

Technical Specification References

Classification	Specification	Designation of Grade	Mechanical Properties			Chemical Composition %					Bend Test		Flattening Test H
			Tensile Strength Min.	Yield Strength Min.	Elongation Min.	C	Si	Mn	P	S	Bending Angle	Bending Radius	
			N/mm ²	N/mm ²	%	Max	Max	Max	Max	Max			
Carbon Steel Tubes For Machine Structural Purposes	JIS G 3445	STKM11A	290min.	-	(N1) Test Piece No. 11 & 12 - 35min. (N1) Test Piece No. 5 - 30min.	0.12	0.60	0.035	0.04	0.04	180°	4D	1/2 D
Cold Rolled Square & Rectangular Hollow Section	APM S 001		270min.	170min.	Gauge Length Lo = 50mm - 20min.	0.20	-	1.20	0.045	0.045	-	-	-

NOTES : (N1) - Elongation values in Table above only applied to tubes over 40mm in outside diameter.
(N1) - When the tensile test is carried out on No. 12 or No. 5 test piece for the tube under 8mm in wall thickness, the minimum value elongation shall be determined by reducing 1.5% per 1mm of decrease in wall thickness from the values given in the Table above and rounding off the value obtained to integer in accordance with JIS Z 8401.

H - Distance between flat plates
D - Outside diameter of the tube
APM S 001 - Manufacturer Standard

Carbon Steel Tubes For Machine Structural Purposes

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Nominal Size	Outside Diameter		Thickness											
			SWG 19				SWG 18				SWG 17			
			1.0 mm				1.2 mm				1.4 mm			
			0.039 in				0.047 in				0.056 in			
mm	in	mm	kg/m	kg/6m	kg/ft	lb/ft	kg/m	kg/6m	kg/ft	lb/ft	kg/m	kg/6m	kg/ft	lb/ft
12	1/2	12.7	0.289	1.734	0.088	0.194	0.340	2.040	0.104	0.229	0.390	2.340	0.119	0.262
16	5/8	15.9	0.368	2.208	0.112	0.247	0.435	2.610	0.133	0.293	0.501	3.006	0.153	0.337
19	3/4	19.1	0.447	2.682	0.136	0.300	0.530	3.180	0.162	0.357	0.611	3.666	0.186	0.410
22	7/8	22.2	0.523	3.138	0.159	0.351	0.622	3.732	0.189	0.417	0.718	4.308	0.219	0.483
25	1	25.4	0.602	3.612	0.183	0.404	0.716	4.296	0.218	0.481	0.829	4.974	0.253	0.558
28	1 1/8	28.6	0.681	4.086	0.208	0.459	0.811	4.866	0.247	0.545	0.939	5.634	0.286	0.631
32	1 1/4	31.8	0.760	4.560	0.232	0.512	0.906	5.436	0.276	0.609	1.050	6.300	0.320	0.706
35	1 3/8	34.9	-	-	-	-	1.000	6.000	0.304	0.670	1.160	6.960	0.354	0.781
38	1 1/2	38.1	-	-	-	-	1.092	6.552	0.333	0.734	1.267	7.602	0.386	0.851
41	1 5/8	41.3	-	-	-	-	1.187	7.122	0.362	0.798	1.378	8.268	0.420	0.926
44	1 3/4	44.5	-	-	-	-	1.281	7.686	0.391	0.862	1.488	8.928	0.454	1.001
47	1 7/8	47.6	-	-	-	-	1.373	8.238	0.419	0.924	1.595	9.570	0.486	1.072
50	2	50.8	-	-	-	-	1.468	8.808	0.447	0.986	1.705	10.230	0.520	1.146
54	2 1/8	54.0	-	-	-	-	1.563	9.378	0.476	1.049	1.816	10.896	0.554	1.221
57	2 1/4	57.2	-	-	-	-	-	-	-	-	1.926	11.556	0.587	1.294
60	2 3/8	60.3	-	-	-	-	-	-	-	-	2.033	12.198	0.620	1.367
65	2 1/2	63.5	-	-	-	-	-	-	-	-	2.144	12.864	0.653	1.440
80	3	76.2	-	-	-	-	-	-	-	-	-	-	-	-

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Nominal Size	Outside Diameter		Thickness											
			SWG 16				SWG 15				SWG 14			
			1.6 mm				1.8 mm				2.0 mm			
			0.063 in				0.071 in				0.079 in			
mm	in	mm	kg/m	kg/6m	kg/ft	lb/ft	kg/m	kg/6m	kg/ft	lb/ft	kg/m	kg/6m	kg/ft	lb/ft
12	1/2	12.7	0.438	2.628	0.134	0.296	0.484	2.904	0.148	0.326	0.528	3.168	0.161	0.355
16	5/8	15.9	0.564	3.384	0.172	0.379	0.626	3.756	0.191	0.421	0.686	4.116	0.209	0.461
19	3/4	19.1	0.691	4.146	0.211	0.465	0.768	4.608	0.234	0.516	0.844	5.064	0.257	0.567
22	7/8	22.2	0.813	4.878	0.248	0.547	0.906	5.436	0.276	0.609	0.996	5.976	0.304	0.670
25	1	25.4	0.939	5.634	0.286	0.631	1.048	6.288	0.319	0.703	1.154	6.924	0.352	0.776
28	1 1/8	28.6	1.066	6.396	0.325	0.717	1.190	7.140	0.363	0.800	1.312	7.872	0.400	0.882
32	1 1/4	31.8	1.192	7.152	0.363	0.800	1.332	7.992	0.406	0.895	1.470	8.820	0.448	0.988
35	1 3/8	34.9	1.318	7.908	0.402	0.886	1.469	8.814	0.448	0.988	1.623	9.738	0.495	1.091
38	1 1/2	38.1	1.440	8.640	0.439	0.968	1.612	9.672	0.491	1.083	1.781	10.686	0.543	1.197
41	1 5/8	41.3	1.567	9.402	0.478	1.054	1.754	10.524	0.534	1.177	1.938	11.628	0.591	1.303
44	1 3/4	44.5	1.693	10.158	0.516	1.138	1.896	11.376	0.578	1.274	2.096	12.576	0.639	1.409
47	1 7/8	47.6	1.815	10.890	0.553	1.219	2.033	12.198	0.620	1.367	2.249	13.494	0.686	1.512
50	2	50.8	1.942	11.652	0.592	1.305	2.175	13.050	0.663	1.462	2.407	14.442	0.734	1.618
54	2 1/8	54.0	2.068	12.408	0.630	1.389	2.317	13.902	0.706	1.557	2.565	15.390	0.782	1.724
57	2 1/4	57.2	2.194	13.164	0.669	1.475	2.459	14.754	0.750	1.654	2.723	16.338	0.830	1.830
60	2 3/8	60.3	2.316	13.896	0.706	1.557	2.597	15.582	0.792	1.746	2.876	17.256	0.877	1.934
65	2 1/2	63.5	2.443	14.658	0.745	1.642	2.739	16.434	0.835	1.841	3.033	18.198	0.925	2.039
80	3	76.2	2.944	17.644	0.897	1.978	3.303	19.818	1.007	2.220	3.660	21.960	1.116	2.460