



Pipes & Tubes

Alloy Steel Pipe | Seamless Carbon Pipe | Low Temp Pipe

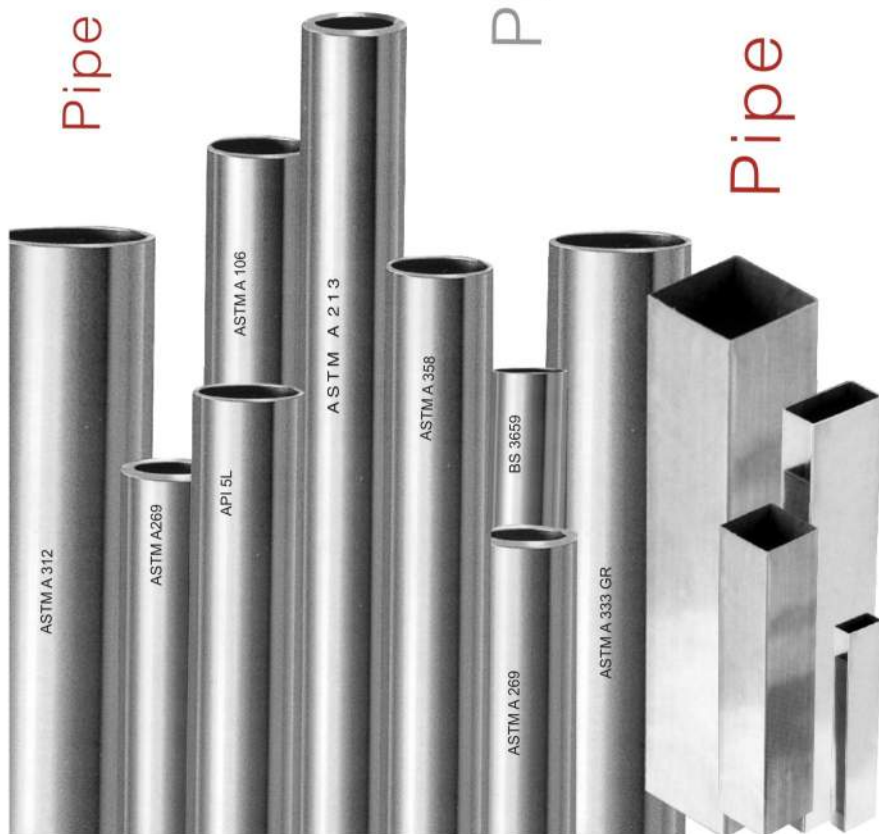


Chrome Moly Pipe | Welded Pipe | Boiler & Mechanical

Pipe

Pipe

Pipe



Pipe dimension in accordance to

**ANSI B 36 - 10
NOMINAL THICKNESS AND WEIGHTS OF STAINLESS STEEL PIPES**

Size of Pipe & Tubes		Number of Schedule													
		5S		10		10S		20		30		40		60	
Nominal in inch	Outside in inch	mm	Kg/m	mm	Kg/m	mm	Kg/m	mm	Kg/m	mm	Kg/m	mm	Kg/m	mm	Kg/m
1/8"	10.3	1.0	0.23	1.28	0.28	-	-	1.60	0.345	-	-	1.73	0.36	-	-
1/4"	13.7	1.2	0.37	1.65	0.49	-	-	2.00	0.580	-	-	2.24	0.63	-	-
3/8"	17.1	1.2	0.47	1.65	0.63	-	-	2.00	0.750	-	-	2.31	0.85	-	-
1/2"	21.3	1.65	0.80	2.11	1.00	-	-	2.5	1.15	-	-	2.77	1.26	-	-
3/4"	26.7	1.65	1.03	2.11	1.28	-	-	2.5	1.500	-	-	2.87	1.68	-	-
1"	33.4	1.65	1.29	2.77	2.09	-	-	2.9	2.24	-	-	3.38	2.50	-	-
1 1/4"	42.2	1.65	1.65	2.77	2.73	-	-	3.0	2.910	-	-	3.56	3.38	-	-
1 1/2"	48.3	1.65	1.90	2.77	3.11	-	-	3.0	3.370	-	-	3.68	4.05	-	-
2"	60.3	1.65	2.38	2.77	3.99	-	-	3.0	4.9	-	-	3.91	5.43	-	-
2 1/2"	73.0	2.11	3.70	3.05	5.26	-	-	4.00	6.80	-	-	5.16	8.62	-	-
3"	88.9	2.11	4.50	3.05	6.45	-	-	4.00	8.423	-	-	5.49	11.47	-	-
3 1/2"	101.6	2.11	5.20	3.05	7.41	-	-	4.5	10.500	-	-	5.74	13.78	-	-
4"	114.3	2.11	5.81	3.05	8.50	-	-	4.5	12.255	-	-	6.02	16.32	-	-
5"	141.3	2.77	9.45	3.40	11.74	-	-	5.00	16.900	-	-	6.56	21.80	-	-
6"	168.3	2.77	11.31	3.40	14.04	-	-	6.35	25.500	-	-	7.11	28.69	-	-
8"	219.1	2.77	14.78	3.76	20.27	-	-	6.35	33.28	7.04	37.38	8.18	42.70	10.31	53.07
10"	273.0	3.40	22.62	4.19	27.80	-	-	6.35	42.41	7.80	51.81	9.27	60.30	12.70	82.8
12"	323.9	3.96	31.36	4.57	36.17	-	-	6.35	50.48	8.38	66.20	10.31	79.71	14.27	110.62
14"	355.6	3.96	34.23	4.78	41.60	6.35	55.53	7.92	68.98	9.52	82.58	11.13	95.00	15.09	128.42
16"	406.4	4.19	41.60	4.78	47.60	6.35	63.61	7.92	79.03	9.52	94.20	12.17	125.2	16.66	162.59
18"	457.2	4.19	46.83	4.78	54.15	6.35	71.69	7.92	89.10	11.13	124.32	14.27	158.27	19.05	209.00
20"	508.0	4.78	59.22	5.54	69.70	6.35	79.76	9.52	118.93	12.70	156.04	15.09	185.89	21.62	251.65
22"	558.8	4.78	63.75	5.54	76.76	6.35	87.84	9.52	131.07	12.70	172.04	-	-	22.22	298.55
24"	609.6	5.54	82.60	6.35	95.92	6.35	95.92	9.52	143.20	14.27	211.72	17.48	258.74	24.61	360.21
26"	660.4	-	-	-	-	7.92	129.40	12.70	205.97	-	-	-	-	-	-
28"	711.2	-	-	-	-	7.92	139.47	12.70	222.13	15.88	276.48	-	-	-	-
30"	762.0	-	-	-	-	7.92	148.55	12.70	238.28	15.88	296.68	-	-	-	-
32"	812.8	-	-	-	-	7.92	158.3	12.70	254.44	15.88	316.88	17.48	342.17	-	-
34"	863.6	-	-	-	-	7.92	168.32	12.70	270.50	15.88	336.96	17.48	364.01	-	-
36"	914.4	-	-	-	-	7.92	178.26	12.70	284.75	15.88	357.28	19.05	420.21	-	-

N.B. Thickness and weight "Standard" Extra-Strong and "Double Extra-Strong" within swell edges have a correspondent value in a "Schedule".

For different thickness that suitable the weights can proceed by the following formula $\frac{24.66 (D-t)}{1000}$

* In accordance to ANSI B 36.19

Pipe dimension in accordance to

ANSI B 36 - 10

NOMINAL THICKNESS AND WEIGHTS OF STAINLESS STEEL PIPES

Number of Schedule															
80		100		120		140		160		Standard		Extra-Strong		Double Extra-Strong	
mm	Kg/m	mm	Kg/m	mm	Kg/m	mm	Kg/m	mm	Kg/m	mm	Kg/m	mm	Kg/m	mm	Kg/m
2.41	0.46	-	-	-	-	-	-	-	-	1.73	0.36	2.41	0.46	-	-
3.02	0.80	-	-	-	-	-	-	-	-	2.24	0.63	3.02	0.80	-	-
3.20	1.10	-	-	-	-	-	-	-	-	2.31	0.85	3.20	1.10	-	-
3.73	1.62	-	-	-	-	-	-	4.78	1.97	2.77	1.26	3.73	1.62	7.47	2.54
3.91	2.21	-	-	-	-	-	-	5.56	2.93	2.87	1.68	3.91	2.19	7.82	3.63
4.55	3.23	-	-	-	-	-	-	6.35	4.30	3.38	2.50	4.55	3.23	9.09	5.45
4.85	4.50	-	-	-	-	-	-	6.35	5.69	3.56	3.38	4.85	4.46	9.70	7.75
5.08	5.49	-	-	-	-	-	-	7.14	7.35	3.68	4.05	5.08	5.40	10.16	9.54
5.54	7.60	-	-	-	-	-	-	8.74	11.26	3.91	5.43	5.54	7.47	11.07	13.44
7.01	11.59	-	-	-	-	-	-	9.52	15.15	5.16	8.62	7.01	11.40	14.02	20.39
7.62	15.25	-	-	-	-	-	-	11.13	21.67	5.49	11.28	7.62	15.25	15.24	28.11
8.08	18.62	-	-	-	-	-	-	-	-	5.74	13.56	8.08	18.62	-	-
8.56	22.29	-	-	11.13	28.25	-	-	13.49	34.05	6.02	16.06	8.56	22.29	17.12	41.66
9.52	30.92	-	-	12.70	40.24	-	-	15.88	49.87	6.55	21.76	9.52	30.92	19.05	58.31
10.97	43.21	-	-	14.27	54.20	-	-	18.26	68.53	7.11	28.23	10.97	42.52	21.95	79.11
12.70	65.63	15.09	76.93	18.26	90.32	20.62	102.47	23.01	112.97	8.18	42.49	12.70	64.57	22.22	107.78
15.09	97.27	18.26	116.38	21.44	134.90	25.40	157.51	28.58	174.95	9.27	60.24	12.70	81.46	25.40	155.5
17.48	133.88	21.44	162.14	25.40	189.82	28.58	211.31	33.32	242.40	9.52	73.76	12.70	97.36	25.40	189.92
19.05	159.00	23.83	197.74	27.79	227.88	31.75	257.47	35.71	286.04	9.52	81.21	12.70	107.28	-	-
21.44	203.50	26.19	249.34	30.96	290.88	36.53	338.32	40.49	370.74	9.52	93.13	12.70	123.18	-	-
23.83	258.29	29.36	314.54	34.92	369.34	39.67	414.74	45.24	466.67	9.52	105.05	12.70	139.07	-	-
26.19	315.97	32.54	387.41	38.10	448.3	44.45	515.94	50.01	573.31	9.52	116.97	12.70	154.97	-	-
28.58	379.70	34.92	457.83	41.28	535.17	47.62	609.30	53.98	682.57	9.52	128.89	12.70	170.86	-	-
30.96	448.3	38.89	555.76	46.02	649.44	52.37	730.72	59.54	819.70	9.52	140.81	12.70	186.75	-	-
-	-	-	-	-	-	-	-	-	-	9.52	152.73	12.70	202.65	-	-
-	-	-	-	-	-	-	-	-	-	9.52	164.65	12.70	234.44	-	-
-	-	-	-	-	-	-	-	-	-	9.52	176.57	12.70	234.44	-	-
-	-	-	-	-	-	-	-	-	-	9.52	188.50	12.70	250.33	-	-
-	-	-	-	-	-	-	-	-	-	9.52	200.42	12.70	266.22	-	-
-	-	-	-	-	-	-	-	-	-	9.52	212.34	12.70	282.12	-	-

N.B. Thickness and weight "Standard" Extra-Strong and "Double Extra-Strong" within swell edges have a correspondent value in a "Schedule".

For different thickness that suitable the weights can proceed by the following formula $24.66 \cdot (D-t)$

— 1000

* In accordance to ANSI B 36.19

HIGHLIGHTS OF ASTM SPECIFICATION STAINLESS STEEL TUBES AND PIPES

Specification	Allowable Outside Diameter Variation in mm			Allowable wall Thickness Variation		Exact Length Tolerances in mm		Testing
Specification	Diameter	Over	Under	Over %	Under%	Over	Under	Testing
ASTM A - 213 Seamless Boiler, Superheater and Heat Exchanger Tubes	Upto 25.4	0.1016	0.1016	+20	-0	3.175	0	Tension Test
	25.4 - 38.1 incl.	0.1524	0.1524	+20	-0	3.175	0	Flattening Test
	38.1 - 50.8 excl.	0.2032	0.2032	+22	-0	3.176	0	Hardness test
	50.8 - 63.5 incl.	0.2540	0.2540	+22	-0	3.760	0	100% Hydrostatic Test
	63.5 - 76.2 excl.	0.3048	0.3048	+22	-0	4.760	0	Flare Test
	76.2 - 101.6 incl.	0.3810	0.3810	+22	-0	4.760	0	Refer to ASTM A-450
ASTM A - 249 Welded Boiler, Superheater, Heat Exchanger and Condenser Tubes	Under 25.4	0.1016	0.1016	+10	-10	3.175	0	Tension Test,
	25.4 -38.1 incl.	0.1524	0.1524	+10	-10	3.175	0	Fltting test
	38.1 - 50.8 excl.	0.2032	0.2032	+10	-10	3.175	0	Flare Test
	50.8 - 63.5 excl.	0.2540	0.2540	+10	-10	3.76	0	* Reverse Bend Test
	63.5 - 76.2 excl.	0.3048	0.3048	+10	-10	4.76	0	Hardness Test
	76.2 - 101.6 incl.	0.3810	0.3810	+10	-10	4.76	0	100% Hydrostatic Test *Reverse Flattering Test Refer to ASTM A-450 Whenever applicable
ASTM A - 269 Seamless & Welded Service	Upto 12.7	0.13	0.13	+15	-15	3.2	0	Tension Test
	12.7 -38.1 excl.	0.13	0.13	+10	-10	3.2	0	Flange Test
	38.1 - 88.9 excl.	0.25	0.25	+10	-10	4.8	0	(Welded only)
	88.9 - 139.7 excl.	0.38	0.38	+10	-10	4.8	0	Hardness Test
	139.7 - 203.2 excl.	0.76	0.76	+10	-10	4.8	0	Reverse Flattening test (Welded only) 100% Hydrostatic Test Refer to ASTM A-269
ASTM A - 312 Seamless & Welded Pipes	13.7 - 48.3 incl.	0.40	0.79	Minimum Wall tubes		6.4	0	Tension Test
	48.3 - 114.3 incl.	0.79	0.79	12.5% under nominal		6.4	0	Fltting Test
	114.3 - 220 incl.	1.59	0.79	wall Specified		6.4 (Normally Random lengths ordered)	0	100% Hydrostatic Test
ASTM - 270 Seamless & Welded Sanitary Tubes	25.4	.05	.20	+12.5	-12.5	3.2	0	Reverse Flattering test
	38.1	.05	.20	+12.5	-12.5	3.2	0	100% Hydrostatic test
	50.8	.05	.28	+12.5	-12.5	3.2	0	External polish on all
	63.5	.05	.28	+12.5	-12.5	3.2	0	tubes
	76.2	.08	.30	+12.5	-12.5	3.2	0	Refer to ASTM A-270
	101.6	.08	.38	+12.5	-12.5	3.2	0	
ASTM A - 268 Seamless & Welded Ferritic Stainless Steel tubes	Upto 12.7	0.13	0.13	+15	-15	3.2	0	Tension Test
	12.7 - 38.1 excl.	0.13	0.13	+10	-10	3.2	0	Flange Test CERW only
	38.1 - 88.9 excl.	0.25	0.25	+10	-10	4.8	0	Hardness Test
	88.9 - 168.9 excl.	0.38	0.38	+10	-10	4.8	0	Reverse Flattering Test 100% Hydrostate Test
ASTM A - 358 For Welded big Diameter Pipes	For all size	+0.5%	0.5%	No Limit	-0.3 mm	Customer's Specification		

SUMMARY OF THE MAIN ASTM STANDARDS GENERALLY USED FOR PIPING

ASTM	Grade	Chemical requirement percent (%)										Mechanical requirements				Impact test at C F
		C Max	MN max	P max	S max	Si max	Ni	Cr	Mo	Cu	Others	Tensile Strength min-Mpa	Yield Strength min-Mpa	Elong. min %		
A33	A	0.25	0.95	0.05	0.06		0.40max	0.40max	0.15max	0.40max	0.08max	330	205	36		
	B	0.30	1.20	0.05	0.06		0.40max	0.40max	0.15max	0.40max	0.08max	415	240	29.5		
A106	A	0.25	0.27-0.93	0.035	0.035	0.10min	0.40max	0.40max	0.15max	0.40max	0.08max	330	205	L36-T25		
	B	0.30	0.29-1.06	0.035	0.035	0.10min	0.40max	0.40max	0.15max	0.40max	0.08max	415	240	L30-T16.5		
	C	0.35	0.29-1.06	0.035	0.035	0.10min	0.40max	0.40max	0.15max	0.40max	0.08max	485	275	L30-T16.5		
A312	TP 304	0.08	2.00	0.040	0.030	0.75	8.00-13.0	18.0-20.0				515	205	L36-T25		
	TP 304L	0.035	2.00	0.040	0.030	0.75	8.00-13.0	18.0-20.0				485	170	L36-T25		
	TP 316	0.08	2.00	0.045	0.030	0.75	10.0-14.0	16.0-18.0	0.75 max			515	205	L36-T25		
	TP 316L	0.035	2.00	0.040	0.030	0.75	10.0-14.0	16.0-18.0	2.00-3.00			515	205	L36-T25		
	TP 317L	0.035	2.00	0.040	0.030	0.75	10.0-15.0	18.0-20.0	2.00-3.00			485	170	L36-T25		
TP 321	TP 321	0.08	2.00	0.040	0.030	0.75	11.0-15.0	18.0-20.0	3.00-4.00			515	205	L36-T25		
	TP 321	0.08	2.00	0.040	0.030	0.75	9.00-13.0	17.0-20.0			Ti > 5xCr < 0.70 Cb + Ta > 10xC < 1.10	515	205	L36-T25		
A333	3	0.19	0.31-0.64	0.025	0.025	0.18-0.37	3.18-3.82					450	240	L30-T20	-100 - 150	
	4	0.12	0.50-1.05	0.025	0.025	0.08-0.37	0.47-0.98	0.44-1.01		0.40-0.75	Al 0.40-0.30	415	240	L30-T16.5	-100 - 150	
	6	0.30	0.29-1.06	0.025	0.025	0.10 min						415	240	L30-T16.5	-45 - 50	
	7	0.19	0.80	0.025	0.025	0.13-0.32	2.03-2.57					450	240	L30-T16.5	-75 - 100	
	8	0.13	0.80	0.025	0.025	0.13-0.32	8.40-9.60					690	515	L22	-195 - 320	
A335	9	0.20	0.40-1.06	0.025	0.025	1.60-2.24				0.75-1.25		435	315	L28	-75 - 100	
	P1	0.10-0.20	0.30-0.80	0.025	0.025	0.10-0.05			0.44-0.65			380	205	L30-T20		
	P2	0.10-0.20	0.30-0.61	0.025	0.025	0.10-0.05			0.50-0.81			380	205	L30-T20		
	P5	0.15	0.30-0.60	0.025	0.025	0.25-0.00			0.40-0.65			415	205	L30-T20		
	P9	0.15	0.30-0.60	0.025	0.025	0.25-0.00			8.00-10.0	0.90-1.10		415	205	L30-T20		
A358	P11	0.05-0.15	0.30-0.61	0.025	0.025	0.50-1.00			1.00-1.50	0.44-0.65		415	205	L30-T20		
	P12	0.05-0.15	0.30-0.61	0.025	0.025	0.50			0.80-1.25	0.44-0.65		415	220	L30-T20		
	P15	0.05-0.15	0.30-0.60	0.025	0.025	1.15-1.65			-	0.44-0.65		415	205	L30-T20		
	P21	0.05-0.15	0.30-0.60	0.025	0.025	0.50			2.65-3.35	0.80-1.06		415	205	L30-T20		
	P22	0.05-0.15	0.30-0.60	0.025	0.025	0.50			1.90-2.60	0.87-1.13		415	205	L30-T20		
	P91	0.08-0.12	0.30-0.60	0.025	0.025	0.20-0.50	0.40max		8.00-9.50	0.85-1.05		585	415	L20		
	TP304	0.08	2.00	0.045	0.030	0.75	8.0-10.50	18.0-20.0	-			Class 1 : Double welded pipes & full Radiography				
	TP310	0.08	2.00	0.045	0.030	0.50	19.0-22.0	24.0-26.0	-			Class 2 : Double welded no Radiography				
	TP316	0.08	2.00	0.045	0.030	0.75	10.0-14.0	16.0-18.0	2.0-3.0			Class 3 : Single welded full Radiography				
	TP316L	0.030	2.00	0.045	0.030	0.75	10.0-14.0	16.0-18.0	2.0-3.0			Class 4 : Single welded full Radiography root pass without addition of filler				
TP321	TP321	0.08	2.00	0.045	0.030	0.75	11.0-15.0	18.0-20.0	3.0-4.0			Class 5 : Double welded spot Radiography				
	TP321	0.08	2.00	0.045	0.030	0.75	9.0-13.0	17.0-19.0	-			Class 5 : Double welded spot Radiography				

Formula - Sheet Width Required for Rolled & Welded Pipes - O. D. (mm) - Thickness (mm) x 3.14 = Sheet Width.

L-Longitudinal
T- Transverse

PHYSICAL & CHEMICAL PROPERTIES OF STAINLESS STEEL, ALLOY STEEL & CARBON STEEL BARS

ASTM A479 STAINLESS STEEL ROUND BAR CHEMICAL & PHYSICAL PROPERTIES														
ASTM GRADE	C	Mn	Si	S	P	Cr	Ni	Mo	Other	Tensile Psi(MPa)	Yield Psi(MPa)	Elongation Strip/Round	Hardn.	Redu.in Area. (%)
A479 TP 304	0.08 max	2.00 max	1.00 max	0.030 max	0.045 max	18.0 max	8.0 max	—	—	75000 (515)	30000 (205)	30	—	40
A479 TP 316	0.08 max	2.00 max	1.00 max	0.030 max	0.045 max	20.0 max	10.5 max	2.0 max	—	75000 (515)	30000 (205)	30	—	40
A479 TP 317L	0.035 max	2.00 max	1.00 max	0.030 max	0.045 max	18.0 max	14.0 max	3.0 max	—	75000 (515)	30000 (205)	30	—	40
A479 TP 310	0.08 max	2.00 max	1.00 max	0.030 max	0.045 max	20.0 max	15.0 max	4.0 max	—	75000 (515)	30000 (205)	30	—	40
A479 TP 347H	0.04 max	2.00 max	1.00 max	0.030 max	0.045 max	26.0 max	22.0 max	—	Cb-BxC -13.0	75000 (515)	30000 (205)	30	—	40
479 TP 321	0.10 max	2.00 max	1.00 max	0.030 max	0.045 max	17.0 max	9.0 max	—	5(C+N)<Ti	75000 (515)	30000 (205)	30	—	40
479 TP 321	0.08 max	2.00 max	1.00 max	0.030 max	0.045 max	19.0 max	12.0 max	—	<0.70%	75000 (515)	30000 (205)	30	—	40
ASTM A182 ALLOY STEEL ROUND BAR CHEMICAL & PHYSICAL PROPERTIES														
ASTM GRADE	C	Mn	Si	S	P	Cr	Ni	Mo	Other	Tensile Psi(MPa)	Yield Psi(MPa)	Elongation Strip/Round	Hardn.	Redu.in Area. (%)
182 F 11 Class 2	0.10 max	0.30 max	0.50 max	0.04 max	0.04 max	1.0 max	—	0.44 max	—	70000 (48.46)	40000 (27.05)	20	143-207	30
A 182 F 22 Class 3	0.05 max	0.30 max	0.50 max	0.04 max	0.04 max	2.50 max	—	0.87 max	—	75000 (52.52)	45000 (31.7)	20	156-207	30
A 182 F 5	0.15 max	0.30 max	0.50 max	0.03 max	0.03 max	4.0 max	0.5 max	0.44 max	—	70000 (48.45)	40000 (27.05)	20	143-217	35
A 182 F 9	0.15 max	0.30 max	0.50 max	0.03 max	0.03 max	8.0 max	—	0.65 max	—	85 (56.65)	35 (380)	20	179-217 (BHN)	40
IS-1875 ASTM A105 CARBON STEEL ROUND BAR CHEMICAL & PHYSICAL PROPERTIES														
ASTM GRADE	C	Mn	Si	S	P	Cr	Ni	Mo	Other	Tensile Psi(MPa)	Yield Psi(MPa)	Elongation Strip/Round	Hardn.	Redu.in Area. (%)
A 105	0.35 max	0.60 max	0.100 max	0.040 max	0.035 max	—	—	—	—	70000 (485)	36000 (250)	30-strip 22-Round	187 max	30 Round
A 105	0.30 max	1.35 max	0.15 max	0.040 max	0.035 max	0.30 max	0.40 max	0.12 max	Cu-0.4 max Cb-0.02 max Va-0.3 max	70-95 (485-655)	36 (250)	22/30	20/16 (-45.6°)	36

Formula - Weight of stainless steel rounds = Dia. (mm) x Dia (mm) x 0.00623 = Kg Per Mtr.
 Weight of Stainless Steel Hexagonal Rods = Dia. (mm) x Dia. (mm) x 0.00679 = Kg Per Mtr.
 Weight of Stainless Steel Square Bars = Dia. (mm) x Dia (mm) x 0.00787 = Kg Per Mtr.
 Weight of Stainless Steel Circle & Blanks = O.D. (mm) X Thk (mm) / 160/1000 = Kg Per Pcs.

STANDARD TYPES OF STAINLESS STEEL GAUGE PIPE & BARS

WEIGHT & THICKNESS OF S.S. GAUGE PIPE PER FEET						
Size	O.D.	10G (3.25)	12G (2.64)	14G (2.03)	16G (1.62)	18G (1.21)
1/4"	6.35	0.075	0.070	0.065	0.058	0.046
5/16"	7.93	0.114	0.105	0.089	0.079	0.060
3/8"	9.52	0.152	0.135	0.113	0.097	0.080
1/2"	12.70	0.226	0.200	0.157	0.134	0.105
3/4"	19.05	0.386	0.326	0.256	0.215	0.161
1"	25.40	0.541	0.450	0.0351	0.294	0.218
1 1/4"	31.82	0.696	0.580	0.448	0.375	0.275
1 1/2"	38.10	0.851	0.700	0.542	0.542	0.322
1 3/4"	44.45	1.020	0.832	0.646	0.530	0.390
2"	50.8	1.161	0.960	1.733	0.607	0.447
2 1/4"	57.15	1.315	1.085	0.828	0.697	0.504
2 1/2"	63.5	1.472	1.210	0.924	0.792	0.562
2 3/4"	69.85	1.630	1.338	1.022	0.847	0.619
3"	76.2	1.782	1.460	1.115	0.924	0.676
3 1/2"	88.9	2.092	1.718	1.306	1.082	0.791
4"	101.6	2.403	1.971	1.497	1.239	0.905
4 1/2"	114.3	2.713	2.224	1.688	1.397	1.020
5"	127.0	3.023	2.477	1.879	1.554	1.134
5 1/2"	139.7	3.336	2.730	2.070	1.713	1.250
6"	152.4	3.654	2.983	2.291	1.875	1.364
6 1/2"	165.1	3.975	3.256	2.452	2.028	1.478

Note : Weight for ***** size bar available on bar will go to 34 and upto 150

STANDARD WIRE GAUGE					
SEG No.	Dia Inch	Dia MM	SWG No.	Dia Inch	Dia MM
7/0	.500	12.7000	23	.024	0.6096
6/0	.464	11.7856	24	.022	0.5588
5/0	.432	10.9728	25	.020	0.5080
4/0	.400	10.1600	26	.018	0.4572
3/0	.372	9.4488	27	.016	0.4166
2/0	.348	8.8892	28	.0148	0.3759
1/0	.324	8.2296	29	.0136	0.3454
1	.300	7.6200	30	.0214	0.3150
2	.276	7.0104	31	.0116	0.2946
3	.252	6.4008	32	.0108	0.2743
4	.232	5.8928	33	.0100	0.2540
5	.212	5.3848	34	.0092	0.2337
6	.192	4.8766	35	.0084	0.2134
7	.176	4.4704	36	.0076	0.1930
8	.160	4.0640	37	.0068	0.1727
9	.144	3.6576	38	.0060	0.1524
10	.128	3.2512	39	.0052	0.1321
11	.116	2.9464	40	.0048	0.1219
12	.104	2.6416	41	.0044	0.1118
13	.092	2.2368	42	.0040	0.1016
14	.080	2.0320	43	.0036	0.0914
15	.072	1.8288	44	.0032	0.0813
16	.064	1.6256	45	.0028	0.0711
17	.056	1.4224	46	.0024	0.0610
18	.048	1.2192	47	.0020	0.0580
19	.040	1.0160	48	.0016	0.0406
20	.036	0.9144	49	.0012	0.0305
21	.032	0.8128	50	.0010	0.0254
22	.028	0.7112			

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

BIG DIAMETER ERW PIPES CONFIRMING TO IS 3589

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

Tolerance on Thickness and Weight : as per IS 1239

The following manufacturing tolerance shall be permitted on the tubes and sockets.

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

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

Nominal Bore	Maximum Permissible Pressure	Maximum Permissible Temperature
mm	N/mm ²	°C
Upto and Including 25 mm	1.20	12.24
Over 25 mm upto and Including 40 mm	1.03	10.50
Over 40 mm upto and Including 80 mm	0.86	8.77
Over 80 mm upto and Including 100 mm	0.69	7.04
Over 100 mm upto and Including 125 mm	0.63	6.47
Over 125 mm upto and Including 150 mm	0.59	5.10
Over 150 mm upto and Including 175 mm	0.50	4.10
Over 175 mm upto and Including 200 mm	0.45	3.50

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

COPPER & BRASS

Our Range of Products

COPPER PRODUCTS		INTERNAL FIN TUBES
1. Copper Tube for general engineering purpose Mfg. range: O.D. - 3mm to 150mm W.T. - up to any thickness, subject to outside diameter Grade - ETP, DHP, DHP		Specialised in Integrally Fin-Tubes Internal & External in all types of Copper based alloys. (First complete manufacturer in India)
2. MEX Flow Tube Half Hard Nitrogenised Seamless Copper Tube for Gas and Plumbing application as per BS:EN1057 (BS 2871 Part I Table X) Mfg. range: 6mm to 159 mm outside diameter Grade - DHP		1. Copper Fin Tubes Mfg. range: 3/4", 5/8" Fin: 19 Fin, 26 Fin. 26 Integres: 40 Fin, Tubro 8, F, Tube
3. Refrigeration Quality Copper Tube Mfg. range: 3/16" & 3/4" diameter upto 27 swg in 15 & 30 mts. coil. Grade - DHP		COPPER ALLOY PRODUCTS
4. High Conductivity Copper Rods Mfg. range: 6mm to 100mm diameter in straight lengths. Grade - ETP		1. Cupro Nickel Tube: 90/10, 70/30 Mfg. range: O.D. - 3mm to 100mm Up to any thickness, subject to outside diameter.
5. Copper Rods for general engineering purpose / Earth Rods Mfg. range: 6mm to 100mm diameter Earth Rods: 14.2 / 14.8 / 16mm Grade - DHP		2. Brass Tube 70/30 / 63/37 / 85/15 / AL Brass Mfg. range: O.D. - 6mm to 100mm W.T. - Up to any thickness, subject to outside diameter
6. Copper Bus Bars & Strips / Tapes Mfg. range: 10mm to 20mm diameter in any thickness are manufactured in straight length Coil form and also Tinned Coated Grade - ETP, DHP, ETP+Ag		3. Brass Rod Mfg. range: O.D. - 6mm to 100mm Dia.
7. Copper Sheets / Earthing Sheets Mfg. range: 4 x 4 feet, 5mm to 10mm and 8 x 4 feet and sizes as per customer's need. Grade - ETP, DHP		4. Brass Flat/ Strips Mfg. range: 10mm to 200mm Dia. in any thickness
		5. Brass Sheets Mfg. range: 4 x 4 feet, 5mm to 10mm & 8 x 4 feet & Sizes as per your requirement.
		We Undertake manufacturing of tailor-made Copper-based Alloy Semis, as per the customers' specification and ensure delivery of goods to our client, even at every short notice.

ALUMINIUM ALLOY : CHEMICAL COMPOSITION STD. (Per Cent)

Alloy (ISS)	Equivalent alloy (A.A.)		Copper		Magnesium		Silicon		Iron	Manganese		*Other (total)	Remark
	Old	New	U.S.A.	Min.	Max.	Min.	Max.	Min.	Max.				
1B	19500	1050	—	0.05	—	—	—	0.30	0.4	—	0.05	0.1	Aluminium 99.5% Min.
1E	19501	1050(EC)	—	0.04	—	—	—	0.15	0.35	—	—	0.1	Aluminium 99.5% Min.
	19700	1070	—	0.03	—	—	—	0.20	0.25	—	0.03	0.1	Aluminium 99.7% Min.
1A	19800	1080	—	0.03	—	—	—	0.15	0.15	—	0.03	0.1	Aluminium 99.8% Min.
1C	19900	1100	—	0.1	—	0.2	—	0.50	0.7	—	0.1	0.2	Aluminium 99.0% Min.
—	—	2011	5.0	6.0	—	0.1	—	0.4	0.7	—	0.1	0.4	Also lead & bismuth - 0.2 - 0.6% each
H15	24345	2014	3.8	5.0	0.2	0.8	0.5	1.2	0.7	0.3	1.2	0.5	—
H14	24534	2017	3.5	4.7	0.4	1.2	0.2	0.7	0.7	0.4	1.2	0.5	—
N3	31000	3003	—	0.1	—	0.1	—	0.6	0.7	0.8	1.5	0.4	—
N21	43000	4043	—	0.1	—	0.2	4.5	6.0	0.6	—	0.5	0.5	—
N2	46000	4047	—	0.1	—	0.2	10.0	13.0	0.6	—	0.5	0.5	—
N4	52000	5052	—	0.1	1.7	2.6	—	0.6	0.7	—	0.5	0.4	—
N5	53000	5086	—	0.1	2.8	4.0	—	0.6	0.7	—	0.5	0.4	—
N6	55000	5056	—	0.1	4.5	5.0	—	0.6	0.7	—	1.01	0.4	Chromium upto 0.25
N8	54300	5083	—	0.1	4.0	4.9	—	0.4	0.7	0.5	1.0	0.4	Chromium upto 0.25
H20	65032	6061	0.15	0.4	0.8	1.2	0.4	0.8	0.7	0.2	0.8	0.4	Chromium (0.15 - 0.35) Either Mn, Cr Shall be present.
H9	63400	6063	—	0.1	0.4	0.9	0.3	0.7	0.6	—	0.3	0.4	Chromium upto 0.10
—	—	6066	0.7	1.2	0.8	1.4	0.9	1.8	0.7	0.6	1.1	0.4	—
—	64423	—	0.5	1.0	0.5	1.3	0.7	1.3	0.8	1.0	—	—	—
91E	63401	6101	—	0.1	0.35	0.8	0.3	0.7	0.5	—	0.03	0.1	—
—	64401	6201	—	0.1	0.6	0.9	0.5	0.9	0.5	—	0.03	0.1	—
H30	64430	6351	—	0.1	0.4	1.2	0.6	1.3	0.6	0.4	1.0	0.3	Chromium upto 0.25
—	74530	7039	—	0.2	1.0	1.5	—	0.4	0.7	0.2	0.7	0.4	Zinc (4 - 5%)
—	—	7075	1.20	2.0	2.1	2.9	—	0.4	0.5	—	0.3	0.5	Zinc (5.1 - 6.4) & Chromium (0.1 - 0.25)

CHEMICAL COMPOSITION OF ALLOY STEELS

Steel Type	Quality	AISI	C	Si	Mn	Cr	W	V	Co	Mo	Ni
High Speed Steel	18 % W	T1	0.75	0.40	0.40	4.30	18.0	1.00	—	—	—
	18% W + 5 % Co	T4	0.80	0.40	0.40	4.30	18.0	1.60	5.0	0.80	—
	18% W + 10 % Co	T5	0.75	0.40	0.40	4.30	18.0	1.60	9.5	0.80	—
	6/5/2	M2	0.80	0.40	0.40	4.30	6.5	2.00	—	5.00	—
Hot Work Steel	9 % W	H21	0.30	0.20	0.30	2.60	8.5	0.40	—	—	—
	5 % Cr	H11	0.36	1.00	0.40	5.00	—	0.40	—	0.10	—
Non Shrinking Die Steel	HCHC	D3	2.0	0.30	0.30	12.00	—	—	—	—	—
	"	D2	1.70	0.30	0.30	12.00	0.5	0.10	—	0.60	—
	OHNS	01	0.95	—	1.00	0.50	0.5	0.10	—	—	—
	"	02	0.90	0.20	1.90	0.30	—	0.10	—	—	—
	"	E0300	1.00	0.40	1.00	1.00	—	0.10	—	0.10	—
Pneumatic Steel		S2	0.48	0.90	0.30	1.10	1.90	0.20	—	—	—
Shock Resisting Steel	V6N		0.90	—	—	—	—	0.20	—	—	0.70
Stainless Steel	Magnetic Non-Magnetic	410	0.10	0.75	1.00	13.00	—	—	—	—	0.60
		304	0.08	1.00	2.00	18.00	—	—	—	—	10.00
Carbon Tool Steel		1095	0.90	0.20	0.40	—	—	—	—	—	—
Constructional Steel	EN-8	1040	0.35/ 0.45	0.10/ 0.35	0.60/ 0.90	—	S&P	each (MAX)	0.06		
	EN-9	1055	0.45/ 0.60	0.10/ 0.35	0.50/ 0.80	—	S&P	each (MAX)	0.06		
	EN-19	4140	0.35/ 0.45	0.10/ 0.35	0.50/ 0.80	0.90/ 1.50	S&P	each (MAX)	0.05	0.20/ 0.40	
	EN-24	4340	0.35/ 0.45	0.10/ 0.35	0.45/ 0.70	0.90/ 1.40	S&P	each (MAX)	0.05	0.20/ 0.35	1.30/ 1.80
	EN-30 B		0.26/ 0.34	0.10/ 0.35	0.40 0.60	1.10/ 1.40	S&P	each (MAX)	0.05	0.20/ 0.40	3.90/ 4.30
	EN-31	52100	0.95/ 1.20	0.10/ 3.35	0.30 0.75	1.00/ 1.60	S&P	each (MAX)	0.025		
	EN-36	3310	0.15/ 0.35	0.10/ 0.35	0.30 0.60	0.60/ 1.10	S&P	each (MAX)	0.05		3.00 3.75
Spring Steel	EN-45	9255	0.50/ 0.60	1.50/ 2.00	0.70 1.00		S&P	each (MAX)	0.05		
	EN-47	6150	0.45/ 0.55	0.50 0.50	0.50 0.80	0.80/ 1.20		S&P		each (MAX)	0.05
Case Hardening Steel	SAE	8620	0.18/ 6.23	0.20 0.35	0.70 0.90	0.40 0.60	S&P	each (MAX)	0.04	0.15/ 0.26	0.40/ 0.70
	16 M/N Cr5 20 M/N Cr5	—	0.14-0.19 0.17-0.22	0.17-0.37 1.17-0.37	1.00-1.30 1.10-1.40	0.80-1.10 1.00-1.30	S&P S&P	—	0.035 0.035	—	—

Notes : O = Oil; CA = Compressed Air; M = Martempering bath; W = Water; A = Air

NICKEL BASE ALLOYS

NOMINAL CHEMICAL COMPOSITION, % (not for specification purposes)

Nickel	Ni	C	Mn	Fe	S	Si	Cu	Cr	Co	Mo	Al	Ti	Other
Nickel200	99.2	0.10	0.3	0.4	0.005	0.18	0.10	-	0.25	-	-	-	-
Nickel201	99.0	0.02	0.35	0.4	0.005	0.18	0.25	-	0.25	-	-	-	-
Nickel205	99.6	0.02	0.3	0.2	0.004	0.08	0.05	-	0.1	-	-	0.03 Mg	0.05
Nickel212	97.7	0.010	2.0	0.05	0.005	0.05	0.03	-	-	-	-	-	-
Nickel222	99.5	0.01	0.02	0.04	0.0025	0.01	0.01	0.01	0.06	0.01	0.01	Mg0.08	-
Nickel270	99.98	0.01	0.003	<0.001	<0.001	<0.001	<0.001	<0.001	-	-	<0.001	Mg<0.001	-
	Ni	C	Mn	Fe	S	Si	Cu	Cr	Co	Mo	Al	Ti	Other
K.MONEL alloy 400	63.0 min	0.15	1.25 max	2.5max	0.024max	0.05max	31.0	-	-	-	-	-	-
K.MONEL alloy 500	63.0 min	0.25	1.5 max	2.0max	0.010max	0.5	30.0	-	-	-	2.9	0.6	-
Cast MONEL alloy	63.0 min	0.07	0.75	2.5max	0.02 max	0.04max	30.0	0.10max	-	0.20max	0.05max	0.01max	-
Cast MONEL alloy	63.0 min	0.03max	0.020max	2.5max	0.02max	0.04max	30.0	0.10	-	0.20max	0.05max	0.01max	-
INCONEL alloy 600	72.0 min	0.025 max	1.0 max	8.0	0.05 max	0.05max	0.05 max	14 - 17	-	-	-	-	Nb + 3.65
INCONEL alloy 625	Bal	0.025max	0.25	3.0max	0.015max	0.5 max	-	21 - 23	-	8 - 10	0.25	0.25	-
INCOLOY alloy 800	32 - 34	0.025max	1.5max	Bal.	0.015max	-	0.75 max	20 - 22	0.5 max	-	0.15 - 0.40	0.35 - 0.60	Al + Ti max. 1.0
INCOLOY alloy 825	38 - 46	0.025max	1.0max	Bal.	0.03 max	0.5max	2.25	19.5 - 23.5	1.5 - 3	2.5 - 3.5	0.20max	0.9	Ti 0.6 - 1.2
INCOLOY alloy 904	32.5	0.025	0.025	Bal.	0.015	0.25	0.25	-	14.5	-	0.1	1.6	-
INCOLOY alloy DS	37.0	0.10 max	0.21 max	Bal.	-	2.3 max	2.3 max	18.0	-	-	-	-	-
Hastalloy C22	Bal	0.010 max	-	2 - 6	-	0.08 max.	-	20 - 22.5	2.5 max.	12.5-14.5	2.50	Co	W-2.50 3.50
Hastalloy C-276	Bal	0.010 max	1.00	5.50	-	-	-	15 - 16.5	15 - 16.5	15 - 17	-	Co	W-3.75v1.1-0.3 Si-0.02 Co-2.50
Hastalloy C-4	Bal	0.009 max.	1.00	3.00	0.7	-	-	14.5 17.5	5.575	14.00 17.00	-	0.70	Co-2.00 Si-0.05 P-0.04

PHYSICAL AND MECHANICAL PROPERTIES

	Density Kg/dm ³	Melting Range °C	Specific heat at 20° C J/Kg°C	Thermal Conductivity at 20° C W/m°C	Thermal Expansion 10-6° C 20-95° C	Electrical resistivity at 20° C microhm cm	Tensile strength N/mm ²	Hardness HV
Nickel 200	8.89	1435-1445	456	74.9	13.3	9.5	380-550	90-120
Nickel 201	8.89	1435-1445	456	79.2	13.3	7.6	340-410	75-100
Nickel 205	8.89	1435-1445	456	74.9	13.3	9.5	340	77
Nickel 212	8.86	1435-1445	430	44.1	-	10.9	476	144
Nickel 222	8.89	1435-1445	456	74.9	13.3	8.8	340	77
Nickel 270	8.89	1455	460	85.7	13.3	7.5	340	80
Monel alloy 400	8.83	1300-1350	419	21.7	14.1	51.0	480-620	111-151
Monel alloy k-500	8.46	1315-1350	419	17.4	13.7	61.4	620-760	141-189
Inconel alloy 600	8.42	1370-1425	461	14.8	13.3	103	550-690	121-173
Inconel alloy 625	8.44	1290-1350	410	9.8	12.8	129	830-1040	146-247
Incoloy alloy 800	7.95	1355-1385	502	11.7	14.2	99	520-700	121-188
Incoloy alloy 825	8.14	1370-1400	441	10.9	14.0	113	580-730	121-183
Incoloy alloy 904	8.12	-	442	14.9	4.6	72	923	-
Incoloy alloy DS	7.92	1330-1400	452	12.0	14.1	108	680	208



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