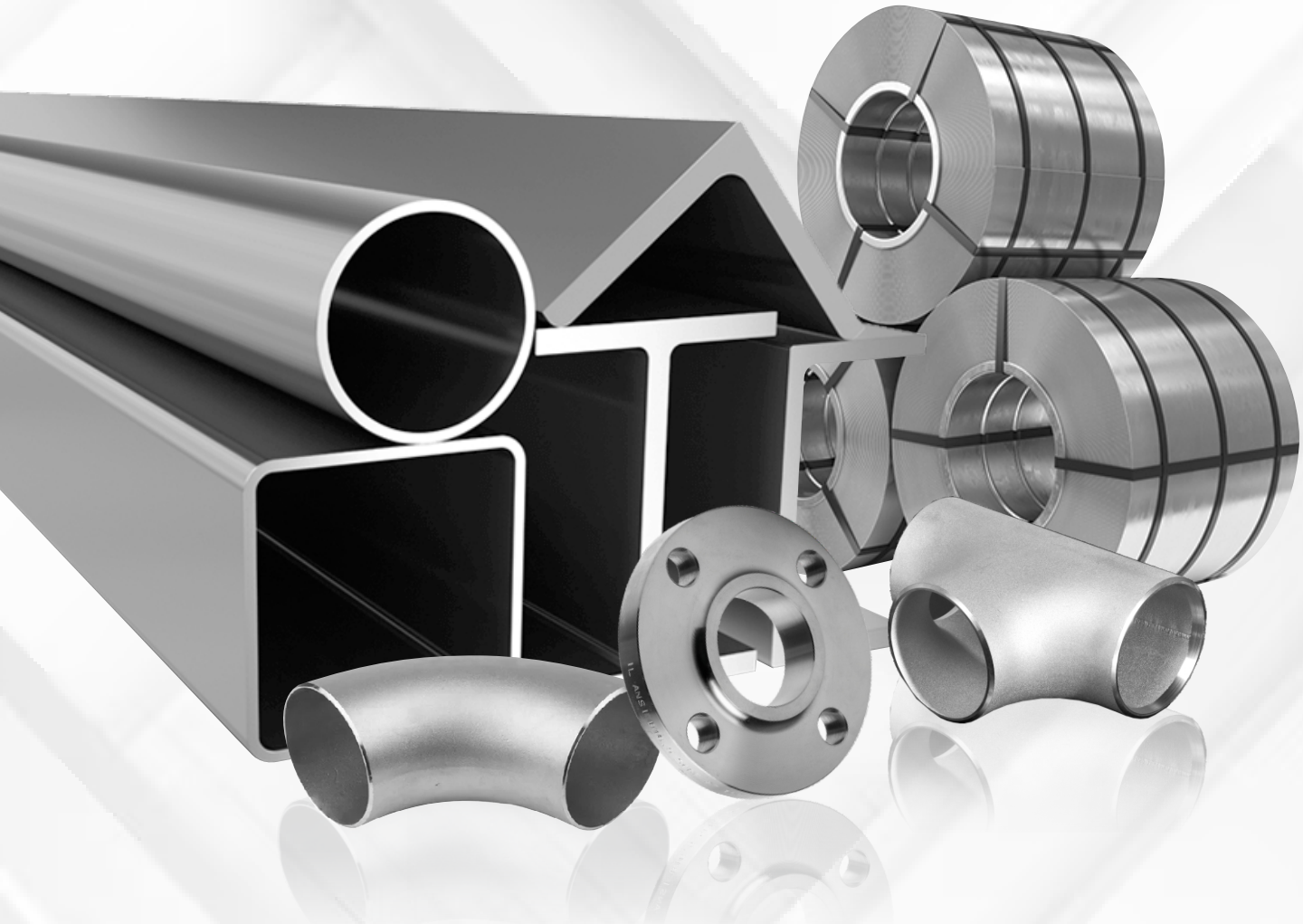
UASL QUALITY MANAGEMENT 007

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

25 YEARS INNOVATION

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	PIPE FITTINGS STRUCTURES	FLANGES FASTENERS	BARS COPPER JUMPERS
STAINLESS STEEL	**CARBON STEEL**	**ALLOY STEEL**	**MILD STEEL & HOT DIP GI**
INCOLOY 800, 825	**NICKEL ALLOY 200**	**TITANIUM GR 2**	**INCONEL 600, 601, 625**
INCOLOY ALLOY 20	**HASTELLOY C22, C276**	**DUPLEX & SUPER DUPLEX**	**GUN METAL**
SMO 254 (UNS S31254)	**PHOSPHORUS BRONZE**	**BOILER QUALITY**	**MONEL 400, K500**
COPPER	**BRASS**	**17-4PH & 15-5PH**	**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.

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 F42/46/52/56/60/065/70/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, Threadolet, 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.

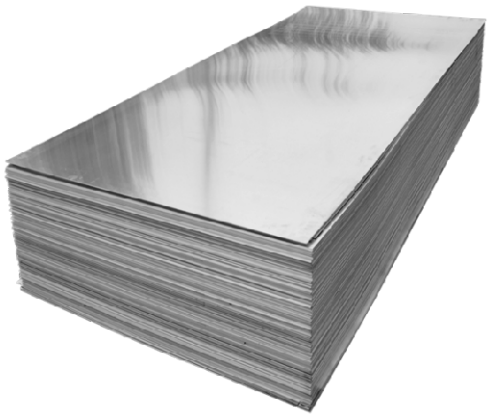
RODS / BARS & WIRES

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 & Molydenum Disilicide
Heating Element Accessories
Aluminium Wire & SS Wire Braided Products.
Special Earthing Materials, Sheet Metal Components.

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

SA 516 Gr. 60/70 Dual Certified with NACE + HIC

Hardox

Hardox 400 / 450 / 500

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

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 spacified as per code)

TYPE	UNS Designation	Condition	Tensile Strengh Mpa	0.2% Proof Strength Map	Elonagation % 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 PLATES - CHEMICAL COMPOSITION

UNS Designation	Type	Carbon	Manganese	Phosphorus	Sulpher	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		Yiled 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

Email : info@ratnadeepsteel.com / rsecsteel@gmail.com | Web.: www.ratnadeepsteel.com

Exotic Grades

Exotic	UNS NO.	W.NR	C(Max)	Mn(Max)	S(Max)	Si(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	-	-	-
ALLOY400	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+tI-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	-	-	-
ALLOY201	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	0.2-06	-	-
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-008 max, Zi-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,Zi-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,Zi0.15
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	C0-13-155,8-0.01-0.025,Zi-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,AI+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	23.00-28.00	4.00-5.00	1.00-2.00	Bal	-	-	P-0.045 max
ALLOY 6XM	N08367	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-018-0.22
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

Email : info@ratnadeepsteel.com / rsecsteel@gmail.com | Web.: www.ratnadeepsteel.com

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, * : Elonagation 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 thikness of 12mm or more
The testimg temperature will be room tempreture unless otherwise specified in the order.

ALLOY STEEL PLATES

ASTM A387 PRESSURE VESSEL PLATES, ALLOY STEEL, CHROMIUM -MOLYBDENUM												
CHMICAL COPOSITION												
Spacification	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

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

ASTM A 283 LOW AND INTERMEDITE 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: Thikness 40mm and under 0.40max & for Thikness 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 STRENGHT

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

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

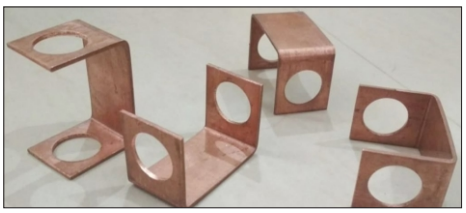
- **Scarp Melting Furnace**
- **Aod Furnace**
- **C.C.M**
- **Rolling Facilities**
- **Drewing Facilities**
- **Annealing**
- **Bright Bars**

Specializing in Stainless Steel & EN Series

SPECIAL PRODUCTS

C TYPE/FLANGE COPPER EARTHING JUMPERS

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

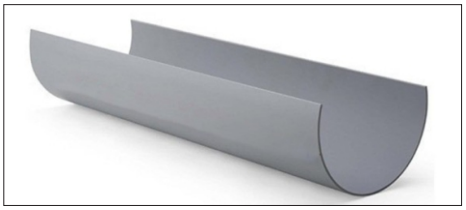


COPPER WIRE BRAIDED STRIPS & BRAIDED ROPES

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

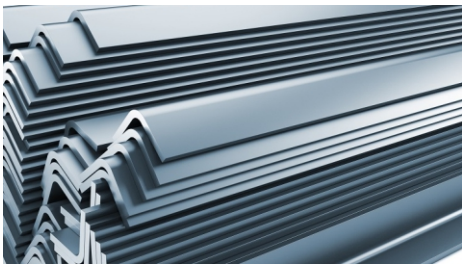
ALUMINUM
PIPES, PLATES & BARS

STRUCTURAL STEEL

We Can Offer You Wide Variety Of Strucatural Steel For Your Regular Needs For Maintenance, Construction As Well As DevelopmentOf New Projects. With Tie Ups With Majorty Of Manufactures 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 Strutural.

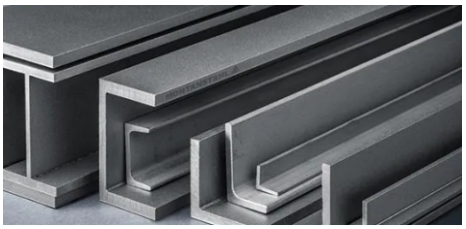
MS ANGLES

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 X45 X4/5/6,
50 x 50 x 5/6, 60 x 60 x 6/8/10, 65 x 65, 75 x 75x 6/8/10, 80 x 80 x6/8,
90 x 90 x 6/8/10,100x6/8/10/12, 110 x 110 x8/10/12, 130 x130 x
10/12, 150 x 150 x 10/12,150 x 150 x16/20 200 x 200 x 16/20
All the above mentioned sizes are in mm.



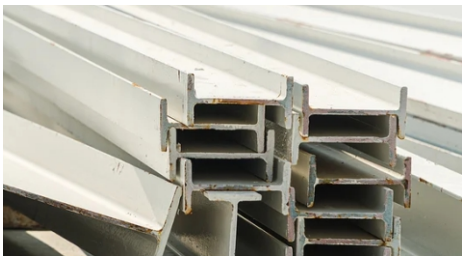
MS CHANNEL

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 sizez are in mm



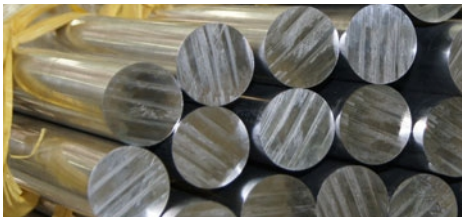
MS BEAM

Light, Medium, standrad
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 x140, 350x
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

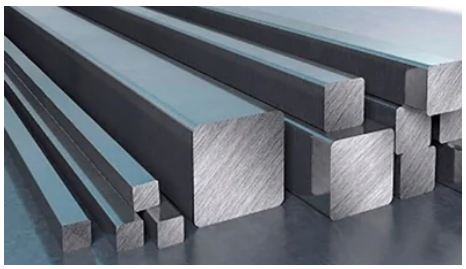
We have a wide range of TMT Re Bars which are available in various types & from Various Primary & secondary Manufacturers.
Above Material can be offered in Grades Like Fe 415 / FE 500 With Manufacturing Test certificate.

MS FLATS

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

MS SQUARE BARS

Availablke in size
10 x 10 mm to
63 x 63 mm



APPLICATION
INDUSTRIES

THIRD PARTY INSPECTION AGENCY & CONSULTANTS

TÜV · Bureau Veritas · SGS · DNV · Lloyd's Register · TOYO ENGINEERING · JACOBS

Mott MacDonald · Knexir Consultants Pvt. Ltd. · Shroff Engineering Consultants · ICS Consultancy Services · ips mehtalia · TATA PROJECTS · VELOSI · CHEMTEX

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FORMULAE OF CALCULATING WEIGHT

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

RATNADEEP
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