

# Technical Specification References

Classification	Specification	Designation of Grade	Mechanical Properties				Chemical Composition %										Impact Properties	
			Tensile Strength		Yield Strength Min.	Elongation Min.		C	Si	Mn	P	S	Mo	Al	CEV	Cu	Test Temperature	Min average absorbed energy for standard test piece
			N/mm <sup>2</sup>			CHS	RHS or SHS											
			t < 3mm	3mm ≤ t ≤ 40mm	N/mm <sup>2</sup>	%	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	
Cold formed welded structural hollow sections of non-alloy and fine grain steels	BS EN 10219	S235JRH	360-510	360-510	235	24	0.17	-	1.40	0.045	0.045	-	-	0.35	-	20	27	
		S275J0H	430-580	410-560	275	20	0.20	-	1.50	0.040	0.040	-	-	0.40	-	0	27	
		S275J2H	430-580	410-560	275	20	0.20	-	1.50	0.035	0.035	-	-	0.40	-	-20	27	
		S355J0H	510-680	470-630	355	20	0.22	0.55	1.60	0.040	0.040	-	-	0.45	-	0	27	
		S355J2H	510-680	470-630	355	20	0.22	0.55	1.60	0.035	0.035	-	-	0.45	-	-20	27	
Structural Steel Hollow Sections for Australian Standard	AS 1163	C 250	320	250	22	18	0.12	0.05	0.50	0.040	0.030	0.10	0.10	0.25	-	-	-	
		C 250 L0	320	250	22	18	0.12	0.05	0.50	0.040	0.030	0.10	0.10	0.25	-	0	27	
		C 350	430	350	20	16	0.20	0.25	1.60	0.040	0.030	0.10	0.10	0.39	-	-	-	
		C 350 L0	430	350	20	16	0.20	0.25	1.60	0.040	0.030	0.10	0.10	0.39	-	0	27	
		C 450	500	450	16	14	0.20	0.45	1.60	0.040	0.030	0.35	0.10	0.39	-	-	-	
		C 450 L0	500	450	16	14	0.20	0.45	1.60	0.040	0.030	0.35	0.10	0.39	-	0	27	
Carbon Steel Square Pipes for General Structural Purposes	JIS G 3466	STKR 400	400	245	-	23 (N1)	0.25	-	-	0.04	0.04	-	-	-	-	-	-	
		STKR 490	490	325	-	23 (N1)	0.18	0.55	1.50	0.04	0.04	-	-	-	-	-	-	
Carbon Steel Tubes For General	JIS G 3444	STK 290	290	-	30 (N1) 20 (N2)	-	-	-	0.050	0.050	-	-	-	-	-	-	-	
		STK 400	400	235	23 (N2) 18 (N1)	-	0.250	-	-	0.040	0.040	-	-	-	-	-	-	
		STK 500	500	355	15 (N1) 10 (N2)	-	0.300 to 1.00	0.300 0.350	0.040	0.040	-	-	-	-	-	-	-	
		STK 540	540	390	20 (N1) 16 (N2)	-	0.230	1.500 0.550	0.040	0.040	-	-	-	-	-	-	-	
Cold-Formed Welded Carbon Steel Structural	SHS & RHS	ASTM A-500	Grade A	310	270	0.30	-	1.40	0.045	0.045	-	-	-	0.18 min	-	-		
			Grade B	400	315	0.30	-	1.40	0.045	0.045	-	-	-	0.18 min	-	-		
			Grade C	425	345	0.27	-	1.35	0.045	0.045	-	-	-	0.18 min	-	-		
			Grade D	400	250	0.30	-	1.40	0.045	0.045	-	-	-	0.18 min	-	-		
	CHS		Grade A	310	230	0.30	-	1.40	0.045	0.045	-	-	-	0.18 min	-	-		
			Grade B	400	290	0.30	-	1.40	0.045	0.045	-	-	-	0.18 min	-	-		
			Grade C	425	315	0.27	-	1.35	0.045	0.045	-	-	-	0.18 min	-	-		
			Grade D	400	250	0.30	-	1.40	0.045	0.045	-	-	-	0.18 min	-	-		
Lipped Channels & Plain Channels	JIS G 3350	SSC 400	400-540	245	21 (N2)	0.25	-	-	0.05	0.05	-	-	-	-	-			
High Tensile C-Purlin	Equivalent to ASTM A446 Gr. B			450	345	12	0.40	-	-	0.20	0.04	-	-	-	-			

**NOTES :**

- The impact properties of steel qualities JR and J0 are verified by laboratory testing only when specified at at the time of the inquiry and order.
- The steel qualities J0 and J2 can be produced upon request with extra cost.
- (N1) Test piece No. 11 and 12
- (N2) Test piece No. 5
  - When the tensile test is carried out on No. 5 and 12 test piece for the tube under 8mm in wall thickness, the minimum elongation value 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.
- t - thickness  
 CHS - Circular Hollow Sections  
 RHS - Rectangular Hollow Sections  
 SHS - Square Hollow Sections

# Carbon Steel Tubes For General Structural Purposes

JIS G 3444 - 1988 - STK 290  
JIS G 3444 - 1988 - STK 400

JIS G 3444 - 1988 - STK 500  
JIS G 3444 - 1988 - STK 540

Outside Diameter	Wall Thickness	Calculated Weight	Cross-Sectional Area	Geometrical Moment of Inertia	Modulus of Section	Radius of Gyration of Area
mm	mm	kg/mm	cm <sup>2</sup>	cm <sup>4</sup>	cm <sup>3</sup>	cm
21.7	2.0	0.972	1.238	0.607	0.560	0.700
27.2	2.0	1.24	1.583	1.26	0.930	0.890
	2.3	1.41	1.799	1.41	1.03	0.880
34.0	2.3	1.80	2.291	2.89	1.70	1.12
42.7	2.3	2.29	2.919	5.97	2.80	1.43
	2.5	2.49	3.157	6.40	3.00	1.42
	2.8	2.76	3.510	7.02	3.29	1.41
48.6	2.3	2.63	3.345	8.99	3.70	1.64
	2.5	2.84	3.621	9.65	3.97	1.63
	2.8	3.16	4.029	10.6	4.36	1.62
	3.2	3.58	4.564	11.8	4.86	1.61
60.5	2.3	3.30	4.205	17.8	5.90	2.06
	3.2	4.52	5.760	23.7	7.84	2.03
	4.0	5.57	7.100	28.5	9.41	2.00
76.3	2.8	5.08	6.465	43.7	11.5	2.60
	3.2	5.77	7.349	49.2	12.9	2.59
	4.0	7.13	9.085	59.5	15.6	2.56
89.1	2.8	5.96	7.591	70.7	15.9	3.05
	3.2	6.78	8.636	79.8	17.9	3.04
	4.0	8.39	10.69	97.0	21.8	3.01
101.6	3.2	7.76	9.892	120	23.6	3.48
	4.0	9.63	12.26	146	28.8	3.45
	5.0	11.9	15.17	177	34.9	3.42
114.3	3.2	8.77	11.17	172	30.2	3.93
	3.6	9.83	12.52	192	33.6	3.92
	4.5	12.2	15.52	234	41.0	3.89
	5.6	15.0	19.12	283	49.6	3.85
139.9	3.6	12.1	15.40	357	51.1	4.82
	4.0	13.4	17.07	394	56.3	4.80
	4.5	15.0	19.13	438	62.7	4.79
	6.0	19.8	25.22	566	80.9	4.74
165.2	4.5	17.8	22.72	734	88.90	5.68
	5.0	19.8	25.16	808	97.8	5.67
	6.0	23.6	30.01	952	115	5.63
	7.0	27.3	34.79	1090	132	5.60

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Outside Diameter	Wall Thickness	Calculated Weight	Cross-Sectional Area	Geometrical Moment of Inertia	Modulus of Section	Radius of Gyration of Area
mm	mm	kg/mm	cm <sup>2</sup>	cm <sup>4</sup>	cm <sup>3</sup>	cm
190.7	4.5	20.7	26.32	1140	120	6.59
	5.0	22.9	29.17	1260	132	6.57
	6.0	27.3	34.82	1490	156	6.53
	7.0	31.7	40.40	1710	179	6.50
216.3	4.5	23.5	29.94	1680	155	7.49
	6.0	31.1	39.64	2190	203	7.44
	7.0	36.1	46.03	2520	233	7.40
267.4	6.0	38.7	49.27	421x10	315	9.24
	6.6	42.4	54.08	460x10	344	9.22
	7.0	45.0	57.26	486x10	363	9.21
	8.0	51.2	65.19	549x10	411	9.18
	9.0	57.3	73.06	611x10	457	9.14
	9.3	59.2	75.41	629x10	470	9.13
355.6	6.4	55.1	70.21	107x10 <sup>2</sup>	602	12.30
	7.9	67.7	86.29	130x10 <sup>2</sup>	734	12.30
	9.0	76.9	98.00	147x10 <sup>2</sup>	828	12.30
	9.5	81.1	103.30	155x10 <sup>2</sup>	871	12.20
	12.0	102.0	129.50	191x10 <sup>2</sup>	108x10	12.20
	12.7	107.0	136.80	201x10 <sup>2</sup>	113x10	12.10
406.4	7.9	77.6	98.90	196x10 <sup>2</sup>	967	14.10
	9.0	88.2	112.40	222x10 <sup>2</sup>	109x10	14.10
	9.5	93.0	118.50	233x10 <sup>2</sup>	115x10	14.00
	12.0	117.0	148.70	289x10 <sup>2</sup>	142x10	14.00
	12.7	123.0	157.10	305x10 <sup>2</sup>	150x10	13.90
	16.0	154.0	196.20	374x10 <sup>2</sup>	184x10	13.80
457.2	9.0	99.5	126.70	318x10 <sup>2</sup>	140x10	15.80
	9.5	105.0	133.60	335x10 <sup>2</sup>	147x10	15.80
	12.0	132.0	167.80	416x10 <sup>2</sup>	182x10	15.70
	12.7	139.0	177.30	438x10 <sup>2</sup>	192x10	15.70
	16.0	174.0	221.80	540x10 <sup>2</sup>	236x10	15.60

Tolerances:

Description	Tolerance	
Thickness (t)	t < 3mm	± 0.3mm
	3mm ≤ t < 12mm	± 10%
	12mm ≥ t	± 10%, - 1.2mm
Outside Diameter (OD)	OD < 50mm	± 0.25mm
	50mm ≥ OD	± 0.5%