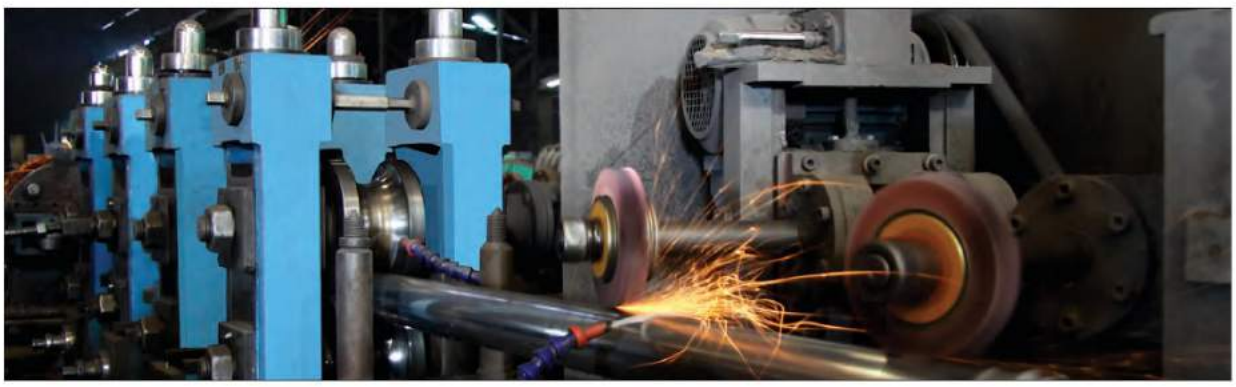
SQUARE TUBES					
B X L (mm) \ Wall Thickness (mm)	1.0	1.2	1.5	2.0	2.5
	WEIGHT KG./MTR.				
12X12	0.358	0.423	0.518		
15X15	0.453	0.538	0.661		
16X16	0.485	0.576	0.709	0.920	
20X20	0.613	0.729	0.901	1.175	
25X25	0.772	0.921	1.14	1.494	1.837
30X30	0.932	1.112	1.379	1.814	2.236
35X35	1.091	1.303	1.618	2.132	2.635
40X40	1.251	1.495	1.857	2.451	3.033
45X45	1.41	1.686	2.097	2.77	3.433
50X50	1.57	1.878	2.336	3.089	3.831

RECTANGULAR TUBES					
B X L (mm) \ Wall Thickness (mm)	1.0	1.2	1.5	2.0	2.5
	WEIGHT KG./MTR.				
20X10	0.453	0.538	0.661		
20X15	0.533	0.634	0.781		
25X10	0.533	0.634	0.781	1.016	
25X15	0.613	0.729	0.9	1.175	
30X15	0.693	0.825	1.02	1.335	
30X20	0.772	0.921	1.14	1.494	
35X20	0.852	1.017	1.259	1.654	
40X15	0.852	1.017	1.259	1.654	
40X20	0.926	1.112	1.379	1.813	
40X30	1.091	1.303	1.618	2.132	
50X20	1.091	1.303	1.618	2.132	
50X25		1.399	1.738	2.292	

FORMULA	
1.	Weight of SS Sheet, Plate Length × Width × Thickness × .000008 = Weight in Kg.
2.	Weight of SS Pipes & Tubes (in Kg) OD - Thick × Thick × .00756 = Weight Per Ft.
3.	Weight of SS Round (in Kg.) Diameter × Diameter × .0019 = Weight per ft.
4.	Weight of SS Hex (in Kg.) Diameter × Diameter × .0021 = Weight per ft.
5.	Weight of SS Square (in Kg.) Diameter × Diameter × .0025 = Weight per ft.
6.	Weight of SS Circle (in Kg.) Diameter × Diameter × Thickness + 3 = Weight per nos.
7.	Weight of SS Flat (in kg.) Width × Thickness × .0024 = Weight per ft.



Specifications

ASTM SPECIFICATION FOR STAINLESS STEEL TUBES / PIPES

Specification	Allowable Outside Diameters Variations in mm			Allowable Wall Thickness Tolerances in mm		Exact Length		Testing
	Diameters	Over	Under	Over	Under	Over	Under	
ASTM A-213 Seamless Boiler, Super heater and Heat Exchanger tubes	upto 25.4 25.4 to 38.1 incl. 38.1 to 50.8 excl. 50.8 to 63.5 excl. 63.5 to 76.2 excl. 76.2 to 101.6 incl.	0.10 0.15 0.20 0.25 0.30 0.38	0.10 0.15 0.20 0.25 0.30 0.38	+20 +20 +22 +22 +22 +22	-0 -0 -0 -0 -0 -0	3.17 3.17 3.17 3.76 4.76 4.76	0 0 0 0 0 0	Tension Test Flattening Test Flare Test Hardness Test 100% Hydrostatic Test Refer to ASTM A-450
ASTM A-249 Welded Boiler Super heater heat Exchanger and Condenser Tubes	upto 25.4 25.4 to 38.1 incl. 38.1 to 50.8 excl. 50.8 to 63.5 excl. 63.5 to 76.2 excl. 76.2 to 101.6 incl.	0.10 0.15 0.20 0.25 0.30 0.38	0.10 0.15 0.20 0.25 0.30 0.38	+10 +10 +10 +10 +10 +10	-10 -10 -10 -10 -10 -10 Minimum Wall +18% -0 available on request	3.17 3.17 3.17 4.76 4.76 4.76	0 0 0 0 0 0	Tension Test Flattening Test Flange Test Reverse Bend Test Hardness Test 100% Hydrostatic Test Refer to ASTM A-450 when ever applicable
ASTM A-269 Seamless & Welded Tubes General Services	upto 12.7 12.7 to 38.1 excl. 38.1 to 88.9 excl. 88.9 to 139.7 excl.	0.13 0.13 0.25 0.38	0.13 0.13 0.25 0.38	+15 +10 +10 +10	-15 -10 -10 -10	3.2 3.2 4.8 4.8	0 0 0 0	Flare Test (Seamless only) Flange Test (Welded only) Reverse Flattening Test (Welded only) Hardness Test 100% Hydrostatic Test
ASTM A-270 Seamless and Welded Austenitic Stainless Steel Sanitary Tubing	25.4 38.1 50.8 63.5 76.2 101.6	0.05 0.05 0.05 0.05 0.08 0.08	0.20 0.20 0.28 0.28 0.30 0.38	+12.5 +12.5 +12.5 +12.5 +12.5 +12.5	-12.5 -12.5 -12.5 -12.5 -12.5 -12.5	3.2 3.2 3.2 3.2 3.2 3.2	0 0 0 0 0 0	Reverse Flattening test 100% Hydrostatic Test External Polish on all tubes Refer to ASTM A-270
ASTM A-312 Seamless & Welded pipes	13.7 to 48.3 incl. 48.3 to 114.3 incl. 114.3 to 220 incl.	0.40 0.79 1.60	0.79 0.79 0.79	Minimum Wall 12.5% under normal wall Specified		6.4 6.4 6.4	0 0 0 (Normally Random Lengths Ordered)	Tension Test Flattening Test 100% Hydrostatic Test Refer to ASTM A-530

Mechnical Properties						Comparison of Indian / Prop. (JSL) Grades with Various International Standards					
Grade	Tensile Strength Mpa (Min.)	Yeild Strength Mpa (Min.)	% Elongation (Min.)	Hardness BHN (Max.)	Hardness RB (Max.)	INDIA / IS Letter Symbol	INDIA / IS Numerical Symbol (ISS)	UNS Designation	Germany / DIN	JAPAN / JIS	USSR / GOST
Austenitic											
301	515	205	40	217	95	X10Cr17Ni7	301	S30100	X12CrNi177	SUS301	
304	515	205	40	201	92	X04Cr19Ni9	304SI	S30400	X5CrNi1810	304	08Ch18N10
						X04Cr19Ni10	/304S2				
304H	515	205	40	201	92			S30409			
304L	485	170	40	201	92			S30403	X2CrNi1911	SUS304L	03Ch18N11
									G-X2CrNiN189	SCS19	
304LN	515	205	40	201	92			S30453	X2CrNiN1810	SUS304LN	
309	515	205	40	217	95	X15Cr24Ni13	309		X15CrNiSi2012	SUH309	20Ch20NS2
309S	515	205	40	217	95			S30908	X7CrNi2314	SUS309S	
310	515	205	40	217	95	X20Cr25Ni20	310		X15CrNiSi2520	SUH310	20Ch25N20S2
310S	515	205	40	217	95			S31008	X12CrNi2521	SUS310S	20Ch23N18
316	515	205	40	217	95	X04Cr17Ni12Mo2	316	S31600	X5CrNiMo17122	SUS316	
316L	485	170	40	217	95	X02Cr17Ni12Mo2	316L	S31603	X2CrNiMO18143	SUS316L	3Ch17N14M3
										SCS16	3Ch16N15M3
316LN	515	205	40	217	95			S31653	X2CrNiMoN17133	SUS316LN	
316Ti	515	205	40	217	95	X04Cr17Ni12Mo2Ti	S31635	S316Ti	X6CrNiMoTi17122		10Ch17N13M2T
317	515	205	40	217	95		S31700		X5CrNiMo17133	SUS317	
317L	515	205	40	217	95		S31703		X2CrNiMo18164	SUS317L	
317LN	550	240	40	217	95		S31753				
321	515	205	40	217	95	X04Cr18Ni10Ti	321	S32100	X6CrNiTi1810	SUS321	08Ch18N10T
347	515	205	40	201	92	X04Cr18Ni10Nb	347	S34700	X6CrNiNb1810	SUS347	08Ch18N12B
Ferritic + Martensitic											
409	380	205	20	179	88			S40900	X6CrTi12		
409RC	350	170	30	179	88						
409M**	450	275	20	187	90						
410	450	205	20	217	96	X12Cr12	410	S41000	X10Cr13	SUS410	
410S	415	205	22	183	89			S41008			
Ferritic											
405	415	170	20	179	88	X04Cr12	405	S40500	X6CrAl13	SUS405	
430	415	205	22	183	89	x07cr17	430	S43000	X6Cr17	SUS430	
430Ti	360	175	27	179	88	X6CrTi17		SUS430LX			
436	450	240	22	89				S43600			
Martensitic											
420	690		15	217	96	X20Cr13	420 S1	S42000	X20Cr13	SUS420JI	
						X30Cr13	420 S2				
						X40Cr13	420 S3				
JBS											
Low Nickel Austenitic											
JSL	550	205	40	217	95						
J3	600	250	40	217	95						
J4	700	350	40	217	95						

Chemical Properties												
Grade	USA-Canada/ AISI-ASTM-ASME	% C (Max)	% Mn (Max)	% P (Max)	% S (Max)	% Si (Max)	% Cr	% Ni	% Mo	% N (Max)	% Cu (Max)	
AUSTENITIC												
301	301	0.15	2.00	0.045	0.030	1.00	16.00 - 18.00	6.00 - 8.00	-	0.10	-	-
304	304	0.08	2.00	0.045	0.030	0.75	18.00 - 20.00	8.00 - 10.50	-	0.10	-	-
304H	304H	0.04 - 0.10	2.00	0.045	0.030	0.75	18.00 - 20.00	8.00 - 10.50	-	-	-	-
304L	304L	0.03	2.00	0.045	0.030	0.75	18.00 - 20.00	8.00 - 12.00	-	0.10	-	-
304LN	304LN	0.03	2.00	0.045	0.030	0.75	18.00 - 20.00	8.00 - 12.00	-	0.10 - 0.16	-	-
309	309	0.2	2.00	0.045	0.030	0.75	22.00 - 24.00	12.00 - 15.00	-	-	-	-
309S	309S	0.08	2.00	0.045	0.030	0.75	22.00 - 24.00	12.00 - 15.00	-	-	-	-
310	310	0.25	2.00	0.045	0.030	0.75	24.00 - 26.00	19.00 - 22.00	-	-	-	-
310S	310S	0.08	2.00	0.045	0.030	0.75	24.00 - 26.00	19.00 - 22.00	-	-	-	-
316	316	0.08	2.00	0.045	0.030	0.75	16.00 - 18.00	10.00 - 14.00	2.00 - 3.00	0.10	-	-
316L	316L	0.03	2.00	0.045	0.030	0.75	16.00 - 18.00	10.00 - 14.00	2.00 - 3.00	0.10	-	-
316LN	316LN	0.03	2.00	0.045	0.030	0.75	16.00 - 18.00	10.00 - 14.00	2.00 - 3.00	0.10 - 0.16	-	-
316Ti	316Ti	0.08	2.00	0.045	0.030	0.75	16.00 - 18.00	10.00 - 14.00	2.00 - 3.00	0.10	-	Ti 5X(C+N) Min., 0.70 Max.
317	317	0.08	2.00	0.045	0.030	0.75	18.00 - 20.00	11.00 - 15.00	3.00 - 4.00	0.10	-	-
317L	317L	0.03	2.00	0.045	0.030	0.75	18.00 - 20.00	11.00 - 15.00	3.00 - 4.00	0.10	-	-
317LN	317LN	0.03	2.00	0.045	0.030	0.75	18.00 - 20.00	11.00 - 15.00	3.00 - 4.00	0.10 - 0.22	-	-
321	321	0.08	2.00	0.045	0.030	0.75	17.00 - 19.00	9.00 - 12.00	-	0.10	-	Ti 5X(C+N) Min., 0.70 Max.
347	347	0.08	2.00	0.045	0.030	0.75	17.00 - 19.00	9.00 - 13.00	-	-	-	Cb = 10XC Min., 1.00 Max.
FERRITIC + MARTENSITIC												
409	409	0.080	1.00	0.040	0.020	1.00	10.50 - 11.75	0.50 max.	-	0.030	-	Ti = 6X(C+N) Min., 0.75 Max.
409RC	-	0.02	1.00	0.040	0.030	1.00	10.50 - 11.75	0.50 max.	-	0.020	-	Ti = 5X C Min., 0.75 Max.
409M	-	0.03	0.8 - 1.5	0.03	0.030	1.00	10.80 - 12.50	1.50 max.	-	0.030	-	Ti = 0.75 Min.
410	410	0.15	1.00	0.040	0.030	1.00	11.50 - 13.50	0.75 max.	-	-	-	-
410S	410S	0.08	1.00	0.040	0.030	1.00	11.50 - 13.50	0.60 max.	-	-	-	-
FERRITIC												
405	405	0.80	1.00	0.04	0.030	1.00	11.50 - 14.50	0.60	-	-	-	Al = 0.10 - 0.30
430	430	0.12	1.00	0.04	0.030	1.00	16.00 - 18.00	0.75 max.	-	-	-	-
430 Ti	430	0.030	1.00	0.04	0.030	1.00	16.00 - 19.00	-	-	-	-	Ti = 0.10 - 1.0
		0.12	1.00	0.040	0.030	1.00	16.00 - 18.00	-	0.75-1.25	-	-	Cb = 5X C Min., 0.80 max.
MARTENSITIC												
420	420	0.15 min.	1.00	0.040	0.030	1.00	12.00 - 14.00	0.75 max.	-	-	-	Mo = 0.50 Max.
JBS	-	0.6 - 0.75	1.00	0.04	0.030	0.75	12.00 - 14.00	-	0.75 max.	-	-	-
LOW NICKLE AUSTENITIC												
JSLAUS (J1)	-	0.08	7.00 - 8.00	0.075	0.030	0.75	15.00 - 17.00	4.00 - 5.00	-	0.10	1.5	-
J3	-	0.08	9.00 - 10.50	0.075	0.030	0.75	14.00 - 16.00	2.00 - 3.00	-	0.15	2.0	-
J4	-	0.10	8.50 - 10.00	0.090	0.030	0.75	15.00 - 16.00	1.2 (max.)	-	0.20	2.0	-

CALCULATED WEIGHTS - STANDARD TUBINGS											
B X L (mm) \ Wall Thickness (mm)	0.71	0.91	1.00	1.20	1.50	1.60	2.00	2.64	3.00	3.25	3.60
	WEIGHT KG. / MTR.										
6.00	0.094	0.116	0.125	0.144							
9.52	0.156	0.196	0.213	0.301	0.317						
12.70	0.213	0.268	0.293	0.345	0.420	0.444	0.535	0.664			
15.87	0.269	0.340	0.372	0.440	0.539	0.571	0.694	0.873			
19.05	0.326	0.413	0.451	0.536	0.658	0.698	0.853	1.083	1.204	1.2	
22.22	0.382	0.485	0.531	0.631	0.778	0.826	1.012	1.294	1.443	1.543	
25.40	0.438	0.557	0.610	0.726	0.896	0.925	1.170	1.502	1.680	1.800	1.062
28.60	0.496	0.631	0.691	0.823	1.017	1.081	1.332	1.715	1.922	2.061	2.253
31.75			0.769	0.917	1.134	1.206	1.488	1.921	2.156	2.316	2.534
35.00			0.851	1.015	1.258	1.338	1.652	2.138	2.403	2.583	2.829
38.10				1.107	1.373	1.460	1.805	2.340	2.633	2.832	3.105
41.27				1.202	1.491	1.587	1.964	2.550	2.870	3.089	3.390
44.45				1.298	1.611	1.714	2.123	2.759	3.109	3.348	3.677
45.00				1.314	1.631	1.736	2.150	2.796	3.150	3.392	3.726
50.00				1.464	1.819	1.936	2.400	3.126	3.525	3.798	4.176
50.80				1.488	1.849	1.968	2.440	3.179	3.585	3.863	4.248
63.50				1.871	2.325	2.476	3.075	4.017	4.538	4.895	5.391
76.20				2.253	2.801	2.984	3.710	4.855	5.490	5.927	6.541
101.60				3.016	3.758	4.000	4.980	6.539	7.395	8.000	8.820

STAINLESS SEEL PIPE SERIES (ANSI B 36.10; B 36.19)										
Nominal	Nominal Pipe Size	Outside Diameter	Wall Thickness and Weight							
			Sch. 5 S		Sch. 10 S		Sch. 40 S		Sch. 80 S	
Inches	mm	mm	mm	kg/m	mm	kg/m	mm	kg/m	mm	kg/m
1/8	6	10.29	-	-	1.24	0.281	1.73	0.370	2.041	0.475
1/4	8	13.72	-	-	1.65	0.498	2.24	0.643	3.02	0.808
3/8	10	17.15	-	-	1.65	0.639	2.31	0.857	3.20	1.116
1/2	15	21.34	1.65	0.812	2.11	1.014	2.77	1.286	3.73	1.642
3/4	20	26.67	1.65	1.032	2.11	1.296	2.87	1.708	3.91	2.225
1	25	33.40	1.65	1.310	2.77	2.121	3.38	2.537	4.55	3.282
1.1/4	32	42.16	1.65	1.671	2.77	2.728	3.56	3.435	4.85	4.524
1.1/2	40	48.26	1.65	1.923	2.77	3.150	3.68	4.101	5.08	5.484
2	50	60.33	1.65	2.421	2.77	3.986	3.91	5.515	5.54	7.588
2.1/2	65	73.03	2.11	3.741	3.05	5.336	5.16	8.755	7.01	11.570
3	80	88.90	2.11	4.578	3.05	6.546	5.49	11.448	7.62	15.484
3.1/2	90	101.60	2.11	5.248	3.05	7.514	5.74	13.756	8.08	18.891
4	100	114.30	2.11	5.918	3.05	8.483	6.02	16.296	8.56	22.628
5	125	141.30	2.77	9.593	3.40	11.722	6.55	22.065	9.52	31.364
6	150	168.28	2.77	11.462	3.40	14.015	7.11	28.648	10.97	43.142
8	200	219.08	2.77	14.979	3.76	20.240	8.18	43.129	12.70	65.526
10	250	273.05	3.40	22.920	4.19	28.163	9.27	61.131	12.70	82.661
12	300	323.85	3.96	31.669	4.57	36.478	9.52	78.811	12.70	98.790
14	350	355.60	3.96	34.812	4.78	41.923	9.53	82.451	12.70	108.871
16	400	406.40	4.19	42.131	4.78	47.994	9.53	94.554	12.7	125.000
18	450	457.20	4.19	47.453	4.78	54.064	9.53	106.657	12.7	141.129
20	500	508.00	4.78	60.135	5.54	69.591	9.53	118.760	12.7	157.258
22	550	558.8	4.78	66.205	5.54	76.627	9.53	130.864	12.7	173.387
24	600	609.6	5.54	83.662	6.35	95.766	9.53	142.967	12.7	189.516