4	20	M24	(7/8")	27	41.1	34.7
600	609.6*) 622	780	28			725	80	642	7.1	12	18	685	5	20	M27	(1")	30		
700	711.2*) 720	895	30			840	80	754	8.0	12	18	800	5	24	M27	(1")	30		
800	812.8*) 820	1015	32			950	90	850	8.0	12	18	905	5	24	M30	(1.1/8")	30		
900	914.4*) 920	1115	34			1050	95	950	10.0	12	20	1005	5	28	M30	(1.1/8")	33		
1000	1016*) 1020	1230	34			1160	95	1052	10.0	16	20	1110	5	28	M33	(1 1/4")	36		

16BAR

DIN 2543 SLIP - ON FLANGES

DIN 2527 BLIND FLANGES

DIN 2633 WELDING NECK FLANGES



WELDING NECK

Unit : mm

Bore		Common Dimension						Hub				Raise Face		Drilling			Approx Weight (kg)	
Nominal Bore	d ₁	D	t			K	T	d ₃	s	r	a	d ₄	f	No. of Bolt	Dia. of Bolt	d ₂	DIN 2543	DIN 2633
			Welding neck	slip-on (No-hub)	Blind													
10	14 (17.2*)	90	14	14	14	60	35	25 28	1.8	4	6	40	2	4	M12 (1.2")	14	0.63	0.580
15	20 (21.3*)	95	14	14	14	65	35	30 32	2.0	4	6	45	2	4	M12 (1.2")	14	0.72	0.648
20	25 (26.9*)	105	16	16	16	75	38	38 40	2.3	4	6	58	2	4	M12 (1.2")	14	1.01	0.952
25	30 (33.7*)	115	16	16	16	85	38	42 45	2.6	4	6	68	2	4	M12 (1.2")	14	1.23	1.14
32	38 (42.4*)	140	16	16	16	100	40	52 56	2.6	6	6	78	2	4	M16 (5/8")	18	1.80	1.69
40	44.5 (48.3*)	150	16	16	16	110	42	60 64	2.6	6	7	88	3	4	M16 (5/8")	18	2.09	1.86
50	57 (60.3*)	165	18	18	18	125	45	72 75	2.9	6	8	102	3	4	M16 (5/8")	18	2.88	2.53
65	76.1*)	185	18	18	18	145	45	90	2.9	6	10	122	3	4	M16 (5/8")	18	3.66	3.06
80	88.9*)	200	20	20	20	160	50	105	3.2	8	10	138	3	8	M16 (5/8")	18	4.77	3.70
100	108 (114.3*)	220	20	20	20	180	52	125 131	3.6	8	12	158	3	8	M16 (5/8")	18	5.65	4.62
125	133 (139.7*)	250	22	22	22	210	55	150 156	4.0	8	12	188	3	8	M16 (5/8")	18	8.42	6.30
150	159 (168.3*)	285	22	22	22	240	55	175 184	4.5	10	12	212	3	8	M20 (3/4")	23	10.4	7.75
200	216 (219.1*)	340	24	24	24	295	62	232 235	5.9	10	16	268	3	12	M20 (3/4")	23	16.1	11.0
250	267 (273*)	405	26	26	26	355	70	285 292	6.3	12	16	320	3	12	M24 (7/8")	27	24.9	15.6
300	381 (323.9*)	460	28	28	28	410	78	338 344	7.1	12	16	378	4	12	M24 (7/8")	27	35.1	22.0
350	355.6*) 368	520	30	30	30	470	82	390	8.0	12	16	438	4	16	M24 (7/8")	27	47.8	28.7
400	406.4*) 419	580	32	32	32	525	85	445	8.8	12	16	490	4	16	M27 (1")	30	63.5	36.3
500	508*) 521	715	34	36	34	650	90	548	8.0	12	16	610	4	20	M30 (1 1/8")	33	102.0	59.3
600	609.6*) 622	840	36	40		770	95	652	8.8	12	18	725	5	20	M33 (1 1/4")	36		
700	711.2*) 720	910	36			840	100	755	8.8	12	18	795	5	24	M33 (1 1/4")	36		
800	812.8*) 820	1025	38			950	105	855	10.0	12	20	900	5	24	M36 (1 3/8")	39		
900	914.4*) 920	1125	40			1050	110	955	10.0	12	20	1000	5	28	M36 (1 3/8")	39		
1000	1016*) 1020	1255	42			1170	120	1058	10.0	16	20	1115	5	28	M39 (1 1/2")	42		

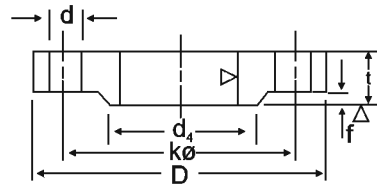
Out side diameter of pipe complies with ISO recommendation R64

25BAR

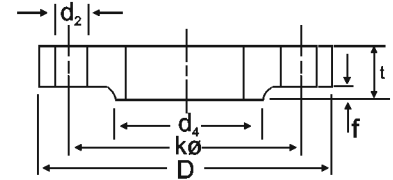
DIN 2544 SLIP - ON FLANGES

DIN 2527 BLIND FLANGES

DIN 2634 WELDING NECK FLANGES



SLIP-ON



BLIND

Unit : mm

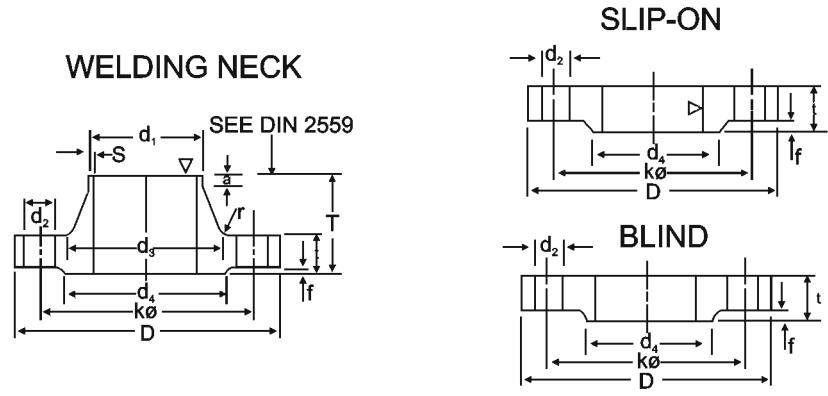
Bore		Common Dimension						Hub				Raise Face		Drilling			Approx Weight (kg)		
Nominal Bore	d ₁	D	t			K	T	d ₃	s	r	a	d ₄	f	No. of Bolt	Dia. of Bolt	d ₂	DIN 2544	DIN 2634	
			Welding neck	slip-on (No-hub)	Blind														
10	14 17.2*)	90	16	16	16	60	35	25 28	1.8	4	6	40	2	4	M12	(1.2")	14	0.72	0.661
15	20 21.3*)	95	16	16	16	65	35	30 32	2.0	4	6	45	2	4	M12	(1.2")	14	0.81	0.746
20	25 26.9*)	105	18	18	18	75	40	38 40	2.3	4	6	58	2	4	M12	(1.2")	14	1.24	1.06
25	30 33.7*)	115	18	18	18	85	40	42 46	2.6	4	6	68	2	4	M12	(1.2")	14	1.38	1.29
32	38 42.4*)	140	18	18	18	100	42	52 56	2.6	6	6	78	2	4	M16	(5/8")	18	2.03	1.88
40	44.5 48.3*)	150	18	18	18	110	45	60 64	2.6	6	7	88	3	4	M16	(5/8")	18	2.35	2.34
50	57 60.3*)	165	20	20	20	125	48	72 75	2.9	6	8	102	3	4	M16	(5/8")	18	3.20	2.82
65	76.1*)	185	22	22	22	145	52	90	2.9	6	10	122	3	8	M16	(5/8")	18	4.29	3.74
80	88.9*)	200	24	24	24	160	58	105	3.2	8	12	138	3	8	M16	(5/8")	18	5.88	4.75
100	108 114.3*)	235	24	24	24	190	65	128 134	3.6	8	12	162	3	8	M20	(3/4")	23	7.54	6.52
125	133 139.7*)	270	26	26	26	220	68	155 162	4.0	8	12	188	3	8	M24	(7/8")	27	10.8	9.07
150	159 168.3*)	300	28	28	28	250	75	182 192	4.5	10	12	218	3	8	M24	(7/8")	27	14.5	11.8
200	216 219.1*)	360	30	30	30	310	80	240 244	6.3	10	16	278	3	12	M24	(7/8")	27	22.3	17.0
250	267 273*)	425	32	32	32	370	88	292 298	7.1	12	18	355	3	12	M27	(1")	30	33.5	24.4
300	381 323.9*)	485	34	34	34	430	92	345 352	8.0	12	18	395	4	16	M27	(1")	30	46.3	31.2
350	355.6*) 368	555	38	38	38	490	100	398	8.0	12	20	450	4	16	M30	(1 1/8")	33	68.0	45.0
400	406.4*)	620	40	40	40	550	110	452	8.8	12	20	505	4	16	M33	(1 1/4")	36	89.7	58.7
500	508*) 521	730	44	44	44	660	125	558	10.0	12	20	615	4	20	M33	(1 1/4")	36	138.0	86.1
600	609.6*) 622	845	46			770	125	660	11.0	12	20	720	5	20	M36	(1 3/8")	39		101.0
700	711.2*) 720	960	46			875	125	760	12.5	12	20	820	5	24	M39	(1 1/2")	42		134.0
800	812.8*) 820	1085	50			990	135	865	14.2	12	22	930	5	24	M45	(1 3/4")	48		183.0
900	914.4*) 920	1185	54			1090	145	968	16.0	12	24	1030	5	28	M45	(1 3/4")	48		232.0
1000	1016*) 1020	1320	58			1210	155	1070	17.5	16	24	1140	5	28	M52	(2")	56		302.0

40BAR

DIN 2545 SLIP - ON FLANGES

DIN 2527 BLIND FLANGES

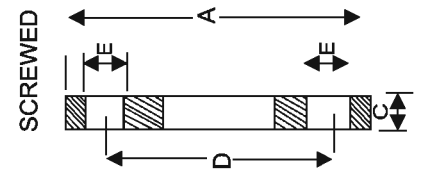
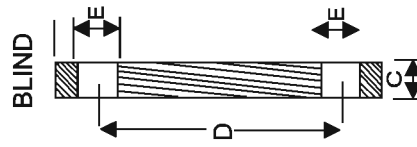
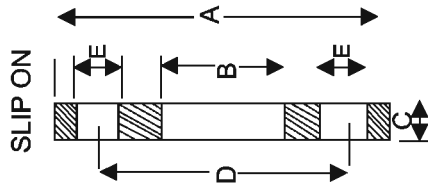
DIN 2635 WELDING NECK FLANGES



Unit : mm

Bore		Common Dimension					Hub				Raise Face		Drilling			Approx Weight (kg)			
Nominal Bore	d ₁	D	t			K	T	d ₂	s	r	a	d ₄	f	No. of Bolt	Dia. of Bolt	d ₂	DIN 2545	DIN 2635	
			Welding neck	slip-on (No-hub)	Blind														
10	14 (17.2*)	90	16	16	16	60	35	25 28	1.8	4	6	40	2	4	M12	(1.2")	14	0.72	0.661
15	20 (21.3*)	95	16	16	16	65	38	30 32	2.0	4	6	45	2	4	M12	(1.2")	14	0.81	0.746
20	25 (26.9*)	105	18	18	18	75	40	38 40	2.3	4	6	58	2	4	M12	(1.2")	14	1.24	1.06
25	30 (33.7*)	115	18	18	18	85	40	42 46	2.6	4	6	68	2	4	M12	(1.2")	14	1.38	1.29
32	38 (42.4*)	140	18	18	18	100	42	52 56	2.6	6	6	78	2	4	M16	(5/8")	18	2.03	1.88
40	44.5 (48.3*)	150	18	18	18	110	45	60 64	2.6	6	7	88	3	4	M16	(5/8")	18	2.35	2.33
50	57 (60.3*)	165	20	20	20	125	48	72 75	2.9	6	8	102	3	4	M16	(5/8")	18	3.20	2.82
65	76.1*)	185	22	22	22	145	52	90	2.9	6	10	122	3	8	M16	(5/8")	18	4.29	3.74
80	88.9*)	200	24	24	24	160	58	105	3.2	8	12	138	3	8	M16	(5/8")	18	5.88	4.75
100	108 (114.3*)	235	24	24	24	190	65	128 134	3.6	8	12	162	3	8	M20	(3/4")	23	7.54	6.52
125	133 (139.7*)	270	26	26	26	220	68	155 162	4.0	8	12	188	3	8	M24	(7/8")	27	10.8	9.07
150	159 (168.3*)	300	28	28	28	250	75	182 192	4.5	10	12	218	3	8	M24	(7/8")	27	14.5	11.80
(175)	(191) (193.7*)	350	32	30	32	295	82	251 218	5.6	10	15	260	3	12	M27	(1")	30	22.1	18.2
200	216 (291.1*)	375	34	34	34	320	88	240 244	6.3	10	16	385	3	12	M27	(1")	30	27.2	21.5
250	267 (273*)	450	38	38	38	385	105	298 306	7.1	12	18	345	3	12	M30	(1 1/8")	33	43.8	34.9
300	318 (323.9*)	515	42	42	42	450	115	352 362	8.0	12	18	410	4	16	M30	(1 1/8")	33	63.3	49.7
350	355.6* 368	580	46	46	46	510	125	408	8.8	12	20	565	4	16	M33	(1 1/4")	36	89.5	68.1
400	406.4* 419	660	50	50	50	585	135	462	11.0	12	20	535	4	16	M36	(1 1/8")	39	127.0	96.5
500	508* 521	744	52	52	52	670	140	562	142	12	20	615	4	20	M39	(1 1/8")	42	172.0	117.0

Out side diameter of pipe complies with ISO recommendation R64



BS 10 Pipes

N.B. Size	Table	Dia of Flange A	Bore of Slip-on B	Thickness of Flange C	Pitch circle Dia D (PCD)	Dia of Bolt Holes E	No. of Bolts
1/2"	D	95	22.3	4.7	67	14.3	4
	E	95	22.3	6	67	14.3	4
	F	95	22.3	9.5	67	14.3	4
	H	114	22.3	13	83	17.5	4
3/4"	D	102	27.7	4.7	73	14.3	4
	E	102	27.7	6	73	14.3	4
	F	102	27.7	9.5	73	14.3	4
	H	114	27.7	13	83	17.5	4
1"	D	114	34.6	5	83	14.3	4
	E	114	34.6	7	83	14.3	4
	F	120	34.6	10	87	17.5	4
	H	120	34.6	14	87	17.5	4
1 1/4"	D	120	43.2	6	87	14.3	4
	E	120	43.2	8	87	14.3	4
	F	133	43.2	13	98	17.5	4
	H	133	43.2	17	98	17.5	4
1 1/2"	D	133	49.5	6	98	14.3	4
	E	133	49.5	9	98	14.3	4
	F	140	49.5	13	105	17.5	4
	H	140	49.5	17	105	17.5	4
2"	D	152	62	8	114	17.5	4
	E	152	62	10	114	17.5	4
	F	165	62	16	127	17.5	4
	H	165	62	19	127	17.5	4
2 1/2"	D	165	75	8	127	17.5	4
	E	165	75	10	127	17.5	4
	F	184	75	16	145	17.5	8
	H	184	75	19	145	17.5	8
3"	D	184	90.5	9.5	145	17.5	4
	E	184	90.5	11	145	17.5	4
	F	203	90.5	16	165	17.5	8
	H	203	90.5	22	165	17.5	8
4"	D	215	116	9.5	178	17.5	4
	E	215	116	13	178	17.5	8
	F	228	116	19	191	17.5	8
	H	228	116	25	191	17.5	8
5"	D	254	144	12.7	210	17.5	8
	E	254	144	14	210	17.5	8
	F	279	144	22	235	22.2	8
	H	279	144	25	235	22.2	8

BS 10 Pipes

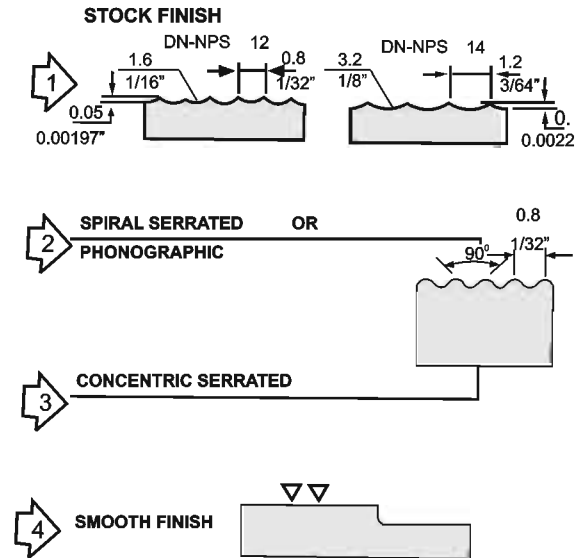
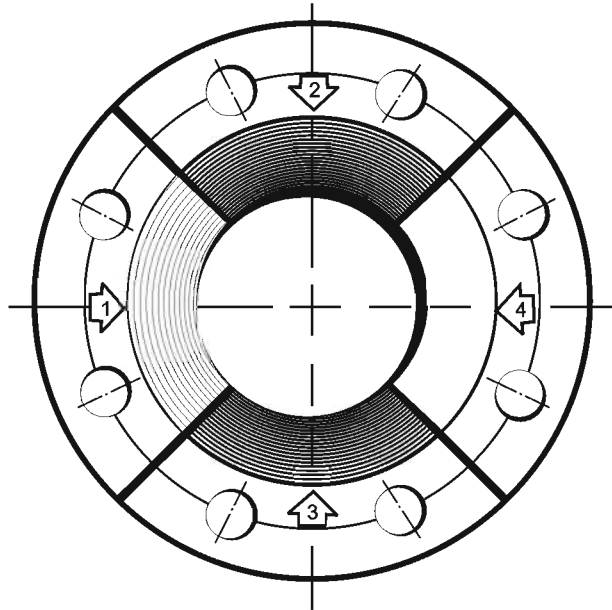
N.B. Size	Table	Dia of Flange A	Bore of Slip-on B	Thickness of Flange C	Pitch circle Dia D	Dia of Bolt Holes E	No. of Bolts
6"	D	279	171	12.7	235	17.5	8
	E	279	171	17	235	22.2	8
	F	305	171	22	260	22.2	12
	H	305	171	29	260	22.2	12
8"	D	336	221.5	13	292	17.5	8
	E	336	221.5	19	292	22.2	8
	F	368	221.5	25	324	22.2	12
	H	368	221.5	32	324	22.2	12
10"	D	406	276.5	16	356	22.2	8
	E	406	276.5	25	356	22.2	12
	F	431	276.5	22	381	25.4	12
	H	431	276.5	35	381	25.4	12
12"	D	457	327	16	406	22.2	12
	E	457	327	29	406	25.4	12
	F	488	327	25	438	25.4	16
	H	488	327	38	438	25.4	16
14"	D	527	359	19	470	25.4	12
	E	527	359	32	470	25.4	12
	F	552	359	25	495	28.7	16
	H	552	359	41	495	28.7	16
16"	D	578	410.5	19	521	25.4	12
	E	578	410.5	32	521	25.4	12
	F	610	410.5	25	552	28.7	20
	H	610	410.5	44	552	32	20
18"	D	641	461.5	22	584	25.4	12
	E	641	461.5	35	584	25.4	16
	F	673	461.5	29	610	32	20
	H	673	461.5	48	610	32	20
20"	D	705	513	25	641	25.4	16
	E	705	513	38	641	25.4	16
	F	737	513	32	673	32	24
	H	737	513	51	673	32	24
24"	D	826	616	29	756	28.7	16
	E	826	616	38	756	32.3	16
	F	851	616	38	781	32	24
	H	851	616	57	781	35	24

DIMENSIONS OF RAISED FLANGES - AS PER IS :1538 (PART IV) - 1976

N. B	Out Dia	Thickness	Bolt Circle Dia	No. Of Bolt	Dia. Of Holes
80	200	21	160	4	19
100	220	22	180	8	19
125	250	22.5	210	8	19
150	285	23.0	240	8	23
200	340	24.5	295	8	23
250	395	26	350	12	23
300	445	27.5	400	12	23
350	505	29	450	16	23
400	565	30	515	16	28
450	615	31.5	565	20	28
500	670	33	620	20	28
600	780	36	725	20	31
700	895	38.5	840	24	31
750	960	40	900	24	31
800	1015	41.5	950	24	34

STANDARD FINISH

STANDARD FINISHES for Face of flange (ANSI B16.5)



STOCK FINISH:

The most widely of any gasket finish. because practically is suitable for all ordinary service conditions. This is a continuous spiral groove. Flanges sizes 12" (304.8mm) and smaller are produced with a 1/16" round-nosed tool at a feed of 1/32" per revolution for sizes 14" (355.6mm) and larger. the finish is made with 1/8" round-nosed tool at a feed of 3/64" per revolution.

SPIRAL SERRATED OR PHONOGRAPHIC.

This Finish Is Producing By Using A 90° Round-nosed Tool.

CONCENTRIC SERRATED:

This finish is producing by using a 90° round-nosed tool.

SMOOTH FINISH:

The Cutting tool employed shall have an approximate 0.06" radius.

The resultant surface finish shall have a 125µ inch to 250µ inch (ANSI B 16.5 para 6.4;4.1)

1. RAISED FACE, AND LARGE MALE AND FEMALE

Either a serrated-concentric or serrated-spiral finish having from 34 to 64 grooves per inch is used,

The Cutting tool employed has an approximate 0.06 in. radius. The resultant surface finish shall have a 125µ (3.2µm) to 500µ inch (12.5µm) approximate roughness.

2. TONGUE AND GROOVE, AND SMALL MALE AND FEMALE

The gasket contact surface does not exceed 125µ in.(3.2µm) roughness

3. RING JOINT

The inside wall surface of gasket groove does not exceed 63µ in.(16.µm) roughness.

4. BLIND

Blind flanges need not be face in the center if, when this center part is raised, its diameter is at least 1 in.

smaller than the inside diameter of fittings of the corresponding pressure class. When the center part is depressed, its diameter is not greater than the inside diameter of the corresponding pressure class fittings. Machining of the depressed center is not required.

DIMENSIONAL TOLERANCES OF FORGED FLANGES ANSI B 16.5

Threaded, Slipon, Lapjoint,
Socket Welding & Blind

Welding Neck

Outside Diameter	O.D. is 600 or smaller O. D. over 600	± 1.6 ± 3.1	Outside Diameter	O.D. is 50 or smaller O. D. over 600	± 1.6 ± 3.1
Inside Diameter (bore)	250 and smaller 12 through 450 500 and larger	± 0.7 ± 1.6 ± 3.1	Inside Diameter slip lap joint:	threaded: to standard gauge limits socket-welding: 250 and larger 300 and larger	(bore) +0.7 -0.0 +1.6 -0.0
Diameter of contact face	1.6 raise face 6.3 raised face: tongue & grooved male & female	± 0.7 ± 0.4	Diameter of counter bore	threaded 250 and smaller 300 and larger	+0.7 -0.0 +1.6 -0.0
Diameter of hub at base	When E is 600 or smaller When E is over 600	± 1.6 ± 3.1	Outside diameter hub	300 and smaller 350 and larger	+2.3 -1.6 ± 3.1
Diameter hub at point of welding	125 and smaller 150 and larger	+0.7 ± 0.7 +4.0 ± 0.0	Diameter of contact face	1.6 raised face 6.3 raised: tongue & grooved male & female	± 0.7 ± 0.4
Thickness	450 and smaller 500 and larger	+3.1 ± 0.0 +4.7 ± 0.0	Thickness	450 and smaller 500 and larger	+3.1 -0.0 +4.7 -0.0
Length through hub	250 and smaller 300 and larger	± 1.6 ± 3.1	Length through hub	250 and smaller 300 and larger	± 1.6 ± 3.1
Drilling	bolt circle bolt hole spacing	± 1.6 ± 0.7	Drilling	bolt circle bolt hole spacing	± 1.6 ± 0.7
	essentricity with respect to bore	0.7 max		essentricity with respect to bore	0.7 max

WELDING NECK FLANGE BORE

NPS (NB)	O.D. (MM)	Sch. 10	Sch. 20	Sch. 30	Sch. Std	Sch. 40	Sch. XS	Sch. 80	Sch. 120	Sch. 160	Sch. XXS
15	21.33	17.1	-	-	15.7	15.7	13.8	13.8	-	11.7	6.4
20	26.67	22.5	-	-	20.8	20.8	18.8	18.8	-	15.5	11.0
25	33.40	27.9	-	-	26.6	25.4	24.3	24.3	-	20.7	15.2
32	42.16	36.6	-	-	35.0	35.0	32.4	32.4	-	29.4	22.7
40	48.26	42.7	-	-	40.8	40.8	38.1	38.1	-	33.7	27.9
50	60.31	54.8	-	-	52.3	52.3	49.2	49.2	-	42.8	38.1
65	73.02	66.9	-	-	62.4	62.4	59.0	59.0	-	53.9	44.9
80	88.90	82.8	-	-	77.9	77.9	73.6	73.6	-	66.6	58.4
100	114.30	108.2	-	-	102.2	102.2	97.1	97.1	92.0	87.3	80.0
125	141.30	134.5	-	-	128.1	128.1	122.2	122.2	115.9	109.5	103.2
150	168.27	161.5	-	-	154.0	154.0	146.3	146.3	139.7	131.7	124.3
200	219.07	211.6	206.2	204.9	202.7	202.7	193.6	193.6	182.5	173.0	174.6
250	273.05	264.7	260.3	257.4	254.5	254.5	247.6	242.8	230.1	215.9	222.2
300	323.85	314.7	311.1	307.0	304.8	303.2	298.4	288.8	273.0	257.2	273.0
350	355.60	346.2	337.8	336.5	336.5	333.3	330.2	317.5	300.0	284.1	-
400	406.40	396.7	390.3	387.3	387.3	381.0	381.0	363.5	344.5	325.4	-
450	457.20	447.5	441.1	434.9	438.1	428.6	431.8	409.5	387.3	366.7	-
500	508.00	497.3	488.9	482.6	488.9	477.8	482.6	455.6	431.8	407.9	-
600	609.60	596.9	590.5	581.0	590.5	574.6	584.2	547.6	517.5	490.5	-

ANSI FLANGES WEIGHT (KGS)

Nom Pipe Size	150#			300#			600#			900#			1500#			2500#		
	WN	S/O	B/K	WN	S/O	B/K	WN	S/O	B/K	WN	S/O	B/K	WN	S/O	B/K	WN	S/O	B/K
1/2"	0.7	0.4	0.5	0.8	0.7	0.8	0.9	0.8	0.8	2.1	1.8	1.9	2.1	1.8	1.9	3.2	3	3
3/4"	0.8	0.7	0.8	1.4	1.2	1.2	1.6	1.4	1.4	2.7	2.4	2.7	2.7	2.4	2.7	3.6	4	4.5
1"	1.1	0.8	0.9	1.7	1.4	1.5	1.9	1.7	1.7	3.9	3.6	3.7	3.9	3.6	3.7	5.4	5	5
1.1/4"	1.5	1.2	1.3	2.2	1.8	2	2.6	2.1	2.4	4.5	4.1	4.3	4.5	4.1	4.3	7.8	8	8
1.1/2"	1.8	1.4	1.6	3.2	2.7	2.9	3.6	3.1	3.4	6.2	5.4	5.9	6.2	5.4	5.9	11.5	11	11
2"	2.7	2.2	2.6	3.6	3.2	3.5	4.7	3.9	4.4	11.3	10.5	11.3	11.3	10.5	11.3	19	17	17
2.1/2"	4.4	3.5	4.1	5.4	4.5	5.3	4.8	5.4	6.8	16.3	15.8	16	16.3	15.8	16	24	25	25
3"	5.2	3.8	5.1	7.3	5.9	7.2	8.7	7.3	8.9	15	12.3	16.8	21	21.5	19.5	42.6	38	39
3.1/2"	6.4	5	6.5	8.9	7.5	9.2	11.6	9	12.7	-	-	-	-	-	-	-	-	-
4"	7.5	5.6	7.5	11.8	10	12.2	18.4	16.5	18.6	24	23.2	24.5	31.8	31	33	64	58	60
5"	9.2	6.5	9.2	16	12.5	16	31	28.5	30.8	38.5	37.5	39.5	59	58.8	60	111	95	101
6"	11.0	8.1	11.8	20.2	16.5	22	37	36.2	38	50	48.3	51.5	72	74	75	171	146	156
8"	18.4	13	20.4	31.2	25.5	36	54.5	51.5	62.2	85	75	89	124	112	125	261	220	242
10"	25.5	18.4	31	44.3	35	55	98.5	76.2	102	123	110	131	207	184	215	485	420	465
12"	37	28.5	47	63.5	52	82.5	105	89.5	132	168	146	187	306	264	316	698	590	665
14"	51	37.5	60	86	73	108	150	102	158	198	172	224	416	-	-	-	-	-
16"	61.5	44.5	61	112	88	139	177	150	225	225	192	259	567	-	-	-	-	-
18"	71.5	54	93	141	115	178	228	180	285	318	272	383	736	-	-	-	-	-
20"	85	72	127	173	139	228	285	231	365	376	330	482	929	-	-	-	-	-
24"	119	95	190	248	212	350	372	330	532	680	632	905	1504	-	-	-	-	-

FORGED FITTINGS & FLANGES ASTM

MATERIAL SPECIFICATION FOR FORGED FITTINGS & FLANGES

SPECIFICATION (ASTM-2002)	CHEMICAL PROPERTIES						MECHANICAL PROPERTIES						OTHERS	
	C%	Min%	P% (Max)	S% (Max)	Si%	Cr%	Ni%	Mo%	U.T.S. (Min) Mpa	Y.S. (Min) Mpa	ELONG. (Min) %	RED. AREA %		Hardness (Max) BHN
STAINLESS STEEL														
A 182 Gr. F 304	0.080 Max	2.00 Max	0.045	0.030	1.00 Max	18.0-20.0	8.0-11.0	-	515	205	30	50	-	
A 182 Gr. F 304L	0.030 Max	2.00 Max	0.045	0.030	1.00 Max	18.0-20.0	8.0-13.0	-	485	170	30	50	-	
A 182 Gr. F 304H	0.04-0.10	2.00 Max	0.045	0.030	1.00 Max	18.0-20.0	8.0-11.0	-	515	205	30	50	-	
A 182 Gr. F 304LN	0.030 Max	2.00 Max	0.045	0.030	1.00 Max	18.0-20.0	8.0-10.5	-	515	205	30	50	N%=0.10-0.16	
A 182 Gr. F 309H	0.04-0.10	2.00 Max	0.045	0.030	1.00 Max	22.0-24.0	12.0-15.0	-	515	205	30	50	-	
A 182 Gr. F 310	0.25 Max	2.00 Max	0.045	0.030	1.00 Max	24.0-26.0	19.0-22.0	-	515	205	30	50	-	
A 182 Gr. F 316	0.080 Max	2.00 Max	0.045	0.030	1.00 Max	16.0-18.0	10.0-14.0	2.0-3.0	515	205	30	50	-	
A 182 Gr. F 316L	0.030 Max	2.00 Max	0.045	0.030	1.00 Max	16.0-18.0	10.0-15.0	2.0-3.0	485	170	30	50	-	
A 182 Gr. F 316H	0.04-0.10	2.00 Max	0.045	0.030	1.00 Max	16.0-18.0	10.0-14.0	2.0-3.0	515	205	30	50	-	
A 182 Gr. F 316LN	0.030 Max	2.00 Max	0.045	0.030	1.00 Max	16.0-18.0	11.0-14.0	2.0-3.0	515	205	30	50	N%=0.10-0.16	
A 182 Gr. F 317	0.080 Max	2.00 Max	0.045	0.030	1.00 Max	18.0-20.0	11.0-15.0	3.0-4.0	515	205	30	50	-	
A 182 Gr. F 317L	0.030 Max	2.00 Max	0.045	0.030	1.00 Max	18.0-20.0	11.0-15.0	3.0-4.0	485	170	30	50	-	
A 182 Gr. F 321	0.080 Max	2.00 Max	0.045	0.030	1.00 Max	17.0-19.0	9.0-12.0	-	515	205	30	50	TP%=(5xC)-0.70	
A 182 Gr. F 321H	0.04-0.10	2.00 Max	0.045	0.030	1.00 Max	17.0-19.0	9.0-12.0	-	515	205	30	50	TP%=(4xC)-0.70	
A 182 Gr. F 347	0.080 Max	2.00 Max	0.045	0.030	1.00 Max	17.0-20.0	9.0-13.0	-	515	205	30	50	Cb%=(10xC)-1.10	
A 182 Gr. F 347H	0.04-0.10	2.00 Max	0.045	0.030	1.00 Max	17.0-20.0	9.0-13.0	-	515	205	30	50	Cb%=(8xC)-1.10	
CARBON STEEL														
A 105	0.35 Max	0.60-1.05	0.035	0.040	0.10-0.35	0.30 Max	0.40 Max	0.12 Max	485	250	22	30	187	Cu%=0.40 Max, Va % = 0.08 Max
LOW TEMPERATURE CARBON STEEL														
A 350 Gr. LF 1	0.35 Max	0.60-1.35	0.035	0.040	0.15-0.30	0.30 Max	0.40 Max	0.12 Max	415-585	205	25	38	197	Cu%=0.40Max, Cb%=0.02 Max, Va % = 0.05 Max, Impact Test =-28.9°C, J=18 Min
A 350 Gr. LF 2	0.30 Max	0.60-1.35	0.035	0.040	0.15-0.30	0.30 Max	0.40 Max	0.12 Max	485-655	250	22	30	197	Cu%=0.40Max, Cb%=0.02 Max, Va % = 0.05 Max, Impact Test =-45.6°C, J=18 Min
A 350 Gr. LF 3	0.20 Max	0.90 Max	0.035	0.040	0.20-0.35	0.30 Max	3.30-3.70	0.12 Max	485-655	260	22	35	197	Cu%=0.40Max, Cb%=0.02 Max, Va % = 0.03 Max, Impact Test =-101°C, J=20 Min
ALLOY STEEL														
A 182 Gr. F 1	0.28 max	0.60-0.90	0.045	0.045	0.15-0.35	-	-	0.44-0.65	485	275	20	30	143-192	-
A 182 Gr. F 2	0.05-0.21	0.30-0.80	0.040	0.040	0.10-0.60	0.50-0.81	-	0.44-0.65	485	275	20	30	143-192	-
A 182 Gr. F 5	0.15 max	0.30-0.60	0.030	0.030	0.50 Max	4.0-6.0	0.5 Max	0.44-0.65	485	275	20	35	143-217	-
A 182 Gr. F 9	0.15 max	0.30-0.60	0.030	0.030	0.50-1.00	8.0-10.0	-	0.90-1.10	585	380	20	40	179-217	-
A 182 Gr. F 11 CL1	0.05-0.15	0.30-0.60	0.030	0.030	0.50-1.00	1.0-1.50	-	0.44-0.65	415	205	20	45	121-174	-
A 182 Gr. F 11 CL2	0.10-0.20	0.30-0.80	0.040	0.040	0.50-1.0	1.0-1.50	-	0.40-0.65	485	275	20	30	143-207	-
A 182 Gr. F 11 CL3	0.10-0.20	0.30-0.80	0.040	0.040	0.50-1.0	1.0-1.50	-	0.44-0.65	515	310	20	30	156-207	-
A 182 Gr. F 12 CL1	0.05-0.15	0.30-0.60	0.045	0.045	0.50 Max	0.80-1.25	-	0.44-0.65	415	220	20	45	121-174	-
A 182 Gr. F 12 CL2	0.10-0.20	0.30-0.80	0.040	0.040	0.10-0.60	0.80-1.25	-	0.44-0.65	485	275	20	30	143-207	-
A 182 Gr. F 22 CL1	0.05-0.15	0.30-0.60	0.040	0.040	0.50 Max	2.0-2.5	-	0.87-1.13	415	205	20	35	170	-
A 182 Gr. F 22 CL3	0.05-0.15	0.30-0.60	0.040	0.040	0.50 Max	2.0-2.50	-	0.87-1.13	515	310	20	30	156-207	-
A 182 Gr. F 91	0.08-0.12	0.30-0.60	0.020	0.010	0.20-0.50	8.0-9.5	0.40 Max	0.85-1.05	585	415	20	40	248	Cb%=0.06-0.10, N%=0.09-0.07, Va % = 0.16-0.25

FORGED PIPE FITTINGS

Forged fittings are stocked to the dimensional specifications and in the material listed below. Where two specifications are quoted dimensions are common to both specifications

Elbow, Tees, Unions (3000 lb), Couplings, Half Couplings, Caps, Hex Plugs, Round Plug, Hex head bushings, Flush bushing, Hexagon Nipples, Swage Nipples, Round nipples, Reducing inserts, ball Plugs. Olets, Elbows, Laterolets and Nipolets.

As per : MSS SP 83/ MSS SP 99/ ASTM A 733 / MSS SP 79/ MSS SP 95/ Design to ANSI B 31.1 (1986)

Materials : ASTM A 105, A105N, A350 LF/LF2, A 182 F304/304L/F321/ F316/F316L, A182 F5/F9/F91/F11/F22 & As per upon request

Threading : Thread fittings are threaded to ANSI B1.20. 1 NPT

Test Certificates : Fittings test certificates to DIN 50049, 3.1.b are available and are supplied with all goods sold. test certificates include full chemical analysis with Carbon Equivalent.

Material conforms to NACE MR 175 (latest edition), has a maximum C.E. of 43% and a maximum carbon content of .23%

Marking: Plugs, Bushings, Hex nipples are marked with the manufacturers mark, heat code and material identification

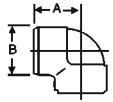
Other fittings (excluding round nipples and swages) are marked with manufacturers mark, heat code, material identification, pressure rating and nominal size

Round Nipples and swage are marked with the manufacturers mark, heat code, material identification, schedule(s) or pressure rating and nominal size (s)

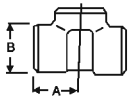


DIMENSION IN MM OF FORGED SCREWED FITTINGS TO ANSI B-16.11 THREADED TO ASA B 2.1

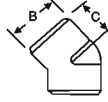
90° ELBOWS



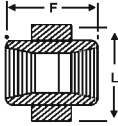
TEE



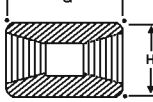
45° ELBOW



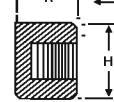
UNION



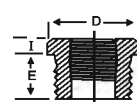
COUPLING



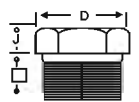
PIPE CAP



BUSHING



HEX HEAD PLUG

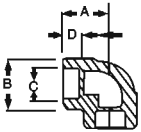


HALF COUPLING = G/2

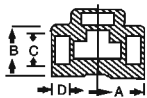
NOM BORE	PIPE O.D.	3000 L.B.S.						COMMON FACTORS						6000 L.B.S.					
		A	B	C	G	H	K	D	E	F	I	J	L	A	B	C	G	H	K
1/8"	10.3	21	22	17	32	16	19	11	10	40	-	6	-	25	25	19	32	22	-
1/4"	13.7	25	25	19	35	19	25	16	11	43	3	6	32	29	33	22	35	25	27
3/8"	17.2	29	33	22	38	22	25	17.5	13	48	4	8	38	33	38	25	38	32	27
1/2"	21.3	33	38	25	48	29	32	22	15	51	5	8	46	38	46	29	48	38	33
3/4"	26.7	38	46	29	51	35	37	27	16	57	6	10	51	44	56	33	51	44	38
1"	33.4	44	56	33	60	44	41	35	19	64	6	10	60	51	62	35	60	57	43
1 1/4"	42.2	51	62	35	67	57	44	44.5	21	70	7	14	72	60	75	43	67	64	46
1 1/2"	48.3	60	75	43	79	64	44	51	21	79	8	16	80	64	84	44	79	76	48
2"	60.3	64	84	45	86	76	48	63.5	22	88	9	17	94	83	102	52	86	92	51
2 1/2"	73.02	83	102	52	92	92	60	76	27	118	10	21	122	95	121	64	92	108	64
3"	89.0	95	121	64	108	108	65	89	29	121	10	25	140	106	146	79	108	127	68
4"	114.5	114	152	79	121	140	68	117.5	32	150	13	25	180	114	152	79	121	159	75

SOCKET WELD FITTING TO ANSI B-16.11

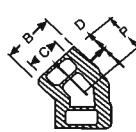
90° ELBOWS



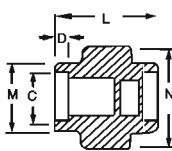
TEE



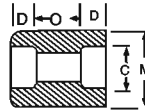
45° ELBOW



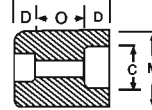
UNION



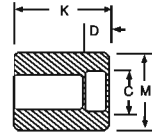
COUPLING



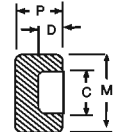
REDUCER



HALF COUPLING



CAP



NOM BORE	PIPE O.D.	3000 L.B.S.								COMMON FACTORS				6000 L.B.S.					
		A	B	K	J	L	M	N	P	Q	Cmin	Dmin	Omin	Omax	A	B	M	K	N
1/8"	10.3	22	18.5	26	16	40	17.3	32	17.5	10	10.7	10	5	8	22	22	20	25	46
1/4"	13.7	22	22	26	18	43	21.2	32	17.5	10	14.1	10	5	8	27	25	24	25	51
3/8"	17.2	25	25	26	19	48	25.4	36	19	10	17.6	10	3	9	27	28	28	26	60
1/2"	21.3	27	32	30	21	51	31	43	22	10	21.7	10	6	13	31	34	34	31	72
3/4"	26.7	34	38	36	24	57	37	50	25	13	27	13	6	13	37	42	41	35	80
1"	33.4	37	46	40	25	64	45.2	60	27	13	33.8	13	9	17	42	50	50	40	94
1 1/4"	42.2	42	56	40	29	70	55	70	30	13	42.6	13	9	17	47	59	58	41	100
1 1/2"	48.3	47	62	40	30	79	61.4	78	32	13	48.7	13	9	17	53	67	55	43	122
2"	60.3	56	75	52	37	89	75	95	38	13	61.2	16	15	23	59	84	83	55	
2 1/2"	73.02	60	92	52	48	114	91.3	125	38	16	73.8	16	14	24		102		56	
3"	89.00	76	110	52	51	127	108.8	140	44	16	89.8	16	14	24		121		58	
4"	114.50	88	137	58		150	136.9		48	19	115.5	19	14	24		152		64	

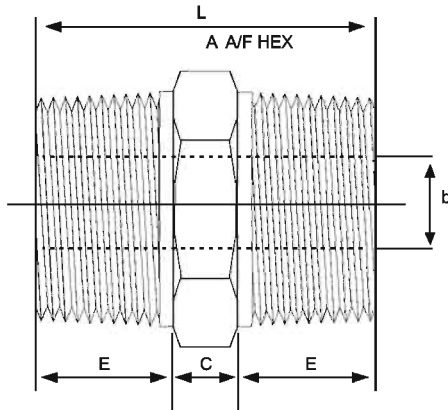
DIMENSIONS AND OTHERS SPECIFICATIONS AS PER CUSTOMERS REQUIREMENTS ARE AVAILABLE ON REQUEST

Screwed Pipe Fittings

(Straight & Reducing Hexagon Nipples)

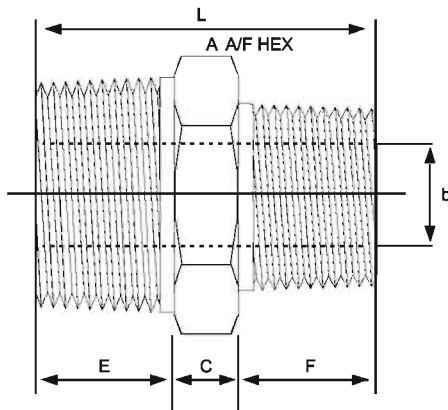
(Dimensions in Millimetres)

Pressure Class 3000



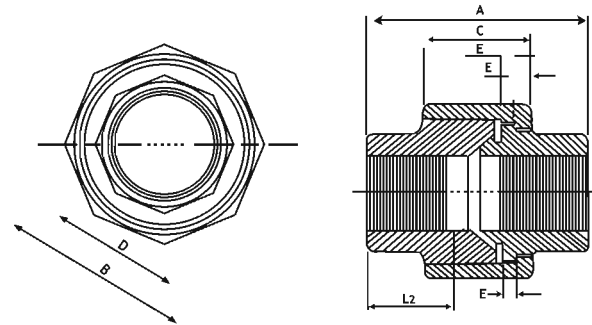
N.B	Dim.A (mm)	Dim.b (mm)	Dim.C (mm)	Dim.E (mm)	Dim.F (mm)	Dim.L (mm)
6	11	5	6	10	.	26
8	15	8	6	15	.	36
8x6	15	5	6	15	10	31
10	18	11	3	16	.	40
10x8	18	8	3	16	15	39
15	22	14	8	20	.	38
15x10	22	11	8	20	16	44
15x8	22	8	8	20	15	43
20	27	19	10	21	.	52
20x15	27	14	9	21	20	50
20x10	27	11	9	21	16	46
25	35	24	10	25	.	60
25x20	35	19	10	25	21	56
25x15	35	14	10	25	20	55
40	50	38	16	26	.	68
40x25	50	24	16	26	25	67
40x20	50	19	16	26	21	63
40x15	50	14	16	26	20	62
50	62	49	17	27	.	71
50x40	62	38	17	27	26	70
50x25	62	24	18	27	25	70
50x20	62	19	17	27	21	65
50x15	62	14	18	27	20	65

Pressure Class 6000



N.B	Dim.A (mm)	Dim.b (mm)	Dim.C (mm)	Dim.E (mm)	Dim.F (mm)	Dim.L (mm)
6	11	2	6	10	.	26
8	15	6	6	15	.	36
8x6	15	2	6	15	10	31
10	18	8	3	16	.	40
10x8	13	6	8	16	15	39
15	22	11	8	20	.	48
15x10	22	8	8	20	16	44
15x8	22	6	8	20	15	43
20	27	13	10	21	.	52
20x15	27	11	9	21	20	50
20x10	27	8	9	21	16	46
25	35	17	10	25	.	60
25x20	35	13	10	25	21	56
25x15	35	11	10	25	20	55
40	50	30	16	26	.	68
40x25	50	17	16	26	25	67
40x20	50	13	16	26	21	63
40x15	50	11	16	26	20	62
50	62	39	17	27	.	71
50x40	62	30	17	27	26	70
50x25	62	17	18	27	25	70
50x20	62	13	17	27	21	65
50x15	62	11	18	27	20	65

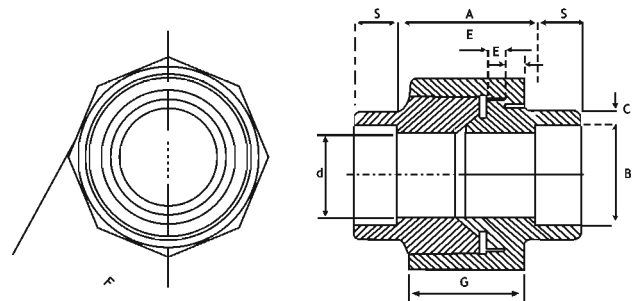
Screwed Unions (Dimensions in Millimeters)



Pressure Class 3000

N.B	Dim.A (mm)	Dim.B (mm)	Dim.C (mm)	Dim.D (mm)	Dim.D (mm)
6	40	32	16	17	3.2
8	43	32	18	19	3.2
10	48	36	19	22	3.2
15	51	43	21	30	4.0
20	57	50	24	36	4.8
25	64	60	25	41	4.8
32	70	70	29	50	5.6
40	79	78	30	60	5.6
50	89	95	37	70	6.4
65	118	125	48	85	9.6
80	121	140	51	100	12.7

Socket Weld Unions (Dimensions in Millimeters)



Pressure Class 3000

N.B	Dim.A (mm)	Dim.B (mm)	Dim.C (mm)	Dim.d (mm)	Dim.E (mm)	Dim.F (mm)	Dim.G (mm)	Dim.S (mm)
6	17	10.7	3.2	6.8	3.2	32	16	10
8	17	14.1	3.3	9.2	3.2	32	18	10
10	17	17.6	3.5	12.5	3.2	36	19	10
15	18	21.8	4.1	15.5	4.0	41	21	10
20	20	27.4	4.3	21.0	4.8	50	24	13
25	26	34.1	5.0	26.5	4.8	60	25	13
32	28	42.9	5.3	35.0	5.6	70	29	13
40	30	49.0	5.6	40.0	5.6	78	30	13
50	36	51.0	6.1	52.0	6.4	95	37	16
65	57	73.8	7.7	62.0	9.6	125	48	16
80	70	86.7	9.3	78.0	12.7	140	51	16

PIPE NIPPLES

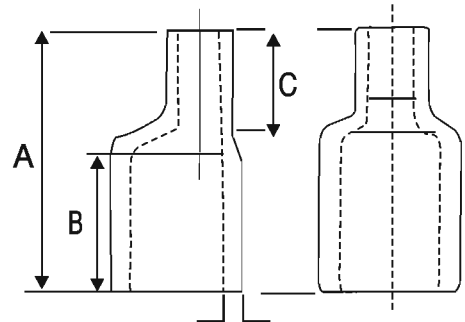
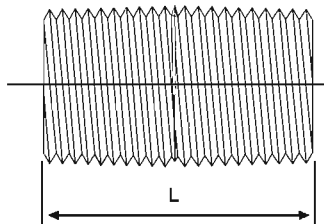
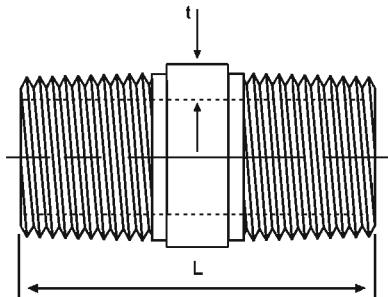
Pipe Nipples Lengths and Sizes

Nominal Pipe Size, in														
1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6
Nominal Nipples Lengths, in														
3/4	7/8	1	1 1/8	1 3/8	1 1/2	1 5/8	1 3/4	2	2 1/2	2 5/8	2 3/4	2 7/8	3	3 1/8
1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	2	2	2 1/2	2 1/2	2 1/2	3	3	3	3	3 1/8
2	2	2	2	2	2 1/2	2 1/2	2 1/2	2 1/2	3	3 1/2	3 1/2	3 1/2	3 1/2	3 1/8
2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	3	3	3	3	3 1/2	4	4	4	4	3 1/8
3	3	3	3	3	3 1/2	3 1/2	3 1/2	3 1/2	4	4 1/2	4 1/2	4 1/2	4 1/2	3 1/8
3 1/2	3 1/2	3 1/2	3 1/2	3 1/2	4	4	4	4	4 1/2	5	5	5	5	3 1/8
4	4	4	4	4	4 1/2	4 1/2	4 1/2	4 1/2	5	5 1/2	5 1/2	5 1/2	5 1/2	3 1/8
	5	5	5	5	5 1/2	5 1/2	5 1/2	5 1/2	6	6 1/2	6 1/2	6 1/2	6 1/2	3 1/8
	6	6	6	6	6 1/2	6 1/2	6 1/2	6 1/2	7	7 1/2	7 1/2	7 1/2	7 1/2	3 1/8
		8	8	8	8 1/2	8 1/2	8 1/2	8 1/2	9	9 1/2	9 1/2	9 1/2	9 1/2	3 1/8
			10	10	10 1/2	10 1/2	10 1/2	10 1/2	11	11 1/2	11 1/2	11 1/2	11 1/2	3 1/8
			12	12	12 1/2	12 1/2	12 1/2	12 1/2	13	13 1/2	13 1/2	13 1/2	13 1/2	3 1/8

PIPE NIPPLES

BS 3799

SWAGES



Nominal Size	Lengths in mm			Nominal Size	Lengths in mm		
mm	A	B	C	mm	A	B	C
10X8	76	48	16	50X15	165	108	29
15X8	89	56	19	50X20	165	108	29
15X10	89	56	19	50X25	165	108	23
20X10	95	57	22	50X32	165	108	29
20X15	95	57	22	50X40	165	108	29
25X15	102	64	22	65X40	178	114	32
25X20	102	64	22	65X50	178	114	32
32X15	102	64	22	80X40	203	133	41
32X20	102	64	22	80X50	203	133	41
32X25	102	64	22	80X65	203	133	41
40X15	114	70	25	100X40	229	140	48
40X20	114	70	25	100X50	229	140	48
40X25	114	70	25	100X65	229	140	48
40X32	114	70	25	100X50	229	140	48

Wall thickness "t" is as required by pressure rating/pipe schedule

ASTM A 193/A 193M ALLOY STEEL, CARBON STEEL & STAINLESS STEEL BOLTING FOR HIGH TEMPERATURE SERVICE

ASTM GRADE	C	Mn	Si	S	P	Cr	Ni	Mo	Other	Hardness	Tensile Psi(MPa)	Yield Psi(MPa)	Elongation in Area %	Redu
A193 B8-B8A AISI Type 304	0.08 Max	2.00 Max	1.00 Max	0.030 Max	0.045 Max	18.00 20.00	8.00 10.50	- -	- -	223HB	75000(515)	30000(205)	30	50
A193B8-B8MA AISI Type 316	0.08 Max	2.00 Max	1.00 Max	0.030 Max	0.045 Max	16.00 18.00	10.00 14.00	2.00 3.00	-	223HB 223HB	75000(515)	30000(205)	30	50
A193B8T-B8TA AISI Type 321	0.08 Max	2.00 Max	1.00 Max	0.030 Max	0.045 Max	17.00 19.00	9.00 12.00	- -	Ti>5xC <0.70	223HB	75000(515)	30000(205)	30	50
A193 B8C-B8CA AISI Type 347	0.08 Max	2.00 Max	1.00 Max	0.030 Max	0.045 Max	17.00 19.00	9.00 13.00	- -	Cb+7a>10 xc51.10	192HB	75000(515)	30000(205)	30	50
A193B6-B6X AISI Type 410	0.15 Max	1.00 -	1.00 Max	0.03 Max	0.040 Max	11.50 13.50	- -	-	-	-	110000(760)	85000(585)	15	50
A193 B7-B7M Alloy Steel (Cr. Mo)	0.37 0.49	0.65 1.10	0.15 0.35	0.040 Max	0.035 Max	0.75 1.20	- -	0.15 0.25	- -	- -	125000(860)	105000(720)	16	50
A193B5	0.10	1.00	1.00	0.030	0.040	4.00	-	0.40	-	-	100000(690)	80000(550)	16	50

ASTM A 194/ 194 M CARBON STEEL, ALLOY STEEL & STAINLESS STEEL NUTS, BOLTS FOR HIGH PRESSURE & HIGH TEMPERATURE SERVICE

ASTM GRADE	C	Mn	Si	S	P	Cr	Ni	Mo	Other	Hardness	Tensile Psi(MPa)	Yield Psi(MPa)	Elongation in Area %	Redu
A1948/8A AISI Type 304	0.08 Max	2.00 Max	1.00 Max	0.03 Max	0.045 Max	18.00 20.00	8.00 10.50	- -	- -	- -	126-300 Grade 8 126-182 Grade 8 A	30000(205)	30	50
A1948M/MA AISI Type 316	0.08 Max	2.00 Max	1.00 Max	0.03 Max	0.045 Max	16.00 18.00	10.00 14.00	2.00 3.00	-	-	126-300 Grade 8m 126-192 Grade 8 MA	30000(205)	30	50
A194/8T/8TA AISI Type 321	0.08 max	2.00 12.00	1.00 max	0.03 0.78 Min	0.045	17.00 19.00	9.00 12.00	- -	Ti>5 xC <0.70	-	126-300 Grade 8T 126-192 Grade 8 TA	30000(205)	30	50
A194/8C/8CA AISI Type 347	0.08 Max	2.00 Max	1.00 Max	0.03 Max	0.045 Max	17.00 19.00	9.00 13.00	- -	Cb+7ax10 xC<1.10	-	126-300 Grade 8CA 126-192 Grade 8 CA	30000(205)	30	50
A194-6 AISI Type 410	0.15 Max	1.00 Max	1.00 Max	0.03 Max	0.040 Max	11.50 13.50	- -	- -	-	-	228271HRC-20-28	30000(205)	30	50
A194 22HM & 2H Carbon Steel	0.4 min	1 Max	0.4 Max	1.050 Max	0.040 Max	- -	- -	- -	-	-	159-352GR.2 248-352GR.2H 159-237GR.2HM 248-352GR.7 159-237GR.7M	30000(205)	30	50
A194-7/7M Alloy Steel	0.37 0.49	0.65 1.1	0.15 0.35	0.04 Max	0.4 Max	0.4 Max	0.75 1.2	- -	0.15 0.25	- -	126-300 Grade 8 126-182 Grade 8 A	30000(205)	30	50



Bolt and Stud Dimensions ASME B 16.5

Nominal Pipe Size	150 LB. Flanges				300 LB. Flanges				600 LB. Flanges			
	# Bolts or Studs	Dia of Bolts or Studs	Length of Stud		# Bolts or Studs	Dia of Bolts or Studs	Length of Stud		# Bolts or Studs	Dia of Bolts or Studs	Length of Stud	
			1/16 RF	RTJ			1/16 RF	RTJ			1/4 RF	RTJ
1/2	4	0.50	2-1/4	-	4	0.50	2 1/2	3	4	0.50	3	3
3/4	4	0.50	2-1/2	-	4	0.63	3	3-1/2	4	0.63	3-1/2	3-1/2
1	4	0.50	2-1/2	3	4	0.63	3	3-1/2	4	0.63	3-1/2	3-1/2
1-1/4	4	0.50	2-3/4	3-1/4	4	0.63	3-1/4	3-3/4	4	0.63	3-3/4	3-3/4
1-1/2	4	0.50	2-3/4	3-1/4	4	0.75	3-1/2	4	4	0.75	4-1/4	4-1/4
2	4	0.63	3-1/4	3-3/4	8	0.63	3-1/2	4	8	0.63	4-1/4	4-1/4
2-1/2	4	0.63	3-1/2	4	8	0.75	4	4-1/2	8	0.75	4-3/4	4-3/4
3	4	0.63	3-1/2	4	8	0.75	4-1/4	4-3/4	8	0.75	5	5
3-1/2	8	0.63	3-1/2	4	8	0.75	4-1/4	5	8	0.88	5-1/2	5-1/2
4	8	0.63	3-1/2	4	8	0.75	4-1/2	5	8	0.88	5-3/4	5-3/4
5	8	0.75	3-3/4	4-1/4	8	0.75	4-3/4	5-1/4	8	1.00	6-1/2	6-1/2
6	8	0.75	4	4-1/2	12	0.75	4-3/4	5-1/2	12	1.00	6-3/4	6-3/4
8	8	0.75	4-1/4	4-3/4	12	0.88	5-1/2	6	12	1.13	7-1/2	7-3/4
10	12	0.88	4-1/2	5	16	1.00	6-1/4	6-3/4	16	1.25	8-1/2	8-1/2
12	12	0.88	4-3/4	5-1/4	16	1.13	6-3/4	7-1/4	20	1.25	8-3/4	8-3/4
14	12	1.00	5-1/4	5-3/4	20	1.13	7	7-1/2	20	1.38	9-1/4	9-1/4
16	16	1.00	5-1/4	5-3/4	20	1.25	7-1/2	8	20	1.50	10	10
18	16	1.13	5-3/4	6-1/4	24	1.25	7-3/4	8-1/4	20	1.63	10-3/4	10-3/4
20	20	1.13	6-1/4	6-3/4	24	1.25	8	8-3/4	24	1.63	11-1/4	11-1/2
24	20	1.25	6-3/4	7-1/4	24	1.50	9	10	24	1.88	13	13-1/4

Nominal Pipe Size	900 LB. Flanges				1500 LB. Flanges				2500 LB. Flanges			
	# Bolts or Studs	Dia of Bolts or Studs	Length of Stud		# Bolts or Studs	Dia of Bolts or Studs	Length of Stud		# Bolts or Studs	Dia of Bolts or Studs	Length of Stud	
			1/4 RF	RTJ			1/4 RF	RTJ			1/4 RF	RTJ
1/2	4	0.75	4-1/4	4-1/4	4	0.75	4-1/4	4-1/4	4	0.75	4 3/4	4 3/4
3/4	4	0.75	4-1/2	4-1/2	4	0.75	4-1/2	4-1/2	4	0.75	5	5
1	4	0.88	5	5	4	0.88	5	5	4	0.88	5-1/2	5-1/2
1-1/4	4	0.88	5	5	4	0.88	5	5	4	1.00	6	6
1-1/2	4	1.00	5-1/2	5-1/2	4	1.00	5-1/2	5-1/2	4	1.13	6	6
2	8	0.88	5-3/4	5-3/4	8	0.88	5-3/4	5-3/4	8	1.00	7	7
2-1/2	8	1.00	6-1/4	6-1/4	8	1.00	6-1/4	6-1/4	8	1.13	7-3/4	8
3	8	0.88	5-3/4	5-3/4	8	1.13	7	7	8	1.25	8-3/4	9
4	8	1.13	6-3/4	6-3/4	8	1.25	7-3/4	7-3/4	8	1.50	10	10-1/4
5	8	1.25	7-1/2	7-1/2	8	1.50	9-3/4	9-3/4	8	1.75	11-3/4	12-1/4
6	12	1.13	7-1/2	7-3/4	12	1.38	10-1/4	10-1/2	8	2.00	13-1/2	14
8	12	1.38	8-3/4	8-3/4	12	1.63	11-1/2	12-3/4	12	2.00	15	15-1/2
10	16	1.38	9-1/4	9-1/4	12	1.88	12-1/4	12-1/2	12	2.50	19-1/4	20
12	20	1.38	10	10	16	2.00	14-3/4	15-1/4	12	2.75	21-1/4	22
14	20	1.50	10-3/4	11	16	2.25	16	16-3/4	-	-	-	-
16	20	1.63	11-1/4	11-1/4	16	2.50	17-1/2	18-1/2	-	-	-	-
18	20	1.88	12-3/4	13-1/4	16	2.75	19-1/2	20-3/4	-	-	-	-
20	20	2.00	13-3/4	14-1/4	16	3.00	21-1/4	22-1/4	-	-	-	-
24	20	2.50	17-1/4	18	16	3.50	24-1/4	25-1/2	-	-	-	-

DIMENSIONAL TOLERANCES FOR FORGED STEEL SCREWED AND SOCKET WELDING FITTINGS ANSI B 16.11

CENTRE TO BOTTOM OF SOCKET

For Sizes 6 NPS and 8 NPS	± 0.8
For Sizes 10 NPS, 15 NPS and 20 NPS	± 1.5
For Sizes 25 NPS, 32 NPS, 40 NPS and 50 NPS	± 2
For Sizes 65 NPS and larger	± 2.5

Sizes 15 NPS through 80 NPS are included for use with Schedule 160 pipe, Fittings for use with Double Extra Strong pipe are not included in this standard.

BORE DIAMETER OF SOCKET

For Sizes 50 NPS and Smaller	+ 0.25 - 0.00
For Sizes 65 NPS and larger	+ 0.35 - 0.00

BOTTOM TO BOTTOM OF SOCKETS COUPLINGS

For Sizes 6 NPS and 8 NPS	
For Sizes 10 NPS, 15 NPS and 20 NPS	± 1.5
For Sizes 25 NPS, 40 NPS and 50 NPS	± 3
For Sizes 65 and larger	± 4
	± 5

CONCENTRICITY OF BORES

The socket and fitting bores shall be concentric within a tolerance of ± 0.8 for all Sizes.

BOTTOM TO SOCKET TO OPPOSITE FACE HALF COUPLINGS

For Sizes 6 NPS and NPS	± 0.8
For Sizes 10 NPS, 15 NPS and 20 NPS	± 1.5
For Sizes 25 NPS, 32 nps, 40 NPS and 50 NPS	± 2
For Sizes 65 NPS and Larger	± 2.5

COINCIDENCE OF AXES

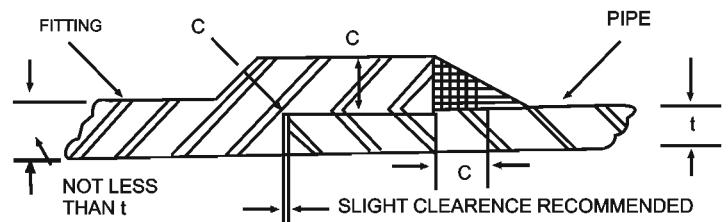
The maximum allowable variation in the alignment of the Socket and fitting bore axes shall be 1.5 mm in 304.8 mm

AMERICAN STANDARD B 16.11

This standard covers the following range of sizes for use with Schedules 40 and 80 pipe as of the publication date of this catalogue.

90° and 45° Elbows	6 NPS through 100 NPS
Tees	6 NPS through 100 NPS
Crosses	6 NPS through 100 NPS
Couplings	6 NPS through 100 NPS

FILLET WELD DIMENSIONS



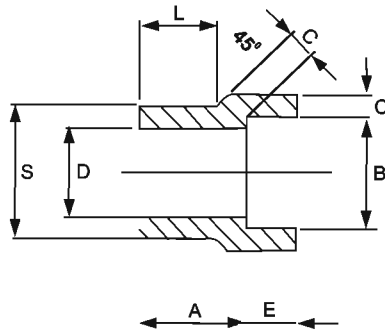
C-Minimum = 1.25t (but not less than 4.0 mm.)

t = Minimum Pipe Wall Thickness

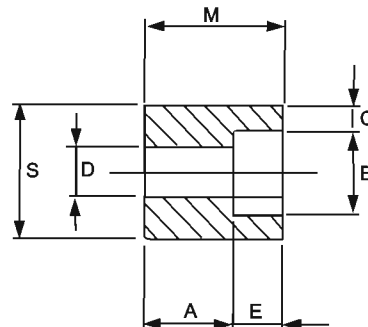
Minimum requirements for socket and fillet weld dimensions as prescribed in the American Standard Code for Pressure Piping, ASA B 31.1

Welding Inserts

Nominal Size mm	3000 LB									6000 LB								
	A	E	M	L	B	D	S	C	Type	A	E	M	L	B	D	S	C	Type
10 X 8	19	10	-	14	14.22	9.0	17.15	3.78	1	21	10	-	14	14.22	6.5	17.15	4.60	1
15X8	21	10	-	16	14.22	9.0	21.34	3.78	1	21	10	-	16	14.22	6.0	21.34	4.60	1
15X8	21	10	-	16	17.65	12.5	21.34	4.01	2	23	10	-	16	17.65	9.0	21.34	5.03	1
20 X18	18	10	21		14.22	9.0	26.67	3.78	1	22	10	21		14.22	6.5	26.67	4.60	1
20 X10	16	10	21		17.65	12.5	26.67	4.01	2	22	10	21		17.65	9.0	26.67	5.03	1
20 X15	22	10		17	21.84	16.0	26.67	4.67	2	25	10		17	21.84	11.5	26.67	5.97	2
25 X 8	19	10	28		14.22	9.0	33.40	3.78	1	24	10	28		14.22	6.0	33.40	4.60	1
25 X 10	18	10	28		17.65	12.5	33.40	4.01	2	22	10	28		17.65	9.0	33.40	5.03	1
25 X 15	16	10	28		21.84	16.0	33.40	4.67	2	28	10	28		21.84	11.5	33.40	5.97	2
25 X 20	24	13		19	27.18	21.0	33.40	4.90	2	28	13		19	27.18	15.5	33.40	6.96	2
32 X 8	22	10	32		14.22	9.0	42.16	3.78	1	25	10	32		14.22	6.0	42.16	4.60	1
32 X 10	21	10	32		17.65	12.5	42.16	4.01	2	24	10	32		17.65	9.0	42.16	5.03	2
32 X 15	19	10	32		21.84	16.0	42.16	4.67	2	22	10	32		21.84	11.5	42.16	5.97	2
32 X 20	18	13	32		27.18	21.0	42.16	4.90	2	21	13	32		27.18	15.5	42.16	6.96	2
32 X 25	25	13	-	21	33.91	26.5	42.16	5.69	2	30	13	-	21	33.91	20.5	42.16	7.92	2
40 X 10	22	10	33		17.65	12.5	48.26	4.01	1	28	10	33		17.65	9.0	48.26	5.03	1
40 X 15	21	10	33		27.18	16.0	48.26	4.67	2	27	10	33		21.84	11.5	48.26	5.97	1
40 X 20	19	13	33		24.18	21.0	48.26	4.90	2	25	13	33		27.18	15.5	48.26	6.96	2
40 X 25	16	13	33		33.91	26.5	48.26	5.69	2	29	13	33		33.91	20.5	48.26	7.92	2
40 X 32	28	13		22	42.67	35.0	48.26	6.07	2	35	13	-	22	42.67	29.5	48.26	7.92	2
50 X 15	25	10	38		21.84	16.0	60.32	6.35	1	28	10	38		21.84	11.5	60.32	5.97	1
50 X 20	24	13	38		27.18	21.0	60.32	4.90	2	27	13	38		27.18	15.5	60.32	6.96	2
50 X 25	22	13	38		33.91	26.5	60.32	5.69	2	25	13	38		33.91	20.5	60.32	7.92	2
50 X 32	21	13	38		42.67	35.0	60.32	6.07	2	24	13	38		42.67	29.5	60.32	7.92	2
50 X 40	32	13		25	48.77	41.0	60.32	6.35	2	39	13		25	48.77	34.0	60.32	8.92	2
65 X 20	40	13	54		27.18	21.0	73.02	4.90	1	43	16		38	61.24	43.0	73.02	10.92	1
65 X 25	38	13	54		33.91	26.5	73.02	5.69	2									
65 X 32	37	13	54		42.67	35.0	73.02	6.07	2									
65 X 40	35	13	54		48.77	41.0	73.02	6.35	2									
65 X 50	46	16		38	61.24	52.5	73.02	6.93	2									
80 X 25	32	13	48		74.01	26.5	88.90	5.69	1									
80 X 32	30	13	48		42.67	35.0	88.90	6.07	2									
80 X 40	29	13	48		48.77	41.0	88.90	6.35	2									
80 X 50	25	16	48		61.24	52.5	88.90	6.93	2									
80 X 65	38	16		32	74.01	62.5	88.90	8.76	2									
100 X 32	43	13	60		42.67	35.0	114.30	6.07	2									
100 X 40	42	13	60		48.77	41.0	114.30	6.35	2									
100 X 50	38	16	60		61.24	52.0	114.30	6.93	2									
100 X 65	38	16	60		74.01	62.5	114.30	8.75	2									
100 X 80	33	16	60		89.99	78.0	114.30	9.30										

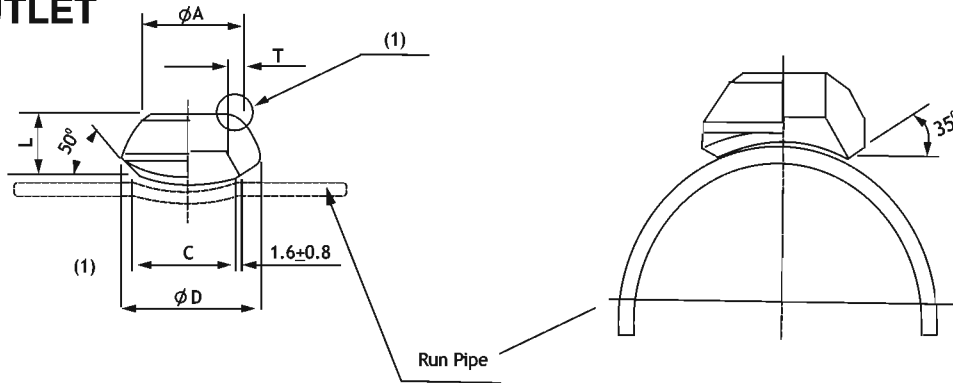


TYPE 1



TYPE 2

WELDING OUTLET

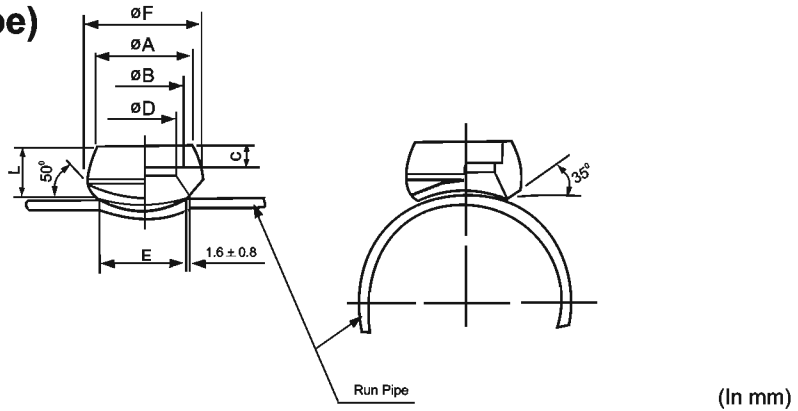


(In mm)

OUTLET NOMINAL SIZE	A	C			L			D			Weight Kg		
		STD	S80 XS	XXS S160	STD	S80 XS	XXS S160	STD	S80 XS	XXS S160	STD	S80 XS	XXS S160
1/8	10.3	15.9	15.9		15.9	15.9		25.4	25.4		0.04	0.05	
1/4	13.7	15.9	15.9		15.9	15.9		25.4	25.4		0.04	0.05	
3/8	17.1	19.1	19.1		19.1	19.1		31.8	31.8		0.07	0.07	
1/2	21.3	23.8	23.8	14.3	19.1	19.1	28.6	34.9	34.9	34.9	0.08	0.09	0.11
3/4	26.7	30.2	30.2	19.1	22.2	22.2	31.8	44.5	44.5	44.5	0.11	0.14	0.32
1	33.5	36.5	36.5	25.4	27.0	27.0	38.1	54.0	54.0	50.8	0.23	0.21	0.38
1 1/4	42.2	44.5	44.5	33.3	31.8	31.8	44.5	65.1	65.1	61.9	0.36	0.41	0.57
1 1/2	48.3	50.8	50.8	38.1	33.3	33.3	50.8	73.0	73.0	69.9	0.45	0.50	0.79
2	60.5	65.1	65.1	42.9	38.1	38.1	55.6	88.9	88.9	81.0	0.79	0.79	0.97
2 1/2	73.2	76.2	76.2	54.0	41.3	41.3	61.9	103.2	103.2	96.8	1.13	1.18	1.53
3	88.9	93.7	93.7	73.0	44.5	44.5	73.0	122.2	122.2	120.7	1.81	1.86	2.87
3 1/2	101.6	101.6	101.6		47.0	47.0		142.9	136.5		2.49	2.54	
4	114.3	120.7	120.7	98.4	50.8	50.8	84.1	152.4	152.4	152.4	2.86	2.90	4.76
5	141.2	141.3	141.3	122.2	57.2	57.2	93.7	179.4	179.4	187.3	4.65	4.72	6.46
6	168.1	169.9	169.9	146.1	60.3	77.8	104.8	215.9	225.4	220.7	5.44	10.43	12.70
8	218.9	220.7	220.7		69.9	98.4		263.5	292.1		10.43	16.78	
10	273.0	274.6	265.1		77.8	93.7		322.3	323.9		16.33	20.90	
12	323.8	325.4	317.5		85.7	103.2		377.8	379.4		26.80	28.00	
14	355.6	357.2	350.9		88.9	100.0		409.6	431.8		30.00	32.00	
16	406.4	408.0	403.2		93.7	106.4		463.6	466.7		34.00	46.50	
18	457.2	458.8	455.6		96.8	111.1		520.7	523.9		44.00	59.00	
20	508.8	508.0	509.6		101.6	119.1		571.5	582.6		53.50	72.00	
24	609.6	614.4	614.4		115.9	139.7		689.0	708.0		99.80	131.50	
26	660.4	666.8	692.2		119.1	146.1		738.2	765.2		120.00	159.00	
30	711.2	(773.1)			136.5			(865.2)			(195.00)		

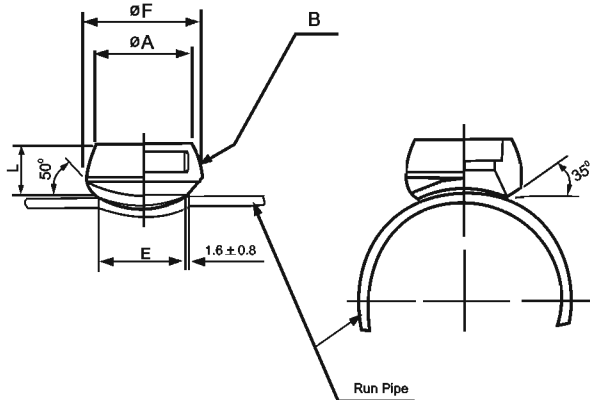
1. End preparation shall be accordance with ANSI B 16.9 etc.

Welding Outlet (Socket Type)



Outlet Size	3000 LB								6000 & 9000 LB							
	A	B	C	D	E	F	L	(Kg) W.T.	C	D	E	F	L	(Kg) Weight		
1/8	18.5	10.7~10.9	11.0±0.3	6.1~7.6	15.9	25.4	19.1	0.05	Common	6000	9000	Common		6000	9000	
1/4	22.9	14.1~14.4	11.0±0.5	8.5~10.0	15.9	25.4	19.1	0.05	-	-	-	-	-	-	-	
3/8	26.9	17.5~17.8	11.0±0.5	11.8~13.3	19.1	31.8	20.6	0.09	-	-	-	-	-	-	-	
1/2	33.0	21.7~22.0	21.1±0.5	15.0~16.6	23.8	34.9	25.4	0.14	13.5±0.5	11.0~12.6	5.6~7.2	10.1	44.5	31.8	2.23	0.24
3/4	39.0	27.1~27.3	13.5±0.5	20.2~21.7	30.2	44.5	27.0	0.15	15.5±0.5	14.8~16.3	10.3~11.8	25.4	50.8	36.5	0.36	0.38
1	47.3	33.8~34.0	15.2±0.8	25.9~27.4	34.5	58.0	33.3	0.27	17.0±0.8	19.9~21.5	14.5~16.0	33.3	61.9	39.7	0.39	0.62
1-1/4	57.0	42.5~42.8	17.4±0.8	34.3~35.8	44.5	65.1	33.3	0.39	19.0±0.8	28.7~30.2	22.0~23.5	38.1	69.9	41.3	0.73	0.75
1-1/2	63.4	48.6~48.9	18.8±0.8	40.1~41.1	50.8	73.0	34.9	0.47	21.0±0.8	33.2~34.7	27.2~28.7	49.2	82.6	42.9	0.91	0.94
2	77.0	61.1~61.4	21.8±0.8	51.7~53.3	65.1	88.9	38.1	0.73	23.0±0.8	42.1~43.6	37.4~38.9	69.9	103.2	52.4	2.33	2.40
2-1/2	96.6	73.8~74.2	25.8±1.5	61.2~64.2	76.2	103.2	39.7	1.25	-	-	-	-	-	-	-	-
3	114.0	89.8~90.2	29.1±1.5	76.4~79.5	93.7	122.2	44.5	1.72	-	-	-	-	-	-	-	-
3-1/2	127.0	102.6~103.0	29.1±1.5	88.7~91.7	101.6	133.4	54.0	1.95	-	-	-	-	-	-	-	-
4	139.9	115.4~115.8	35.4±1.5	100.7~103.7	120.7	152.4	47.6	3.29	-	-	-	-	-	-	-	-

Welding Outlet (Threaded Type)



Outlet Size	3000 LB						6000 & 9000 LB					
	A	B	E	F	L	(Kg) Weight	A	B	E	F	L	(Kg) Weight
1/8	18.5	NPT 1/8	15.9	25.4	19.1	0.05	-	-	-	-	-	-
1/4	22.9	NPT 1/4	15.9	25.4	19.1	0.05	-	NPT 1/4	14.3	34.9	28.6	0.14
3/8	26.9	NPT 3/8	19.1	31.8	20.6	0.09	-	NPT 3/8	14.3	34.9	28.6	0.14
1/2	33.0	NPT 1/2	23.8	34.9	25.4	0.11	43.0	NPT 1/2	19.1	44.5	31.8	0.20
3/4	39.0	NPT 3/4	30.2	44.5	27.0	0.16	49.0	NPT 3/4	25.4	50.8	36.5	0.34
1	47.3	NPT 1	34.5	54.0	33.3	0.28	59.0	NPT 1	33.3	61.9	39.7	0.56
1-1/4	57.0	NPT 1-1/4	44.5	65.1	33.3	0.41	69.0	NPT1-1/4	38.1	69.9	41.3	0.71
1-1/2	63.4	NPT 1-1/2	50.8	73.0	34.9	0.45	77.0	NPT1-1/2	49.2	82.6	42.9	0.89
2	77.0	NPT 2	65.1	88.9	38.1	0.79	91.0	NPT 2	69.9	103.2	52.4	2.30
2-1/2	96.6	NPT 2-1/2	76.2	103.2	46.0	1.36	-	-	-	-	-	-
3	114.0	NPT 3	93.7	122.2	50.8	1.97	-	-	-	-	-	-
3-1/2	122.2	NPT 3-1/3	101.6	133.4	54.0	2.61	-	-	-	-	-	-
4	138.9	NPT 4	120.7	152.4	57.2	3.22	-	-	-	-	-	-



Pipes : Importing from Following mills



PIPES & TUBES ASTM / API / BS / DIN / IS

MATERIAL SPECIFICATION FOR PIPES & TUBES OF STAINLESS STEEL, ALLOY STEEL, CARBON STEEL & MILD STEEL

PIPE SPECIFICATION	CHEMICAL PROPERTIES						MECHANICAL PROPERTIES				OTHERS
	C%	Min%	P% (Max)	S% (Max)	Si%	Cr%	Ni%	Mo%	U.T.S. (Min) Mpa	Y.S. (Min) Mpa	
API 5L Gr. A	0.22 Max	0.90 Max	0.030	0.030	-	-	-	-	331	207	For Seamless : C% Will be 0.028 for Gr. B to x 70 Mn% will be 1.40 for Gr. X65 to X 70 $\sigma = 625 \text{ 000 } A_{e2} / U_{e2}$
API 5L Gr. B	0.26 Max	1.20 Max	0.030	0.030	-	-	-	-	414	241	
API 5L Gr. X 42	0.26 Max	1.30 Max	0.030	0.030	-	-	-	-	414	290	
API 5L Gr. X 46	0.26 Max	1.40 Max	0.030	0.030	-	-	-	-	434	317	
API 5L Gr. X 52	0.26 Max	1.40 Max	0.030	0.030	-	-	-	-	455	359	
API 5L Gr. X 56	0.26 Max	1.40 Max	0.030	0.030	-	-	-	-	490	386	
API 5L Gr. X 60	0.26 Max	1.45 Max	0.030	0.030	-	-	-	-	517	414	
API 5L Gr. X 65	0.26 Max	1.65 Max	0.030	0.030	-	-	-	-	531	448	
API 5L Gr. X 70	0.26 Max	1.65 Max	0.030	0.030	-	-	-	-	565	483	
BS 3059 PT-I Gr. 320	0.16 Max	0.30-0.70	0.040	0.040	0.35 Max	-	-	-	320-480	195	
BS 3059 PT-II Gr. 360	0.17 Max	0.40-0.80	0.035	0.035	0.10-0.35	-	-	-	360-500	235	
BS 3059 PT-II Gr. 440	0.12-0.18	0.90-1.20	0.035	0.035	0.10-0.35	-	-	-	440-580	245	
BS 3059 PT-I Gr. 620	0.10-0.15	0.40-0.70	0.030	0.030	0.10-0.35	0.70-0.10	-	0.45-0.65	460-610	180	
BS 6323 Gr. 1	0.13 Max	0.60 Max	0.050	0.050	-	-	-	-	300	200	
BS 6323 Gr. 2	0.16 Max	0.70 Max	0.050	0.050	-	-	-	-	340	250	
BS 6323 Gr. 3	0.20 Max	0.90 Max	0.050	0.050	0.35 Max	-	-	-	400	300	
BS 1387	0.20 Max	1.20 Max	0.045	0.045	-	-	-	-	320-460	195	
DIN 17175 Gr. St. 35.8	0.17 Max	0.40-0.80	0.040	0.040	0.10-0.35	-	-	-	225	360-480	
DIN 17175 Gr. St. 45.8	0.21 Max	0.40-1.20	0.040	0.040	0.10-0.35	-	-	-	245	410-530	
DIN 17175 Gr. 17Mn4	0.14-0.20	0.90-1.20	0.040	0.040	0.20-0.40	0.30 Max	-	-	275	460-580	
DIN 17175 Gr. 19Mn5	0.17-0.22	1.00-1.30	0.040	0.040	0.30-0.36	0.30 Max	-	-	315	510-610	
DIN 17175 Gr. 15Mo3	0.12-0.20	0.40-0.80	0.035	0.035	0.10-0.35	-	0.25-0.35	-	275	550-600	
DIN 17175 Gr. 13CrMo44	0.10-0.18	0.40-0.80	0.035	0.035	0.10-0.35	0.70-1.10	-	0.45-0.65	295	440-590	
DIN 17175 Gr. 10CrMo910	0.08-0.15	0.40-0.70	0.035	0.035	0.50 Max	2.00-2.50	-	0.90-1.20	385	550-600	
DIN 17175 Gr. 13CrMo910	0.10-0.18	0.40-0.70	0.035	0.035	0.10-0.35	0.70-1.10	-	0.45-0.65	295	440-590	
DIN 17175 Gr. 14MoV63	0.10-0.18	0.40-0.70	0.035	0.035	0.10-0.35	0.50-0.70	-	0.50-0.70	325	460-610	
DIN 17175 Gr. X20CrMoV121	0.17-0.23	1.00 Max	0.030	0.030	0.50 Max	0.80-1.20	0.30-0.80	0.80-1.20	490	690-850	
IS 1239 Part I	-	-	0.050	0.050	-	-	-	-	320	-	
IS 3569 Gr. Fe 380	0.16 Max	1.20 Max	0.040	0.040	-	-	-	-	330	195	
IS 3569 Gr. Fe 410	0.20 Max	1.30 Max	0.040	0.040	-	-	-	-	410	235	
IS 1979 Gr. YST 290	0.28 Max	1.25 Max	0.040	0.050	-	-	-	-	410	290	
IS 1979 Gr. YST 320	0.30 Max	1.35 Max	0.040	0.050	-	-	-	-	430	320	
IS 1979 Gr. YST 360	0.30 Max	1.35 Max	0.040	0.050	-	-	-	-	450	360	
IS 1979 Gr. YST 390	0.26 Max	1.35 Max	0.040	0.050	-	-	-	-	490	390	
IS 1979 Gr. YST 410	0.26 Max	1.35 Max	0.040	0.050	-	-	-	-	520	410	
IS 1979 Gr. YST 450	0.26 Max	1.40 Max	0.040	0.050	-	-	-	-	530	450	
IS 1979 Gr. YST 480	0.26 Max	1.60 Max	0.040	0.040	-	-	-	-	565	480	
IS 1978 Gr. YST 210	0.22 Max	0.90 Max	0.040	0.050	-	-	-	-	330	210	
IS 1978 Gr. YST 240	0.27 Max	1.15 Max	0.040	0.050	-	-	-	-	410	240	

PIPES & TUBES ASTM / API / BS / DIN / IS

MATERIAL SPECIFICATION FOR PIPES & TUBES STAINLESS STEEL ALLOY STEEL, CARBON STEEL & MILD STEEL

PIPE SPECIFICATION	CHEMICAL PROPERTIES										MECHANICAL PROPERTIES				OTHERS
	C%	Mn%	P% (Max)	S% (Max)	Si%	Cr%	Ni%	Mo%	U.T.S. (Mpa)	Y.S. (Mpa)	ELONG. (Min)				
											35	25			
ASTMA 312 Gr. TP 304	0.080 Max	2.00 Max	0.045	0.030	1.00 Max	18.0-20.0	8.0-11.0	-	515	205	35	25	-		
ASTMA 312 Gr. TP 304L	0.035 Max	2.00 Max	0.045	0.030	1.00 Max	18.0-20.0	8.0-13.0	-	485	170	35	25	-		
ASTMA 312 Gr. TP 304H	0.04-0.10	2.00 Max	0.045	0.030	1.00 Max	18.0-20.0	8.0-11.0	-	515	205	35	25	-		
ASTMA 312 Gr. TP 304LN	0.035 Max	2.00 Max	0.045	0.030	1.00 Max	18.0-20.0	8.0-12.0	-	515	205	35	25	N%=0.10-0.16		
ASTMA 312 Gr. TP 309S	0.080 Max	2.00 Max	0.045	0.030	1.00 Max	22.0-24.0	12.0-15.0	0.75 Max	515	205	35	25	-		
ASTMA 312 Gr. TP 310S	0.080 Max	2.00 Max	0.045	0.030	1.00 Max	24.0-26.0	19.0-22.0	0.75 Max	515	205	35	25	-		
ASTMA 312 Gr. TP 316	0.080 Max	2.00 Max	0.045	0.030	1.00 Max	16.0-18.0	11.0-14.0	2.00-3.00	515	205	35	25	-		
ASTMA 312 Gr. TP 316L	0.035 Max	2.00 Max	0.045	0.030	1.00 Max	16.0-18.0	10.0-14.0	2.00-3.00	485	170	35	25	-		
ASTMA 312 Gr. TP 316H	0.04-0.10	2.00 Max	0.045	0.030	1.00 Max	16.0-18.0	11.0-14.0	2.00-3.00	515	205	35	25	-		
ASTMA 312 Gr. TP 316LN	0.035 Max	2.00 Max	0.045	0.030	1.00 Max	16.0-18.0	11.0-14.0	2.00-3.00	515	205	35	25	N%=0.10-0.16		
ASTMA 312 Gr. TP 317	0.080 Max	2.00 Max	0.045	0.030	1.00 Max	18.0-20.0	11.0-14.0	3.00-4.00	515	205	35	25	-		
ASTMA 312 Gr. TP 317L	0.035 Max	2.00 Max	0.045	0.030	1.00 Max	18.0-20.0	11.0-15.0	3.00-4.00	515	205	35	25	-		
ASTMA 312 Gr. TP 321	0.080 Max	2.00 Max	0.045	0.030	1.00 Max	17.0-19.0	9.0-12.0	-	515	205	35	25	TI%=(5XC)-0.70		
ASTMA 312 Gr. TP 321H	0.04-0.10	2.00 Max	0.045	0.030	1.00 Max	17.0-19.0	9.0-12.0	-	515	205	35	25	TI%=(4XC)-0.60		
ASTMA 312 Gr. TP 347	0.080 Max	2.00 Max	0.045	0.030	1.00 Max	17.0-19.0	9.0-13.0	-	515	205	35	25	Cb%=(10XC)-1.00		
ASTMA 312 Gr. TP 347H	0.04-0.10	2.00 Max	0.045	0.030	1.00 Max	17.0-19.0	9.0-13.0	-	515	205	35	25	Cb%=(8XC)-1.10		
ASTMA 358 Gr. TP 304	0.080 Max	2.00 Max	0.045	0.030	0.75 Max	18.0-20.0	8.0-10.5	-	515	205	40	40	N%=0.10 Max, HRB=92 Max		
ASTMA 358 Gr. TP 304L	0.035 Max	2.00 Max	0.045	0.030	0.75 Max	18.0-20.0	8.0-12.0	-	485	170	40	40	N%=0.10 Max, HRB=92 Max		
ASTMA 358 Gr. TP 309S	0.080 Max	2.00 Max	0.045	0.030	0.75 Max	22.0-24.0	12.0-15.0	-	515	205	40	40	HRB=95 Max		
ASTMA 358 Gr. TP 310S	0.080 Max	2.00 Max	0.045	0.030	1.50 Max	24.0-26.0	19.0-22.0	-	515	205	40	40	HRB=95 Max		
ASTMA 358 Gr. TP 316	0.080 Max	2.00 Max	0.045	0.030	0.75 Max	16.0-18.0	10.0-14.0	2.00-3.00	515	205	40	40	N%=0.10 Max, HRB=95 Max		
ASTMA 358 Gr. TP 316L	0.035 Max	2.00 Max	0.045	0.030	0.75 Max	16.0-18.0	10.0-14.0	2.00-3.00	485	170	40	40	N%=0.10 Max, HRB=95 Max		
ASTMA 358 Gr. TP 321	0.080 Max	2.00 Max	0.045	0.030	0.75 Max	17.0-19.0	9.0-12.0	-	515	205	40	40	N%=0.10 Max, TI%=(5XC)-0.70, HRB=95 Max		
ASTMA 358 Gr. TP 347	0.080 Max	2.00 Max	0.045	0.030	0.75 Max	17.0-19.0	9.0-13.0	-	515	205	40	40	Cb%=(10XC)-1.00, HRB=92 Max		
ASTMA 106 Gr. A	0.25 Max	0.27-0.93	0.035	0.035	0.10 Min	0.40 Max	0.40 Max	0.15 Max	330	205	35	25	Cu%:0.40 Max, Va%: 0.08		
ASTMA 106 Gr. B	0.30 Max	0.29-1.06	0.035	0.035	0.10 Min	0.40 Max	0.40 Max	0.15 Max	415	240	30	16.5	Cu%:0.40 Max, Va%: 0.08		
ASTMA 106 Gr. C	0.35 Max	0.29-1.06	0.035	0.035	0.10 Min	0.40 Max	0.40 Max	0.15 Max	485	275	30	16.5	Cu%:0.40 Max, Va%: 0.08		
ASTMA 53 Gr. A	0.25 Max	0.95 Max	0.050	0.045	-	0.40 Max	0.40 Max	0.15 Max	330	205	30	16.5	Cu%:0.40 Max, Va%: 0.08		
ASTMA 53 Gr. B	0.30 Max	1.20 Max	0.050	0.045	-	0.40 Max	0.40 Max	0.15 Max	415	240	30	16.5	Cu%:0.40 Max, Va%: 0.08		
ASTMA 333 Gr. 1	0.30 Max	0.40-1.06	0.025	0.025	-	-	-	-	380	205	35	25	Impact Test= -45 °C, J=18 Min, HRB=85 Max		
ASTMA 333 Gr. 6	0.30 Max	0.29-1.06	0.025	0.025	0.10 Min	-	-	-	415	240	30	16.5	Impact Test= -45 °C, J=18 Min, HRB=85 Max		
ASTMA 335 Gr. P1	0.10-0.20	0.30-0.80	0.025	0.025	0.10-0.50	-	-	0.44-0.65	380	205	30	20	-		
ASTMA 335 Gr. P2	0.10-0.20	0.30-0.61	0.025	0.025	0.10-0.30	0.50-0.81	-	0.44-0.65	380	205	30	20	-		
ASTMA 335 Gr. P5	0.15 Max	0.30-0.60	0.025	0.025	0.50 Max	4.00-6.00	-	0.45-0.65	415	205	30	20	-		
ASTMA 335 Gr. P9	0.15 Max	0.30-0.60	0.025	0.025	0.25-1.00	8.00-10.00	-	0.90-1.10	415	205	30	20	-		
ASTMA 335 Gr. P11	0.05-0.15	0.30-0.60	0.025	0.025	0.50-1.00	1.00-1.50	-	0.44-0.65	415	205	30	20	-		
ASTMA 335 Gr. P12	0.05-0.15	0.30-0.61	0.025	0.025	0.50 Max	0.80-1.25	-	0.44-0.65	415	220	30	20	-		
ASTMA 335 Gr. P22	0.05-0.15	0.30-0.60	0.025	0.025	0.50 Max	1.90-2.60	-	0.87-1.13	415	205	30	20	-		
ASTMA 335 Gr. P91	0.08-0.12	0.30-0.60	0.020	0.010	0.20-0.50	8.00-9.50	0.40 Max	0.85-1.05	620	440	20	-	V%=0.18-0.25, N%=0.030-0.070, Al%=0.02 Max, Cb%=0.06-0.10		
ASTMA 213 Gr. T5	0.10-0.20	0.30-0.61	0.025	0.025	0.10-0.30	0.50-0.81	-	0.44-0.65	415	205	30	30	HRB=85 Max		
ASTMA 213 Gr. T1	0.15 Max	0.30-0.60	0.025	0.025	0.50 Max	4.00-6.00	-	0.45-0.65	415	205	30	30	HRB=85 Max		
ASTMA 213 Gr. T11	0.05-0.15	0.30-0.60	0.025	0.025	0.50-1.00	1.00-1.50	-	0.44-0.65	415	205	30	30	HRB=85 Max		
ASTMA 213 Gr. T12	0.05-0.15	0.30-0.61	0.025	0.025	0.50 Max	0.80-1.25	-	0.44-0.65	415	220	30	30	HRB=85 Max		
ASTMA 213 Gr. T22	0.05-0.15	0.30-0.60	0.025	0.025	0.50 Max	1.90-2.60	-	0.87-1.13	415	205	30	30	HRB=85 Max		
ASTMA 179	0.06-0.18	0.27-0.63	0.035	0.035	-	-	-	-	325	180	35	35	HRB=72 Max		
ASTMA 210 Gr. A1	0.27 Max	0.93 Max	0.035	0.035	0.10 Min	-	-	-	415	255	30	30	HRB=79 Max		

STAINLESS STEEL SCHEDUL PIPE & DIMENSION

DESIGNATION		O/D	NOMINAL WALL THICKNESS															
OF DIAMETER		DIA	SCH.5S		SCH.5		SCH.10S		SCH.10		SCH.20S		SCH.30		SCH.40S		SCH.40	
(A)	(B)	METER MM	WALL THK	WEIGHT KG/MTR	WALL THK	WEIGHT KG/MTR	WALL THK	WEIGHT KG/MTR	WALL THK	WEIGHT KG/MTR	WALL THK	WEIGHT KG/MTR	WALL THK	WEIGHT KG/MTR	WALL THK	WEIGHT KG/MTR	WALL THK	
6	1/8	10.3	1.0	0.23			1.2	0.27			1.5	.33			1.73	0.37		
8	1/4	13.72	1.2	0.37			1.65	0.49			2.00	.58			2.24	0.64		
10	3/8	17.2	1.2	0.47			1.65	0.63			2.00	.74			2.31	0.87		
15	1/2	21.3	1.65	0.81	1.65	0.81	2.11	1.02	2.11	1.02	2.5	1.15			2.77	1.29		
20	3/4	26.7	1.65	1.03	1.65	1.03	2.11	1.30	2.11	1.30	2.5	1.49			2.87	1.71		
25	1	33.4	1.65	1.31	1.65	1.31	2.77	2.12	2.77	2.12	3.00	2.24			3.38	2.54		
32	1-1/4	42.2	1.65	1.67	1.65	1.67	2.77	2.73	2.77	2.73	3.00	2.90			3.56	3.44		
40	1-1/2	48.3	1.65	1.93	1.65	1.93	2.77	3.15	2.77	3.15	3.00	3.35			3.68	4.11		
50	2	60.3	1.65	2.42	1.65	2.42	2.77	3.99	2.77	3.99	3.5	4.90			3.91	5.52		
65	2-1/2	73.0	2.11	3.75	2.11	3.75	3.05	5.34	3.05	5.34	3.5	6.00			5.16	8.77		
80	3	88.9	2.11	4.59	2.11	4.59	3.05	6.56	3.05	6.56	4.00	8.37			5.49	11.50		
90	3-1/2	101.6	2.11	5.25	2.11	5.25	3.05	7.53	3.05	7.53	4.00	9.62			5.74	13.78		
100	4	114.3	2.11	5.93	2.11	5.93	3.05	8.50	3.05	8.50	4.5	12.18			6.02	16.32		
125	5	141.3	2.77	9.61	2.77	9.61	3.40	11.74	3.40	11.74	5.00	16.80			6.55	22.10		
150	6	168.3	2.77	11.47	2.77	11.47	3.40	14.04	3.40	14.04	5.5	22.08			7.11	28.69		
200	8	219.1	2.77	15.00	2.77	15.00	3.76	20.27	3.76	20.27	6.35	33.82	7.04	37.38	8.18	43.20		
250	10	273.1	3.40	22.95	3.40	22.95	4.19	28.20	4.19	28.20	6.35	42.41	7.80	51.81	9.27	61.22		
300	12	323.9	3.96	31.72	4.19	33.60	4.57	36.54	4.57	36.54	6.35	50.48	8.38	66.20	9.53	75.01	10.31	
350	14	355.6	3.96	34.86			4.78	41.99	6.35	55.53	7.92	68.95	9.53	82.58	9.53	82.58	11.13	
400	16	406.4	4.19	42.20			4.78	48.07	6.35	63.61	7.92	79.03	9.53	94.70	9.53	94.70	12.70	
450	18	457.2	4.19	47.46			4.78	54.15	6.35	71.69	7.92	89.10	11.13	124.32	9.53	106.83	14.27	
500	20	508.0	4.78	60.23			5.54	69.70	6.35	79.76	9.53	118.93	12.70	157.51	9.53	118.93	15.06	
550	22	558.8	4.78	65.95			5.54	76.75	6.35	87.84	9.53	131.07	12.70	173.66	9.53	131.07	15.88	
600	24	609.6	5.54	83.80			6.35	95.92	6.35	95.92	9.53	143.20	14.27	212.72	9.53	143.20	17.45	
650	26	660.4								7.92	129.40	12.70	205.97		9.53	155.32		
700	28	711.2								7.92	139.47	12.70	222.13	15.88	276.48	9.53	167.44	
750	30	762.0	6.35	120.15			7.92	149.55	7.92	149.55	12.70	238.28	15.88	296.68	9.53	179.56		
800	32	812.8								7.92	159.62	12.70	254.44	15.88	316.88	9.53	191.69	17.48
850	34	863.6								7.92	169.64	12.70	270.50	15.88	336.96	9.53	203.74	17.48
900	36	914.4								7.92	179.77	12.70	286.75	15.88	357.28	9.53	215.93	19.05

WALL THICKNESS & WEIGHT / METER

NOMINAL WALL THICKNESS																					
		SCH 60		SCH 80 S		SCH.80		SCH.100		SCH.120		SCH.140		SCH.160		SCH.XXS					
D/AM ETER	WEIGHT KG/MTR	WALL THK	WEIGHT KG/MTR	WALL THK	WEIGHT KG/MTR	WALL THK	WEIGHT KG/MTR	WALL THK	WEIGHT KG/MTR	WALL THK	WEIGHT KG/MTR	WALL THK	WEIGHT KG/MTR	WALL THK	WEIGHT KG/MTR	WALL THK	WEIGHT KG/MTR				
6				2.41	0.47																
8				3.02	0.82																
10				3.20	1.12																
15				3.73	1.64									4.78	1.98	7.47	2.59				
20				3.91	2.23									5.56	2.94	7.82	3.69				
25				4.55	3.29									6.35	4.30	9.09	5.53				
32				4.85	4.53									6.35	5.59	9.70	7.88				
40				5.08	5.49									7.14	7.35	10.16	9.69				
50				5.54	7.60									8.74	11.29	11.07	13.65				
65				7.01	11.60									9.53	15.15	14.02	20.72				
80				7.62	15.51									11.13	21.67	15.24	28.11				
90				8.08	18.92											16.15	34.56				
100				8.56	22.66					11.13	28.75			13.49	34.05	17.12	41.66				
125				9.53	31.44					12.70	40.90			15.88	49.87	19.05	58.31				
150				10.97	43.21					14.27	55.03			18.26	68.59	21.95	79.2				
200		10.81	53.90	12.70	65.63			15.06	76.93	18.24	91.73	20.62	102.47	23.01	112.97	22.23	108.00				
250		12.20	82.80	12.70	82.80	15.06	97.27	18.24	116.38	21.41	134.90	25.40	155.50	28.58	174.95	25.40	155.5				
300	80.94	14.27	110.62	12.70	98.95	17.45	133.88	21.41	162.14	25.40	189.82	28.58	211.31	33.32	242.40	25.40	189.82				
350	96.00	15.06	128.42	12.70	109.04	19.05	160.54	23.80	197.74	27.76	227.88	31.75	257.47	35.71	286.04						
400	125.20	16.66	162.59	12.70	125.20	21.41	206.40	26.19	249.34	30.94	290.88	36.53	338.32	40.46	370.74						
450	158.27	19.05	209.00	12.70	141.35	23.80	258.29	29.36	314.54	34.93	369.34	39.67	414.74	45.24	466.67						
500	185.89	20.62	251.65	12.70	157.51	26.19	315.97	32.54	387.41	38.10	448.30	44.45	515.94	49.99	573.31						
550	216.04	22.23	298.55	12.70	173.66	28.57	379.70	34.92	457.83	41.27	535.17	47.62	609.30	53.97	682.57						
600	258.74	24.59	360.21	12.70	189.82	30.94	448.30	38.89	555.76	46.02	649.44	52.37	730.72	59.51	819.70						
650				12.70	205.97	24.66D-t) t 1000 Wt/pam + formula Weight stainless steel pipe OD (mm) - W.T. (mm) XW.T. (mm) X 0.02466 = Kg. per mtr.															
700				12.70	222.13																
750				1270	238.28																
800	348.11			12.70	254.44																
850	370.22			12.70	270.50																
900	427.09			12.70	286.75																

CARBON STEEL & ALLOY STEEL PIPE DIMENSIONS ANSI B 36.10

Nominal Pipe size	O/D	Schedule 10	Schedule 20	Schedule 30	Schedule STD	Schedule 40	Schedule 60	Schedule XS	Schedule 80	Schedule 100	Schedule 120	Schedule 140	Schedule 160	Schedule XXS
MM INCH	MM	W.T. KG/M	W.T. KG/M	W.T. KG/M	W.T. KG/M	W.T. KG/M	W.T. KG/M	W.T. KG/M	W.T. KG/M	W.T. KG/M	W.T. KG/M	W.T. KG/M	W.T. KG/M	W.T. KG/M
3	1/8	10.3			1.73	0.37	1.73	0.37	2.41	0.47				
6	1/4	13.7			2.24	0.63	2.24	0.63	3.02	0.80				
10	3/8	17.1			2.31	0.84	2.31	0.84	3.20	1.10				
15	1/2	21.3			2.77	1.27	2.77	1.27	3.73	1.62				
20	3/4	26.7			2.87	1.69	2.87	1.69	3.91	2.20			4.78	1.95
25	1	33.4			3.38	2.50	3.38	2.50	4.55	3.24			5.56	2.90
32	1 1/4	42.2			3.56	3.39	3.56	3.39	4.85	4.47			6.35	5.61
40	1 1/2	48.3			3.68	4.05	3.68	4.05	5.08	5.41			7.14	7.25
50	2	60.3			3.91	5.44	3.91	5.44	5.54	7.48			8.74	11.11
65	2 1/2	73.0			5.16	8.63	5.16	8.63	7.01	11.41			9.53	14.92
80	3	88.9			5.49	11.3	5.49	11.3	7.62	15.3			11.13	21.35
90	3 1/2	101.6			5.74	13.57	5.74	13.57	8.08	18.63			-	
100	4	114.3			6.02	16.07	6.02	16.07	8.56	22.3	11.13	28.32		
125	5	141.3			6.55	21.77	6.55	21.77	9.53	30.9	12.7	40.2		
150	6	168.3			7.11	28.26	7.11	28.26	10.97	42.5	14.3	54.2		
200	8	219.1			8.18	42.5	8.18	42.5	12.7	64.6	15.1	75.92	18.3	90.4
250	10	273.0			9.27	60.3	9.27	60.3	12.7	81.5	18.3	114.7	21.44	133.0
300	12	323.8			9.53	73.8	10.31	79.7	14.27	109.0	21.4	160.0	25.4	187.0
350	14	355.6	6.35	54.7	9.53	81.3	11.13	94.6	15.09	126.0	27.8	224.0	31.8	253.5
400	16	406.4	6.35	62.6	9.53	93.3	12.7	123.0	16.66	160.0	26.2	245.0	30.9	286.0
450	18	457.2	6.35	70.6	9.53	105.0	14.20	156.0	19.05	206.0	29.36	310.0	34.0	363.0
500	20	508.0	6.35	78.5	9.53	117.2	15.09	183.0	20.62	248.0	32.5	381.0	38.1	441.0
550	22	558.8	6.35	86.6	9.53	129.0			22.2	294.0	34.9	451.0	41.3	527.0
600	24	610.0	6.35	94.5	9.53	141.0	17.48	255.0	24.61	355.0	38.8	547.7	46.0	640.0
650	26	660.0	7.92	127.3	12.7	203.0			12.7	202				
700	28	711.0	7.92	137.4	12.7	218.0	15.88	272.0		12.7	218			
750	30	762.0	7.92	147.9	12.7	234.6	15.88	292.2		12.7	235			
800	32	812.8	7.92	157.9	12.7	250.6	15.88	312.0		12.7	251			
850	34	863.6	7.92	167.9	12.7	266.5	15.88	331.7		12.7	266			
900	36	914.4	7.92	176.9	12.7	282.4	15.88	352.2		12.7	282			



All Dimensions in millimeters. W.T. = Wall Thickness. KG/M = Kilograms per Meter.

MILD STEEL PIPES CONFIRMING TO IS : 1239 (PART 1) - 1979

Nominal Bore		Outside Diameter		Light		Medium		Heavy	
Inch	In mm	In	mm	Thickness mm	Weight kg/mtr	Thickness mm	Weight Kg/Mtr.	Thickness mm	Weight Kg/Mtr.
1/8"	3 mm	0.406	10.32	1.80	0.361	2.00	0.407	2.65	0.493
1/4"	6 mm	0.532	13.49	1.80	0.517	2.35	0.650	2.90	0.769
3/8"	10 mm	0.872	17.10	1.80	0.674	2.35	0.852	2.90	1.02
1/2"	15 mm	0.844	21.43	2.00	0.952	2.65	1.122	3.25	1.45
3/4"	20 mm	1.094	27.20	2.35	1.410	2.65	1.580	3.25	1.90
1"	25 mm	1.312	33.80	2.65	2.010	3.25	2.440	4.05	2.97
1.1/4"	32 mm	1.656	42.90	2.65	2.580	3.25	3.140	4.05	3.84
1.1/2"	40 mm	1.906	48.40	2.90	3.250	3.25	3.610	4.05	4.43
2"	50 mm	2.375	60.30	2.90	4.110	3.65	5.100	4.47	6.17
2.1/2"	65 mm	3.004	76.20	3.25	5.840	3.65	6.610	4.47	7.90
3"	80 mm	3.500	88.90	3.25	6.810	4.05	8.470	4.85	10.1
4"	100 mm	4.500	114.30	3.65	9.890	4.50	12.10	5.40	14.4
5"	125 mm	5.500	139.70	-	-	4.85	16.20	5.40	17.8
6"	150 mm	6.500	165.10	-	-	4.85	19.20	5.40	21.2

BIG DIAMETER ERW PIPES CONFIRMING TO IS 3589

Wall Thickness in mm	Nominal Bore 7" NB 193.7 mm OD	Nominal Bore 8" NB 219.1 mm OD	Nominal Bore 10" NB 273 mm OD	Nominal Bore 12" NB 323.7 mm OD	Nominal Bore 14" NB 355.6 mm OD	Nominal Bore 16" NB 406.4 mm OD	Nominal Bore 18" NB 457 mm OD	Nominal Bore 20" NB 508 mm OD
kg/mtr	kg/mtr	kg/mtr	kg/mtr	kg/mtr	kg/mtr	kg/mtr	kg/mtr	kg/mtr
4.85	22.59	25.62	32.07	38.13	-	-	-	-
5.20	24.17	27.43	34.34	40.85	-	-	-	-
5.60	26.00	29.28	36.93	43.93	48.11	-	-	-
6.00	27.88	31.53	39.50	47.02	51.49	61.00	69.00	-
6.35	29.34	33.28	41.73	49.67	54.43	62.35	70.50	78.50
7.01	32.27	36.76	46.43	55.45	61.82	69.04	-	-
7.94	-	41.00	50.95	61.85	67.98	77.92	87.80	-
8.18	-	42.56	53.42	65.12	-	-	-	-
9.53	-	51.50	60.24	73.75	81.21	93.13	105.00	117.00
12.70	-	-	-	-	107.28	123.30	139.00	155.00

Tolerance on Thickness and Weight : as per IS 1239
The following manufacturing tolerance shall be permitted on the tubes and sockets.

- (a) **Thickness**
- (1) **Butt welded Light tubes** + Not limited
- 8 percent
 - Medium and Heavy tubes** + Not Limited
- 10 percent
 - (2) **Seamless tubes** + Not Limited
- 12.5 percent
- (b) **Weight :**
- (1) **Single tube (light series)** + 10 percent
- 8 percent
 - (2) **Single tube (medium and heavy series)** + 10 percent

MAXIMUM PERMISSIBLE PRESSURE AND TEMPERATURE FOR TUBES WITH STEEL COUPLINGS OR SCREWED AND SOCKETED JOINTS

Nominal Bore mm	Maximum Permissible		Maximum Permissible Temperature °C
	Pressure N/mm ²	Kg./cm ²	
Upto and Including 25 mm	1.20	12.24	260
Over 25 mm upto and Including 40 mm	1.03	10.50	260
Over 40 mm upto and Including 80 mm	0.86	8.77	260
over 80 mm upto and Including 100 mm	0.69	7.04	260
	0.83	8.47	177
Over 100 mm upto and Including 125 mm	0.69	7.04	171
Over 125 mm upto and Including 150 mm	0.50	5.10	160

For tubes fitted with appropriate fittings of suitably butt welded together, the Max. permissible pressure shall be 21.00 Kg/cm² and Max. permissible temp. 260°C

SUMMARY OF THE MAIN ASTM STANDARDS GENERALLY USED FOR SHEETS / PLATES

ASTM	Grade	Chemical requirements percent (%)											Mechanical requirements					
		C max	Mn max	P max	S max	Si max	Ni	Cr	Mo	Cu	Others	Tensile Strength mini-MPa	Yield Strength mini-MPa	Elong mini %	Brinell	Hardness Rockwell		
A240	304	0.08	2.00	0.045	0.030	0.75	8.00-10.5	18.00-20.0					515	205	40	201	92	
	304L	0.03	2.00	0.045	0.030	0.75	8.00-12.0	18.00-20.0					485	170	40	201	92	
	310	0.08	2.00	0.045	0.030	1.50	19.0-22.0	24.0-26.0					515	205	40	217	95	
	316	0.08	2.00	0.045	0.030	0.75	10.0-14.0	16.0-18.0	2.00-3.00				515	205	40	217	95	
	316L	0.03	2.00	0.045	0.030	0.75	10.0-14.0	16.0-18.0	2.00-3.00				485	170	40	217	95	
	317L	0.03	2.00	0.045	0.030	0.75	11.0-15.0	18.0-20.0	3.00-4.00				515	205	40	217	95	
	321	0.08	2.00	0.045	0.030	0.75	9.00-12.0	17.0-19.0				Ti > 0.070 Cb + Ta > 0.00 < 1.10	515	205	40	217	95	
A 387 Class1 Class2	347	0.08	2.00	0.045	0.030	0.75	9.00-13.0	17.0-19.0					515	205	40	201	92	
	2	0.05-0.21	0.55-0.80	0.035	0.040	0.15-0.40		0.50-0.80	0.45-0.60			Class 1 Class 2	380 488	230 310	22	max201HB	max92HRB	
	5	0.15	0.30-0.60	0.04	0.030	0.050		4.00-6.00	0.45-0.65				415 515	205 310	18	max202HB	max92HRB	
	7	0.15	0.30-0.60	0.030	0.030	1.00		6.00-8.00	0.45-0.65				415 515	205 310	18	max217HB	max95HRB	
	9	0.15	0.30-0.60	0.030	0.030	1.00		8.00-10.0	0.90-1.10				415 515	205 310	18	max217HB	max95HRB	
	11	0.04-0.17	0.40-0.65	0.035	0.04	0.50-0.80		1.00-1.50	0.45-0.65				415 515	240 310	22	max217HB	max95HRB	
	12	0.04-0.17	0.40-0.65	0.035	0.04	0.15-0.40		0.80-1.15	0.45-0.60				380 450	230 275	22	max217HB	max95HRB	
	21	0.04-0.17	0.30-0.60	0.035	0.035	0.50		2.75-3.25	0.90-1.10				415 515	205 310	18	max201HB	max92HRB	
	22	0.05-0.17	0.30-0.60	0.035	0.035	0.50		2.00-2.50	0.90-1.10				415 515	205 310	18	max201HB	max92HRB	
	55	0.22	0.90	0.035	0.04	0.15-0.40							380-515	205	27			
	60	0.27	0.90	0.035	0.04	0.15-0.40							415-550	220	25			
	65	0.31	0.90	0.035	0.04	0.15-0.40							450-585	240	23			
70	0.33	1.20	0.035	0.04	0.15-0.40							485-620	260	21				
A 515	55	0.20	0.90-1.20	0.035	0.04	0.15-0.40							380-515	205	27			
	60	0.23	0.85-1.20	0.035	0.04	0.15-0.40							415-550	202	25			
	65	0.26	0.85-1.20	0.035	0.04	0.15-0.40							450-585	240	23			
	70	0.28	0.85-1.20	0.035	0.04	0.15-0.40							485-620	260	21			
	Class 1	0.24	0.70-1.35	0.035	0.040	0.15-0.40	0.25 max	0.80 max	0.35 max				485-620	345	22			
Class 2	0.24	0.70-1.35	0.035	0.040	0.15-0.40	0.25 max	0.80 max	0.35 max				550-690	415	22				

IS-2002-62 STEEL PLATES FOR BOILERS

Designation	C max	Chemical Composition				Tensile Test			Elongation	
		Si max	P max	S max	Tensile strength Mpa	Yield Strength Mpa	%min Test Piece	%min		
IS 2002-1	0.18	0.10-0.35	0.040	0.040	362-442	540	5.65-6.50 4.65-5.0	26	30	
IS 2002-2A	0.20	0.10-0.35	0.050	0.050	412-491	491	5.65-6.50 4.65-5.0	25	29	
IS 2002-2B	0.22	0.10-0.35	0.050	0.050	510-608	491	5.65-6.50 4.65-5.0	20	24	

IS-2062-92 STEEL FOR GENERAL STRUCTURAL PURPOSES

Grade	Designation	% Chemical Composition				Tensile strength (Min) kg/mm ²	Yield Strength (Min) Mpa	Bend Test	Statist Place Charpy V Notch Impact Energy Joule min
		C max	MN max	S max	P max				
A	FE410 WA	0.23	1.5	0.060	0.030	0.42	41.8	3t	27
B	FE410 WB	0.22	1.5	0.045	0.045	0.40	41.8	t<25mm	21 for 27 3t for t>25mm
C	FE410 WC	0.20	1.5	0.040	0.040	0.40	41.8	2t	27

Formula - Weight of Stainless Steel Sheets/Plates = Length (mm) x Width (mm) x Thickness (mm) x 7.86 = Kg./Sheet.

TECHNICAL INFO OF NICKEL BASED ALLOYS

U.S.A. / GROSSBRITANNIE U.S.A. / GRANDE-BRETAGNE U.S.A. / GREAT BRITAN													
Analyses		Analyses Composition											
Handelsbezeichnung Designation Commercial Commercial designation	C%	Co%	Cr%	Mo%	Ni%	V%	W%	Al%	Cu%	Nb/Cb Ta%	Ti%	Fe%	Sonstige Autres -Other %
Monel 400	0.12	-	-	-	65.0	-	-	-	32.0	-	-	1.5	Mn 1.
Monel 401	0.10	-	-	-	43.0	-	-	-	53.0	-	-	0.75	Si 0.25;Mn z25
Monel 404	0.15	-	-	-	52.0-57.0	-	-	0.05	rest/bal	-	-	0.50	Mn 0.10; Si 0.10;So.024
Monel 502	0.10	-	-	-	63.0-17.0	-	-	2.5-3.5	rest/bal	-	0.50	2.0	Mn 1.5;Si:So.010
Monel k 500	0.13	-	-	-	64.0	-	-	2.8	30.0	-	0.60	1.0	Mn 0.8
Monel B	0.10	1.25	0.60	28.0	rest/bal	0.30	-	-	31.0	-	-	1.2	Mn1.0;So,0.04
Hastelloy B2	0.02	1.0	1.0	26.0-30.0	rest/bal	-	-	-	-	-	-	2.0	Mn1.0;Si 0.10
Hastelloy C	0.07	1.25	16.0	17.0	rest/bal	0.30	40	-	-	-	-	5.75	Mn 1.0;Si 0.70
Hastelloy C4	0.015	2.0	14.0-17.0	14.0-17.0	rest/bal	-	-	-	-	-	0.70	3.0	Mn1.0;Si 0.70
Hastelloy C276	0.02	2.5	14.0-16.5	15.0-17.0	rest/bal	0.35	3.0-4.5	-	-	-	-	4.0-7.0	Mn 1.0;Si 0.05
Incoloy 800	0.04	-	21.0	-	32.0	-	-	0.3	-	-	0.4	45.0	-
Incoloy 801	0.05	-	20.5	-	32.0	-	-	-	-	-	1.1	45.0	-
Incoloy 802	0.35	-	21.0	-	32.0	-	-	0.6	-	-	0.7	45.0	-
Incoloy 804	0.05	-	29.5	-	41.0	-	-	0.3	-	-	0.6	25.4	-
Incoloy 805	0.12	-	7.5	0.50	36.0	-	-	-	0.10	-	-	rest/bal	Mn 0.60;Si 0.50
Incoloy 810	0.25	-	21.0	-	32.0	-	-	-	0.50	-	-	rest/bal	Mn 0.90; Si 0.80
Incoloy 825	0.04	-	21.0	3.0	42.0	-	-	-	2.0	-	1.0	30.0	-
Incoloy 901	0.05	-	12.5	6.0	rest/bal	-	-	-	-	-	2.9	34.0	Mn 0.24;0.12;00.015
Incoloy 903	0.02	15.0	-	-	38.0	-	-	0.7	-	Nb 3.0	1.4	41.0	-
Incoloy 904	0.02	14.0	-	-	33.0	-	-	-	-	-	1.7	50.0	-
Incoloy 600	0.05	-	15.5	-	75.0	-	-	-	-	-	-	8.0	-
Incoloy 601	0.05	-	23.0	-	60	-	-	1.4	-	-	-	14.0	-
Incoloy 610	0.20	-	15.5	-	rest/bal	-	-	-	0.50	Nb 1.0	-	9.0	Mn0.90;Si 2.0
Incoloy 617	0.07	12.5	22.5	9.0	54.0	-	-	1.0	-	-	-	-	-
Incoloy 625	0.05	-	21.5	9.0	61.0	-	-	0.60	-	Nb 3.65	0.60	2.5	Mn 0.5;Si 0.50
Incoloy671	0.07	12.5	22.5	9.0	51.0	-	-	-	-	-	0.35	-	-
Incoloy 700	0.12	28.5	15.0	3.75	46.0	-	-	3.0	0.05	-	2.20	0.70	Mn 0.10;Si 0.30
Incoloy 702	0.04	-	15.6	-	rest/bal	-	-	3.4	0.10	-	0.70	0.35	Mn 0.05; Si 0.20
Incoloy 705	0.30	-	15.5	-	rest/bal	-	-	-	0.50	-	-	8.0	Mn 0.90; Si 5.5

CHEMICAL COMPOSITION OF TITANIUM / NICKEL BASE ALLOYS

Grade	UNS Designation	C %	Mn %	P %	S %	Si%	Ni %	Co %	Cu %	Ag%	Fe %	Pb %	Zn %	N %	Ti %	H %	O %
		Max	Max	Max	Max	-	-	-	-	-	-	-	-	Max	Max	Max	Max
70/30 Cu-Nu	C 71500	0.05	1.0	0.02	0.02	-	29.0-33.0	-	-	-	0.40-1.0	0.02	0.50	-	-	-	-
90/10 Cu-Ni	C 70600	0.05	1.0	0.02	0.02	-	9.0-11.0	-	-	-	1.0-1.8	0.02	0.50	-	-	-	-
Titanium Gr. 2	R 50400	0.08	0.03	-	-	-	-	-	-	-	0.30	-	-	-	-	-	0.25
Titanium Gr. 1	R 50250	0.08	0.03	-	-	-	-	-	-	-	0.20	-	-	-	-	0.015	0.18
Type 17-4PH	-	0.07	1.00	0.04	0.03	1.00	3.00-5.00	3.00-5.00	0.15-0.45	-	-	-	-	-	-	-	-
Nickel 200	2200	0.15	0.35	-	0.01	0.35	99.0	-	-	-	0.40	-	-	-	-	-	-
Nickel 201	2201	-	0.35	-	0.01	0.35	99.0	-	0.25	-	0.40	-	-	-	-	-	-

FERROUS STEELS

A 106 / A 106 M	SEAMLESS CARBON STEEL PIPE FOR HIGH TEMPERATURE SERVICE, GRADE A,B,C,D, . HIC AND SSC TESTED PIPE, HYDRO TESTED, NACE MR 0175/MR 0103/ISO 15156
A 312/ A312 M	SEAMLESS AND WELDED PIPE AUSTENITIC STAINLESS STEEL, GRADE TP 304, 304L, 316, 316L, 321, 347 321H, 304H, 347, 347H, 316, 16H, 316TI, 317,317L. 8904-904L RADIOGRAPHY, SOLUTION ANNEALING, EDDY CURRENT TESTED E 112, GRAIN SIZE, HYDROTEST IN PSI, INTERGRANULAR CORROSION TEST A262 PRACTICE 'E', 'A', 'C', EDDY CURRENT TESTED, NACE MR 0175/MR0103, WELDED WITH AUTOMATIC MACHINE WELDING.
A 333 / A333 M	SEAMLESS AND WELDED STEEL PIPE FOR LOW TEMPERATURE SERVICE, GRADE 6, NORMALISING AND TEMPERING, QUENCHING AND TEMPER, IMPACT TEST AT -460C, HYDRO TESTED PIPE, NACE MR 0175/MR0103, FLATTENING TEST.
A 335 / A 335M	SEAMLESS FERRITIC ALLOY STEEL PIPE FOR HIGH TEMPERATURE SERVICE, GRADE - P1,P2,P5,P9,P11,P12,P22,P91, NORMALISING, NORMALISING AND TEMPER, QUENCH AND TEMPER, HOT FORMING, ANNEALING, HYDROTEST, FLATTENING TEST, NACE MR 0175/MR 0103.
A 358 / A358M	ELECTRIC-FUSION WELDED (EFW) AUSTENITIC CHROMIUM-NICKEL ALLOY STEEL PIPE FOR HIGH TEMPERATURE SERVICE, GRADE TP 304, 304L, 316, 316L, 321, 347, 321H, 304H, 347, 347H, 316, 16H, 316TI, 317, 317L. 8904, 904L RADIOGRAPHY, SOLUTION ANNEALING, CHEMICAL & PHYSICAL PROPERTIES TO MATCH AS PER A240 / A240M, WELD TENSILE, PARENT TENSILE, HYDROTEST, EDDY CURRENT TESTED, HYDRO TEST DONE.
A 790- A790 M	STANDARD SPECIFICATION FOR SEAMLESS AND WELDED FERRITIC AND AUSTENITIC STAINLESS STEEL PIPE.-GRADE S31803, S32205, SUPER DUPLEX, 32750/32760- HYDROTEST IN PSI, EDDY CURRENT TESTED, INTERGRANULAR CORROSION TEST PRACTICE 'E', 'C', 'A' EDDY CURRENT TESTED, HYDRO TEST DONE.
A 213/ A213M	STANDARD SPECIFICATION FOR SEAMLESS FERRITIC AND AUSTENITIC ALLOY STEEL BOILER, SUPERHEATER AND HEAT EXCHANGER TUBES- GRADE T2,T5,T9,T11, T12, T17, T21, T23, T91, TP 304,, 304L, 309S, 310H, 316TI, 316, 316L 316LN, 317, 317L, 321, 321H, 347, 347H, ANNEALING NORMALISING TEMPERING, SOLUTION ANNEALING.
A268 / A268 M	SEAMLESS AND WELDED FERRITIC AND MARTENSITIC STAINLESS STEEL TUBING FOR GENERAL SERVICE, GRADE TP 410, 430, 446, 409, HYDROTEST IN PSI.
A 450 / A 450 M	STANDARD SPECIFICATION FOR GENERAL REQUIREMENT FOR CARBON AND LOW ALLOY STEEL TUBES.
A 105 / A 105M	STANDARD SPECIFICATION FOR CARBON STEEL FORGING FOR PIPING APPLICATION - FORGED PIPE FITTING, NPT BSPT THREADED PIPE FITTING, SOCKET WELDED, FROM SIZE 1/8" TO 4" - UNION, ELBOW, TEE, COUPLING, WELDING BOSS, WELDOLET, NIPPOLET, SWEPOLET, ELBOWLET, STREET ELBOW, PLUG OF ROUND HEAD, SQUARE HEAD AND HEX HEAD SOCKET, THREDOLET, ASME B 16. 11 - FLANGES AS PER ASME B 16.5 AND B 16.47 - SERIES A & B - CLASS 150, 300, 400, 600, 900, 1500, 2500, SLIP ON, THREADED, WELD NECK, SWRF FLANGE, WNRF, SORF, RTJ, WNRTJ, SWRTJ, REDUCING FLANGE, GROOVED & TONGUE, BLIND - BLRF FLANGES, BLRTJ - DIN FLANGES 2501, PN 16, PN 25, PN 100, PN 125, NACE MR 01 75/ MR 0103, HYDROFLORIC ACID SERVICE, NORMALISING, IMPACT TEST AS PER PED REQUIREMENT, FORGING IN NORMALISED RANGE, IFR FITTINGS, SPECTACLE BLIND B 16.48.
A 182 / A 182M	STANDARD SPECIFICATION FOR FORGED OR ROLLED ALLOY AND STAINLESS STEEL PIPE FLANGES, FORGED FITTING, AND PART AS PER DRAWING, FOR HIGH TEMPERATURE SERVICE, REQUIREMENT AS PER A 961 / A 961M - GRADE F1, F5, F9, F91, F11, CL1, CL2, CL3, F12, F22, CL1, CL3, F 304, 304L, 321, 347, 321H, 304H, 347, 347H, 316, 316H, 16H, 316TI, 317, 317L, 8904, 904L, F50, F51, F60 - NORMALISING, NORMALISING & TEMPERING, WATER QUENCHED, SOLUTION ANNEALED, POST WELD HEAT TREATMENT, SIMULATION HEAT TREATMENT - FORGED FITTING, FLANGES SORF FLANGES, DIN FLANGES, ASME B 16.5-, GRAIN SIZE, SORF, BLRF, WNRF, RTJ FLANGE, SOCKET WELD FITTINGS, NPT & BSPT THREADED FITTINGS, STREET ELBOW, TEE, TEE REDUCING, CONC REDUCING COUPLING, ECC REDUCING COUPLING, IGC PRACTICE A262 'E', 'C', 'A'.
A 234/ A 234 M	STANDARD SPECIFICATION FOR PIPING FITTING , BUTT WELDED, WROUGHT CARBON STEEL AND ALLOY STEEL FOR MODERATE AND HIGH TEMPERATURE SERVICE - BUTT WELDED ELBOW TEE REDUCER CONCENTRIC, ECCENTRIC, UNEQUAL TEE, EQUAL TEE, CROSSES EQUAL & UNEQUAL, LONG RADIUS BEND 3D, 5D, 6D, 7D, 10D, AND OF ANY RADIUS, 180 DEG/120/160 THK, SUPPLEMENTARY REQUIREMENT OF S 78 OF A960 / A960, HFN MARKING, GRADE - WPB, WPC, WP1, WP12, WP11 CLASS 1, CLASS3, WP 11 CL2, WP22CL1, WP 22 CL 3, WP 5 CL 1, CL 3, WP 9 CL 1, CL 3, WP 91. ADDITIONAL HEAT TREATMENT OF P 91, NORMALISING, NORMALISING AND TEMPERING, QUENCH & TEMPER, NON DESTRUCTIVE TESTING, IMPACT TEST AS PER PED REQUIREMENT, WELDED & SEAMLESS CONSTRUCTION, 100% RADIOGRAPHY, HIC (HYDROGEN INDUCED CRACKING), SSC TEST, IFR FITTINGS, MAGNETIC PARTICAL INSPECTION OF WELD JOINT.
A 350 / A 350	SCARBON AND LOW ALLOY STEEL FORGING, REQUIRING NOTCH TOUGHNESS TESTING FOR PIPING COMPONENTS, IMPACT TESTING, GRADE LF2, LF 6, LF1, ETC AND CLASS 1 AND CLASS 2, MORMALISE AND TEMPER, ELECTRIC FURNACE AND VACUUM INDUCTION MELTING - DIMENSION AS PER BS 3799, ASME 16.9, NPT BSPT THREADING, SOCKET WELDED, FROM SIZE 1/8" TO 4" UNION ELBOW, TEE, COUPLING, WELDING BOSS, WELDOLET, NIPPOLET, SWEPOLET, ELBOWNET, STREET ELBOW, SOCKOLET, THREDOLET - ASME B16.11- FLANGES AS PER ASME B 16.5 AND B 16.5 AND 16.47 - SERIES 'A' & 'B' - CLASS 150, 300, 400, 600, 900, 1500, 2500, SLIP ON, THREADED, WELD NECK, SWRF FLANGE, WNRF, SORF, RTJ, WNRTJ, SWRTJ, REDUCING FLANGE, GROOVED 7 TONGUE, BLIND - BLRF FLANGES, BLRTJ-DIN FLANGES 2501, PN 16, PN 25, PN 100, PN 125, NACE MR 0175/ MR0103, HYDROFLORIC ACID SERVICES, NORMALISING, IMPACT TEST AS PER PED REQUIREMENT, FORGING IN NORMALISING TEMPERATURE.

FORMULA OF CALCULATING WEIGHT

- 1) **Weight of S.S. Pipe**
 $O.D. (mm) - W. Thick (mm) \times W. Thick (mm) \times 0.0248 = Wt. Per Mtr.$
 $O.D. (mm) - W. Thick (mm) \times W. Thick (mm) \times 0.00756 = Wt. Per Feet.$
- 2) **Weight of S.S. Round Bar**
 $DIA (mm) \times DIA (mm) \times 0.00623 = Wt. Per Mtr.$
 $DIA (mm) \times DIA (mm) \times 0.0019 = Wt. Per Feet.$
- 3) **Weight of S.S. Square Bar**
 $DIA (mm) \times DIA (mm) \times 0.00788 = Wt. Per Mtr.$
 $DIA (mm) \times DIA (mm) \times 0.0024 = Wt. Per Feet.$
- 4) **Weight of S.S. Hexagonal Bar**
 $DIA (mm) \times DIA (mm) \times 0.00680 = Wt. Per Mtr.$
 $DIA (mm) \times DIA (mm) \times 0.002072 = Wt. Per Feet.$
- 5) **Weight of S.S. Flat Bar**
 $Width (mm) \times Thick (mm) \times 0.00798 = Wt. Per Mtr.$
 $Width (mm) \times Thick (mm) \times 0.00243 = Wt. Per Feet.$
- 6) **Weight of S.S. Sheets & Plates**
 $Length (Mtrs) \times Width (Mtrs) \times Thick (mm) \times 8 = Kg. Per Sheet$
 $Length (Ft) \times Width (Ft) \times Thick (mm) \times 3/4 = Kg. Per Sheet$
- 7) **Weight of S. S. Circle**
 $Dia (mm) \times Dia (mm) \times Thick (mm) \div 160 = Gms. Per PC$
 $Dia (mm) \times Dia (mm) \times Thick (mm) \times 0.0000063 = Kg. Per PC$
- 8) **Weight of Brass Pipe / Copper Pipe**
 $O.D. (mm) - Thick (mm) \times Thick (mm) \times 0.0260 = Wt. Per Mtr.$
- 9) **Weight of Lead Pipe**
 $O.D. (mm) - Wt. (mm) \times Wt. (mm) \times 0.0345 = Wt. Per. Mtr.$
- 10) **Weight of Aluminium Pipe**
 $O.D. (mm) - Thick (mm) \times Thick (mm) \times 0.0083 = Wt. Per Mtr.$
- 11) **Weight of Aluminium Sheet**
 $Length (Mtr.) \times Width (Mtr.) \times Thick (mm) \times 2.69 = Wt. Per PC$
- 12) **Weight for Conversion of Mtr. To Feet**
 $Weight of 1 Mtr. \div 3.2808 = Feet$
- 13) **Formula for Calculating Width of Sheet for making Pipe**
 $Outer DIA - Wall Thickness \times 22/7 \text{ Width of Sheet}$
- 14) **Formula For Healthy Business**
 $Honesty + Quality of Goods + Quick Service$
 $+ Reasonable rate = \text{Good Health of Business}$

THIRD PARTY INSPECTION





EXPORTS :

Having established our presence in the Indian market, we are now aggressively venturing into exporting of our products to various countries. Middle East, Far East, Europe, African Countries etc.

ISO 9001-2008 : In recognition of our efforts in quality control we have been awarded the coveted ISO 9001-2008 quality certification from reputed agency.

LOGISTICS:

We have pool of people who are completely dedicated in providing our clients with the best Logistics solution by AIR / SEA /ROAD. We have tied up with various shipping lines, Airlines & Road Transporters enabling us to provide with best services, competitive pricing & timely delivery of material to clients destination worldwide. Regarding delivery of product we work as per clients guidelines & put all our resources in it to meet them.

APPLICATION INDUSTRIES



SHIP BUILDING



ENGINEERING



SUGAR INDUSTRY



NUCLEAR & POWER



**CHEMICAL &
PHARMACEUTICAL**



OIL & GAS INDUSTRIES



**PETRO-CHEMICAL
& REFINERY**



cement plant



**FOOD & BEVERAGE
INDUSTRIES**



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METAL & ENGINEERING CO.

Stockist of : Pipe & Pipe Fittings in
Ferrous & Non-Ferrous Metal

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