



MSME
सूक्ष्म, लघु एवं मध्यम उद्यम
MICRO, SMALL & MEDIUM ENTERPRISES
UDYAM-MH-19-0085169



RATNADEEP
STEEL & ENGG. CO.

- Pipes, Tubes
- Pipe Fittings
- Flanges, Fasteners
- Sheets, Plates, Coils
- Flats, Bars
- Angles, Channels, Beams
- Ferrous & Non-Ferrous Metals



The Reliable Steel Source
Inspiring Customer's Confidence.

Technical Guide
Version 9.0

COMPANY PROFILE

Ratnadeep Steel & Engg. Co. an ISO Certified Company is a leading **Manufacturer, Supplier and Stockist of Ferrous and Non Ferrous metals** in form of **Pipes, Tubes, Plates, Sheets, Fittings, Bars, Flanges, Structures & Fasteners**. With over 25 years of experience in the industry, Ratnadeep is known for its wide range of products, high quality standards, and competitive prices.

Ratnadeep's products are used in a wide range of industries, including oil & gas, power generation, petrochemicals, pharmaceuticals, food & beverage, textiles, and machinery etc. The company also offers custom cutting and fabrication services to meet the specific needs of its customers.

Ratnadeep is committed to providing its customers with the best possible service and support. Its team of experienced professionals is always available to answer questions and help customers find the right products for their needs.

In short, Ratnadeep Steel & Engg. Co. is a trusted **One-stop shop for all your Ferrous and Non Ferrous metal needs**.

The following items we deal are in wide range of Sizes and Grades and are readily available with us in bulk quantities...

PIPES & TUBES PLATES, SHEETS & COILS

STAINLESS STEEL
INCOLOY 800, 825
INCOLOY ALLOY 20
SMO 254 (UNS S31254)
COPPER

PIPE FITTINGS STRUCTURES

CARBON STEEL
NICKEL ALLOY 200
HASTELLOY C22, C276
PHOSPHORUS BRONZE
BRASS

FLANGES FASTENERS

ALLOY STEEL
TITANIUM GR 2
DUPLEX & SUPER DUPLEX
BOILER QUALITY
17-4PH & 15-5PH

BARs COPPER JUMPERS

MILD STEEL & HOT DIP GI
INCONEL 600, 601, 625
GUN METAL
MONEL 400, K500
ALUMINIUM

We are approved suppliers to various government department & Public sectors all over the country & regularly supplying to them for a long time. We have got ready stock of the above items in various sizes as per National / International Standards & Specification & the same shall be supplied as per your requirements at very reasonable rates.

We can arrange any **Third-Party inspection agency from LRIS, BVIS, IBR, TUV, DNV, MECON, MDL, PDIL, LLOYDS etc.**

Hope, that we will get an opportunity to work with your esteemed organization and prove our excellence to build a long-term relation for the future.

Request you to please enlist our name in your approved Suppliers/Vendors list and send us your valuable purchase enquiries to enable us to quote our most competitive rates and terms.

QUALITY POLICY

At Ratnadeep Steel & Engg. Co., we are committed to providing high-quality products and services to our customers. Our quality policy is guided by principles that support our unique working culture, which incorporates respect, self-management, open communication, and continuous improvement.



Our quality assurance system starts with understanding our customers' requirements and continues until the customer is completely satisfied with the delivery of our products and services. We exercise stringent quality control measures to ensure the accurate dimensions and mechanical properties of our products.

Our quality assurance system assures each product to pass through the following processes and quality systems:

- **Material Control System**
- **Process Control System**
- **Machining and Dimensional Control**
- **Certification and Supplementary Test**
- **Finishing, Marking & Packing**

Our quality policy is built for a result-oriented work culture to fulfill our customers' needs in terms of cost, quality, and delivery. We are aiming towards zero losses by enhancing the effectiveness of people and plant equipment safely.

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PRODUCT RANGE

PIPES & TUBES



Stainless Steel	: ASTM A 312 GR. TP 304, 304L, 304H, 309S, 309H, 310S, 310H, 316, 316L, 316Ti, 316H, 316LN, 317, 317L, 321, 321H, 347, 347H, 904L.
Carbon Steel	: ASTM A 53 GR. A & B, ASTM A 106, GR. A, B & C, API 5L GR.B, API 5L X 42, X46, X52, X56, X60, X65 & X70, X80 (PSL1 & PSL2)
Alloy Steel	: ASTM A 335 GR P1, P5, P9, P11, P12, P22, P91, P92 etc.
High Nickel Alloys	: Monel, Nickel, Inconel, Hastelloy, Copper Brass, Bronze, Titanium, Tantalum, Bismuth, Aluminium, High Speed Steel, Zinc, Lead etc.
Type	: Round, Square, Rectangular (Seamless, Welded, ERW & EFW)
Size	: 1/4" NB to 32"NB (Seamless & Welded)
Wall Thickness	: Sch.5S to Sch. XXS & as specified.
Size	: 1/4"OD to 6"OD
Wall Thickness	: 22SWG TO 10SWG

BUTTWELD FITTINGS



Stainless Steel	: ASTM A 403 GR. WP 304, 304L, 304H, 309S, 309H, 310S, 310H, 316, 316L, 316Ti, 316H, 316LN, 317, 317L, 321, 321H, 347, 347H, 904L.
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/WP92 etc.
Duplex & Super Duplex Steel	: UNS S31803, UNS S32750, UNS S32760, 904L, Alloy 20, 254 SMO
High Nickel Alloys	: Monel, Nickel, Inconel, Hastelloy, Copper Brass, Bronze, Titanium, Tantalum, Bismuth, Aluminium, High Speed Steel, Zinc, Lead etc.
Type	: Elbow, Tee, Reducer, Return Bends, Stub-Ends, Cap, Collar, Cross, Insert etc.
Size	: 1/4" NB to 32"NB (Seamless & Welded)
Wall Thickness	: Sch.5S to Sch. XXS & as specified.

SCREWED & FORGED FITTINGS



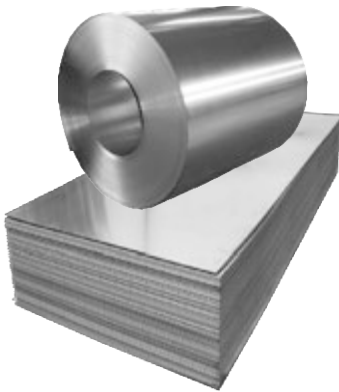
Stainless Steel	: ASTM A 182 F304, 304L, 304H, 309S, 309H, 310S, 310H, 316, 316L, 317, 317L, 321, 310, 347, 347H, 904L.
Carbon Steel	: ASTM A 105/A694 F42/46/52/56/60/65/70/A350 LF3/A350LF2
Alloy Steel	: ASTM A 182 F1/F5/F9/F11/F22/F91 etc.
Others	: Monel, Nickel, Inconel, Hastelloy, Copper Brass, Bronze, Titanium, Tantalum, Bismuth, Aluminium, High Speed Steel, Zinc, Lead etc.
Type	: Elbow, Tee, Union, Cross, Coupling, Plug, Swage Nipple, Welding Boss, Hexagon Nipple, Barrel Nipple, Hexagon Nut, Hose Nipple, Weldolet, Elbolet, Sockolet, Thredolet, Nipolet, Latrolet etc.
Size	: 1/4" NB to 4"NB (Socketweld & Threaded)
Class	: 3000#, 6000#, 9000#

PRODUCT RANGE

FLANGES



Stainless Steel	: ASTM A 182 F304, 304L, 304H, 316, 316L, 317, 317L, 321, 310, 347, 347H, 904L etc.
Carbon Steel	: ASTM A 105/A694 F42/46/52/56/60/65/70/A350LF3/A350LF2 etc.
Alloy Steel	: ASTM A 182 F1, F5, F11, F22, F91 etc.
Duplex Steel	: 2205 (Monel), 2507 (Super Duplex), UNS-31803, 32750, 32990
Others	: Monel, Nickel, Inconel, Hastelloy, Copper Brass, Bronze, Titanium, Tantalum, Bismuth, Aluminium, High Speed Steel, Zinc, Lead etc.
Type	: Weldneck, Slipon, Blind, Socket Weld, Lap Joint, Spectacle, Ring Joint, Orifice, Long Weldneck, Deck Flange etc.
Size	: 1/2" NB to 48"NB
Class	: 150#, 300#, 400#, 600#, 900#, 1500# & 2500# also as per National & International Standards



SHEET, PLATE & COILS

Stainless Steel	: ASTM A 240 GR. TP 304, 304L, 304H, 309S, 309H, 310S, 310H, 316, 316L, 316Ti, 316H, 316LN, 317, 317L, 321, 321H, 347, 348, 348H, 409, 416, 420, 430 etc.
Alloy Steel	: ASTM A387 Gr. 2, 5, 9, 11, 12 & 22, 91 in class 1 & 2 ASTM A204 Gr. A & B, DIN 17175 Gr. 15Mo3 & 16Mo3 with IBR Test Certificate.
Carbon Steel / Boiler Quality	: IS 2062 Gr. A, B & C, IS 2002 Gr. 1 & 2 ASTM A516 Gr. 60 & 70, ASTM A516 Gr. 60 & 70, A572 Gr. 50 etc.



RODS / BARS & WIRES

Material Grade	: Stainless Steel, Nickel Alloys, Carbon Steel, Alloy Steel, IBR Non IBR.
High Nickel Alloy	: Monel, Nickel, Inconel, Hastelloy, Copper Brass, Bronze, Titanium, Tantalum, Bismuth, Aluminium, High Speed Steel, Zinc, Lead etc.
Type	: Rods, Hex, Square, Wires, Billets etc.



COPPER BRAIDED WIRES & JUMPERS

Copper Flexible Connectors
Silicon Carbide & Molybdenum Disilicide
Heating Element Accessories
Aluminium Wire & SS Wire Braided Products.
Special Earthing Materials, Sheet Metal Components.

PIPES & TUBES



Stainless Steel	: ASTM A 312 GR. TP 304, 304L, 304H, 316, 316L, 317, 317L, 321, 310, 347, 904L etc.
Carbon Steel	: ASTM A 53 GR. B / A105 GR. B / API 5L GRADE B / API 5L GR. X42/46/52/56/60/65/70/S355J2H etc. (IBR & NON IBR)
Low Temperature, Carbon Steel	: A333 Gr.3 / Gr. 6 etc.
Alloy Steel	: ASTM A 335 GR P1, P5, P9, P11, P12, P22, P91, P92 etc.
M.S. ERW & Hot Dipped Galvanized (G.I) ERW Air Pre Heater & Corten Tubes	: Pipe as per IS1239 & IS3589, Gr. FC 330 & 410
High Nickel Alloys	: Monel, Nickel, Inconel, Hastelloy, Copper & Brass, Bronze, Titanium, Tantalum, Bismuth, Aluminium, High Speed Steel, Zinc, Lead etc.
Type	: Round, Square, Rectangular
Size	: 1/4" NB to 32"NB (Seamless) 1/2" NB to 108"NB (Welded)
Wall Thickness	: Sch.5S to Sch. XXS & Heavy Wall Pipe 22 SWG to 10 SWG

CARBON STEEL / ALLOY STEEL / STAINLESS STEEL

PIPE & TUBES SCHEDULE DIMENSIONS WALL THICKNESS, WT./MTR. (KG)

NOMINAL PIPE SIZE		SCHEDULE DESIGNATIONS 36.10 & 36.19 ANSI / ASME	WALL THICKNESS MM	WEIGHT KG / METER
OD	INCH MM			
1/2	15	STD 40s	2.76	1.26
	0.840	XS 80	3.73	1.62
	21.3	160	4.77	1.95
3/4	20	10 10s	2.10	1.27
	1.050	STD 40 40s	2.87	1.68
	26.7	80 80s	3.91	2.19
		160	5.53	2.88
		XXS	7.82	3.63
1	25	5 5s	1.65	1.29
	1.315	10 10s	2.76	2.09
	33.4	STD 40 40s	3.37	2.50
		80 80s	4.54	3.23
		160	6.35	4.23
		XXS	9.09	5.45
1-1/4	32	5 5s	1.65	1.64
	1.660	10 10s	2.76	2.69
	42.2	STD 40 40s	3.55	3.38
		80 80s	4.85	4.46
		160	6.35	5.60
		XXS	9.70	7.76
1-1/2	40	5 5s	1.65	1.89
	1.900	10 10s	2.76	3.10
	48.3	STD 40 40s	3.68	4.04
		80 80s	5.08	5.40
		160	7.13	7.23
		XXS	10.16	9.54
2	50	5 5s	1.65	2.38
	2.375	10 10s	2.76	3.93
	60.3	STD 40 40s	3.91	5.44
		80 80s	5.53	7.48
		160	8.73	11.11
		XXS	11.07	13.45
2-1/2	65	5 5s	2.10	3.68
	2.875	10 10s	3.04	5.26
	73.0	STD 40 40s	5.15	8.63
		80 80s	7.01	11.41
		160	9.52	14.91
		XXS	14.0	20.40
3	80	5 5s	2.10	4.51
	3.55	10 10s	3.04	6.45
	88.9	STD 40 40s	5.48	11.28
		80 80s	7.62	15.27
		160	11.12	21.33
		XXS	15.24	27.68
3-1/2	90	5 5s	2.10	5.17
	4.000	10 10s	3.04	7.40
	101.6	STD 40 40s	5.74	13.57
		80 80s	8.07	18.62
		XXS	16.15	34.03
4	100	5 5s	2.10	5.83
	4.500	10 10s	3.04	8.36
	114.3	STD 40 40s	6.02	16.07
		80 80s	8.56	22.32
		120	11.12	28.30
		160	13.48	33.53
		XXS	17.12	41.02
5	125	5 5s	2.76	9.45
	5.563	10 10s	3.40	11.57
	141.3	STD 40 40s	6.55	21.77
		80 80s	9.52	30.95
		120	12.70	40.27
		160	15.87	49.10
		XXS	19.05	57.42
6	150	5 5s	2.76	11.30
	6.625	10 10s	3.40	13.83
	168.3	STD 40 40s	7.11	28.26
		80 80s	10.97	42.56
		120	14.27	54.21
		160	18.26	67.55
		XXS	21.94	79.18
8	200	5 5s	2.76	14.76
	8.625	10 10s	3.75	19.96
	219.1	20 20s	6.350	33.31
		30 30s	7.036	36.78
		STD 40 40s	8.179	42.53
		60 60s	10.31	53.08
		XS 80 80s	12.70	64.63
		100	15.08	75.89
		120	18.26	90.43
		140	20.62	100.93
		160	23.01	111.26
		XXS	22.27	107.88

NOMINAL PIPE SIZE		SCHEDULE DESIGNATIONS ANSI / ASME	WALL THICKNESS MM	WEIGHT KG / METER
OD	INCH MM			
10	250	5S	3.40	22.63
	10.750	10S	4.19	27.78
	273.1	20	6.35	41.76
		30	7.79	51.00
		STD 40 40S	9.27	60.30
		XS 60 80S	12.70	81.53
		80	15.08	95.97
		100	18.26	114.74
		120	21.43	133.01
		140	25.40	155.11
		160	28.57	172.26
12	300	5s	3.96	31.25
	12.750	10s	4.57	35.99
	323.9	20	6.35	49.71
		30	8.38	65.20
		STD 40s	9.52	73.83
		40	10.31	79.73
		XS 80s	12.70	97.44
		60	14.27	108.97
		80	17.47	132.02
		100	21.43	159.86
		120	25.40	186.93
		140	28.57	208.06
		160	33.32	238.74
14	350	10s	4.77	41.31
	14.000	20	6.35	54.68
	355.6	STD 30 40s	7.92	67.94
		40	9.52	81.28
		XS 40s	11.12	94.50
		60 80s	12.70	107.38
		80	15.08	126.68
		100	19.05	158.10
		120	23.82	194.92
		140	27.78	224.62
		160	31.75	253.55
			35.71	281.71
16	400	10s	4.77	47.29
	16.000	20	6.35	62.64
	406.4	STD 30 40s	7.92	77.87
		40	9.52	93.21
		XS 30 80s	12.70	123.29
		60 40	16.66	160.13
		80	21.43	203.50
		100	26.18	245.53
		120	30.96	286.65
		140	36.52	333.14
		160	40.48	365.33
18	450	10s	4.77	53.27
	18.000	20	6.35	70.59
	457.2	STD 30 40s	7.92	87.79
		40	9.52	105.15
		XS 30 80s	11.12	122.37
		40	12.70	139.20
		60 80s	14.27	155.91
		80	19.05	205.82
		100	23.82	254.61
		120	29.36	309.78
		140	34.92	363.67
		160	39.67	408.49
			45.23	459.56
20	500	10s	5.53	68.60
	20.000	20	6.35	78.55
	508.0	STD 30 40s	9.52	117.08
		40	12.70	155.11
		60 80s	15.08	183.39
		80	20.62	247.87
		100	26.18	311.14
		120	32.53	381.49
		140	38.10	441.48
		160	44.45	508.10
			50.01	564.83
24	600	10s	6.35	94.46
	24.000	20 40s	9.52	140.94
	609.6	XS 80s	12.70	186.93
		30	14.27	209.56
		40	17.47	255.16
		60	24.61	355.05
		80	30.96	441.80
		100	38.88	547.28
		120	46.02	639.63
		140	52.37	719.68
		160	59.53	807.58

**MS / GI ERW / EFW TUBE / PIPE CONFIRMING TO
IS:1239 PART 1 PLAIN END./ IS 3589 GR. 330/410/450 BEVELLED END**



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

Nominal Bore		Outside Diameter		Light		Medium		Heavy	
				Thickness	Weight	Thickness	Weight	Thickness	Weight
Inch	In mm	In	mm	mm	kg/mtr	mm	Kg/Mtr.	mm	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



LARGE 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	-	-	-	-
5.60	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

CARBON STEEL, ALLOY STEEL, LOW TEMP, PIPE & TUBES SPECIFICATION

CHEMICAL ANALYSIS									MECHANICAL PROPERTIES			SPECIFIC REQUIREMENT
									TENSILE STRENGTH	YIELD TRESS	ELONGA-TION	
SPECIFICATION	WT	C%	Mn %	P % MAX	S% MAX	Si%	Cr%	Mo%	Mpa	Mpa	50mm MIN	
ASTM A 53/A	AW	0.25MAX	0.95MAX	0.050	0.060	-	-	-	330MIN	205MIN	36	Cr Mo Cu Ni Va 40 15 40 40 08 Five elements not to exceed 1%
ASTM A 53/B	AW	0.30MAX	1.20MAX	0.050	0.060	-	-	-	415MIN	240MIN	29/5	
ASTM A 106/A	AW	0.25MAX	0.27-0.93	0.035	0.025	0.10MIN	0.40MAX	0.15MAX	330MIN	205MIN	35/2	
ASTM A 106/B	AW	0.35MAX	0.29-1.06	0.035	0.025	0.10MIN	0.40MAX	0.15MAX	415 MIN	240MIN	30/22	
ASTM A 106/C	AW	0.35MAX	0.29-1.06	0.035	0.025	0.10MIN	0.40MAX	0.15MAX	485MIN	275MIN	30/22	
ASTM A 179	MW	0.06-018	0.27-0.63	0.035	0.035	-	-	-	325MIN	180MIN	35.0	Hardness 72 HRB Max
ASTM A 214	MW	0.18MAX	0.27-0.63	0.035	0.035	-	-	-	385MIN	180MIN	35.0	Hardness 72 HRB Max
ASTM A 192	MW	0.06-0.18	0.27-0.63	0.035	0.035	0.25MAX	-	-	325MIN	180MIN	35.0	Hardness 77 HRB Max
ASTM A 209/T1	MW	0.10-0.20	0.30-0.80	0.025	0.025	0.10-0.50	-	0.44-0.65	380MIN	205MIN	30/22	Hardness 80 HRB Max
ASTM A 209/T1a	MW	0.15-0.25	0.30-0.80	0.025	0.025	0.10-0.50	-	0.44-0.65	365MIN	195MIN	30/22	Hardness 81 HRB Max
ASTM A 209/T1b	MW	0.14MAX	0.30-0.80	0.025	0.025	0.10MIN	-	0.44-0.65	415MIN	220MIN	30/22	Hardness 77 HRB Max
ASTM A 210/A-1	MW	0.27max	0.93max	0.048	0.035	0.10MIN	-	-	415MIN	255MIN	30/22	Hardness 79 HRB Max
ASTM A 210/C	MW	0.35MAX	0.29-1.06	0.048	0.035	0.10MIN	-	-	485MIN	275MIN	30/22	Hardness 89 HRB Max
ASTM A 213/T2	MW	0.10/0.20	0.30-0.61	0.025	0.025	0.10-0.30	0.50-0.81	0.44-0.65	415MIN	205MIN	30/22	Hardness 85 HRB Max
ASTM A 213/T5	MW	0.15MAX	0.30-0.60	0.025	0.025	0.50MAX	4.00-6.00	0.44-0.65	415MIN	205MIN	30/22	Hardness 85 HRB Max
ASTM A 213/T11	MW	0.15MAX	0.30-0.60	0.025	0.025	0.50-1.00	1.00-1.50	0.44-0.65	415MIN	205MIN	30/22	Hardness 85 HRB Max
ASTM A 213/T12	MW	0.15MAX	0.30-0.61	0.025	0.025	0.50MAX	0.80-1.25	0.44-0.65	415MIN	205MIN	30/22	Hardness 85 HRB Max
ASTM A 213/T22	MW	0.15MAX	0.30-0.60	0.025	0.025	0.50MAX	1.90-2.60	0.87-1.13	415MIN	205MIN	30/22	Hardness 85 HRB Max
ASTM A 333/3	AW	0.19MAX	0.31-1.64	0.025	0.025	0.18-0.37	Ni	3.18-3.82	380MIN	205MIN	35/25	IMPACT AS -50F FOR 40X10/18/1490 MRB -50F40X10/18/14 90 HRB MAX
ASTM A 333/6	AW	0.30MAX	0.29-1.06	0.025	0.025	0.10MIN	-	-	415MIN	240MIN	30/22	
ASTM A 334/3	AW	0.19MAX	0.31-1.64	0.025	0.025	0.18-0.37	Ni	3.18-3.82	380MIN	205MIN	35/28	
ASTM A 334/6	MW	0.30MAX	0.9-1.06	0.025	0.025	0.10MIN	-	-	415MIN	240MIN	30/22	
ASTM A 335/P1	AW	0.10-0.20	0.30-0.80	0.025	0.025	0.10-0.50	-	0.40-0.65	380MIN	205MIN	30/22	
ASTM A 335/P2	AW	0.10-0.20	0.30-0.61	0.025	0.025	0.10-0.30	0.50-0.81	0.40-0.65	380MIN	205MIN	30/22	
ASTM A 335/P5	AW	0.15MAX	0.30-0.60	0.025	0.025	0.50-1.00	4.00-6.00	0.40-0.65	415MIN	205MIN	30/22	
ASTM A 335/P11	AW	0.15MAX	0.30-0.61	0.025	0.025	0.50MAX	0.80-1.25	0.40-0.65	415MIN	205MIN	50/22	
ASTM A 335/P12	AW	0.15MAX	0.30-0.60	0.025	0.025	0.50MAX	1.90-2.60	0.87-1.13	415MIN	205MIN	30/22	
ASTM A 335/P22	AW	0.15MAX	0.30-0.60	0.025	0.025	0.50MAX	1.90-2.60	0.87-1.13	415MIN	205MIN	30/22	
BS/3059/1/33		0.15Max	0.30-0.70	0.050	0.050	-	-	-	324-441	186MIN	25	
BS/3059/2/33		0.15MAX	0.40-0.70	0.050	0.050	0.10-0.35	-	-	324-441	186MIN	21	
BS/3059/245		0.12-0.18	0.90-1.20	0.035	0.035	0.10-0.35	-	-	441-560	245MIN	22	
DIN/17175/ST35.8		0.17MAX	0.40MIN	0.040	0.040	0.35MAX	-	-	340-441	235MIN	25	
DIN/17175/ST45.8		0.22MAX	0.45MIN	0.040	0.040	0.10-0.35	-	-	441-540	255 MIN	25	
DIN/17175/15MO3		0.12-0.20	0.50-0.80	0.040	0.040	0.10-0.35	-	0.25-0.35	441-540	284MIN	21	
DIN/17175/13CrMO44		0.10-0.18	0.40-0.60	0.040	0.040	0.10-0.35	0.70-1.60	0.40-0.50	441-570	294MIN	22	
DIN/17175/10CrM910		0.15MAX	0.40-0.60	0.040	0.040	0.15-0.50	2.0-2.5	0.9-1.10	441-570	249MIN	22	
ASTM A 199/T5	MW	0.50-0.15	0.30-0.60	0.025	0.025	0.50MAX	4.00-6.00	0.45-0.65	415MIN	170MIN	30/22	HARDNESS 85 HRB MAX HARDNESS 85 HRB MAX HARDNESS 85 HRB MAX HARDNESS 85 HRB MAX HARDNESS 85 HRB MAX HARDNESS 85 HRB MAX HARDNESS 85 HRB MAX HARDNESS 85 HRB MAX HARDNESS 85 HRB MAX HARDNESS 85 HRB MAX HARDNESS 85 HRB MAX HARDNESS 85 HRB MAX HARDNESS 85 HRB MAX HARDNESS 85 HRB MAX
ASTM A 199/T11	MW	0.05-0.15	0.30-0.60	0.025	0.025	0.50-1.00	1.00-1.50	0.44-0.65	415MIN	170MIN	30/22	
ASTM A 199/T22	MW	0.05-0.15	0.30-0.60	0.025	0.025	0.50MAX	1.90-2.60	0.87-1.13	415MIN	170MIN	30/22	
ASTM A 199/T4	MW	0.15MAX	0.30-0.60	0.025	0.025	0.50-1.00	2.15-2.85	0.44-0.65	415MIN	170MIN	30/22	
ASTM A 199/T7	MW	0.15MAX	0.30-0.60	0.025	0.025	0.50-1.00	6.00-8.00	0.45-0.65	415MIN	170MIN	30/22	
ASTM A 200/T5	MW	0.15MAX	0.30-0.60	0.025	0.025	0.50-1.00	4.00-6.00	0.45-0.65	415MIN	170MIN	30/22	
ASTM A 200/T11	MW	0.05-0.15	0.30-0.60	0.025	0.025	0.50-1.00	1.00-1.50	0.44-0.65	415MIN	170MIN	30/22	
ASTM A 200/T22	MW	0.05-0.15	0.30-0.60	0.030	0.030	0.50MAX	1.90-2.60	0.87-1.13	415MIN	170MIN	30/22	
ASTM A 200/T4	MW	0.05-0.15	0.30-0.60	0.030	0.030	0.50-1.00	2.15-2.85	0.44-0.65	415MIN	170MIN	30/22	
ASTM A 200/T7	MW	0.15MAX	0.30-0.60	0.030	0.030	0.50-1.00	6.00-8.00	0.45-0.65	415MIN	170MIN	30/22	
ASTM A 199/T9	MW	0.15MAX	0.30-0.60	0.030	0.030	0.25-1.00	8.00-10.0	0.90-1.10	415MIN	170MIN	30/22	
ASTM A335/P9	MW	0.15MAX	0.30-0.60	0.025	0.025	0.25-1.00	8.00-10.00	0.09-1.10	415MIN	172MIN	30/22	
ASTM A178A	MW	0.06-0.18	0.30-0.60	0.035	0.035	-	-	-	325MIN	160MIN	35	
ASTM A178C	MW	0.35MAX	0.27-0.63	0.035	0.035	-	-	-	415MIN	170MIN	30	
ASTM A178B	MW	0.27MAX	0.80 MAX	0.030	0.015	0.10MIN	-	-	485MIN	275MIN	30	

CHEMICAL COMPOSITION OF STAINLESS STEEL

Stainless Steel is essentially a low carbon steel which contains chromium at 10% or more by weight. It is this addition of chromium that gives the steel its unique stainless corrosion resisting Properties. The corrosion resistance and other useful properties of the steel are enhanced by increased chromium content and the addition of other elements such as molybdenum, nickel and nitrogen

Chemical Composition of Stainless Steel											Nearest Equivalent Specification		
AISI Grade	UNS NO.	EN	BS	C Max	Mn Max	P Max	S Max	Si Max	Cr	Ni	Mo	Cu	I.S.

Austenitic

201	S20100	-	-	0.15	5.5/7.5	0.06	0.03	1	16.0/18.0	3.5/5.5	-	-	-
202	S20200	-	-	0.15	7.5/10	0.06	0.03	1	17.0/19.0	4.0/6.0	-	-	-
301	S30100	-	301S21	0.15	2.0max	0.045	0.040	1.0	16.0/18.0	6.0/8.0	-	-	10Cr17Ni7
302	S30200	-	-	0.15	2.0	0.045	0.030	1.0	17.0/19.0	8.0/10.0	-	-	07Cr18Ni9
303	S30300	-	303S31	0.15	2.0	0.045	0.15 min	1.0	17.0/19.0	8.0/10.0	-	-	15Cr18Ni9
304	S30400	1.4301	-	0.08	2.0	0.045	0.030	1.0	18.0/20.0	8.0/10.0	-	-	04Cr18Ni10
304L	S30403	1.4307	304S11	0.030	2.0	0.045	0.030	1.0	18.0/20.0	8.0/12.0	-	-	02Cr18Ni11
304LN	S30453	1.4306	304S61	0.030	2.0	0.045	0.030	0.75	18.0/20.0	8.0/11.0	-	-	-
304H	S30409	-	-	0.05	2.0	0.045	0.03	1	18.0/20.0	8.5/9.5	-	-	-
309	S30900	-	309S16	0.20	2.0max	0.045	0.030	1.0	22.0/24.0	12.0/15.0	-	-	20Cr24Ni12
309S	S30908	1.4833	-	0.08	2.0	0.045	0.030	1.0	22.0/24.0	12.0/15.0	-	-	-
310H	S31009	-	-	0.25	2.0	0.045	0.030	1.50	24.0/26.0	19.0/22.0	-	-	10Cr25Ni12
310S	S31008	1.4845	-	0.08	2.0	0.045	0.030	1.50	24.0/26.0	19.0/22.0	-	-	-
316	S31600	-	316S31	0.08	2.0	0.045	0.030	1.0	16.0/18.0	10.0/14.0	2.0/3.0	-	04Cr17Ni12Mo2
316L	S31603	1.4404	316S11	0.030	2.0	0.045	0.030	1.0	16.0/18.0	10.0/14.0	2.0/3.0	-	03Cr17Ni12Mo2
316LN	S31653	-	316S61	0.030	2.0	0.045	0.030	0.75	16.0/18.0	10.0/14.0	2.0/3.0	-	-
316Ti	S31635	1.4571	320S31	0.080	2.0	0.045	0.030	1.0	16.0/18.0	10.0/14.0	2.0/3.0	-	-
317	S31700	-	-	0.08	2.0	0.045	0.030	1.0	18.0/20.0	11.0/15.0	3.0/4.0	-	-
317L	S31703	-	317S12	0.030	2.0	0.045	0.030	1.0	18.0/20.0	11.0/15.0	3.0/4.0	-	-
317LN	S31753	-	-	0.03	2.0	0.045	0.03	1	18.0/20.0	11.0/15.0	3.0/4.0	-	-
321	S32100	1.4541	321S31	0.08	2.0	0.045	0.030	1.0	17.0/19.0	9.0/12.0	-	-	04Cr18Ni10Ti20
347	S34700	-	347S31	0.08	2.0	0.045	0.030	1.0	17.0/19.0	9.0/12.0	-	-	04Cr18Ni10Nb-40
904L	N08904	1.4539	-	0.02	2.0	0.045	0.035	1	19.0/23.0	23.0/28.0	4.0-5.0	-	-

Ferritic

410	S41000	-	410S21	0.15	1.00	0.040	0.030	1.0	11.50-13.50	0.75	...	...	...
410S	S41008	1.4000	403S17	0.08	1.00	0.040	0.030	1.0	11.50-13.50	0.60	...	...	...
429 ^o	S42900	-	-	0.12	1.00	0.040	0.030	1.0	14.00-16.00	...	...	...	...
430	S43000	1.4016	430S17	0.12	1.00	0.040	0.030	1.0	16.00-18.00	0.75	...	...	...
439	S43035	-	-	0.07	1.00	0.040	0.030	1.0	17.00-19.00	0.050	...	0.04	...
444	S44400	-	-	0.025	1.00	0.040	0.030	1.0	17.5-19.5	1.00	1.75-2.50	0.035	...
446	-	-	-	0.25	1.50	0.040	0.030	0.50	11.40/13.00				
409L	-	-	-	≤ 0.030	≤ 1.00	≤ 1.00	-	-	-	10.50~11.75	~	-	-

Duplex & Super Duplex

---	S31803	1.4462	-	0.030	2.00	0.030	0.020	1.0	21.0-23.0	4.5-6.5	2.5-3.5	—	0.08-0.20
255 ^o	S32550	-	-	0.040	1.50	0.040	0.030	1.0	24.0-27.0	4.5-6.5	2.9-3.9	1.50-2.50	0.10-0.25
2507	S32750	1.441	-	0.030	1.20	0.035	0.020	0.8	24.0-26.0	6.0-8.0	3.0-5.0	0.50	0.24-0.32
---	S32760	-	-	0.030	1.00	0.030	0.010	1.0	24.0-26.0	6.0-8.0	3.0-4.0	0.50-1.00	0.20-0.30

MECHANICAL PROPERTIES OF S.S. PIPES

Table-2 Annealing Requirements

A312/A 312M

Table-3 Tensile Requirements

Grade or UNS Designation	Solution Treating Temperature	Cooling Requirements
All Grades not individually listed below	1900° (1040°C)	rapid°
TP321H, TP347H, TP348H		
Cold Rolled	2000°F (1100°C)	
Hot Rolled only	1925°F (1050°C)	
TP304H, TP316H,		
Cold Rolled	1900°F (1040°C)	
Hot rolled only	1900°F (1040°C)	
TP309H, TP309HCB, TP310H	1900°F (1040°C)	
TP310HCB		
S30815	1920°F (1050°C)	rapid°
s31272	1920°F (1050°C)	rapid°
S31254	2100°F (1050°C)	rapid°
S24565	2050-2140°F (1120-1170°C)	rapid°
S35315	2010°F (1100°C)	rapid°
N08367	2010°F (1100°C)	rapid°
N08904	2010°F (1100°C)	rapid°

Grade	UNS Designation	Tensile Strength, min Ksi (MPa)	Yield Strength, Min Ksi (MPa)
TP304L	S30403	70 (485)	25 (170)
TP316L	S31603	70 (485)	25 (170)
TP304	S30400	75 (515)	30 (205)
TP304h	S30409	75 (515)	30 (205)
TP309Cb	S30940	75 (515)	30 (205)
TP309H	S30909	75 (515)	30 (205)
TP309HCB	S30941	75 (515)	30 (205)
TP309s	S30908	75 (515)	30 (205)
TP310Cb	S31040	75 (515)	30 (205)
TP310H	S31009	75 (515)	30 (205)
TP310HCB	S31041	75 (515)	30 (205)
TP310s	S31008	75 (515)	30 (205)
	S31272	65 (450)	29 (200)
TP316	S31600	75 (515)	30 (205)
TP316H	S31609	75 (515)	30 (205)
TP317	S31700	75 (515)	30 (205)
TP317L	S31703	75 (515)	30 (205)
TP321	S32100		
Welded		75 (515)	30 (205)
Seamless			
≤ 3/8 in.		75 (515)	30 (205)
> 3/8 in.		70 (485)	25 (170)
TP321H	S32109		
Welded		75 (515)	30 (205)
Seamless			
< 3/8 in.		75 (515)	30 (205)
> 3/8 in.		70 (485)	25 (170)
TP347	S34700	75 (515)	30 (205)
TP347H	S34700	75 (515)	30 (205)
TP347LN	S34751	75 (515)	30 (205)
TP348	S34800	75 (515)	30 (205)
TP348H	S34809	75 (515)	30 (205)
TPXM-10	S21900	90 (620)	50 (345)
TPXM-11	S21904	90 (620)	50 (345)
TPXM-15	S38100	75 (515)	30 (205)
TPXM-29	S24000	100 (690)	55 (380)
TPXM-19	S20910	100 (690)	55 (380)
TP304N	S30451	80 (550)	35 (240)
TP316N	S31651	80 (550)	35 (240)
TP304LN	S31653	75 (515)	30 (205)
-	S31254	94 (650)	44 (300)
-	S30615	90 (620)	40 (275)
-	S30815	87 (600)	45 (310)
-	S30600	75 (540)	35 (240)
-	S31725	75 (515)	30 (205)
-	S31726	80 (550)	35 (240)
-	S31050		
T<0.25 in.		84 (580)	39 (270)
T>0.25 in.		78 (540)	37 (255)
-	s32615	80 (550)	32 (220)
-	S33228	73 (500)	27 (185)
-	S24565	115 (795)	60 (415)
-	S30415	87 (600)	42 (290)
-	S32654	109 (750)	62 (430)
-	S35315	94 (650)	39 (270)
-	N08367:		
t<0.187		100 (690)	45 (310)
t>0.187		95 (655)	45 (310)
-	N08904	71 (490)	31 (215)

Elongation in 2 in or 50mm (or 4D), min, % Longitudinal Transverse

All Grades except S31050 and S32615 35 25 S32615, S31050 25 - N08367

Prior to the issuance of A312/A 312 M -88a, the tensile and yield strength values were 76 (515) and 30 (205) respectively, for nominal wall greater than 3/8 in. (9.5mm)



PIPE FITTINGS

BUTTWELD & SOCKETWELD FITTING



BUTTWELD SPECIFICATION

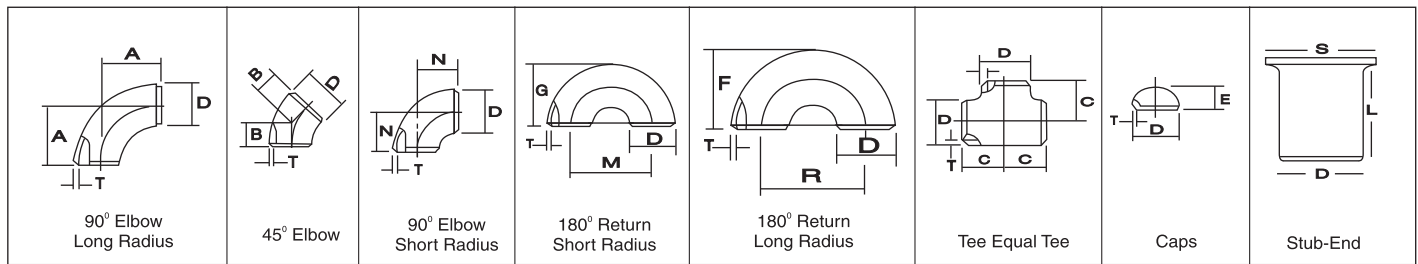
Stainless Steel	: ASTM A 403 WP 304, 304L, 304H, 310S, 310H, 316, 316L, 317, 317L, 321, 310, 347, 347H, 904L etc.
Carbon Steel	: ASTM A234 WPB/ A420 WPL3/A420 WPL6/ MSS-SP-75 WPHY 42/46/52/56/60/65/70/80
Alloy Steel	: ASTM A234 WP1/WP5/WP9/WP11/WP22/WP91/WP92 etc. API 6A Type, ASTM A519 GR. 4130 / Gr. 4140
Others	: Duplex, Super Duplex, Monel, Nickel, Inconel, Hastalloy, Copper Brass, Bronze, Titanium, Tantalum, Bismuth, Aluminium, High Speed Steel, Zinc, Lead etc.
Type	: Elbow, Tee, Reducer, Return Bends, Stub-Ends, Cap, Collar, Cross, Insert etc.
Size	: 1/4" NB to 32"NB (Seamless) 1/4" NB to 108"NB (Welded)
Wall Thickness	: Sch.5S to Sch. XXS



SOCKETWELDED OR SCREWED SPECIFICATION

Stainless Steel	: ASTM A 312 TP 304, 304L, 304H, 310, 316, 316L, 316H, 317, 317L, 317H, 321, 310, 347, 347H, 904L etc.
Carbon Steel	: ASTM A105 / A 350 LF2 etc.
Alloy Steel	: ASTM A182 F1/F5/F9/F11/F22/F91/F92 / AISI 4130 / AISI 4140
Others	: Duplex, Super Duplex, Monel, Nickel, Inconel, Hastalloy, Copper Brass, Bronze, Titanium, Tantalum, Bismuth, Aluminium, High Speed Steel, Zinc, Lead etc.
Type	: Elbow, Cushion, Tee, Union, Cross, Coupling, Plug, Swage, Welding Boss, Hexagon Nipple, Barrel Nipple, Hexagon Nut, Hose, Weldolet, Elbolet, Sockolet, Thredolet, Nipolet, Latrolet etc.
Size	: 1/4" NB to 6"NB (Socketweld & Threaded)
Class	: 3000#, 6000#, 9000#

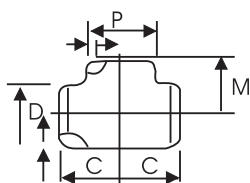
DIMENSION OF BUTT-WELDING FITTING ANSI B-16.9 / B - 16.29



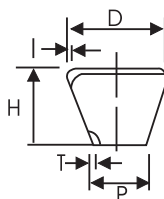
Nominal Pipe Size		Outside Diameter	Center to Face				Back to Face			Center to Center			Length 'L'	
INCH	MM	D	A R=1.5D	B	C	N R=1D	E	F	G	R	M	S	Short L	Long L
1/2	15	21.3	38.00	16.0	25.0	-	25.0	48.0	-	76.0		35.0	50.8	76.2
3/4	20	26.7	29.00	11.0	29.0	-	25.0	43.0	-	57.0		43.0	50.8	76.2
1	25	33.4	38.00	22.0	38.0	25.0	38.0	56.0	41.0	76.0	51.0	51.0	50.8	101.6
1.1/4	32	42.2	48.00	25.0	48.0	32.0	38.0	70.0	52.0	95.0	64.0	64.0	50.8	101.6
1.1/2	40	48.3	57.15	29.0	57.0	38.0	38.0	83.0	62.0	114.0	76.0	73.0	50.8	101.6
2	50	60.3	76.00	35.0	64.0	51.0	38.0	106.0	81.0	152.0	102.0	93.0	63.5	152.4
2.1/2	65	73.0	95.25	44.0	76.0	64.0	38.0	132.0	100.0	191.0	127.0	105.0	63.5	152.4
3	80	88.9	114.30	51.0	86.0	76.0	51.0	159.0	121.0	229.0	152.0	127.0	63.5	152.4
3.1/2	90	101.6	133.35	57.0	95.0	89.0	54.0	184.0	140.0	267.0	175.0	140.0	76.2	152.4
4	100	114.3	152.0	64.0	105.0	102.0	64.0	210.0	159.0	305.0	203.0	157.0	76.2	152.4
5	125	141.3	190.0	79.0	123.0	127.0	76.0	262.0	197.0	381.0	254.0	186.0	76.2	203.2
6	150	168.3	229.0	95.0	143.0	152.0	102.0	313.0	237.0	457.0	305.0	218.0	88.9	203.2
8	200	219.1	305.0	127.0	178.0	203.0	89.0	414.0	313.0	610.0	406.0	270.0	101.6	203.2
10	250	273.1	381.0	159.0	216.0	254.0	102.0	515.0	391.0	762.0	508.0	324.0	127.0	254.0
12	300	323.8	457.0	190.0	254.0	305.0	127.0	619.0	467.0	914.0	610.0	381.0	152.4	254.0
14	350	355.6	533.0	222.0	279.0	385.0	152.0	711.0	533.0	1067.0	711.0	413.0	152.4	305.0
16	400	406.4	610.0	254.0	305.0	406.0	165.0	813.0	610.0	1219.0	813.0	470.0	152.4	305.0
18	450	457.2	686.0	286.0	343.0	457.0	178.0	914.0	686.0	1372.0	914.0	533.0	152.4	305.0
20	500	508.0	762.0	318.0	381.0	508.0	203.0	1016.0	762.0	1524.0	1016.0	584.0	152.4	305.0
22	550	559.0	838.0	343.0	419.0	559.0	229.0	1118.0	838.0	1676.0	1118.0	614.4	152.4	305.0
24	600	610.0	914.0	381.0	432.0	610.0	254.0	1219.0	914.0	1629.0	1219.0	692.0	152.4	305.0
26	650	660.0	991.0	405.0	495.0	660.0	267.0							
28	700	711.0	1067.0	438.0	521.0	771.0	267.0							
30	750	762.0	1143.0	470.0	559.0	762.0	267.0							
32	800	813.0	1219.0	502.0	597.0	813.0	267.0							
34	850	864.0	1295.0	533.0	635.0	864.0	267.0							
36	900	914.4	1372.0	565.0	673.0	914.0	267.0							

All Dimensions in Millimeters

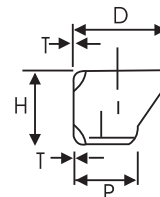
DIMENSION OF BUTT-WELDING FITTING ANSI B-16.9 / B - 16.28



REDUCING TEES



CONCENTRIC REDUCERS



ECCENTRIC REDUCERS

Nominal Pipe Size		Outside Diameter		Center to End		Length
INCH	MM	D	P	C	M	H
1/2 x 3/8	15 x 10	21.3	17.1	25	25	-
1/2 x 1/4	15 x 8	21.3	13.7	25	25	-
3/4 x 1/2	20 x 15	26.7	21.3	29	29	38
3/4 x 3/8	20 x 10	26.7	17.1	29	29	38
1 x 3/4	25 x 20	33.4	26.7	38	38	51
1 x 1/2	25 x 15	33.4	21.3	38	38	51
1 1/4 x 1	32 x 25	42.2	33.4	48	48	51
1 1/4 x 3/4	32 x 20	42.2	26.7	48	48	51
1 1/4 x 1/2	32 x 15	42.2	21.3	48	48	51
1 1/2 x 1 1/4	40 x 32	48.3	42.2	57	57	64
1 1/2 x 1	40 x 25	48.3	33.4	57	57	64
1 1/2 x 3/4	40 x 20	48.3	26.7	57	57	64
1 1/2 x 1/2	40 x 15	48.3	21.3	57	57	64
2 x 1 1/2	50 x 40	60.3	48.3	64	60	76
2 x 1 1/4	50 x 32	60.3	42.2	64	57	76
2 x 1	50 x 25	60.3	33.4	64	51	76
2 x 3/4	50 x 20	60.3	26.7	64	44	76
2 1/2 x 2	65 x 50	73.0	60.3	76	70	89
2 1/2 x 1 1/2	65 x 40	73.0	48.3	76	67	89
2 1/2 x 1 1/4	65 x 32	73.0	42.2	76	64	89
2 1/2 x 1	65 x 25	73.0	33.4	76	57	89
3 x 2 1/2	80 x 65	88.9	73.0	86	83	89
3 x 2	80 x 50	88.9	60.3	86	76	89
3 x 1 1/2	80 x 40	88.9	48.3	86	73	89
3 x 1 1/4	80 x 32	88.9	42.2	86	70	89
4 x 3 1/2	100 x 90	114.3	101.6	105	102	102
4 x 3	100 x 80	114.3	88.9	105	98	102
4 x 2 1/2	100 x 65	114.3	73.0	105	95	102
4 x 2	100 x 50	114.3	60.3	105	89	102
4 x 1 1/2	100 x 40	114.3	48.3	105	86	102
5 x 4	125 x 100	141.3	114.3	124	117	127
5 x 3 1/2	125 x 90	141.3	101.6	124	114	127
5 x 3	125 x 80	141.3	88.9	124	111	127
5 x 2 1/2	125 x 65	141.3	73.0	124	108	127
5 x 2	125 x 50	141.3	60.3	124	105	127
6 x 5	150 x 125	168.3	141.3	143	137	140
6 x 4	150 x 100	168.3	114.3	143	130	140
6 x 3 1/2	150 x 90	168.3	101.6	143	127	140
6 x 3	150 x 80	168.3	88.9	143	124	140
6 x 2 1/2	150 x 65	168.3	73.0	143	121	140

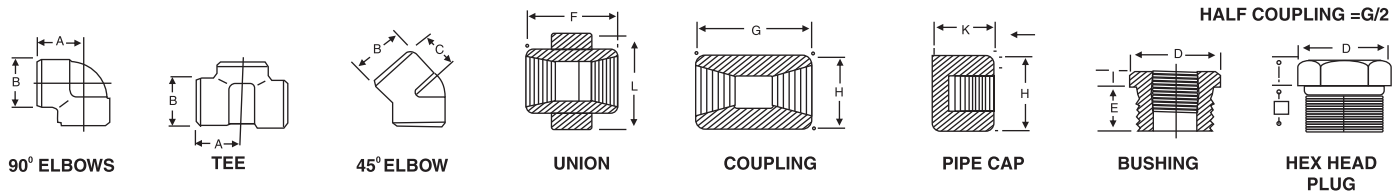
Nominal Pipe Size		Outside Diameter		Center to End		Length
INCH	MM	D	P	C	M	H
8 x 6	200 x 150	219.1	168.3	178	168	152
8 x 5	200 x 125	219.1	141.3	178	162	152
8 x 4	200 x 100	219.1	114.3	178	156	152
8 x 3 1/2	200 x 90	219.1	101.6	178	152	152
10 x 8	250 x 200	273.1	219.1	216	203	178
10 x 6	250 x 150	273.1	168.1	216	194	178
10 x 5	250 x 125	273.1	141.3	216	191	178
10 x 4	250 x 100	273.1	114.3	216	184	178
12 x 10	300 x 250	323.9	273.1	254	241	203
12 x 8	300 x 200	323.9	219.1	254	229	203
12 x 6	300 x 150	323.9	168.3	254	219	203
12 x 5	300 x 125	323.9	141.3	254	216	203
14 x 12	350 x 300	355.6	323.9	279	270	330
14 x 10	350 x 250	355.6	273.1	279	257	330
14 x 8	350 x 200	355.6	219.1	279	248	330
14 x 6	350 x 150	355.6	168.3	279	238	330
16 x 14	400 x 350	406.4	355.6	305	305	356
16 x 12	400 x 300	406.4	323.9	305	295	356
16 x 10	400 x 250	406.4	273.1	305	283	356
16 x 8	400 x 200	406.4	219.1	305	273	356
16 x 6	400 x 150	406.4	168.3	305	264	356
18 x 16	450 x 400	457.0	406.4	343	330	381
18 x 14	450 x 350	457.0	355.6	343	330	381
18 x 12	450 x 300	457.0	323.9	343	321	381
18 x 10	450 x 250	457.0	273.1	343	308	381
18 x 8	450 x 200	457.0	219.1	343	298	381
20 x 18	500 x 450	508.0	457.0	381	368	508
20 x 16	500 x 400	508.0	406.4	381	356	508
20 x 14	500 x 350	508.0	355.6	381	356	508
20 x 12	500 x 300	508.0	323.9	381	346	508
20 x 10	500 x 250	508.0	273.1	381	333	508
20 x 8	500 x 200	508.0	219.1	381	324	508
24 x 22	600 x 550	610.0	559.0	432	432	508
24 x 20	600 x 500	610.0	508.0	432	432	508
24 x 18	600 x 450	610.0	457.0	432	419	508
24 x 16	600 x 400	610.0	406.4	432	406	508
24 x 14	600 x 350	610.0	355.6	432	406	508
24 x 12	600 x 300	610.0	323.9	432	397	508
24 x 10	600 x 250	610.0	273.1	432	384	508

All Dimensions in Millimeters

ALL FITTINGS					90°/60°/45° 30° ELBOWS &TEES		REDUC-ERS		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		Alingnment of End Dimentions		Overall Lengh		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	
½" - 2½" 15 - 65	±1.6 - 0.8	±0.80	±0.8	Not Less Than 87.5% Nominal Thnk	Not Less Than 87.5% Nominal Thk	FROM ½" TO 18 15 TO 600	FROM 3/4"	FROM 1/2" - 24" 15 - 600	FROM 1/2" - 8" 15 - 200	±6	±6.35	±6.0	±6.4	±1	±3	±3.17	½" - 4" 15 - 100	±1	400 - 600 1.6	±2		
3" - 3½" 80 - 90	±1.6					5" - 8" 125 - 200	±2	±4														
4" 100						10" - 12" 250 - 300	±3	±5														
5" - 6" 125 - 150	+2.4	+1.60	±6			±6.35	±6.0	±6.4	±1	±3	±3.17	14" - 16" 350 - 400	±3	±7								
8" 200												18" - 24"	±4	±10								
10" - 18" 250 - 450	+4 -3.2	+2.38 -0.80	±3.2			±4.8	±2.40	10" - 24" +2.38 250 - 600	±10	±10	±2.0"	±1.60	±10	±1.60	26" - 30" 650 - 750	±5	26" - 36" 650 -	±10				
20" - 24" 500 - 600	+6.4	3.17	32" - 42" 800 - 1050												±5	±13						
26" - 30" 650 - 750	+6.4 -4.8	±4.8	44" - 48" 1100 - 1200												±5	±20						
32" - 48" 800 - 1200	+6.4 -4.8					±5		±5		±20												

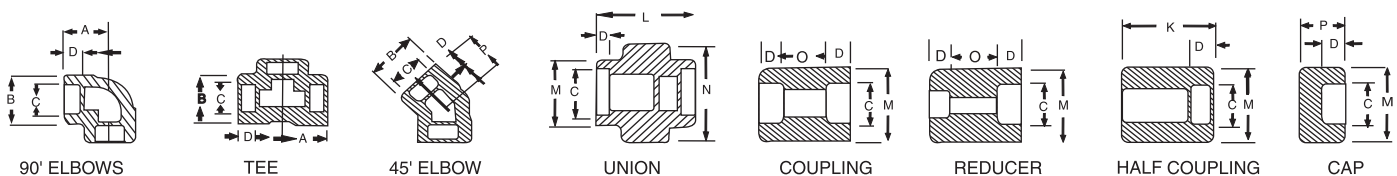
Figure 10 shows the orthographic projections of a mechanical part. The front view (top left) shows a central circular feature with a square hole and four rectangular protrusions. The top view (bottom left) shows a square base with rounded corners. The side view (top right) shows a curved profile. The detail view (bottom right) shows a close-up of the corner of the part, with dimensions 16.08, 19.1, and 3.2 Rad. Min. indicated.

DIMENSIONS OF FORGED SCREWED FITTINGS AS PER ANSI B 16.11 THREADED TO ANSI B 2.1



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

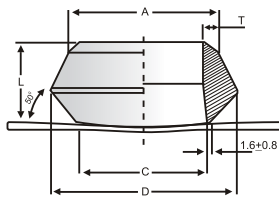
DIMENSIONS OF SOCKET WELD FITTINGS AS PER (ANSI B-16.11)



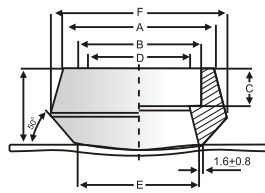
NOM BORE	PIPE O.D.	3000 L.B.S.						COMMON FACTORS						6000 L.B.S					
		A	B	K	J	L	M	N	P	Q	C	D	O	O	A	B	M	K	N
1/8"	10.3	22	18.5	26	16	40	17.3	32	17.5	10	10.7	10	5	8	22	22	20	25	46
1/4"	13.7	22	22	26	18	43	21.2	32	17.5	10	14.1	10	5	8	27	25	24	25	51
3/8"	17.2	25	25	26	19	48	25.4	36	19	10	17.6	10	3	9	27	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	66	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	

All dimensions are in Millimeters. Dimensions and other specifications as per customers requirements are available on request

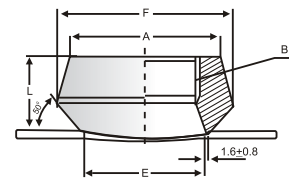
WELDOLETS / SOCKOLETS / THREADED OUTLETS



WELDOLET



SOCKOLET



THREDOLET

(In mm)

WELDOLET

OUTLET NOMINAL SIZE	A	C			L			D			Weight Kg		
		S40 STD	S80 XS	XXS S160	S40 STD	S80 XS	XXS S160	S40 STD	S80 XS	XXS S160	S40 STD	S80 XS	XXS S160
1/2	21.3	23.8	23.8	14.3	19.1	19.1	28.6	34.9	34.7	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	47.6		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	168.3	169.9	169.9	146.1	60.3	77.8	104.8	215.9	225.4	220.7	5.44	10.43	12.70

SOCKOLET

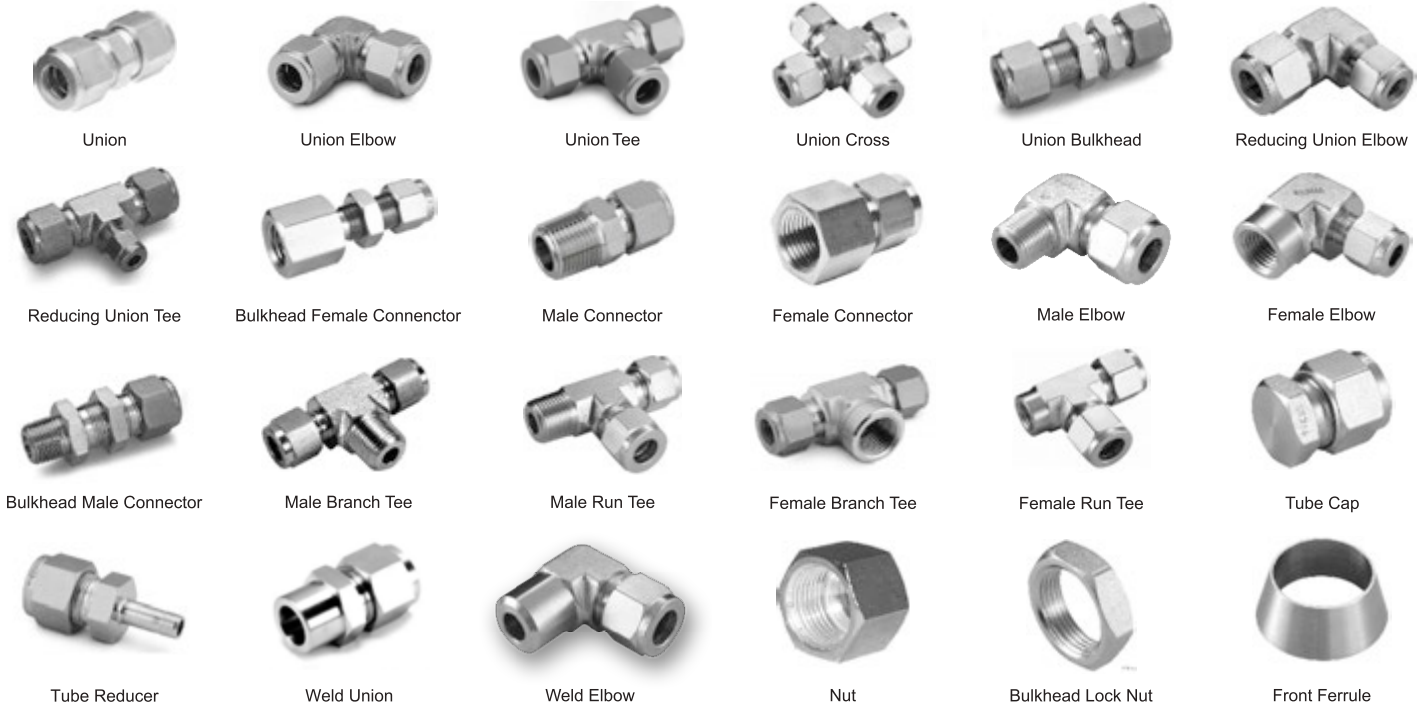
			Class 3000 #						Class 6000 #					
OUTLET SIZE	A	B	C	D	E	F	L	(kg) W.T.	C	D	E	F	L	(kg) W.T.
1/2"	33	21.7-22	21.1±0.5	15.0-16.6	23.8	34.9	25.4	0.14	13.5±0.5	11.0-12.6	10.1	44.5	31.8	0.23
3/4	39	27.1-27.3	13.5±0.5	20.2-21.7	30.2	44.5	27	0.15	15.5±0.5	14.8-16.3	25.4	50.8	36.5	0.36
1"	47.3	33.8-34	15.2±0.8	25.9-27.4	34.5	54	33.3	0.27	17.0±0.8	19.9-21.5	33.3	61.9	39.7	0.39
1 1/4"	57	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	38.1	69.9	41.3	0.73
1 1/2"	63.4	48.6-48.9	18.8±0.8	40.1-41.7	60.8	73	34.9	0.47	21.0±0.8	33.2-24.7	49.2	82.6	42.9	0.91
2"	77	61.1-51.4	21.8±0.8	51.7-53.3	65.1	88.9	38.1	0.73	23.0±0.8	42.1-43.6	69.9	103.2	52.4	2.33
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	89.8-90.2	29.1±1.5	76.4-79.5	93.7	122.2	44.5	1.72						
3 1/2"	127	102.6-103.0	29.1±1.5	88.7-91.7	101.6	133.4	54	1.95						
4"	138.9	115.4-115.8	35.4±1.5	100.7-103.7	120.7	152.4	47.6	3.29						

THREDOLET

			Class 3000 #				Class 6000 #					
OUTLET SIZE	A	B	E	F	L	(kg) Weight	A	B	E	F	L	(kg) Weight
1/2"	33	NPT 1/2"	23.8	34.9	25.4	0.11	43	NPT 1/2"	19.1	44.5	31.8	0.2
3/4"	39	NPT 3/4"	30.2	44.5	27	0.16	49	NPT 3/4"	25.4	50.8	36.5	0.34
1"	47.3	NPT 1"	36.5	54	33.3	0.28	59	NPT 1"	33.3	61.9	39.7	0.56
1 1/4"	57	NPT 1 1/4"	44.5	65.1	33.3	0.41	69	NPT 1 1/4"	38.1	69.9	41.3	0.71
1 1/2"	63.4	NPT 1 1/2"	50.8	73	34.9	0.45	77	NPT 1 1/2"	49.2	82.6	42.9	0.89
2"	77	NPT 2"	65.1	88.9	38.1	0.79	91	NPT 2"	69.9	103.2	52.4	2.3
2 1/2"	96.6	NPT 2 1/2"	76.2	103.2	46	1.36	-	-	-	-	-	-
3"	114	NPT 3"	93.7	122.2	50.8	1.97	-	-	-	-	-	-
3 1/2"	122.2	NPT 3 1/2"	101.6	133.4	54	2.61	-	-	-	-	-	-
4"	138.9	NPT 4"	120.7	152.4	57.2	3.22	-	-	-	-	-	-

TUBE FITTINGS

DOUBLE FERRULE TUBE FITTINGS



HYDRAULIC FITTINGS



SIZE : 4 MM OD To 38 MM OD / 1/8" OD To 1 1/2" OD

PRESSURE : 100 Psi To 6000 Psi

DESIGN : Forged Body or Bar Stock Body

OTHER NON STANDARD SIZES WE OFFER

1/4" NB, 3/8" NB, 1/2" NB, 3/4" NB, 1" NB, 1 1/4" NB, 1 1/2" NB & 2" NB.

MATERIAL :

Stainless Steel, Stainless Steel 304, Stainless Steel 304L, Stainless Steel 316, Stainless Steel 316L, Stainless Steel 316Ti, Stainless Steel 310, Brass, Copper, Duplex, Super Duplex, Inconel, Monel, Hastelloy, 254 SMO, 904L, Titanium, Cupro Nickel, PTFE

END CONNECTION : BSP, BSPT, NPT, UNF, Metric

COATING & SURFACE TREATMENT : Stainless Steel Bright Finish, Electro Plating and any other Custom plating as per customers requirement. Nut will be Silver Plated

BRAND : "KE"

EQUIVALENT TO : SWAGELOK & PARKER

FASTENERS



- HEX BOLTS & HEX SCREWS & HEAVY HEX BOLTS
- HEXAGONAL NUT & HEAVY HEX NUT
- PLAIN WASHERS
- SPRING WASHERS
- THREADED RODS :
- DIN 975 & DIN 976 & ASTM A 193
- SOCKET HEAD ALLEN CAP SCREWS
- EYE-BOLTS
- DOUBLE END STUD BOLTS
- HEXAGON SOCKET SET SCREWS WITH FLAT POINT
- T-HEAD BOLTS
- U BOLTS STANDARD

Material Grade

Stainless Steels : 304, 304L, A2-80, A2-70, A4-80, A4-70, 316, 316L, B8M, 310, 317L, 321, 347, 17-4 PH, 410, 904L
Diameter : M3 to M100 up to 1000 MM in Length

Duplex & Super Duplex : UNS 31803, S32205, S32760, S32750
Diameter : M3 to M100 up to 1000 MM in length

Hastelloy : Hastelloy C-276, Hastelloy C-22
Diameter : M3 to M56 up to 500 MM in length

Exotics : 904L, A-286, Alloy 20, Alloy 50, Nitronic50, Nitronic 60, Titanium, Cupro-Nickel 90-10, Cupro-Nickel 70-30
Diameter : M3 to M56 up to 500 MM in Length

Nickel Alloys : Inconel 600, 601, 625, 718, 750, 800/800H, 825, 925, Monel 400, K-500 & Nickel 200
Diameter : M3 to M56 to 500 MM in Length

Size Bolt : M3 to M100
Nut : 1/4" to 4"
M3 to M100

Washer : M2 to M100

FLANGES



Stainless Steel	: ASTM A 182 F304 / 304L / 304H / 316 / 316L / 317 / 317L / 321 / 310 / 347 / 904L
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 / F92 ETC. ASTM A519 Gr. 4130 / gR. 4140, API 6A Type - 10000 / 15000 / 25000 PSI
Duplex Steel	: 2205 (Duplex), 2507 (Super Duplex) UNS - 31803, 32750, 32760, 32990
Others	: Monel, Nickel, Inconel, Hastelloy, 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, Deck Flange Etc.
Size	: 1/8" NB to 48"NB
Class	: 150#, 300#, 400#, 600#, 900#, 1500# & 2500# Also as per the National & International Standard.

BRITISH STANDARD-10

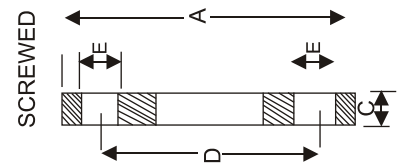
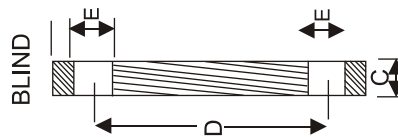
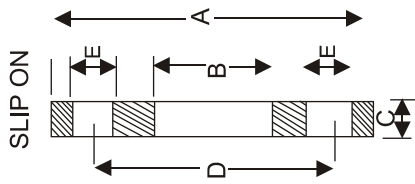


Table D : For working steam pressure upto 50 lbs per sq. inch.

Nominal pipe size	O.D. of Pipe	Dia. of Flange	Dia. Of Bolt Circle	No. of Bolt	Dia. of Bolt	Thickness
1/2"	27/32"	3.34"	2.5/8"	4	1/2"	3/16"
3/4"	1.1/16"	4"	2.7/8"	4	1/2"	3/16"
1"	1.11/32"	4.1/2"	3.1/4"	4	1/2"	3/16"
1.1/4"	1.11/16"	4.3/4"	3.7/16"	4	1/2"	1/4"
1.1/2"	1.28/32"	5.1/4"	3.7/8"	4	1/2"	1/4"
2"	2.3/8"	6"	4.1/2"	4	5/8"	5/16"
2.1/2"	3"	6.1/2"	5"	4	5/8"	5/16"
3"	3.1/2"	7.1/4"	5.3/4"	4	5/8"	3/8"
3.1/2"	4"	8"	6.1/2"	4	5/8"	3/8"
4"	4.1/2"	8.1/2"	7"	4	5/8"	3/8"
5"	5.1/2"	10"	8.1/4"	8	5/8"	1/2"
6"	6.12"	11"	9.1/4"	8	5/8"	1/2"
7"	7.1/2"	12"	10.1/4"	8	5/8"	1/2"
8"	8.5/8"	13.1/4"	11.1/2"	8	5/8"	1.1/2"
9"	9.5/8"	14.1/2"	12.3/4"	8	5/8"	5/8"
10"	10.3/4"	16"	14"	8	3/4"	5/8"
12"	12.3/4"	18"	16"	8	3/4"	5/8"
14"	14"	20.3/4"	18.1/2"	12	7/8"	3/4"
16"	16"	22.3/4"	20.1/2"	12	7/8"	3/4"
18"	18"	25.1/4"	23"	12	7/8"	7/8"
20"	20"	27.3/4"	25.1/4"	16	7/8"	1"
24"	24"	32.1/2"	29.3/4"	16	1"	1.1/8"

Table E : For working steam pressure upto 50 lbs and upto 100per sq. inch.

Nominal pipe size	Dia. of Flange	Dia. Of Bolt Circle	No. of Bolt	Dia. of Bolt	Thickness
1/2"	3.34"	2.5/8"	4	1/2"	1/4"
3/4"	4"	2.7/8"	4	1/2"	1/4"
1"	4.1/2"	3.1/4"	4	1/2"	9/32"
1.1/4"	4.3/4"	3.7/16"	4	1/2"	5/16"
1.1/2"	5.1/4"	3.7/8"	4	1/2"	11/32"
2"	6"	4.1/2"	4	5/8"	3/8"
2.1/2"	6.1/2"	5"	4	5/8"	13/32"
3"	7.1/4"	5.3/4"	4	5/8"	7/16"
3.1/2"	8"	6.1/2"	8	5/8"	15/32"
4"	8.1/2"	7"	8	5/8"	1/2"
5"	10"	8.1/4"	8	5/8"	9/16"
6"	11"	9.1/4"	8	3/4"	11/16"
7"	12"	10.1/4"	8	3/4"	3/4"
8"	13.1/4"	11.1/2"	8	3/4"	3/4"
9"	14.1/2"	12.3/4"	12	3/4"	13/16"
10"	16"	14"	12	3/4"	7/8"
12"	18"	16"	12	7/8"	1"
14"	20.3/4"	18.1/2"	12	7/8"	1"
16"	22.3/4"	20.1/2"	12	7/8"	1"
18"	25.1/4"	23"	16	7/8"	1.1/8"
20"	27.3/4"	25.1/4"	16	7/8"	1.1/4"
24"	32.1/2"	29.3/4"	16	1.1/8"	1.1/2"

Table F : For working steam pressure upto 100 lbs and upto 150per sq. inch.

Nominal pipe size	Dia. of Flange	Dia. Of Bolt Circle	No. of Bolt	Dia. of Bolt	Thickness
1/2"	3.34"	2.5/8"	4	1/2"	3/8"
3/4"	4"	2.7/8"	4	1/2"	3/8"
1"	4.3/4"	3.7/16"	4	5/8"	3/8"
1.1/4"	5.1/4"	3.7/8"	4	5/8"	1/2"
1.1/2"	5.1/2"	4.1/8"	4	5/8"	1/2"
2"	6.1/2"	5"	4	5/8"	5/8"
2.1/2"	7.1/4"	5.3/4"	8	5/8"	5/8"
3"	8"	6.1/2"	8	5/8"	5/8"
3.1/2"	8.1/2"	7"	8	5/8"	3/4"
4"	9"	7.1/2"	8	5/8"	3/4"
5"	11"	9.1/4"	8	3/4"	7/8"
6"	12"	10.1/4"	12	3/4"	7/8"
7"	13.1/4"	11.1/2"	12	3/4"	7/8"
8"	14.1/2"	12.3/4"	12	3/4"	1"
9"	16"	14"	12	7/8"	1"
10"	17"	15"	12	7/8"	1"
12"	19.1/4"	17.1/4"	16	7/8"	1.1/8"
14"	21.3/4"	19.1/2"	16	1"	1.1/4"
16"	24"	21.3/4"	20	1"	1.1/4"
18"	26.1/2"	24"	20	1.1/8"	1.3/8"
20"	29"	26.1/2"	24	1.1/8"	1.1/2"
24"	33.1/2"	30.3/4"	24	1.1/8"	1.5/8"

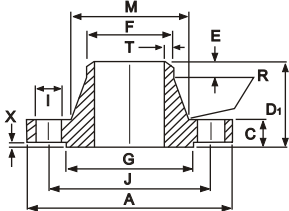
Table H : For working steam pressure upto 150 lbs and upto 250per sq. inch.

Nominal pipe size	Dia. of Flange	Dia. Of Bolt Circle	No. of Bolt	Dia. of Bolt	Thickness
1/2"	4.1/2"	3.1/4"	4	5/8"	1/2"
3/4"	4.1/2"	3.1/4"	4	5/8"	1/2"
1"	4.3/4"	3.7/16"	4	5/8"	9/16"
1.1/4"	5.1/4"	3.7/8"	4	5/8"	11/16"
1.1/2"	5.1/2"	4.1/8"	4	5/8"	11/16"
2"	6.1/2"	5"	4	5/8"	3/4"
2.1/2"	7.1/4"	5.3/4"	8	5/8"	3/4"
3"	8"	6.1/2"	8	5/8"	7/8"
3.1/2"	8.1/2"	7"	8	5/8"	7/8"
4"	9"	7.1/2"	8	5/8"	1"
5"	11"	9.1/4"	8	3/4"	1.1/8"
6"	12"	10.1/4"	12	3/4"	1.1/8"
7"	13.1/4"	11.1/2"	12	3/4"	1.1/4"
8"	14.1/2"	12.3/4"	12	3/4"	1.1/4"
9"	16"	14"	12	7/8"	1.3/8"
10"	17"	15"	12	7/8"	1.3/8"
12"	19.1/4"	17.1/4"	16	7/8"	1.1/2"
14"	21.3/4"	19.1/2"	16	1"	1.5/8"
16"	24"	21.3/4"	20	1"	1.3/4"
18"	26.1/2"	24"	20	1.1/8"	1.7/8"
20"	29"	26.1/2"	24	1.1/8"	2"
24"	33.1/2"	30.3/4"	24	1.1/4"	2.1/4"

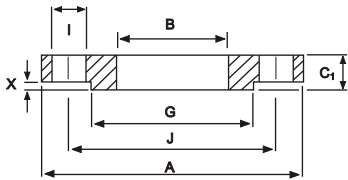
BS4504 PN10 FLANGES

Dimensions in mm

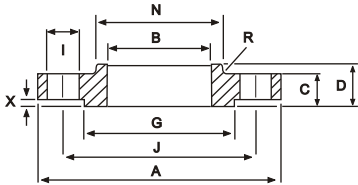
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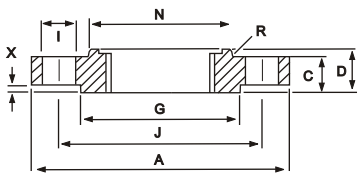
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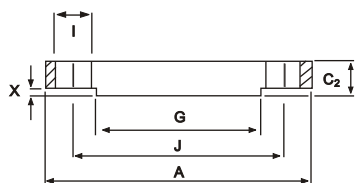
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CODE 113



CODE 105



Nom. Size NB	Flange						Raised Face		Boss	Drilling			Bolting	Neck					Bore Diameter
	A	C	C1	C2	D	D1	G	X	N	No.	I	J		M	F	E	R	T	B
10	90	14	14	14	20	35	40	2	30	4	14	60	M12	28	17.2	6	3	1.8	18.0
15	95	14	14	14	20	35	45	2	35	4	14	65	M12	32	21.3	6	3	2.0	22.0
20	105	16	16	16	24	38	58	2	45	4	14	75	M12	39	26.9	6	4	2.3	27.5
25	115	16	16	16	24	38	68	2	52	4	14	85	M12	46	33.4	6	4	2.6	34.5
32	140	16	18	16	26	40	78	2	60	4	18	100	M16	56	42.2	6	5	2.6	43.0
40	150	16	18	16	26	42	88	3	70	4	18	110	M16	64	48.3	7	5	2.6	49.5
50	165	18	20	18	28	45	102	3	84	4	18	125	M16	74	60.3	8	5	2.9	61.5
65	185	18	20	18	32	45	122	3	104	4/8	18	145	M16	92	73.0	10	6	2.9	74.0
80	200	20	20	20	34	50	138	3	118	8	18	160	M16	110	88.9	10	6	3.2	90.5
100	220	20	22	20	40	52	162	3	140	8	18	180	M16	130	114.3	12	6	3.6	116.0
125*	250	22	22	22	44	55	188	3	168	8	18	210	M16	158	141.3	12	6	4.0	142.5
150	285	22	24	22	44	55	212	3	195	8	22	240	M20	184	168.3	12	8	4.5	170.5
200	340	24	24	24	44	62	268	3	246	8	22	295	M20	234	219.1	16	8	5.6	221.5
250	395	26	26	26	46	68	320	3	298	12	22	350	M20	288	273.0	16	10	6.3	276.5
300	445	26	28	26	46	68	370	4	350	12	22	400	M20	342	323.9	16	10	7.1	327.6
350	505	26	28	26	53	68	430	4	400	16	22	460	M20	390	355.6	16	10	7.1	359.0
400	565	26	32	26	57	72	482	4	459	16	26	515	M24	440	406.4	16	10	7.1	411.0
450	615	28	36	28	63	72	532	4	502	20	26	565	M24	488	457.0	16	12	7.1	462.0
500	670	28	38	28	67	75	585	4	559	20	26	620	M24	540	508.0	16	12	7.1	513.5
600	780	28	42	34	75	80	685	5	658	20	30	725	M27	640	610.0	18	12	7.1	616.5
700	895	30	-	38	-	80	800	5	-	24	30	840	M27	746	711.0	18	12	8.0	-
800	1015	32	-	42	-	90	905	5	-	24	33	950	M30	848	813.0	18	12	8.0	-
900	1115	34	-	46	-	95	1005	5	-	28	33	1050	M30	948	914.0	20	12	10.0	-
1000	1230	34	-	52	-	95	1110	5	-	28	36	1160	M33	1050	1016.0	20	12	10.0	-
1200	1455	38	-	60	-	115	1330	5	-	32	39	1380	M36	1256	1220.0	25	12	11.0	-
1400	1675	42	-	-	-	120	1535	5	-	36	42	1590	M39	1460	1420.0	25	12	12.0	-
1600	1915	46	-	-	-	130	1760	5	-	40	48	1820	M45	1666	1620.0	25	12	14.0	-
1800	2115	50	-	-	-	140	1960	5	-	44	48	2020	M45	1866	1820.0	30	15	15.0	-
2000	2325	54	-	-	-	150	2170	5	-	48	48	2230	M45	2070	2020.0	30	15	16.0	-
2200	2550	58	-	-	-	160	2370	6	-	52	56	2440	M52	2275	2220.0	35	15	-	-
2400	2760	62	-	-	-	170	2570	6	-	56	56	2650	M52	2478	2420.0	35	15	-	-
2600	2960	65	-	-	-	180	2780	6	-	60	56	2850	M52	2680	2620.0	40	18	-	-
2800	3180	70	-	-	-	190	3000	6	-	64	56	3070	M52	2882	2820.0	40	18	-	-
3000	3405	75	-	-	-	200	3210	6	-	68	62	3290	M56	3085	3020.0	40	18	-	-

* Care should be taken with these sizes as the pipe o.d. does not relate to normal stainless steel dimensions.

1. Weldnecks (Code 111) are bored to suit schedule of pipework used.

2. Code 105 flanges are supplied flat faced unless otherwise requested by the purchaser.

3. For information sizes NB 10 to DN150 use PN16 dimensions.

Bs4504 PN16 FLANGES

Dimensions in mm

Nom. Size NB	Flange						Raised Face		Boss	Drilling				Bolting	Neck					Bore Diameter
	A	C	C1	C2	D	D1	G	X	N	No.	I	J	M		F	E	R	T	B	
10	90	14	14	14	20	35	40	2	30	4	14	60	M12	28	17.2	6	3	1.8	18.0	
15	95	14	14	14	20	35	45	2	35	4	14	65	M12	32	21.3	6	3	2.0	22.0	
20	105	16	16	16	24	38	58	2	45	4	14	75	M12	39	26.9	6	4	2.3	27.5	
25	115	16	16	16	24	38	68	2	52	4	14	85	M12	46	33.4	6	4	2.6	34.5	
32	140	16	18	16	26	40	78	2	60	4	18	100	M16	56	42.2	6	5	2.6	43.0	
40	150	16	18	16	26	42	88	3	70	4	18	110	M16	64	48.3	7	5	2.6	49.5	
50	165	18	20	18	28	45	102	3	84	4	18	125	M16	74	60.3	8	5	2.9	61.5	
65	185	18	20	18	32	45	122	3	104	4/8	18	145	M16	92	73.0	10	6	2.9	74.0	
80	200	20	20	20	34	50	138	3	118	8	18	160	M16	110	88.9	10	6	3.2	90.5	
100	220	20	22	20	40	52	162	3	140	8	18	180	M16	130	114.3	12	6	3.6	116.0	
125*	250	22	22	22	44	55	188	3	168	8	18	210	M16	158	141.3	12	6	4.0	142.5	
150	285	22	24	22	44	55	212	3	195	8	22	240	M20	184	168.3	12	8	4.5	170.5	
200	340	24	26	24	44	62	268	3	246	12	22	295	M20	234	219.1	16	8	5.6	221.5	
250	405	26	29	26	46	70	320	3	298	12	26	355	M24	288	273.0	16	10	6.3	276.5	
300	460	28	32	28	46	78	378	4	350	12	26	410	M24	342	323.9	16	10	7.1	327.6	
350	520	30	35	30	57	82	438	4	400	16	26	470	M24	390	355.6	16	10	8.0	359.0	
400	580	32	38	32	63	85	490	4	456	16	30	525	M27	444	406.4	16	10	8.0	411.0	
450	640	34	42	36	63	87	550	4	502	20	30	585	M27	490	457.0	16	12	8.0	462.0	
500	715	34	46	36	73	90	610	4	559	20	33	650	M30	546	508.0	16	12	8.0	513.5	
600	840	36	52	44	83	95	725	5	658	20	36	770	M33	650	610.0	18	12	8.8	616.5	
700	910	36	60	48	83	100	795	5	760	24	36	840	M33	750	711.0	18	12	8.6	-	
800	1025	38	68	52	90	105	900	5	864	24	39	950	M36	848	813.0	20	12	10.0	-	
900	1125	40	76	58	94	110	1000	5	968	28	39	1050	M39	948	914.0	20	12	10.0	-	
1000	1255	42	84	64	100	120	1115	5	1072	28	42	1170	M39	1056	1016.0	22	12	10.0	-	
1200	1485	48	98	76	-	130	1330	5	-	32	48	1390	M45	1260	1220.0	30	12	12.5	-	
1400	1685	52	-	-	-	145	1530	5	-	36	48	1590	M45	1465	1420.0	30	12	14.2	-	
1600	1930	58	-	-	-	160	1750	5	-	40	56	1820	M52	1668	1620.0	35	12	16.0	-	
1800	2130	62	-	-	-	170	1950	5	-	44	56	2020	M52	1870	1820.0	35	15	17.5	-	
2000	2435	66	-	-	-	190	2150	5	-	48	62	2230	M56	2072	2020.0	40	15	20.0	-	

* Care should be taken with these sizes as the pipe o.d. does not relate to normal stainless steel dimensions.

1. Weldnecks (Code 111) are bored to suit schedule of pipework used.

2. Code 105 flanges are supplied flat faced unless otherwise requested by the purchaser.

Bs4504 PN25 FLANGES

Dimensions in mm

Nom. Size NB	Flange						Raised Face		Boss	Drilling			Bolting	Neck					Bore Diameter
	A	C	C1	C2	D	D1	G	X	N	No.	I	J		M	F	E	R	T	B
10	90	16	14	16	22	35	40	2	30	4	14	60	M12	28	17.2	6	3	1.8	18.0
15	95	16	14	16	22	38	45	2	35	4	14	65	M12	32	21.3	6	3	2.0	22.0
20	105	18	16	18	26	40	58	2	45	4	14	75	M12	40	26.9	6	4	2.3	27.5
25	115	18	16	18	28	40	68	2	52	4	14	85	M12	46	33.4	6	4	2.6	34.5
32	140	18	18	18	30	42	78	2	60	4	18	100	M16	56	42.2	7	5	2.6	43.0
40	150	18	18	18	32	45	88	3	70	4	18	110	M16	64	48.3	7	5	2.9	49.5
50	165	20	20	20	34	48	102	3	84	4	18	125	M16	74	60.3	8	5	2.9	61.5
65	185	22	22	22	38	52	122	3	104	8	18	145	M16	92	73.0	10	6	2.9	74.0
80	200	24	24	24	40	58	138	3	118	8	18	160	M16	110	88.9	12	6	3.2	90.5
100	235	24	26	24	44	65	162	3	145	8	22	190	M20	134	114.3	12	6	3.6	116.0
125*	270	26	28	26	48	68	188	3	170	8	26	220	M24	162	141.3	12	6	4.0	142.5
150	300	28	30	28	52	75	218	3	200	8	26	250	M24	190	168.3	12	8	4.5	170.5
200	360	30	32	30	52	80	278	3	256	12	26	310	M24	244	219.1	16	8	6.3	221.5
250	425	32	35	32	60	88	335	3	310	12	30	370	M27	296	273.0	18	10	7.1	276.5
300	485	34	38	34	67	92	395	4	364	16	30	430	M27	350	323.9	18	10	8.0	327.5
350	555	38	42	38	72	100	450	4	418	16	33	490	M30	398	355.6	20	10	8.0	359.5
400	620	40	46	40	78	110	505	4	472	16	36	550	M33	452	406.4	20	10	8.8	411.0
450	670	42	50	44	84	110	555	4	520	20	36	600	M33	500	457.0	20	12	8.8	462.0
500	730	44	56	45	90	125	615	4	580	20	36	660	M33	558	508.0	20	12	10.0	513.5
600	845	46	68	54	100	125	720	5	684	20	39	770	M36	660	610.0	20	12	11.0	616.5
700	960	46	-	-	-	125	820	5	-	24	42	875	M39	760	711.0	20	12	12.5	-
800	1085	50	-	-	-	135	930	5	-	24	48	990	M45	864	813.0	22	12	14.2	-
900	1185	54	-	-	-	145	1030	5	-	28	48	1090	M45	968	914.0	24	12	16.0	-
1000	1320	58	-	-	-	155	1140	5	-	28	56	1210	M52	1070	1016.0	24	12	17.5	-
1200	1530	-	-	-	-	-	1350	5	-	32	56	1420	M52	-	1220.0	-	12	12.5	-
1400	1755	-	-	-	-	-	1560	5	-	36	62	1640	M56	-	1420.0	-	12	14.2	-
1600	1975	-	-	-	-	-	1780	5	-	40	62	1860	M56	-	1620.0	-	15	16.0	-
1800	2185	-	-	-	-	-	1985	5	-	44	70	2070	M64	-	1820.0	-	15	17.5	-
2000	2425	-	-	-	-	-	2210	5	-	48	70	2300	M64	-	2020.0	-	15	20.0	-

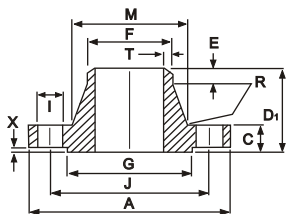
* Care should be taken with these sizes as the pipe o.d. does not relate to normal stainless steel dimensions.

1. Weldnecks (Code 111) are bored to suit schedule of pipework used.

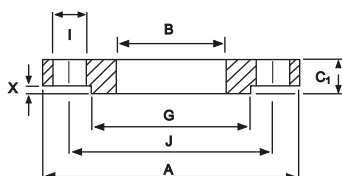
2. Code 105 flanges are supplied flat faced unless otherwise requested by the purchaser.

3. For information sizes NB10 to NB150 use PN40 dimensions.

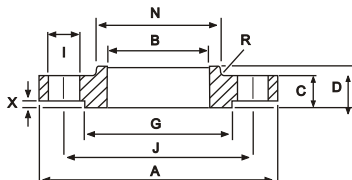
CODE 111



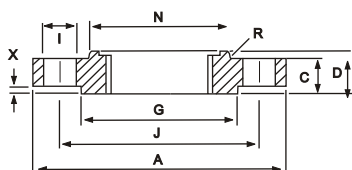
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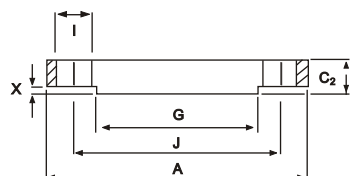
CODE 112



CODE 113



CODE 105



Bs4504 PN40 FLANGES

Dimensions in mm

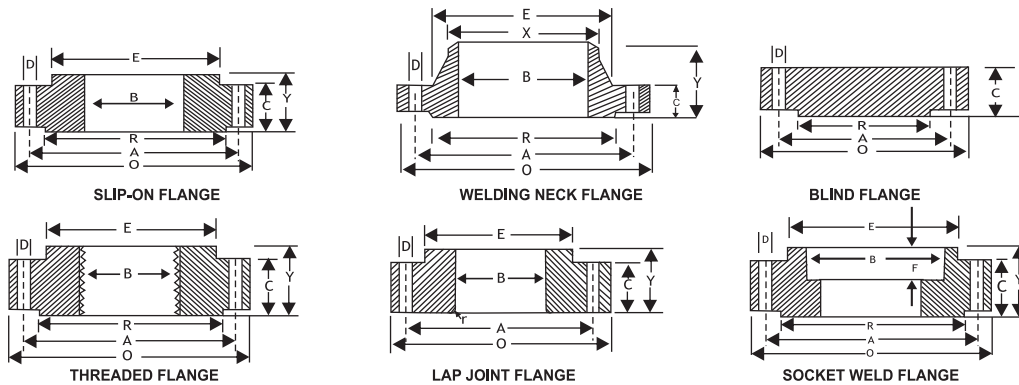
Nom. Size NB	Flange						Raised Face		Boss	Drilling			Bolting	Neck					Bore Diameter
	A	C	C1	C2	D	D1	G	X	N	No.	I	J		M	F	E	R	T	B
10	90	16	14	16	22	35	40	2	30	4	14	60	M12	28	17.2	6	3	1.8	18.0
15	95	16	14	16	22	38	45	2	35	4	14	65	M12	32	21.3	6	3	2.0	22.0
20	105	18	16	18	26	40	58	2	45	4	14	75	M12	40	26.9	6	4	2.3	27.5
25	115	18	16	18	28	40	68	2	52	4	14	85	M12	46	33.4	6	4	2.6	34.5
32	140	18	18	18	30	42	78	2	60	4	18	100	M16	56	42.2	6	5	2.6	43.5
40	150	18	18	18	32	45	88	3	70	4	18	110	M16	64	48.3	7	5	2.6	49.5
50	165	20	20	20	34	48	102	3	84	4	18	125	M16	74	60.3	8	5	2.9	61.5
65	185	22	22	22	38	52	122	3	104	8	18	145	M16	92	76.1	10	6	2.9	77.5
80	200	24	24	24	40	58	138	3	118	8	18	160	M16	110	88.9	12	6	3.2	90.5
100	235	24	26	24	44	65	162	3	145	8	22	190	M20	134	114.3	12	6	3.6	116.0
125*	270	26	28	26	48	68	188	3	170	8	26	220	M24	162	141.3	12	6	4.0	142.5
150	300	28	30	28	52	75	218	3	200	8	26	250	M24	190	168.3	12	8	4.5	170.5
200	375	34	36	36	52	88	285	3	260	12	30	320	M27	244	219.1	16	8	6.3	221.5
250	450	38	42	38	60	105	345	3	312	12	33	385	M30	306	273.0	18	10	7.1	276.5
300	515	42	48	42	67	115	410	4	380	16	33	450	M30	362	323.9	18	10	8.0	327.5
350	580	46	54	46	72	125	465	4	424	16	36	510	M33	408	355.6	20	10	8.8	359.5
400	660	50	60	50	78	135	535	4	478	16	33	585	M36	462	406.4	20	10	11.0	411.0
450	685	50	66	54	84	135	560	4	522	20	39	610	M36	500	457.0	20	12	12.5	462.0
500	755	52	72	56	90	140	615	4	576	20	42	670	M39	562	508.0	20	12	14.2	513.5
600	890	60	84	70	100	150	735	5	686	20	48	795	M45	666	610.0	20	12	16.0	616.5

* Care should be taken with these sizes as the pipe o.d. does not relate to normal stainless steel dimensions.

1. Weldnecks (Code 111) are bored to suit schedule of pipework used.

2. Code 105 flanges are supplied flat faced unless otherwise requested by the purchaser.

FLANGES CLASS -150 / 300 / 600



DIMENSIONS OF CLASS 150 FLANGES AS PER B 16.5

Nominal Pipe Size	Flange Dia O	Dia of Bolt Circle A	No. of Bolt Holes D	No. of Holes	Thk. of Flange C	Dia of Hub E	Length through Hub			Dia Bore		Dia of R/F R	Depth of Socket F	Pipe Dia X
							S/O & S/W Y	W/N Y	L/J Y	S/O & S/W B	L/J B			
15	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	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	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	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	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	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	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	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	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	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	279.4	241.3	22.2	8	25.4	192.1	39.7	88.9	39.7	170.1	171.4	215.9	27.0	168.27
200	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	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	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	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	596.9	539.7	28.6	16	36.5	457.2	63.5	127.0	87.3	415	411.2	469.9	44.4	406.40
450	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	457.00
500	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	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

DIMENSIONS OF CLASS 300 FLANGES AS PER B 16.5

Nominal Pipe Size	Flange Dia O	Dia of Bolt Circle A	No. of Bolt Holes D	No. of Holes	Thk. of Flange C	Dia of Hub E	Length through Hub			Dia Bore		Dia of R/F R	Depth of Socket F	Pipe Dia X
							S/O & S/W Y	W/N Y	L/J Y	S/O & S/W B	L/J B			
15	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	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	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	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	155.6	114.3	22.2	4	20.3	69.8	30.2	68.3	30.2	49.5	50.0	73.0	15.9	48.26
50	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	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	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	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	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	317.5	269.9	22.2	12	38.5	206.4	52.4	98.4	62.4	170.7	171.4	215.9	-	168.27
200	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	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	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	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	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	711.2	628.5	34.9	24	60.3	533.4	88.9	158.7	130.2	461.8	462.3	533.4	-	457.00
500	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	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

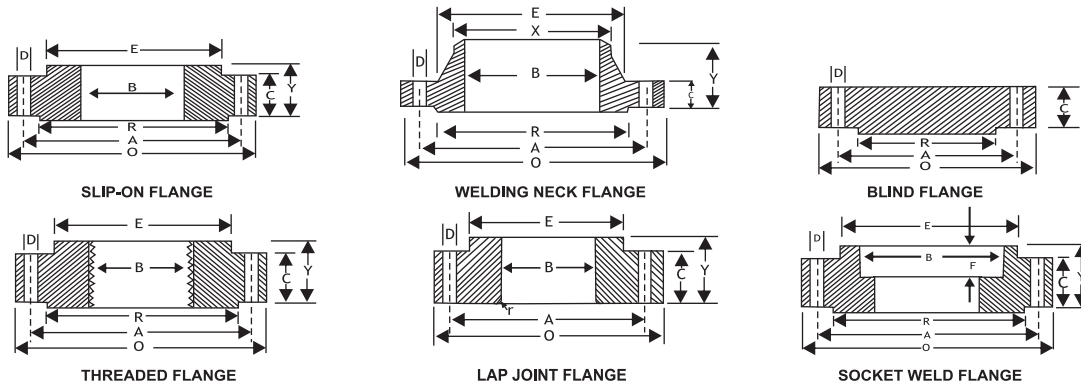
DIMENSIONS OF CLASS 600 FLANGES AS PER B 16.5

Nominal Pipe Size	Flange Dia O	Dia of Bolt Circle A	No. of Bolt Holes D	No. of Holes	Thk. of Flange C	Dia of Hub E	Length through Hub			Dia Bore		Dia of R/F R	Depth of Socket F	Pipe Dia X
							S/O & S/W Y	W/N Y	L/J Y	S/O & S/W B	L/J 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	141.5	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	277.3	323.8	-	273.05
300	558.8	488.9	34.9	20	66.7	400.0	92.1	155.6	117.3	327.1	328.1	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	462.2	533.4	-	457.00
500	812.8	729.9	44.4	24	88.9	609.6	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

Metric values are direct conversion from Inches table of B16.5

Flanges except Lap Joint will be furnished with (1.6 mm) raised face, Which is included in " Thickness " (C) and Length Through Hub (Y).

FLANGES CLASS - 900 / 1500 / 2500



DIMENSIONS OF CLASS 900 FLANGES AS PER B 16.5

Nominal Pipe Size	Flange Dia O	Dia of Bolt Circle A	No. of Bolt Holes D	No. of Holes	Thk. of Flange C	Dia of Hub E	Length through Hub			Dia Bore		Dia of R/F R	Depth of Socket F	Pipe Dia X
							S/O & S / W Y	W/N Y	L/J Y	S/O & S / W B	L/J 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	104.9	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	2241.3	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	157.1	-	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	85.5	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	269.8	-	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

DIMENSIONS OF CLASS 1500 FLANGES AS PER B 16.5

Nominal Pipe Size	Flange Dia O	Dia of Bolt Circle A	No. of Bolt Holes D	No. of Holes	Thk of Flange C	Dia of Hub E	Length through Hub			Dia Bore		Dia of R/F R	Depth of Socket F	Pipe Dia X
							S/O & S / W Y	W/N Y	L/J Y	S/O & S / W B	L/J 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	34.9	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	41.3	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	41.3	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	62.0	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	266.7	203.2	31.7	8	47.6	133.3	73.0	117.5	73.0	90.7	91.7	127.0	-	88.90
100	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	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	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	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	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	673.1	571.5	54.0	16	123.8	450.8	181.0	282.6	218.9	327.1	328.1	381.0	-	323.85

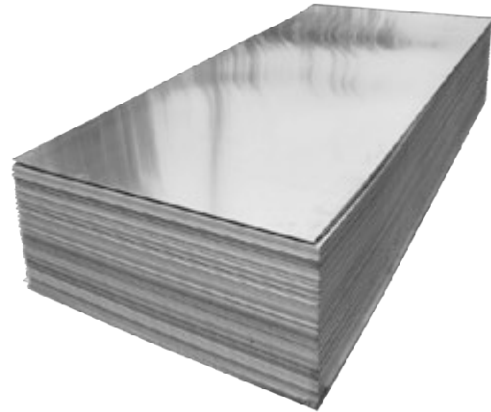
DIMENSIONS OF CLASS 2500 FLANGES PER B 16.5

Nominal Pipe Size	Flange Dia O	Dia of Bolt Circle A	No. of Bolt Holes D	No. of Holes	Thk of Flange C	Dia of Hub E	Length through Hub			Dia Bore		Dia of R/F R	Depth of Socket F	Pipe Dia X
							S/O & S / W Y	W/N Y	L/J Y	S/O & S / W B	L/J B			
15	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	139.7	95.2	22.2	4	31.7	50.8	42.9	79.4	42.9	27.7	27.7	42.9	-	26.67
25	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	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	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	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	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	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	355.6	273.0	41.3	8	76.2	165.1	107.9	190.5	107.9	116.1	116.1	157.2	-	114.30
125	416.1	323.8	47.6	8	92.1	203.2	130.0	228.6	130.0	143.8	143.8	185.7	-	141.30
150	482.6	368.3	54.0	8	107.9	234.9	152.4	273.0	152.4	170.7	170.7	215.1	-	168.27
200	552.4	438.1	54.0	12	127.0	304.8	177.8	317.5	177.8	221.5	221.5	269.9	-	219.07
250	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	762.0	619.1	73.0	12	184.1	441.3	254.9	463.5	254.0	327.1	327.1	381.0	-	323.85

Metric values are direct conversion from Inches table of B16.5

RF Thickness 6.3 mm Extra to be provided (Except Lap Joint Flange & FF Flanges).

SHEETS / PLATES / COILS



Stainless Steel & Duplex Steel

Stainless Steel	: ASTM A240 304/304L/316/316L/316Ti/309/310/317/317L/321/347/409/410/430/904L/SMO 254 / AL6XN
Duplex & Super Duplex	: Standard ASTM A240 - UNS S31803/S32205 (2205) Lean ASTM A240 - UNS S32304 (2304) Super Duplex ASTM A240 - UNS S32750 (2507) ASTM A240 - UNS S32760 (Zeron 100)

Quenched & Tempered

ASTM A537 CL.1 & 2

Boiler Quality Hardox

SA 516 Gr. 60/70 Dual Hardox 400 / 450 / 500
Certified with NACE + HIC

Hi-Nickel & Titanium

Hi-Nickel

Nickel	: ASTM B162 N02200, N02201
Inconel	: ASTM B 168 N06600, N06601, N06617 ASTM B 670 N07718 ASTM B 443 N06625
Incoloy	: ASTM B 409 N08800, N08810 ASTM B 424 N08825 ASTM B 462 N08020
Hastelloy	: ASTM B 575 N10276, N06022 ASTM B 333 N10665

Titanium

Commercially Pure	: ASTM B 265 Gr.1 R 56250 (CP4) Gr.2 R 50400 (CP3) Gr.3 R 50550 (CP2) Gr.4 R 50700 (CP1) Gr.7 R 52400 Gr.11 R 52250
Alloys	: ASTM B 265 Gr.5 R 56400 (6Al-4V) Gr.23 R 56401 (6Al-4V-ELI) Gr.12 R 53400

Alloy Steel, Carbon Steel / Mild Steel

Alloy Steel Pipe	: ASTM A387 Gr. 11, 12, 22, 5, 91 (CL 1/2)
Carbon Steel	: ASTM A 36, S275 JR, IS 2062 Gr. A/B
Mild Steel	: HR Is2062 Plates Abrasion Resistant Gr.200 / 400 / 450 / 500 UTTAM Hard & SAIL Hard (E250BR / E350 / E350C or EN10025-25355J2+N) Corten Steel Ship Building Plates

Aluminium

ASTM B 928
5083 (A95083), 5086 (A95086),
5052 (A95052) T6061 (A96061)

Spring Steel Coils

CR C55, C80, C62, C45

Cupro Nickel

ASTM B171 C70600 (90:10), C71500 (70:30)

Monel

ASTM B127 N04400, DIN N05500

Size

Sheets	: 0.8mm to 4mm thk. in 1000 upto 2000 mm Width & 2000 upto 6000 Length
Plates	: 5mm to 100 mm thk. In 1000 upto 2000 mm Width & 2000 upto 8000 Length
Coils	: 0.1 mm thk. to 12mm thk. in 10mm upto 1500 Width
Foils	: 0.01 mm thk. to 0.3 mm thk. in any width
Strips	: 1mm thk. to 100 mm thk. in 10 mm upto 900 mm Width & 1000 upto 6000 Length

Finish

HR No.1, 2B, BA, Matt, Matt+1 side PVC, BA + 1side PVC,
Chequered

Specializing in:

Stainless Steel Series, Hardox 400/500

Inconel®, Incoloy®, Monel®, Hastelloy®, Duplex®
are Registered Trade Marks of their Respective Owners.

STAINLESS STEEL PLATES CHEMICAL COMPOSITIONS (%)

TYPE	C*	Mn	P*	S*	Si*	Cr	Ni	Others
304	0.08	2.00	0.045	0.030	0.75	18.0-20.0	8.0-10.5	No.25
304L	0.03	2.00	0.045	0.030	0.75	18.0-20.0	8.0-12.0	No.25
309S	0.08	2.00	0.045	0.030	0.75	22.0-24.0	12.0-15.0	
310S	0.08	2.00	0.045	0.030	1.50	24.0-26.0	19.0-22.0	
314	0.15	1.5	0.045	0.030	1.5-2.5	23-27	19-23	
316	0.08	2.00	0.045	0.030	0.75	16.0-18.0	10.0-14.0	Mo 2.0-3.0, No.10
316L	0.03	2.00	0.045	0.030	0.75	16.0-18.0	10.0-14.0	Mo 2.0-3.0, -0.10
316Ti	0.08	2.00	0.045	0.030	0.75	16.0-18.0	10.0-14.0	No.10Ti5(C+N)Min, 0.70Max
317L	0.03	2.00	0.045	0.030	0.75	18.0-20.0	11.0-15.0	Mo 3.0-4.0, No.10
321	0.08	2.20	0.045	0.030	0.75	17.0-19.0	9.0-12.0	Ti5 (C+N)Min, 0.70 Max
330	0.08	2.00	0.030	0.030	0.75-1.5	17.0-20.0	34.0-37.0	GUI
347	0.08	2.00	0.045	0.030	0.75	17.0-19.0	9.0-13.0	Cb 10XC Min, 1.0 Max
409	0.03	1.00	0.030	0.040	1.00	10.5-11.75	0.5Max	Ti 6© MaxMin-0.75
410	0.15	1.00	0.030	0.030	1.00	11.5-13.5	0.75	
420	0.15Min	1.00	0.030	0.040	1.00	12.0-14.0		
430	0.12	1.00	0.030	0.040	1.00	16.0-18.0		
431	0.2	1.00	0.04	0.030	1.00	15.0-17.0	12.5-2.50	EN 57
440C	0.95-1.0	1.00	0.04	0.03	1.00	16.0-18.0		
446	0.2	1.5	0.04	0.03	1.00	23.0-27.0	0.60Max	
17-4PH	0.07	1.0	0.04	0.03	1.0	15.17.50	3.0-5.0	CU 3.0-5.0
904L	0.02	2.00	0.030	0.045	1.00	19.0-23.0	23.0-28.0	Mo 4.0-5.0, CUL, 0-2.0*=MAX

Mechanical Properties of wrought Stainless Steel (All properties minimum spacificed as per code)

TYPE	UNS Designation	Condition	Tensile Strength Mpa	0.2% Proof Strength Map	Elongation % in 50mm	Hardness Brinell	ASTM Specification
301	S30100	Annealed	515	205	40	201	A197
302	S30200	Annealed	515	205	40	201	A167
304	S30400	Annealed	515	205	40	201	A240
304L	S30403	Annealed	485	170	40	202	A240
309S	S30908	Annealed	515	205	40	217	A167
310S	S31008	Annealed	515	205	40	217	A167
316	S31600	Annealed	515	205	40	217	A240
316L	S31603	Annealed	485	205	40	217	A240
316Ti	S31635	Annealed	515	205	30	217	A167
317L	S31703	Annealed	515	205	40	217	A240
321	S32100	Annealed	515	205	40	217	A240
300	N08330	Annealed	480	210	30	75	B536
347	S34700	Annealed	515	205	40	201	A240
409	S40900	Annealed	380	205	22	179	A176
410	S41000	Annealed	450	205	20	217	A176
420	S42000	Annealed	860	-	-	-	A580
430	S43000	Annealed	450	205	22	183	A176
431	S43100	Annealed	965	-	-	-	A580
440C	S44004	Annealed	760	450	14	223	A276
446	S44600	Annealed	515	275	20	217	A176
17-4PH	S17400	H1025	1070	1000	12	331	-
904L	-	Annealed	490	220	35	90	-

DUPLEX & SUPER DUPLEX STEEL

DUPLEX & SUPER DUPLEX STEEL PLATES - CHEMICAL COMPOSITION

UNS Designation	Type	Carbon	Manganese	Phosphorus	Sulphur	Silicon	Chromium	Nickel	Molybdenum	Nitrogen	Copper	Other Elements
S31200	...	0.030	2.00	0.045	0.030	1.00	24.0-26.0	5.5-6.5	1.20-2.00	0.14-0.20	...	...
S31260	...	0.030	1.00	0.030	0.030	0.75	24.0-26.0	5.5-7.5	2.5-3.50	0.10-0.300	0.20-0.80	W0.10-0.50
S31803	...	0.030	2.00	0.030	0.020	1.00	21.0-23.0	4.5-6.5	2.5-3.5	0.08-0.20	...	...
S32001	...	0.030	4.0-6.0	0.040	0.030	1.00	19.5-21.5	1.00-3.00	0.60	0.05-00.17	1.00	...
S32205	2205	0.030	2.00	0.030	0.020	1.00	22.0-23.0	4.5-6.5	3.0-3.5	0.14-0.20	...	...
S32304	2304	0.030	2.50	0.040	0.030	1.00	21.5-24.5	3.0-5.5	0.05-0.60	0.05-0.60	0.05-0.60	...
S32520	...	0.030	1.50	0.035	0.020	0.80	24.0-26.0	5.5-8.0	3.0-4.0	0.20-0.35	0.50-2.00	...
S32550	255	0.040	1.50	0.040	0.030	1.00	24.0-27.0	4.5-6.5	2.9-3.9	0.10-0.25	1.50-2.50	...
S32750	2507	0.030	1.20	0.035	0.020	0.80	24.0-26.0	6.0-8.0	3.0-5.0	0.24-0.32	0.50	...
S32760	...	0.030	1.00	0.030	0.010	1.00	24.0-26.0	6.0-8.0	3.0-4.0	0.20-0.30	0.50-1.00	W0.50-1.00
S32900	329	0.080	1.00	0.040	0.030	0.75	23.0-28.0	2.0-5.00	1.00-2.00	...	...	...
S32950	...	0.030	2.00	0.035	0.010	0.060	26.0-29.0	3.5-5.2	1.00-2.50	0.15-0.35	...	...

MACHANICAL TEST REQUIREMENTS

UNS Designation	Type	Tensile Strength, min		Yield Strength, Min		Elongation in 2 in. or 50mm, min, %	Hardness, max		Cold Bend
		Ksi	Mpa	Ksi	MPa		Brinell	Rockwell B	
S31200	...	100	690	65	450	25.0	293	31	not required
S31260	...	100	690	70	485	20.0	290	...	...
S31803	...	90	620	65	450	25.0	293	31	not required
S32001	...	90	620	65	450	25.0	...	25	not required
S32205	2205	90	620	65	450	25.0	293	31	not required
S32304	2304	87	600	58	400	25.0	290	32J	not required
S32520	...	112	760	80	550	25.0	310	...	not required
S32550	255	110	760	80	550	15.0	302	32	not required
S32750	2507	116	795	80	550	15.0	310	32J	not required
S32760	...	108	750	80	550	25.0	270	...	not required
S32900	329	90	620	70	485	15.0	269	28	not required
S32950	...	100	690	70	485	15.0	293	32	not required

EXOTIC GRADES / NICKEL ALLOYS PIPES / PLATES / ROUNDS / FORGINGS & FITTINGS

Exotic Grades

Exotic	UNS NO.	WNR	C(Max)	Mn(Max)	S(Max)	S(Max)	Cr	Ni	Mo	Cu	Fe	Ti	Al	Other
ALLOY 200	N02200	2.4066	0.080	0.180	0.005	0.180	-	99.5+	-	-	-	-	-	-
ALLOY 201	N02201	2.4068	0.10	0.80	0.005	0.180	-	99.5+	-	0.130	0.200	-	-	-
ALLOY 400	N04400	2.4360	0.300	1.000	0.024	0.200	-	63.0min	-	28-34	2.5max	-	-	-
ALLOY K-500	N05500	2.4375	0.250	1.500	0.010	0.050	-	63.0min	-	27-33	2.0max	0.35-0.85	2.3-3.14	-
ALLOY 800	N08800	1.4876	0.0100	1.500	0.015	1.000	19.0-23.0	30.0-35.0	-	0.75max	39.5min	0.15-0.60	0.15-0.60	-
ALLOY 800H	N08810	1.4958	0.0500	1.500	0.015	1.000	19.0-23.0	30.0-35.0	-	0.75max	39.5min	0.15-0.60	0.15-0.60	AL-Ti 0.30-1.20
ALLOY 800HT	N08811	1.4959	0.0600	1.500	0.015	1.000	19.0-23.0	30.0-35.0	-	0.75max	39.5min	0.25-0.60	0.25-0.60	AL+Hf 0.85-1.20
ALLOY 330	N08330	-	0.080	2.000	0.030	0.75-1.50	17.0-20.0	34.0-37.0	-	-	Sal	-	-	P-0.030MAX
ALLOY DS	-	1.4862	0.100	0.8-1.5	0.030	1.9-2.8	17.0-19.0	35.5-41.0	-	0.5max	Sal	0.2max	-	-
ALLOY 600	N06600	2.4816	0.150	1.000	0.015	0.050	14.0-17.0	72.0min	-	0.5max	6.0-10.0	-	-	-
ALLOY 201	N06601	2.4851	0.100	1.000	0.015	0.500	21.0-25.0	58.0-63.0	-	1.0max	Sal	-	1.0-1.7	-
ALLOY 625	N08825	2.4858	0.025	0.100	0.030	0.500	19.5-23.5	38.0-46.0	2.5-3.0	1.5-3.0	Sal	0.6-1.2	0.200	-
ALLOY 625	N06625	2.4858	0.100	0.500	0.015	0.500	20.0-23.0	58.0min	8.0-10.0	-	5.0max	0.400	0.400	P-0.015,Nb-3.15-4.15,Co-1.0MAX
ALLOY 750	N07750	2.4669	0.080	1.000	0.010	0.500	14.0-17.0	70.0min	-	0.50max	5.0-9.0	2.25-2.75	0.40-1.00	Co-1.00MAX,N-0.70-1.20
ALLOY 718	N07718	2.4668	0.02-0.08	0.350	0.015	0.350	17.0-21.0	50.0-55.0	2.80-3.30	0.20max	Sal	0.70-1.15	0.30-0.70	P-0.1max,B 0.006max,Nb-0.75-5.50 Co-1.0max
ALLOY 617	N06617	2.4663	0.05-0.15	1.000	0.015	1.000	20.0-24.0	44.5min	8.0-10.0	0.5max	3.0max	0.6max	0.8-1.5	80.006max Co-10.0-15.0
ALLOY C4	N06455	2.4610	0.010	1.000	0.010	0.050	14.5-17.5	Bal	14.0-17.0	-	3.0max	0.70max	-	P-0.025max Co-2.5
ALLOY C22	N06022	2.4602	0.015	0.500	0.02	0.080	20.0-22.5	-	12.5-14.5	-	2.0-6.0	-	-	P-0.020max Co-2.5max,V-0.35max,W-2.5-3.5
ALLOY C276	N010276	2.4819	0.010	1.000	0.03	0.080	14.5-16.5	Bal	15.0-17.0	-	4.0-7.0	-	-	P-0.040max,W-3.0-4.5,Co-2.5max,V-0.35max
ALLOY B2	N010665	2.4617	0.010	1.000	-	0.008	0.4-1.0	Bal	26.0-30.0	-	2.0max	-	-	P-0.020max Co-1.0max,W-3.0-4.5,V-35max
ALLOY B3	N010675	2.4600	0.00	3.000	-	0.100	1.0-3.0	65.0min	27.0-32.0	0.20max	1.5max	0.2max	0.50max	Co-3max, W-3.0max
ALLOY 75	N06075	2.4630-2.495	10.08-0.15	1.000	-	1.000	18.0-21.0	Bal	-	0.5max	5.0max	0.2-0.6	-	-
ALLOY 80A	N07080	2.4631-2.4952	0.100	1.000	0.015	1.000	18.0-21.0	Bal	-	0.2max	3.0max	1.8-2.7	1.0-1.8	Co-2.0 max,B-0.08 max,Zr-0.15 max
ALLOY 901	N09901	2.4662	0.100	0.500	0.030	0.400	11.0-14.0	40.0-45.0	5.0-6.5	0.5max	Sal	2.8-3.1	0.35max	Co-1.0 max
ALLOY 90	N07090	2.4632	0.130	1.000	0.015	1.000	18.0-21.0	Bal	-	0.2max	1.5max	2.0-3.0	1.0-2.0	Co15.0-21.0, B-0.02max,Zr-0.15max
ALLOY 105	-	2.4634	0.120	1.000	0.010	1.000	14.0-5.7	Bal	4.5-5.5	0.2max	1.0max	0.9-1.5	4.5-4.9	Co-18-22 B-0.003-0.010,Zr0.15
ALLOY 115	-	2.4636	0.2-0.2	1.000	0.015	1.000	14.0-16.0	Bal	3.0-5.0	0.2max	1.0max	3.5-4.5	4.5-5.5	Co-13-155,8-0.01-0.025,Zr-0.15max
ALLOY 263	N07263	2.4650	0.04-0.08	0.600	0.007	0.400	19.0-21.0	Bal	5.6-6.1	0.2max	0.7max	1.9-2.4	0.60max	B-0.005max,Co-19-21,Al+Ti-2.4-2.8
ALLOY 690	N06690	2.4642	0.020	0.300	0.015	0.300	27.0-31.0	58.0min	-	0.50max	8.0-10.0	0.300	0.300	-
ALLOY 20	N08020	-	0.070	2.000	0.035	1.000	19.0-21.0	32.0-38.0	2.0-3.0	3.0-4.0	Bal	-	-	P-0.045max,Nb+Ti-8xC-1.0
ALLOY 904 L	N08904	1.4539	0.020	2.000	0.035	1.000	19.00-23.00	23.00-25.00	4.00-5.00	1.00-2.00	Bal	-	-	P-0.045 max
ALLOY 6XM	N06367	NL	0.030	2.000	0.030	1.000	2.00-22.00	23.50-25.50	6.00-7.00	0.75max	Bal	-	-	P-0.04max,NO,15-0.25
ALLOY SMO-254	S31254	1.4547	0.020	1.000	0.010	0.800	19.5-20.5	17.5-18.5	6.0-6.5	0.50-1.00	Bal	-	-	P-0.030max,N-0.18-0.22
ALLOY SMO 654	S32654	1.4562	0.020	2.000-4.00	0.005	0.500	24.0-25.0	21.0-23.0	7.0-8.0	0.30-0.60	Bal	-	-	P-0.03max, N-0.45-0.55

Age Hardening Martensitic Steels

Common Grade	-	UNS	C	Mn	P	S	Si	Cr	Ni	Mo	N	Other
NITRONIC-40	-	S 21900	0.03 max	8.0-0.0	0.04 max	0.03 max	00 max	19.0-21.5	5.5-7.5	-	0.5-0.0	-
NITRONIC -50	XM-19	S 21910	0.06 max	4.0-6.0	0.040 max	0.030 max	0.75 max	20.5-23.5	11.5-13.5	1.50-3.0	0.20-0.40	Cb-0.10-0.30, V-0.10-0.30
NITRONIC-60	22-13-5	S 21800	0.10 max	7.0-9.0	0.060 max	0.030 max	3.5-4.5	16.0-18.0	8.0-9.0	-	0.080-0.18	-
13-8 MO	-	S 13800	0.05 max	0.10max	0.01 max	0.008 max	0.10 max	12.25-13.25	7.50-8.5	2-2.5	-	N-0.01 max,Al-0.9-1.35
15-7MO	-	S 15700	0.09 max	1.0 max	0.04 max	0.03 max	1.0 max	14.0-16.0	6.5-7.75	2.0-3.0	-	Al-0.75-1.50
17-4PH	-	S 17400	0.07 max	1.0 max	0.04 max	0.03 max	1.0 max	15.00-17.5	3.0-5.0	-	30-5.0	Nb+Ta-0.15-0.45
17-7PH	630	S 17760	0.09 max	1.0 max	0.04 max	0.04 max	1.0 max	16.0-18.0	6.5-7.75	-	-	Al-0.75-1.50
A-286	1.4980	S 66286	0.08 max	2.0 max	-	-	1.0 max	13.5-16.00	24.0-27.0	1.0-1.5	-	Ti1.9-2.3,Al-0.35 max
												V-0.1-0.5, 8-MO3-0.010

CARBON STEEL : CHEMICAL COMPOSITION OF STANDARD GRADES

Grades	% Chemical Composition									Deoxidation
	C	Mn	Si	S	P	Al	Cu	Nb+V+Ti	Ce	
IS 1079 Gr 0	0.15 max	0.60 max	-	0.055 max	0.055 max	-	-	-	-	Semi Killed / Killed
IS 1079 Gr D	0.12 max	0.50 max	-	0.040 max	0.040 max	-	-	-	-	Semi Killed / Killed
IS 1079 Gr DD	0.10 max	0.40 max	-	0.035 max	0.035 max	0.02 min	-	-	-	Al Killed
IS 1079 Gr EDD	0.08 max	0.40 max	-	0.030 max	0.030 max	0.02 min	-	-	-	Al Killed
IS 2062 E 250 A	0.23 max	1.50 max	0.40 max	0.045 max	0.045 max	-	-	0.25	0.25	Semi Killed / Killed
IS 2062 E 250 B	0.22 max	1.50 max	0.40 max	0.045 max	0.045 max	-	-	0.25 max	0.41 max	Killed
IS 2062 E250 C	0.20 max	1.50 max	0.04 max	0.040 max	0.040 max	-	0.20-0.35	0.25 max	-	Killed
IS 2062 E 250 Cu C	0.20 max	1.60 max	0.45 max	0.045 max	0.045 max	-	-	0.25 max	0.44 max	Killed
IS 2062 E410	0.20 max	1.60 max	0.45 max	0.045 max	0.045 max	-	-	0.25 max	0.44 max	Killed
IS 2060 E450 D	0.22 max	1.60 max	0.45 max	0.045 max	0.045 max	-	-	0.25 max	0.45 max	Killed
IS 2062 E 450 E	0.22 max	1.80 max	0.45 max	0.045 max	0.045 max	-	-	0.25 max	0.48 max	Killed
IS 5986 Fe 410	0.20 max	1.20 max	- max	0.040 max	0.040 max	-	-	-	0.42 max	Killed
IS 10748 Gr 1	0.10 max	0.50 max	- max	0.040 max	0.040 max	-	-	-	-	Killed

CARBON STEEL: MECHANICAL PROPERTIES OF STANDARD GRADES

Grades	YS N/MM	UTS N/mm	% El (Min) (t)	Bend test (t)	Hard R	Charpy V- Notch Impact Energy (min)
IS 1079 Gr O	-	-	-	2 t	-	-
IS 1079 Gr D	-	240 - 400	25	1 t	-	-
IS 1079 Gr DD	-	260 - 390	28	Close	-	-
IS 1079 Gr EDD	-	260 - 380	32	Close	-	-
IS 20620 E250 A	250 min	410 min	23	3 t	-	-
IS 2062 E250 B	250 min	410 min	23	2 t	-	27 J at Room temp See Note
IS 2062 E250 C	250 min	410 min	23	2 t	-	27 J at Room temp See Note
IS 2062 E250 Cu C	250 min	410 min	23	2 t	-	27 J at Room temp See Note
IS 2062 E410	410 min	540 min	23	2 t	-	50 J at Room temp See Note
IS 2062 E450 D	450 min	570 min	20	2 t	-	45 J at Room temp See Note
IS 2062 E450 E	450 min	590 min	20	2 t	-	45 J at Room temp See Note
IS 5986 Fe410	255 min	410 - 520	24 for t>3/0 mm*	2 t	-	

(t) =Nominal thickness of test piece, * : Elongation 15 min N in 80mm GL for t < 3.0 mm

Note : For grade IS 2062 E250B, E250C, E410, E450E Impact Test shall be certified for product thickness of 12mm or more

The testing temperature will be room temperature unless otherwise specified in the order.

*Although every care has been taken during the production of this brochure, we regret that we cannot accept any liability in respect of any incorrect information it may contain or any damages which may arise through the misinterpretation of its contents

ALLOY STEEL PLATES

ASTM A387 PRESSURE VESSEL PLATES, ALLOY STEEL, CHROMIUM -MOLYBDENUM												
CHEMICAL COMPOSITION												
Specification	C% max	Si%	Mn%	P% max	S% max	Cr%	Mo%	V%	Tensile Strength Ksi (Mpa)	Yield Strength (0.2% offset) Ksi (Mpa) min	Elongation % min	
											GL=8 in*2 or 200 mm	GL=2 in or 50 mm
Grade 5 Class-2	0.15	0.50 max	0.30-0.60	0.035	0.030	4.00-6.00	0.45-0.65		75-100 (515-690)	45 (310)	-	18
Grade 9 Class-2	0.15	1.00 max	0.30-0.60	0.030	0.030	8.00-10.00	0.90-1.10	0.04 max	75-100 (515-690)	45 (310)	-	18
Grade 11 Class-2	0.05-0.17	0.05-0.80	0.40-0.65	0.035	0.035	1.00-1.50	0.45-0.65		75-100 (515-690)	43 (310)	18	22
Grade 12 Class-2	0.05-0.17	0.15-0.40	0.40-0.65	0.035	0.035	0.80-1.15	0.45-0.60		65-85 (450-585)	40 (275)	19	22
Grade 22 Class-2	0.05-0.15	0.50 max	0.30-0.60	0.035	0.035	2.00-2.50	0.90-1.10		75-100 (515-690)	45 (310)	-	18
Grade 91* Class-2	0.08-0.12	0.20-0.50	0.30-0.60	0.020	0.010	8.00-9.50	0.85-1.05	0.18-0.25	85-110 (585-760)	60 415	-	18

*Additional Properties for Grade 91) Ni-0.40 max, Cb-0.06-0.10, N-0.030-0.070, Al -0.02, Ti % Z : 0.01 max

ASTM A 283 LOW AND INTERMEDIATE TENSILE STRENGTH STEEL PLATES

Designation	Chemical Composition				Mechanical Properties			
	C%	Mn% max	P% max	S% max	Tensile Strength (Mpa)	Yield Strength (Mpa)	Elongation %min	
							GL=8 in	GL=2 in
Grade A	0.14	0.90	0.035	0.040	310-415	165	27	30
Grade B	0.17	0.90	0.035	0.040	345-450	185	25	28
Grade C	0.24	0.90	0.035	0.040	380-515	205	22	25
Grade D	0.27	0.90	0.035	0.040	415-550	230	20	23

Note: 1) For Silicon: Thickness 40mm and under 0.40max & for Thickness over 40mm 0.15-0.40

2) Min% when copper is specified is specified 0.20

ASTM A 283 PRESSURE VESSEL PLATES, CARBON STEEL LOW & INTERMEDIATE TENSILE STRENGTH

Designation	Chemical Composition				Mechanical Properties			
	C%	Mn% max	P% max	S% max	Tensile Strength (Mpa)	Yield Strength (Mpa)	Elongation %min	
							GL=8 in	GL=2 in
Grade A	0.17	0.90	0.035	0.035	310-485	165	27	30
Grade B	0.22	0.90	0.035	0.040	345-485	185	25	28
Grade C	0.28	0.90	0.035	0.040	380-515	205	22	23

ROUND BAR, HEX, SQUARE

We take Opportunity To Introduce Ourselves As One Of The Leading Manufacturer, Producers And Exporters Of High Quality Stainless Steel Billets, RCS, Wire Rod, Round, Flat, Hexagon, Square, Black & Bright Bars.



Size

Bright Bars	: 5mm Dia upto 350mm Dia
Black Bars	: 16mm Dia upto 350mm Dia
Square Brs	: 5mm Dia upto 250mm Dia
Hex Bars	: 5mm Dia upto 150mm dia
Wires	: 0.1mm Dia to 5mm Dia
Type	: Round, Hexagonal & Square

Specification

Condition	: Rolled, Forged, Annealed, Piked, Hot Rolled, cold Roll
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Grades

Stainless Steel	: 304/304, 316/316L/316Ti, 321, 310/310S, 317/317L, 347, 17-4Ph, Ph.15-5Ph 904L, 410, 420, 430, 431, 430F, 416, 440C etc. Copper, Brass, Aluminium, Hast Alloy, Titanium, Monel < Inconel < Nickel, etc.
Duplex Steel	: UNS 31803, UNS 32205, UNS 32750, UNS 32760
Alloy Steel	: F5, F9, F11, F22, F91 Carbon steel, Mild Steel, Boiler Quality Plates
Specification	: ASTM, AISI, ASME, DIN, UNS etc.

Facilities

- Scarp Melting Furnace
- Aod Furnace
- C.C.M
- Rolling Facilities
- Drawing Facilities
- Annealing
- Bright Bars

Specializing in Stainless Steel & EN Series

SPECIAL PRODUCTS

C TYPE/FLANGE COPPER EARTHING JUMPERS

Material : Copper **Bending Degree :** 90 Deg
Size : 2-inch to 14 inch **Surface Finish :** Natural
Design : Customized



COPPER WIRE BRAIDED STRIPS & BRAIDED ROPES



WIRE MESH / BARBED WIRE / CHAIN LINK



HALF ROUND PIPE AS PER CUSTOMER REQUIREMENT



PHOSPHORUS BRONZE BAR GUN METAL BAR, BRASS BAR COPPER BAR



COPPER NICKEL PIPE & PIPE FITTINGS



BOILER TUBES AIR PRE HEATER TUBES



ALUMINUM PIPES, PLATES & BARS



STRUCTURAL STEEL

We Can Offer You Wide Variety Of Structural Steel For Your Regular Needs For Maintenance, Construction As Well As Development Of New Projects. With Tie Ups With Majority Of Manufacturers We Can Offer Steel From Prime manufacturers Like Sail/ Vizag/ Jindal/ Tisco As Well As From Secondary Rolling & Re Rolling Manufacturers. We Offer Following Product In Our Range Of Structural steel : Mild Steel Structural.

MS ANGLES

Grade : IS 2062

Product Range : The following are the sizes available.

25 X 25 X3/5, 35 X 35 X 5, 40 X 40 X 5/6, 45 X 45 X 4/5/6,
50 X 50 X 5/6, 60 X 60 X 6/8/10, 65 X 65, 75 X 75 X 6/8/10, 80 X 80 X 6/8,
90 X 90 X 6/8/10, 100 X 6/8/10/12, 110 X 110 X 8/10/12, 130 X 130 X
10/12, 150 X 150 X 10/12, 150 X 150 X 16/20, 200 X 200 X 16/20

All the above mentioned sizes are in mm.



MS CHANNEL

Grade : IS 2062

Product Range : The following are the sizes available.

75 X 40, 100 X 50, 125 X 75, 150 X 75, 175 X 75, 200 X 75,
250 X 80, 300 X 90, 350 X 100, 400 X 100.

All the above mentioned sizes are in mm



MS BEAM

Light, Medium, standard

Grade : IS 2062

Product Range : The following are the sizes available.

100 X 50, 125 X 70, 150 X 75, 175 X 85, 200 X 100, 250 X 125, 300 X 140, 350 X
140, 400 X 150, 450 X 150, 500 X 180, 600 X 210.

All the above mentioned sizes are in mm



MS ROUNDS BARS

Product Name : Wire Rods

Grade : Low Carbon - 5WR-14 / IS:2062 Gr.A

Product Range : Diameters available (unit mm), 5mm to 250mm

All the above mentioned sizes are in mm

These are available in straight in straight lengths (as mutually agreed).



TMT BARS

We have a wide range of TMT Re Bars which are available in various types & from Various Primary & secondary Manufacturers.

Above Material can be offered in Grades Like Fe 415 / FE 500 With Manufacturing Test certificate.



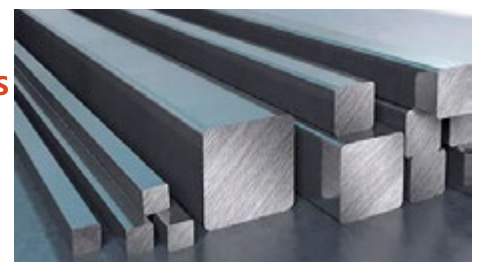
MS FLATS

Available in size
21 x 6mm to
300 x 16mm



MS SQUARE BARS

Available in size
10 x 10 mm to
63 x 63 mm



APPLICATION INDUSTRIES



THIRD PARTY INSPECTION AGENCY & CONSULTANTS

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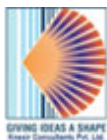


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FORMULAE OF CALCULATING WEIGHT

- WEIGHT OF STAINLESS STEEL / CARBON STEEL PIPES & TUBES
 $OD\ (mm) - W.T.\ (mm) \times W.T.\ (mm) \times 0.02466 = KG/MTR$
- WEIGHT OF COPPER PIPES & TUBES
 $O.D.\ (mm) - W.T.\ (mm) \times W.T.\ (mm) \times 0.0285 = KG/MTR$
- WEIGHT OF ALUMINIUM PIPES & TUBES
 $O.D.\ (mm) - W.T.\ (mm) \times W.T.\ (mm) \times 0.0082 = KG/MTR$
- WEIGHT OF LEAD PIPES & TUBES
 $O.D.\ (mm) - W.T.\ (mm) \times W.T.\ (mm) \times 0.0345 = KG/MTR$
- SHEET WIDTH REQD FOR ROLLED & WELDED PIPES
 $O.D.\ (mm) - Thk.\ (mm) \times 3.14 = SHEET\ WIDTH\ (mm)$
- WEIGHT FOR SQUARE / RECTANGLE PIPES
 $Length\ From\ 4\ Angle\ (OD)/3.14 - Thk.\ (mm) \times Thk.\ (mm) \times 0.00756 = KG/PER\ FEET$
- WEIGHT OF STAINLESS STEEL CIRCLE & BLANKS
 $O.D.\ (mm) \times O.D.\ (mm) \times Thk.\ (mm) / 160 / 1000 = KG/PCS.$
- WEIGHT OF STAINLESS STEEL SHEETS & PLATES
 $Length\ (mtr) \times Width\ (mtr) \times Thk.\ (mm) \times 8 = KG/SHEET$
- WEIGHT OF CARBON STEEL SHEETS & PLATES
 $Length\ (mtr) \times Width\ (mtr) \times Thk.\ (mm) \times 7.85 = KG/SHEET$
- WEIGHT OF ALUMINIUM SHEETS & PLATES
 $Length\ (mtr) \times Width\ (mtr) \times Thk.\ (mm) \times 2.66 = KG/SHEET$
- WEIGHT OF LEAD SHEETS & PLATES
 $Length\ (mtr) \times Width\ (mtr) \times Thk.\ (mm) \times 11.2 = KG/SHEET$
- WEIGHT OF STAINLESS STEEL ROUNDS / ROUND BAR
 $Dia.\ (mm) \times Dia.\ (mm) \times 0.00623 = KG/MTR$
- WEIGHT OF STAINLESS STEEL HEXAGONAL RODS
 $Dia.\ (mm) \times Dia.\ (mm) \times 0.00679 = KG/MTR$
- WEIGHT OF STAINLESS STEEL SQUARE RODS
 $Dia.\ (mm) \times Dia.\ (mm) \times 0.00787 = KG/MTR$



Head / Corporate Office

Office No. 111, 1st Floor, Aman Griha,
1st Carpenter Street, CP Tank,
Mumbai-400004, Maharashtra, India.
Tel.: +91-022-23871616 / 6636 2580

Our Works

Plot No.14, Dhruv Logistic Park,
Village Koyanavale, Near M.I.D.C. Talaja,
Navi Mumbai-410206
Maharashtra, India.

Bhawar Jain

+91 98210 25704

Jigar Jain

+91 99300 91290

Email : info@ratnadeepsteel.com / rsecsteel@gmail.com

www.ratnadeepsteel.com

