

มุ่งมั่นสู่การเป็นผู้นำอันดับหนึ่งในอุตสาหกรรมท่อเหล็ก คุณภาพมาตรฐานสากล

Striving to be no. 1 manufacturer of the highest quality steel pipes in Thailand

บริษัท สามชัยสตีลอินดัสทรี จำกัด (มหาชน) ตั้งขึ้นในปี พ.ศ. 2540 โดยกลุ่มผู้บริหารที่มีประสบการณ์นานกว่า 20 ปี บริษัทฯ เป็นบริษัทอุตสาหกรรม ผลิตท่อเหล็กที่เจริญเติบโตเร็วที่สุดบริษัทหนึ่งในประเทศไทย การเจริญก้าวหน้าของบริษัทเป็นผลมาจากวิสัยทัศน์ของผู้บริหาร และการลงทุนพัฒนาด้านเครื่องจักรที่ทันสมัยในการผลิตอย่างต่อเนื่อง การพัฒนาด้านเทคนิค และความสามารถของบุคคลากรตลอดจนการบริหารและการจัดการที่เป็นระบบ

บริษัทฯ เป็นผู้ผลิตท่อเหล็กแบบ ERW ที่มีกำลังผลิตสูงที่สุดในประเทศ โดยมีกำลังผลิตสูงถึง 430,000 ตันต่อปี และเป็นผู้นำรายแรกที่ผลิตท่อเหล็กขนาดใหญ่ถึงขนาด 18 นิ้ว โดยใช้เครื่องจักรที่ทันสมัยที่สุดในการผลิตท่อเหล็ก ERW จากประเทศญี่ปุ่น และใช้เทคโนโลยี FFX (Flexible Forming) และ Roll Box ซึ่งเป็นเทคโนโลยีที่ทันสมัยทำให้การผลิตมีประสิทธิภาพสูง และท่อเหล็กที่ผลิตได้มีคุณภาพสูงกว่าการผลิตด้วยเครื่องจักรที่ใช้เทคโนโลยีแบบเดิมๆ

Corporate Profile





บริษัทฯมีโรงงานขนาดใหญ่ที่ทันสมัยในเนื้อที่ 148 ไร่ตั้งอยู่ที่อำเภอเมือง จังหวัดสมุทรสาคร และโรงงานแห่งที่สองที่ตั้งอยู่บนถนนปู่เจ้าสมิงพราย จังหวัดสมุทรปราการ ซึ่งทำให้บริษัทฯมีความสามารถในการบริการลูกค้าได้ครอบคลุมทั้งด้านตะวันออกและตะวันตกของกรุงเทพได้อย่างมีประสิทธิภาพ



Samchai Steel Industries Public Company Limited was established in 1997 by the management team who has had the experience and expertise in manufacturing steel pipes for more than 20 years. Today. Samchai steel is among the fastest growing steel pipe companies. This strong growth is the result of the management team's extended vision that encompasses extensive investment in the latest technology, consistant development of human resources, and establishment of professional management.

With the manufacturing capacity of 430,000 tonnes per annum, Samchai Steel is the largest ERW steel pipe manufacturer in Thailand. Samchai Steel is also the first steel pipe company to manufacture large steel pipes that range from 10" to 18". These large pipes are manufactured by Samchai Steel are guaranteed at their highest quality.





Samchai Steel consists of two production plants. Its primary production plant sits on a 148-acre land, located at A. Muang, Samutsakorn (east of Bangkok) white its secondary production plant is located at Phuchaosamingrai, Samutprakarn (south of Bangkok). The scattered locations of these two production plants enable Samchai Steel to reach its customers more accessibly and conveniently.



TUBULARGE





ท่อ Tubularge หรือ ท่อเหล็กโครงสร้างหน้าตัดกลวง (Hollow Structural Sections, HSS) เป็นท่อเหล็กที่ผลิตจากการม้วนและเชื่อมเหล็กแผ่นที่มีกำลังสูงเพื่อนำมาใช้สำหรับงานโครงสร้างเหล็ก ท่อเหล็กโครงสร้างหน้าตัดกลวงนี้มีศักยภาพในการประยุกต์สูงไม่เพียงเฉพาะสามารถทดแทนโครงสร้างดั้งเดิม เช่น คอนกรีตเสริมเหล็ก หรือแม้กระทั่งสามารถทดแทนโครงสร้างเหล็กหน้าตัดชนิดเปิด (open sections) เช่น หน้าตัดตัว I และ H เป็นต้น

ท่อเหล็ก Tubularge คือ ท่อเหล็กโครงสร้างที่มีขนาดตั้งแต่ 1/2 นิ้วจนถึง 18 นิ้ว ซึ่งใช้เทคโนโลยี FFX (Flexible tube forming Mill Line) ที่ทันสมัยที่สุดจากประเทศญี่ปุ่นผสานกับเทคโนโลยีจากสหรัฐอเมริกามีความหนาสูงสุดถึง 16 มม. มีทั้งทรงกลม สี่เหลี่ยมพืนผ้า และสี่เหลี่ยมจัตุรัส ปัจจุบันสามชัยสตีลอินดัสทรีฯ เป็นผู้เดียวในประเทศที่สามารถผลิตท่อเหล็กชนิดนี้ได้ถึงขนาด 18"

ในหลายๆ ประเทศที่พัฒนาแล้ว เช่น อเมริกา ญี่ปุ่นและประเทศส่วนมากในยุโรปเป็นต้น นิยมใช้ท่อเหล็กโครงสร้างขนาดใหญ่ในงานสถาปัตยกรรมต่างๆ เช่นเดียวกับสนามบินสุวรรณภูมิของประเทศไทย ซึ่งท่อดังกล่าวนั้นเป็นการนำเข้าจากต่างประเทศที่มีราคาสูง ปัจจุบันสามชัยสตีลฯ สามารถผลิตท่อเหล็กขนาดใหญ่Tubulargeได้ ซึ่งเป็นการลดต้นทุนราคาโครงสร้างเหล็กได้จากเดิมกว่าครึ่ง

นอกจากท่อTubulargeแล้ว บริษัทยังผลิตท่อเหล็กสำหรับงานท่อน้ำ ท่อลำเลียงของเหลวใช้สำหรับงานระบบท่อต่างๆตามมาตรฐานสากลต่างๆอีกด้วย



Tubularge pipes and tubes are used mainly for construction and vary in sizes starting from $\frac{1}{2}$ inches up to 18 inches in diameters. Tubularge products are produced using high-end steel production called FFX forming technology from Japan and the United States. The wall's thickness is up to 16mm. for round pipes and 14mm. for square and rectangular pipes. Currently, Samchai Steel Industries PCL is the only producer using this technology and is the only producer that can offer pipes with such large dimensions.

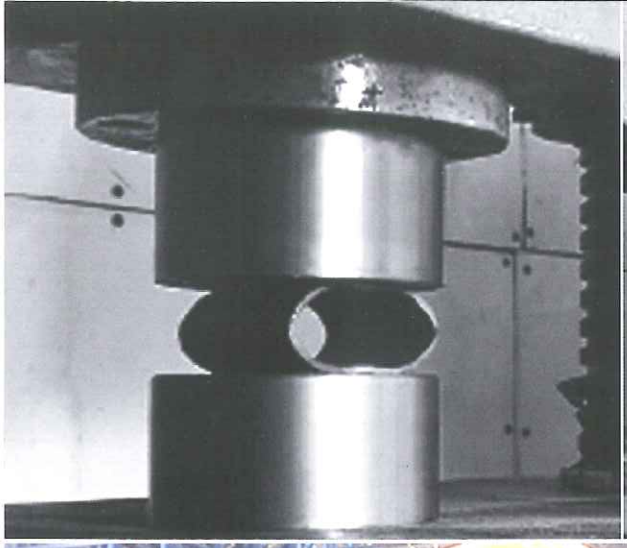
Introducing Tubularge







Many developed countries such as the United States, Japan, Korea, Singapore, Hong Kong, Australia and most countries in Europeare using these pipes as the main construction materials rather than beams, wide flange and concrete. In Thailand, Tubularge was used to construct the new airport, "Suwanabhum" where all pipes with a diameter of larger than 8 inches needed to be imported which resulted in higher prices due to taxes, freight charges and production costs. Samchai Steel Industries PLC is now able to produce Tubularge pipes and tubes in Thailand with world's standard quality and competitive price.







Tubularge Qualifications



มาตรฐานของท่อ Tubularge

มาตรฐานของท่อเหล็กโครงสร้างหน้าตัดกลวง Tubularge สามารถผลิตภายใต้มาตรฐานสากลที่หลากหลาย เช่น

- มาตรฐานอเมริกา เช่น ASTM A500
- มาตรฐานญี่ปุ่น เช่น JIS G3444, G3466
- มาตรฐานเยอรมัน เช่น DIN 2458, 2395
- มาตรฐานอังกฤษ เช่น BS 6363
- มาตรฐานออสเตรเลีย เช่น AS 1163
- มาตรฐานยุโรป เช่น EN 10219
- มาตรฐานไทย เช่น มอก. 107

มาตราฐานของท่อใช้งานทั่วไป

- ASTM A53
- JIS G3452, G3454
- DIN 2440, 2444
- BS 1387
- TIS 276, 277

TUBULARGE QUALIFICATIONS

Tubularge tubes are produced according to world's standards such as:

- American Standard of ASTM A500
- Japanese Standard of JIS G3444, G3466
- German Standard of DIN 2458, 2395
- British Standard of BS 6363
- Australian Standard of AS 1163
- European Standard of EUROCODE 3
- Thai Standard of TIS 107

ข้อดีที่ได้จาก Tubularge

- มีศักยภาพในการใช้งานสูง สามารถทดแทนโครงสร้างเหล็กชนิดบีมบางชนิดได้ดีกว่า
- ในด้านของความแข็งแกร่ง รูปทรงหน้าตัดที่มีเสถียรภาพ คุณสมบัติเชิงกล รูปทรงเลขาคณิต
- ใช้เวลาการก่อสร้างที่รวดเร็วกว่าโครงสร้างชนิดอื่นๆ
- ประหยัดค่าใช้จ่ายมากกว่าโครงสร้างชนิดอื่นๆ
- สามารถรื้อถอนได้ง่ายและสามารถขายต่อได้
- สามารถควบคุมคุณภาพการก่อสร้างได้มากกว่า

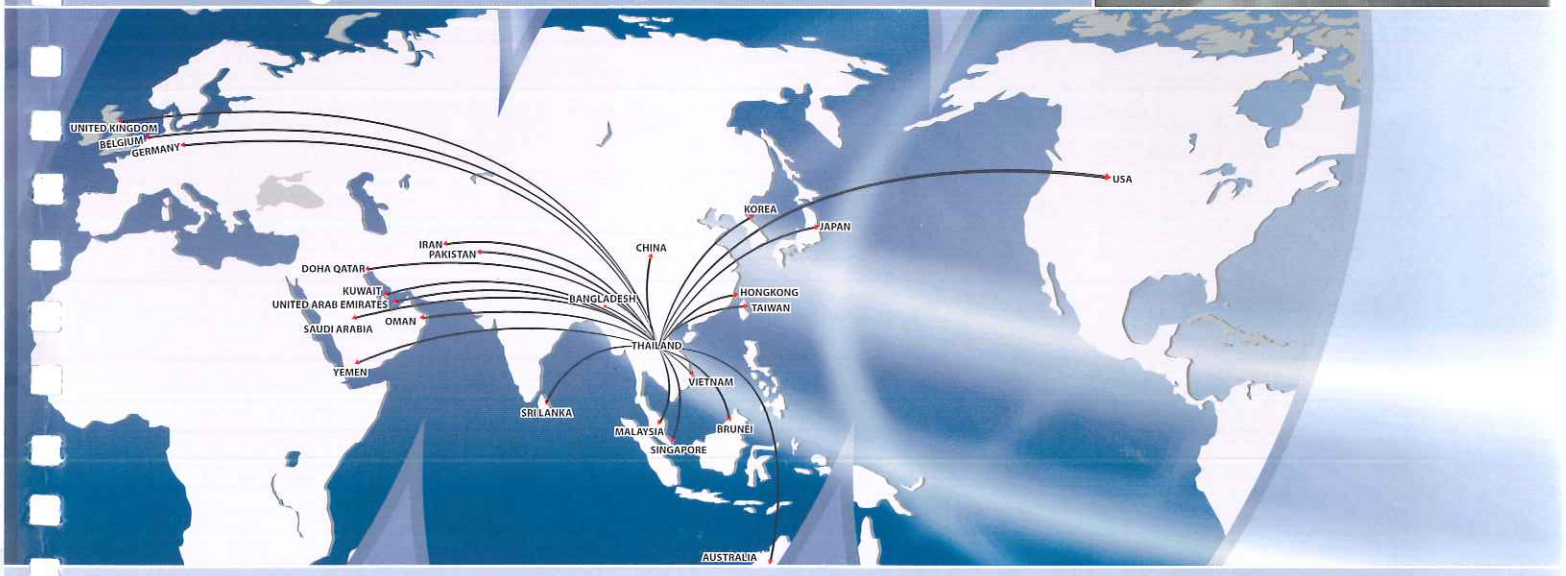
ADVANTAGES OF TUBULARGE

- Easy application and substitutable for beams and wide flange in terms of stiffness, stability, mechanicals properties and geometrical properties.
- Less construction time consumed and lower costs compared to other materials.
- Nicer finishing due to its geometrical properties.
- Better torsion, lesser stress, and more stability.
- According to its mechanical properties, fewer materials are needed when using Tubularge for construction.
- Provide easy operations, and thus, more construction quality control.





Advantages of tubularge



Quality System Certificate

จากการพัฒนาและรักษาคุณภาพสินค้าอย่างต่อเนื่อง บริษัทฯ จึงนำระบบการจัดการคุณภาพ ISO 9001 : 2000 มาประยุกต์ใช้เป็น แนวทางในการบริหารงานจนประสบความสำเร็จ และได้รับการรับรอง ระบบการจัดการคุณภาพ ISO 9001 : 2000 จาก TÜV Rheinland (Thailand) เมื่อวันที่ 1 กันยายน 2545

With the developing to keep the best quality, the company has implemented the quality management system ISO 9001 : 2000 and certified by TÜV Rheinland (Thailand) since September 2001

TÜV CERT
DIN EN ISO 9001:2000
Cert.No.: 01 100 019017

TÜV CERT

CERTIFICATE

The TÜV CERT Certification Body
of TÜV Anlagentechnik GmbH
Unternehmensgruppe TÜV Rheinland/Berlin-Brandenburg
hereby certifies in accordance with
TÜV CERT procedures that

Samchai Steel Holding Co., Ltd.
75/14, 75/17 Moo 5, Soi Wat Sopanaram, Ekachai Rd.,
A. Muang, Samutsakorn 74000, Thailand

has established and applies a quality management system for

**Manufacturing of Round Steel Pipes,
Galvanized Steel Pipes, Steel-C-Channels,
Square and Rectangular Steel Pipes**

An audit was performed,
Report No. 019017
Proof has been furnished that the requirements according to

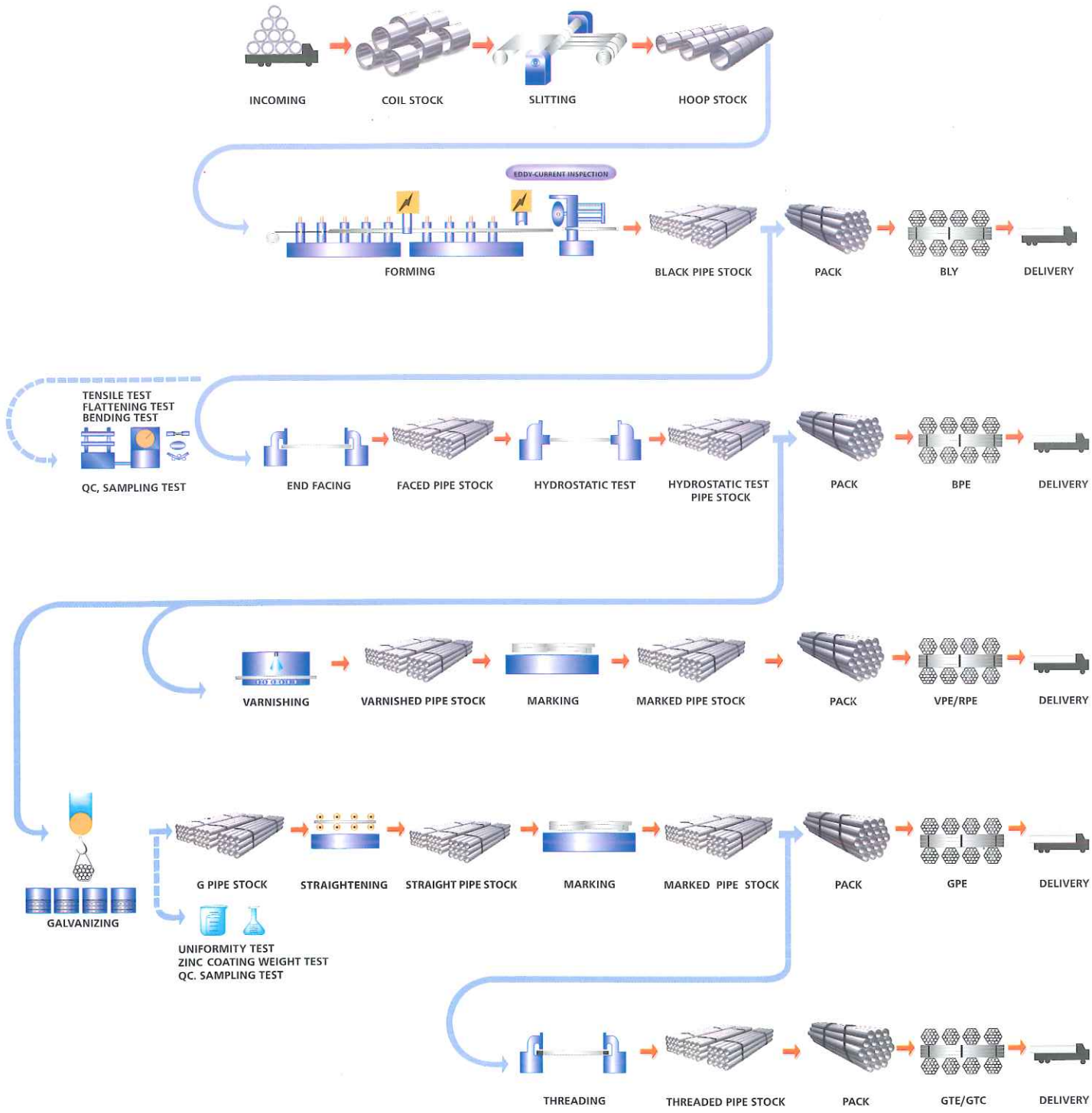
DIN EN ISO 9001:2000

are fulfilled.
The certificate is valid until 2005 September
Certificate Registration No. 01 100 019017

Cologne 2002-09-12

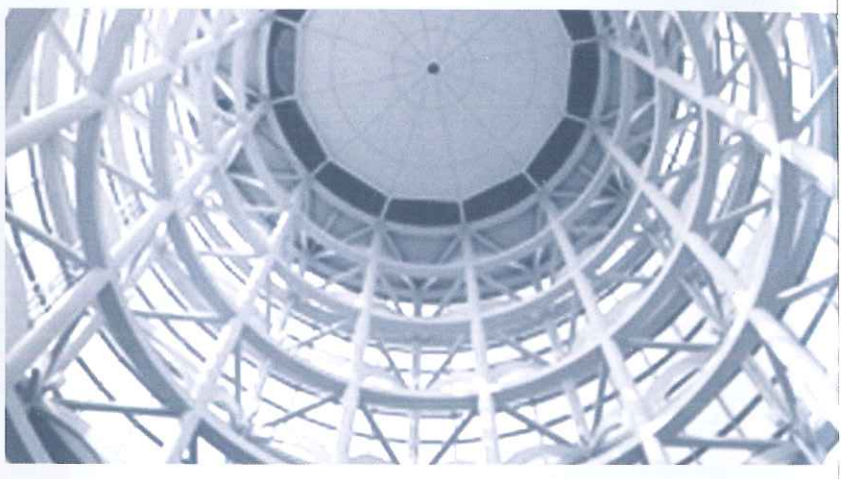
TÜV Rheinland/
Berlin-Brandenburg
TÜV
TÜV CERT Certification Body of
TÜV Anlagentechnik GmbH

Tube mill flow Chart



TUBULARGE

Structural Application



Tubularge

STANDARD SPECIFICATION

Structural Application

Standard	Classification	Grade	Mechanical Properties			Chemical Composition %					Tolerance	
			Tensile Strength Min. Mpa.	Yield Strength Min. Mpa.	Elonga-tion Min %	C Max. %	Si Max. %	Mn Max. %	P Max. %	S Max. %	Outside Diameter	Wall Thickness
Commercial	Black Steel Pipes / E.R.W. / BPE / BLY	SAMCHAI	320	195	20	0.20	-	1.20	0.045	0.045	± 1%	+ Unlimit, - 12.5%
TIS 107	Round Pipe	HS 41	402	235	23	0.28	-	-	0.048	0.048	≤ 50 mm.; ± 0.5 mm.	2.0 - 3.2 mm.; ± 0.3 mm.
		HS 50	490	314	23	0.21	0.57	1.53	0.048	0.048	> 50 mm.; ± 1%	4.0 - 8.0 mm.; ± 10%
		HS 51	500	353	15	0.33	0.37	0.33-1.03	0.048	0.048		
	Square Pipe and Rectangular Pipe	HS 41	402	235	23	0.28	-	-	0.048	0.048	≤ 100 mm.; ± 1.5 mm.	2.0 - 3.2 mm.; ± 0.3 mm.
		HS 50	490	314	23	0.21	0.57	1.53	0.048	0.048	> 100 mm.; ± 1.5%	4.0 - 12.0 mm.; ± 10%
JIS G 3444	E.R.W. Carbon Steel Tube For General Structure	STK 290	290	-	30	-	-	-	0.050	0.050	Class1, Under 50 mm.; ± 0.5 mm. 50 mm. or over; ± 1%, Class2, Under 50 mm.; ± 0.25mm. 50 mm. or over; ±0.5%	Class1, <4mm.; +0.6, -0.5mm. 4-12mm.; +15%, -12.5% >12mm.; +15%, -1.5mm. Class2, <3mm. ±0.3mm. 3-12mm.; ±10% >12mm.; +10%, -1.2mm.
		STK 400	400	235	23	0.25	-	-	0.040	0.040		
		STK 490	490	315	23	0.18	0.55	1.50	0.040	0.040		
		STK 500	500	355	15	0.24	0.35	0.30-1.30	0.040	0.040		
		STK 540	540	390	20	0.23	0.55	1.50	0.040	0.040		
JIS G3466	Carbon Steel Square Tube For General Structure	STKR 400	400	245	23	0.25	-	-	0.040	0.040	100mm.or under; ±1.5mm. Over 100 mm.; ± 1.5%	Under 3 mm.; ± 0.3 mm. 3 mm. or over; ± 10%
		STKR 490	490	325	23	0.18	0.55	1.50	0.040	0.040		
DIN 2395	Rectangular and Square Welded Steel Hollow Section	St33	290-540	185	17	-	-	-	-	-	See Table	± 10% (max. 0.35 mm.)
		RSt 37-2	360-470	235	21	0.20	-	-	0.050	0.050		
		St 52.3	490-630	355	20	1.20	-	-	0.040	0.040		
BS 6363	Welded cold formed Steel Structure Hollow Section	34/26	340	260	12	0.16	-	1.20	0.050	0.050	± 0.75% / min ± 0.4 mm.	≤ 3 mm.; ± 10% > 3 mm.; ± 8%
		43/36	430	360	10	0.20	0.40	1.20	0.050	0.050		
		50/45	500	450	8	0.23	0.40	1.20	0.050	0.050		
ASTM A500	Cold-Formed Welded Carbon Steel Structure Tubing in Round	Grade A	310	228	25	0.30	-	-	0.045	0.045	≤ 48.3 mm.; ± 0.5% ≥ 50.8 mm.; ± 0.75%	± 10%
		Grade B	400	290	23	0.30	-	-	0.045	0.045		
		Grade C	427	317	21	0.27	-	1.40	0.045	0.045		
		Grade D	400	250	23	0.30	-	-	0.045	0.045		
	Square Tube and Rectangular Tube	Grade A	310	269	25	0.30	-	-	0.045	0.045	≤ 63.5 mm.; ± 0.51mm. > 63.5-88.9 mm.; ± 0.64mm. >88.9-139.7mm.; ± 0.76mm. > 139.7 mm.; ± 1%	± 10%
		Grade B	400	317	23	0.30	-	-	0.045	0.045		
		Grade C	427	345	21	0.27	-	1.40	0.045	0.045		
		Grade D	400	250	23	0.30	-	-	0.045	0.045		
EN 10219	Cold Formed Welded Structural Hollow Section of Non-alloy and Fire Grain Steels	S 235 JRH	340-510	235	24	0.17	-	1.40	0.040	0.040	± 1% / min. ± 0.5 mm. max. ± 10 mm.	+ Not Limit, - 10%
		S 275 J0H	410-580	275	20	0.20	-	1.50	0.035	0.035		
		S 275 J2H	410-580	275	20	0.20	-	1.50	0.030	0.030		
		S 355 J0H	490-630	355	20	0.22	0.55	1.60	0.035	0.035		
		S 355 J2H	490-630	355	20	0.22	0.55	1.60	0.030	0.030		
AS 1163	Structural Steel Hollow Section for Australian Standard	C 250	320	250	22	0.12	0.05	0.5	0.04	0.03	≤ 50 mm.; + 0.4 / - 0.8 mm. > 50 mm.; ± 0.01 d	± 10%
		C 250 LO	320	250	22	0.12	0.05	0.5	0.04	0.03		
		C 350	430	350	20	0.2	0.25	1.6	0.04	0.03		
		C 350 LO	430	350	20	0.2	0.25	1.6	0.04	0.03		
		C 450	500	450	16	0.2	0.45	1.6	0.04	0.03		
		C 450 LO	500	450	16	0.2	0.45	1.6	0.04	0.03		
TIS 1228	Lip Channel Steel	SSC 400	400-540	245	21	0.25	-	-	0.050	0.050	A and B = ± 1.5 mm. C = ± 2.0 mm. H; < 150 mm. = ± 1.5 mm. H; 150-300 mm. = ± 2.0 mm.	1.6 mm. = ± 0.22 mm. 2.3 mm. = ± 0.25 mm. 2.8 mm. = ± 0.28 mm. 3.2 mm. = ± 0.30 mm.
BS 1139	Metal Scaffolding	Type 4	340-480	235	24	0.20	0.30	-	0.050	0.050	± 0.5 mm.	- 10 %

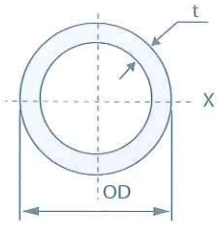
TUBULARGE

Standard for hollow structural steel sect



TUBULARGE

Standard for hollow structural steel section



STRUCTURAL ROUND HOLLOW SECTION

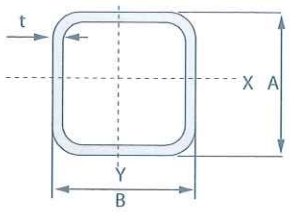
Outside Diameter		wall thickness (t)	Unit Mass	Informative reference			
in	mm.	mm	kg/m	Cross sectional area cm^2	Geometrical moment of inertia cm^4 Ix , Iy	Modulus of section cm^3 Zx , Zy	Radius of gyration of area cm ix , iy
1/2"	21.3	1.0	0.50	0.64	0.33	0.31	0.72
		1.2	0.59	0.76	0.38	0.36	0.71
		1.4	0.69	0.88	0.44	0.41	0.71
		1.6	0.78	0.99	0.48	0.45	0.70
		1.8	0.87	1.10	0.53	0.50	0.69
		2.0	0.95	1.21	0.57	0.54	0.69
		2.3	1.08	1.37	0.63	0.59	0.68
		2.5	1.16	1.48	0.66	0.62	0.67
		2.8	1.28	1.63	0.71	0.67	0.66
3/4"	26.9	1.0	0.64	0.81	0.68	0.51	0.92
		1.2	0.76	0.97	0.80	0.60	0.91
		1.4	0.88	1.12	0.91	0.68	0.90
		1.6	1.00	1.27	1.02	0.76	0.90
		1.8	1.11	1.42	1.12	0.84	0.89
		2.0	1.23	1.56	1.22	0.91	0.88
		2.3	1.40	1.78	1.36	1.01	0.87
		2.5	1.50	1.92	1.44	1.07	0.87
		2.8	1.66	2.12	1.56	1.16	0.86
1"	33.7	1.2	0.96	1.23	1.62	0.96	1.15
		1.4	1.12	1.42	1.86	1.10	1.14
		1.6	1.27	1.61	2.08	1.24	1.14
		1.8	1.42	1.80	2.30	1.37	1.13
		2.0	1.56	1.99	2.51	1.49	1.12
		2.3	1.78	2.27	2.81	1.67	1.11
		2.5	1.92	2.45	3.00	1.78	1.11
		2.8	2.13	2.72	3.27	1.94	1.10
		3.0	2.27	2.89	3.44	2.04	1.09
		3.2	2.41	3.07	3.60	2.14	1.08
		3.5	2.61	3.32	3.84	2.28	1.07
1-1/4"	42.4	1.4	1.42	1.80	3.79	1.79	1.45
		1.6	1.61	2.05	4.27	2.02	1.44
		1.8	1.80	2.30	4.74	2.24	1.44
		2.0	1.99	2.54	5.19	2.45	1.43
		2.3	2.27	2.90	5.84	2.76	1.42
		2.5	2.46	3.13	6.26	2.95	1.41
		2.8	2.73	3.48	6.86	3.24	1.40
		3.0	2.91	3.71	7.25	3.42	1.40
		3.2	3.09	3.94	7.62	3.59	1.39
		3.5	3.36	4.28	8.16	3.85	1.38
1-1/2"	48.3	1.4	1.62	2.06	5.68	2.35	1.66
		1.6	1.84	2.35	6.41	2.65	1.65
		1.8	2.06	2.63	7.12	2.95	1.65
		2.0	2.28	2.91	7.81	3.23	1.64
		2.3	2.61	3.32	8.81	3.65	1.63
		2.5	2.82	3.60	9.46	3.92	1.62
		2.8	3.14	4.00	10.40	4.31	1.61
		3.0	3.35	4.27	11.00	4.55	1.61
		3.2	3.56	4.53	11.59	4.80	1.60
		3.5	3.87	4.93	12.43	5.15	1.59
		4.0	4.37	5.57	13.77	5.70	1.57
2"	60.3	1.4	2.03	2.59	11.24	3.73	2.08
		1.6	2.32	2.95	12.72	4.22	2.08
		1.8	2.60	3.31	14.16	4.70	2.07
		2.0	2.88	3.66	15.58	5.17	2.06
		2.3	3.29	4.19	17.65	5.85	2.05
		2.5	3.56	4.54	18.99	6.30	2.05
		2.8	3.97	5.06	20.95	6.95	2.04
		3.0	4.24	5.40	22.22	7.37	2.03
		3.2	4.51	5.74	23.47	7.78	2.02
		3.5	4.90	6.25	25.28	8.39	2.01
		4.0	5.55	7.07	28.17	9.34	2.00
2-1/2"	76.1	2.0	3.65	4.66	31.98	8.40	2.62
		2.3	4.19	5.33	36.34	9.55	2.61
		2.5	4.54	5.78	39.19	10.30	2.60
		2.8	5.06	6.45	43.37	11.40	2.59
		3.0	5.41	6.89	46.10	12.11	2.59
		3.2	5.75	7.33	48.78	12.82	2.58
		3.5	6.27	7.98	52.72	13.85	2.57
		4.0	7.11	9.06	59.06	15.52	2.55
		4.5	7.95	10.12	65.12	17.11	2.54
		5.0	8.77	11.17	70.92	18.64	2.52

TUBULARGE
Standard for hollow structural steel section

Outside Diameter		wall thickness (t)	Unit Mass	Informative reference			
				Cross sectional area	Geometrical moment of inertia	Modulus of section	Radius of gyration of area
in	mm.	mm	kg/m	cm^2	cm^4	cm^3	cm
					Ix , Iy	Zx , Zy	ix , iy
3"	88.9	2.0	4.29	5.46	51.57	11.60	3.07
		2.3	4.91	6.26	58.70	13.21	3.06
		2.5	5.33	6.79	63.37	14.26	3.06
		2.8	5.95	7.57	70.26	15.81	3.05
		3.0	6.36	8.10	74.76	16.82	3.04
		3.2	6.76	8.62	79.21	17.82	3.03
		3.5	7.37	9.39	85.75	19.29	3.02
		4.0	8.38	10.67	96.34	21.67	3.00
		4.5	9.37	11.93	106.54	23.97	2.99
		5.0	10.35	13.18	116.37	26.18	2.97
3-1/2"	101.6	2.5	6.11	7.78	95.61	18.82	3.50
		2.8	6.82	8.69	106.13	20.89	3.49
		3.0	7.29	9.29	113.04	22.25	3.49
		3.2	7.77	9.89	119.85	23.59	3.48
		3.5	8.47	10.79	129.92	25.58	3.47
		4.0	9.63	12.26	146.28	28.80	3.45
		4.5	10.78	13.73	162.13	31.92	3.44
		5.0	11.91	15.17	177.47	34.93	3.42
4"	114.3	2.5	6.89	8.78	137.26	24.02	3.95
		2.8	7.70	9.81	152.52	26.69	3.94
		3.0	8.23	10.49	162.55	28.44	3.94
		3.2	8.77	11.17	172.47	30.18	3.93
		3.5	9.56	12.18	187.15	32.75	3.92
		4.0	10.88	13.86	211.07	36.93	3.90
		4.5	12.19	15.52	234.32	41.00	3.89
		5.0	13.48	17.17	256.92	44.96	3.87
		6.0	16.03	20.41	300.21	52.53	3.83
5"	139.7	3.2	10.77	13.72	319.78	45.78	4.83
		3.5	11.76	14.98	347.49	49.75	4.82
		4.0	13.39	17.05	392.86	56.24	4.80
		4.5	15.00	19.11	437.20	62.59	4.78
		5.0	16.61	21.16	480.54	68.80	4.77
		6.0	19.78	25.20	564.26	80.78	4.73
6"	168.3	3.2	13.03	16.60	565.74	67.23	5.84
		3.5	14.22	18.12	615.45	73.14	5.83
		4.0	16.21	20.65	697.09	82.84	5.81
		4.5	18.18	23.16	777.22	92.36	5.79
		5.0	20.14	25.65	855.85	101.70	5.78
		6.0	24.02	30.59	1008.69	119.87	5.74
		7.0	27.85	35.47	1155.79	137.35	5.71
		9.0	35.36	45.04	1433.29	170.33	5.64
8"	219.1	4.5	23.82	30.34	1747.24	159.49	7.59
		5.0	26.40	33.63	1928.04	176.00	7.57
		6.0	31.53	40.17	2281.95	208.30	7.54
		7.0	36.61	46.64	2625.75	239.68	7.50
		9.0	46.63	59.40	3283.80	299.75	7.43
		12.0	61.29	78.07	4199.88	383.38	7.33
10"	273.0	4.5	29.80	37.96	3421.58	250.67	9.49
		5.0	33.05	42.10	3780.81	276.98	9.48
		6.0	39.51	50.33	4487.08	328.72	9.44
		7.0	45.92	58.50	5177.30	379.29	9.41
		9.0	58.60	74.64	6510.56	476.96	9.34
		12.0	77.24	98.39	8396.14	615.10	9.24
12"	323.8	5.0	39.31	50.08	6363.44	393.05	11.27
		6.0	47.02	59.90	7565.33	467.28	11.24
		7.0	54.69	69.67	8744.31	540.11	11.20
		9.0	69.87	89.01	11034.72	681.58	11.13
		12.0	92.27	117.55	14305.80	883.62	11.03
		14.0	106.96	136.26	16380.16	1011.75	10.96
14"	355.6	6.0	51.73	65.90	10070.55	566.40	12.36
		7.0	60.18	76.66	11649.71	655.21	12.33
		9.0	76.93	98.00	14725.86	828.23	12.26
		12.0	101.68	129.53	19139.47	1076.46	12.16
		14.0	117.94	150.24	21951.81	1234.64	12.09
		16.0	134.00	170.70	24663.00	1387.12	12.02
16"	406.4	6.0	59.25	75.47	15128.33	744.50	14.16
		7.0	68.95	87.83	17519.25	862.17	14.12
		9.0	88.20	112.36	22192.62	1092.16	14.05
		12.0	116.72	148.69	28937.01	1424.07	13.95
		14.0	135.48	172.59	33260.39	1636.83	13.88
		16.0	154.05	196.24	37448.82	1842.95	13.81
18"	457.0	6.0	66.73	85.01	21618.10	946.09	15.95
		7.0	77.68	98.96	25055.35	1096.51	15.91
		9.0	99.44	126.67	31791.55	1391.32	15.84
		12.0	131.69	167.76	41556.30	1818.66	15.74
		14.0	152.95	194.84	47844.57	2093.85	15.67
		16.0	174.01	221.67	53959.38	2361.46	15.60

TUBULARGE

Standard for hollow structural steel section



STRUCTURAL SQUARE HOLLOW SECTION

Side length A x B mm.	wall thickness (t) mm.	Unit mass kg/m.	Informative reference							
			Cross sectional area cm^2	Geometrical moment of inertia cm^4		Modulus of section cm^3		Radius of gyration of area cm	
				Ix	Iy	Zx	Zy	ix	iy
25 x 25	1.0	0.73	0.93	0.88	0.88	0.71	0.71	0.97	0.97
	1.2	0.87	1.11	1.02	1.02	0.82	0.82	0.96	0.96
	1.4	1.00	1.27	1.15	1.15	0.92	0.92	0.95	0.95
	1.6	1.12	1.43	1.28	1.28	1.02	1.02	0.94	0.94
	1.8	1.25	1.59	1.39	1.39	1.12	1.12	0.94	0.94
	2.0	1.36	1.74	1.51	1.51	1.20	1.20	0.93	0.93
	2.3	1.53	1.95	1.67	1.67	1.33	1.33	0.92	0.92
	2.6	1.69	2.16	1.83	1.83	1.46	1.46	0.92	0.92
	2.8	1.79	2.28	1.94	1.94	1.55	1.55	0.92	0.92
	3.0	1.89	2.41	2.06	2.06	1.65	1.65	0.92	0.92
32 x 32	1.0	0.95	1.21	1.92	1.92	1.20	1.20	1.26	1.26
	1.2	1.13	1.44	2.24	2.24	1.40	1.40	1.25	1.25
	1.4	1.31	1.66	2.55	2.55	1.59	1.59	1.24	1.24
	1.6	1.48	1.88	2.84	2.84	1.77	1.77	1.23	1.23
	1.8	1.64	2.09	3.11	3.11	1.94	1.94	1.22	1.22
	2.0	1.80	2.30	3.37	3.37	2.11	2.11	1.21	1.21
	2.3	2.04	2.60	3.74	3.74	2.34	2.34	1.20	1.20
	2.6	2.26	2.88	4.09	4.09	2.55	2.55	1.19	1.19
	2.8	2.41	3.07	4.31	4.31	2.70	2.70	1.19	1.19
	3.0	2.55	3.25	4.54	4.54	2.84	2.84	1.18	1.18
	3.2	2.69	3.42	4.76	4.76	2.98	2.98	1.18	1.18
38 x 38	1.0	1.14	1.45	3.28	3.28	1.73	1.73	1.50	1.50
	1.2	1.36	1.73	3.85	3.85	2.03	2.03	1.49	1.49
	1.4	1.57	2.00	4.39	4.39	2.31	2.31	1.48	1.48
	1.6	1.78	2.26	4.91	4.91	2.58	2.58	1.47	1.47
	1.8	1.98	2.52	5.40	5.40	2.84	2.84	1.46	1.46
	2.0	2.18	2.78	5.87	5.87	3.09	3.09	1.45	1.45
	2.3	2.47	3.15	6.54	6.54	3.44	3.44	1.44	1.44
	2.6	2.75	3.51	7.17	7.17	3.77	3.77	1.43	1.43
	2.8	2.94	3.74	7.57	7.57	3.98	3.98	1.42	1.42
	3.0	3.12	3.97	7.96	7.96	4.19	4.19	1.42	1.42
	3.2	3.29	4.19	8.34	8.34	4.39	4.39	1.41	1.41
40 x 40	1.4	1.66	2.11	5.16	5.16	2.58	2.58	1.56	1.56
	1.6	1.88	2.39	5.78	5.78	2.89	2.89	1.55	1.55
	1.8	2.09	2.67	6.36	6.36	3.18	3.18	1.54	1.54
	2.0	2.31	2.94	6.92	6.92	3.46	3.46	1.54	1.54
	2.3	2.62	3.33	7.72	7.72	3.86	3.86	1.52	1.52
	2.6	2.92	3.72	8.47	8.47	4.24	4.24	1.51	1.51
	2.8	3.11	3.96	8.95	8.95	4.47	4.47	1.50	1.50
	3.0	3.30	4.21	9.41	9.41	4.71	4.71	1.50	1.50
	3.2	3.49	4.45	9.87	9.87	4.93	4.93	1.49	1.49
50 x 50	1.4	2.10	2.67	10.39	10.39	4.16	4.16	1.97	1.97
	1.6	2.38	3.03	11.68	11.68	4.67	4.67	1.96	1.96
	1.8	2.66	3.39	12.91	12.91	5.17	5.17	1.95	1.95
	2.0	2.93	3.74	14.11	14.11	5.64	5.64	1.94	1.94
	2.3	3.34	4.25	15.82	15.82	6.33	6.33	1.93	1.93
	2.6	3.73	4.76	17.44	17.44	6.97	6.97	1.91	1.91
	2.8	3.99	5.08	18.47	18.47	7.39	7.39	1.91	1.91
	3.0	4.25	5.41	19.47	19.47	7.79	7.79	1.90	1.90
	3.2	4.50	5.73	20.44	20.44	8.18	8.18	1.89	1.89
	3.6	4.98	6.35	22.31	22.31	8.92	8.92	1.87	1.87
60 x 60	1.6	2.88	3.67	20.64	20.64	6.88	6.88	2.37	2.37
	1.8	3.22	4.11	22.89	22.89	7.63	7.63	2.36	2.36
	2.0	3.56	4.54	25.08	25.08	8.36	8.36	2.35	2.35
	2.3	4.06	5.17	28.23	28.23	9.41	9.41	2.34	2.34
	2.6	4.55	5.80	31.24	31.24	10.41	10.41	2.32	2.32
	2.8	4.87	6.20	33.18	33.18	11.06	11.06	2.31	2.31
	3.0	5.19	6.61	35.05	35.05	11.68	11.68	2.30	2.30
	3.2	5.50	7.01	36.88	36.88	12.29	12.29	2.29	2.29
	3.6	6.11	7.79	40.38	40.38	13.46	13.46	2.28	2.28
	4.0	6.71	8.55	43.70	43.70	14.57	14.57	2.26	2.26

TUBULARGE
Standard for hollow structural steel section

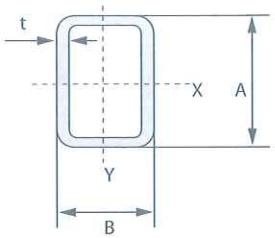
Side length A x B mm.	wall thickness (t) mm.	Unit mass kg/m.	Informative reference						
			Cross sectional area cm^2	Geometrical moment of inertia cm^4		Modulus of section cm^3		Radius of gyration of area cm	
				Ix	Iy	Zx	Zy	ix	iy
70 x 70	1.6	3.38	4.31	33.30	33.30	9.52	9.52	2.78	2.78
	1.8	3.79	4.83	37.02	37.02	10.58	10.58	2.77	2.77
	2.0	4.19	5.34	40.63	40.63	11.61	11.61	2.76	2.76
	2.3	4.78	6.09	45.89	45.89	13.11	13.11	2.74	2.74
	2.6	5.37	6.84	50.93	50.93	14.55	14.55	2.73	2.73
	2.8	5.75	7.32	54.19	54.19	15.48	15.48	2.72	2.72
	3.0	6.13	7.81	57.36	57.36	16.39	16.39	2.71	2.71
	3.2	6.51	8.29	60.45	60.45	17.27	17.27	2.70	2.70
	3.6	7.24	9.23	66.40	66.40	18.97	18.97	2.68	2.68
	4.0	7.97	10.15	72.07	72.07	20.59	20.59	2.66	2.66
75 x 75	1.6	3.64	4.63	41.23	41.23	10.99	10.99	2.98	2.98
	1.8	4.07	5.19	45.86	45.86	12.23	12.23	2.97	2.97
	2.0	4.50	5.74	50.38	50.38	13.44	13.44	2.96	2.96
	2.3	5.14	6.55	56.97	56.97	15.19	15.19	2.95	2.95
	2.6	5.77	7.36	63.31	63.31	16.88	16.88	2.93	2.93
	2.8	6.19	7.88	67.41	67.41	17.98	17.98	2.92	2.92
	3.0	6.60	8.41	71.41	71.41	19.04	19.04	2.91	2.91
	3.2	7.01	8.93	75.32	75.32	20.08	20.08	2.90	2.90
	3.6	7.81	9.95	82.85	82.85	22.09	22.09	2.89	2.89
	4.0	8.59	10.95	90.04	90.04	24.01	24.01	2.87	2.87
80 x 80	1.8	4.35	5.55	56.01	56.01	14.00	14.00	3.18	3.18
	2.0	4.82	6.14	61.58	61.58	15.40	15.40	3.17	3.17
	2.3	5.50	7.01	69.70	69.70	17.43	17.43	3.15	3.15
	2.6	6.18	7.88	77.55	77.55	19.39	19.39	3.14	3.14
	2.8	6.63	8.44	82.63	82.63	20.66	20.66	3.13	3.13
	3.0	7.07	9.01	87.59	87.59	21.90	21.90	3.12	3.12
	3.2	7.51	9.57	92.45	92.45	23.11	23.11	3.11	3.11
	3.6	8.37	10.67	101.82	101.82	25.46	25.46	3.09	3.09
	4.0	9.22	11.75	110.79	110.79	27.70	27.70	3.07	3.07
	4.5	10.26	13.07	121.47	121.47	30.37	30.37	3.05	3.05
90 x 90	1.8	4.92	6.27	80.60	80.60	17.91	17.91	3.59	3.59
	2.0	5.45	6.94	88.72	88.72	19.72	19.72	3.58	3.58
	2.3	6.23	7.93	100.60	100.60	22.35	22.35	3.56	3.56
	2.6	7.00	8.92	112.12	112.12	24.92	24.92	3.55	3.55
	2.8	7.51	9.56	119.61	119.61	26.58	26.58	3.54	3.54
	3.0	8.01	10.21	126.95	126.95	28.21	28.21	3.53	3.53
	3.2	8.51	10.85	134.14	134.14	29.81	29.81	3.52	3.52
	3.6	9.50	12.11	148.08	148.08	32.91	32.91	3.50	3.50
	4.0	10.48	13.35	161.47	161.47	35.88	35.88	3.48	3.48
	4.5	11.67	14.87	177.46	177.46	39.44	39.44	3.45	3.45
100 x 100	1.8	5.48	6.99	111.49	111.49	22.30	22.30	3.99	3.99
	2.0	6.07	7.74	122.84	122.84	24.57	24.57	3.98	3.98
	2.3	6.95	8.85	139.49	139.49	27.90	27.90	3.97	3.97
	2.6	7.82	9.96	155.70	155.70	31.14	31.14	3.95	3.95
	2.8	8.39	10.68	166.26	166.26	33.25	33.25	3.94	3.94
	3.0	8.96	11.41	176.63	176.63	35.33	35.33	3.93	3.93
	3.2	9.52	12.13	186.81	186.81	37.36	37.36	3.92	3.92
	3.6	10.64	13.55	206.61	206.61	41.32	41.32	3.91	3.91
	4.0	11.73	14.95	225.70	225.70	45.14	45.14	3.89	3.89
	4.5	13.08	16.67	248.59	248.59	49.72	49.72	3.86	3.86
120 x 120	2.0	7.33	9.34	215.26	215.26	35.88	35.88	4.80	4.80
	2.3	8.39	10.69	244.97	244.97	40.83	40.83	4.79	4.79
	2.6	9.45	12.04	274.02	274.02	45.67	45.67	4.77	4.77
	2.8	10.15	12.92	293.03	293.03	48.84	48.84	4.76	4.76
	3.0	10.84	13.81	311.76	311.76	51.96	51.96	4.75	4.75
	3.2	11.53	14.69	330.20	330.20	55.03	55.03	4.74	4.74
	3.6	12.90	16.43	366.25	366.25	61.04	61.04	4.72	4.72
	4.0	14.25	18.15	401.22	401.22	66.87	66.87	4.70	4.70
	4.5	15.91	20.27	443.44	443.44	73.91	73.91	4.68	4.68
125 x 125	2.0	7.64	9.74	243.98	243.98	39.04	39.04	5.01	5.01
	2.3	8.75	11.15	277.77	277.77	44.44	44.44	4.99	4.99
	2.6	9.86	12.56	310.85	310.85	49.74	49.74	4.98	4.98
	2.8	10.59	13.48	332.52	332.52	53.20	53.20	4.97	4.97
	3.0	11.31	14.41	353.87	353.87	56.62	56.62	4.96	4.96
	3.2	12.03	15.33	374.91	374.91	59.99	59.99	4.95	4.95
	3.6	13.46	17.15	416.09	416.09	66.57	66.57	4.93	4.93
	4.0	14.87	18.95	456.07	456.07	72.97	72.97	4.91	4.91
	4.5	16.62	21.17	504.42	504.42	80.71	80.71	4.88	4.88
	5.0	18.33	23.36	551.02	551.02	88.16	88.16	4.86	4.86
	6.0	21.69	27.63	639.27	639.27	102.28	102.28	4.81	4.81
	6.3	22.68	28.89	664.54	664.54	106.33	106.33	4.80	4.80
	8.0	28.10	35.79	798.54	798.54	127.77	127.77	4.72	4.72

TUBULARGE
Standard for hollow structural steel section

Side length A x B mm.	wall thickness (t) mm.	Unit mass kg/m.	Informative reference						
			Cross sectional area cm^2	Geometrical moment of inertia cm^4		Modulus of section cm^3		Radius of gyration of area cm	
				Ix	Iy	Zx	Zy	ix	iy
150 x 150	4.0	18.01	22.95	806.16	806.16	107.49	107.49	5.93	5.93
	4.5	20.15	25.67	894.18	894.18	119.22	119.22	5.90	5.90
	5.0	22.26	28.36	979.54	979.54	130.60	130.60	5.88	5.88
	6.0	26.40	33.63	1142.59	1142.59	152.35	152.35	5.83	5.83
	6.3	27.62	35.19	1189.59	1189.59	158.61	158.61	5.81	5.81
	8.0	34.38	43.79	1440.56	1440.56	192.07	192.07	5.74	5.74
	9.0	38.21	48.67	1577.22	1577.22	210.30	210.30	5.69	5.69
175 x 175	4.5	23.68	30.17	1445.99	1445.99	165.26	165.26	6.92	6.92
	5.0	26.18	33.36	1587.30	1587.30	181.41	181.41	6.90	6.90
	6.0	31.11	39.63	1859.01	1859.01	212.46	212.46	6.85	6.85
	6.3	32.57	41.49	1937.77	1937.77	221.46	221.46	6.83	6.83
	9.0	45.27	57.67	2593.87	2593.87	296.44	296.44	6.71	6.71
200 x 200	4.5	27.21	34.67	2187.99	2187.99	218.80	218.80	7.94	7.94
	5.0	30.11	38.36	2405.54	2405.54	240.55	240.55	7.92	7.92
	6.0	35.82	45.63	2826.04	2826.04	282.60	282.60	7.87	7.87
	6.3	37.52	47.79	2948.47	2948.47	294.85	294.85	7.85	7.85
	8.0	46.94	59.79	3611.14	3611.14	361.11	361.11	7.77	7.77
	9.0	52.34	66.67	3977.50	3977.50	397.75	397.75	7.72	7.72
	12.0	67.93	86.53	4984.80	4984.80	498.48	498.48	7.59	7.59
250 x 250	4.5	34.28	43.67	4355.04	4355.04	348.40	348.40	9.99	9.99
	5.0	37.96	48.36	4798.50	4798.50	383.88	383.88	9.96	9.96
	6.0	45.24	57.63	5661.90	5661.90	452.95	452.95	9.91	9.91
	6.3	47.41	60.39	5914.88	5914.88	473.19	473.19	9.90	9.90
	8.0	59.50	75.79	7297.12	7297.12	583.77	583.77	9.81	9.81
	9.0	66.47	84.67	8070.69	8070.69	645.66	645.66	9.76	9.76
	12.0	86.77	110.53	10228.28	10228.28	818.26	818.26	9.62	9.62
300 x 300	4.5	41.34	52.67	7620.31	7620.31	508.02	508.02	12.03	12.03
	5.0	45.81	58.36	8408.41	8408.41	560.56	560.56	12.00	12.00
	6.0	54.66	69.63	9950.17	9950.17	663.34	663.34	11.95	11.95
	6.3	57.30	72.99	10403.83	10403.83	693.59	693.59	11.94	11.94
	8.0	72.06	91.79	12898.50	12898.50	859.90	859.90	11.85	11.85
	9.0	80.60	102.67	14306.82	14306.82	953.79	953.79	11.80	11.80
	12.0	105.61	134.53	18281.41	18281.41	1218.76	1218.76	11.66	11.66
350 x 350	6.0	64.08	81.63	15990.86	15990.86	913.76	913.76	14.00	14.00
	6.3	67.19	85.59	16730.31	16730.31	956.02	956.02	13.98	13.98
	8.0	84.62	107.79	20815.28	20815.28	1189.44	1189.44	13.90	13.90
	9.0	94.73	120.67	23135.87	23135.87	1322.05	1322.05	13.85	13.85
	12.0	124.45	158.53	29744.19	29744.19	1699.67	1699.67	13.70	13.70

TUBULARGE

Standard for hollow structural steel section



STRUCTURAL RECTANGULAR HOLLOW SECTION

Side length A x B mm.	wall thickness (t) mm.	Unit mass kg/m.	Informative reference						
			Cross sectional area cm^2	Geometrical moment of inertia cm^4		Modulus of section cm^3		Radius of gyration of area cm	
				Ix	Iy	Zx	Zy	ix	iy
50 x 25	1.0	1.13	1.43	4.68	1.60	1.87	1.28	1.81	1.06
	1.2	1.34	1.71	5.49	1.87	2.19	1.50	1.79	1.05
	1.4	1.55	1.97	6.26	2.13	2.50	1.70	1.78	1.04
	1.6	1.75	2.23	6.99	2.37	2.80	1.90	1.77	1.03
	1.8	1.95	2.49	7.68	2.61	3.07	2.09	1.76	1.02
	2.0	2.15	2.74	8.34	2.83	3.34	2.26	1.75	1.02
	2.3	2.44	3.10	9.27	3.15	3.71	2.52	1.73	1.01
	2.6	2.71	3.46	10.13	3.47	4.05	2.77	1.71	1.00
	2.8	2.89	3.68	10.66	3.67	4.27	2.94	1.70	1.00
	3.0	3.07	3.91	11.18	3.88	4.47	3.11	1.69	1.00
	3.2	3.24	4.13	11.67	4.10	4.67	3.28	1.68	1.00
60 x 40	1.4	2.10	2.67	13.51	7.25	4.50	3.63	2.25	1.65
	1.6	2.38	3.03	15.18	8.14	5.06	4.07	2.24	1.64
	1.8	2.66	3.39	16.79	8.99	5.60	4.50	2.23	1.63
	2.0	2.93	3.74	18.35	9.82	6.12	4.91	2.22	1.62
	2.3	3.34	4.25	20.57	10.99	6.86	5.50	2.20	1.61
	2.6	3.73	4.76	22.67	12.11	7.56	6.06	2.18	1.60
	2.8	3.99	5.08	24.01	12.83	8.00	6.42	2.17	1.59
	3.0	4.25	5.41	25.30	13.53	8.43	6.76	2.16	1.58
	3.2	4.50	5.73	26.54	14.21	8.85	7.11	2.15	1.58
	3.6	4.98	6.35	28.91	15.53	9.64	7.77	2.13	1.56
75 x 38	1.8	3.03	3.85	28.01	9.77	7.47	5.14	2.70	1.59
	2.0	3.34	4.26	30.66	10.67	8.18	5.62	2.68	1.58
	2.3	3.81	4.85	34.47	11.97	9.19	6.30	2.67	1.57
	2.6	4.26	5.43	38.09	13.21	10.16	6.95	2.65	1.56
	2.8	4.56	5.81	40.39	14.00	10.77	7.37	2.64	1.55
	3.0	4.86	6.19	42.62	14.77	11.37	7.78	2.62	1.55
	3.2	5.15	6.56	44.78	15.53	11.94	8.17	2.61	1.54
	3.6	5.72	7.28	48.87	17.00	13.03	8.95	2.59	1.53
	4.0	6.27	7.99	52.69	18.45	14.05	9.71	2.57	1.52
75 x 40	1.8	3.08	3.93	28.98	10.96	7.73	5.48	2.72	1.67
	2.0	3.40	4.34	31.73	11.98	8.46	5.99	2.70	1.66
	2.3	3.88	4.94	35.69	13.45	9.52	6.72	2.69	1.65
	2.6	4.35	5.54	39.45	14.85	10.52	7.42	2.67	1.64
	2.8	4.65	5.92	41.85	15.74	11.16	7.87	2.66	1.63
	3.0	4.95	6.31	44.18	16.62	11.78	8.31	2.65	1.62
	3.2	5.25	6.69	46.43	17.47	12.38	8.73	2.64	1.62
	3.6	5.83	7.43	50.70	19.12	13.52	9.56	2.61	1.60
	4.0	6.40	8.15	54.71	20.74	14.59	10.37	2.59	1.60
75 x 50	1.8	3.37	4.29	33.80	18.14	9.01	7.26	2.81	2.06
	2.0	3.72	4.74	37.06	19.87	9.88	7.95	2.80	2.05
	2.3	4.24	5.40	41.77	22.36	11.14	8.94	2.78	2.03
	2.6	4.75	6.06	46.27	24.75	12.34	9.90	2.76	2.02
	2.8	5.09	6.48	49.16	26.28	13.11	10.51	2.75	2.01
	3.0	5.42	6.91	51.96	27.77	13.86	11.11	2.74	2.00
	3.2	5.75	7.33	54.68	29.22	14.58	11.69	2.73	2.00
	3.6	6.40	8.15	59.89	32.01	15.97	12.81	2.71	1.98
	4.0	7.02	8.95	64.80	34.69	17.28	13.88	2.69	1.97
80 x 40	1.6	2.88	3.67	30.64	10.50	7.66	5.25	2.89	1.69
	1.8	3.22	4.11	33.99	11.62	8.50	5.81	2.88	1.68
	2.0	3.56	4.54	37.24	12.71	9.31	6.35	2.86	1.67
	2.3	4.06	5.17	41.92	14.27	10.48	7.13	2.85	1.66
	2.6	4.55	5.80	46.38	15.76	11.60	7.88	2.83	1.65
	2.8	4.87	6.20	49.24	16.71	12.31	8.36	2.82	1.64
	3.0	5.19	6.61	52.00	17.65	13.00	8.82	2.81	1.63
	3.2	5.50	7.01	54.67	18.55	13.67	9.28	2.79	1.63
	3.6	6.11	7.79	59.77	20.32	14.94	10.16	2.77	1.62
	4.0	6.71	8.55	64.54	22.04	16.13	11.02	2.75	1.61
80 x 60	1.8	3.79	4.83	45.00	28.99	11.25	9.66	3.05	2.45
	2.0	4.19	5.34	49.41	31.81	12.35	10.60	3.04	2.44
	2.3	4.78	6.09	55.81	35.89	13.95	11.96	3.03	2.43
	2.6	5.37	6.84	61.96	39.82	15.49	13.27	3.01	2.41
	2.8	5.75	7.32	65.93	42.35	16.48	14.12	3.00	2.40
	3.0	6.13	7.81	69.80	44.81	17.45	14.94	2.99	2.40
	3.2	6.51	8.29	73.56	47.21	18.39	15.74	2.98	2.39
	3.6	7.24	9.23	80.80	51.84	20.20	17.28	2.96	2.37
	4.0	7.97	10.15	87.66	56.27	21.92	18.76	2.94	2.35
	4.2	8.32	10.60	90.97	58.41	22.74	19.47	2.93	2.35

TUBULARGE
Standard for hollow structural steel section

Side length A x B mm.	wall thickness (t) mm.	Unit mass kg/m.	Informative reference							
			Cross sectional area cm^2	Geometrical moment of inertia cm^4		Modulus of section cm^3		Radius of gyration of area cm	
				Ix	Iy	Zx	Zy	ix	iy
90 x 50	1.8	3.79	4.83	52.59	21.28	11.69	8.51	3.30	2.10
	2.0	4.19	5.34	57.74	23.33	12.83	9.33	3.29	2.09
	2.3	4.78	6.09	65.21	26.29	14.49	10.52	3.27	2.08
	2.6	5.37	6.84	72.39	29.13	16.09	11.65	3.25	2.06
	2.8	5.75	7.32	77.01	30.96	17.11	12.38	3.24	2.06
	3.0	6.13	7.81	81.52	32.74	18.11	13.10	3.23	2.05
	3.2	6.51	8.29	85.90	34.48	19.09	13.79	3.22	2.04
	3.6	7.24	9.23	94.30	37.84	20.96	15.14	3.20	2.02
	4.0	7.97	10.15	102.26	41.06	22.72	16.42	3.17	2.01
	4.2	8.32	10.60	106.07	42.62	23.57	17.05	3.16	2.01
90 x 60	1.8	4.07	5.19	59.59	32.04	13.24	10.68	3.39	2.49
	2.0	4.50	5.74	65.48	35.17	14.55	11.72	3.38	2.48
	2.3	5.14	6.55	74.06	39.72	16.46	13.24	3.36	2.46
	2.6	5.77	7.36	82.32	44.10	18.29	14.70	3.35	2.45
	2.8	6.19	7.88	87.66	46.93	19.48	15.64	3.33	2.44
	3.0	6.60	8.41	92.87	49.69	20.64	16.56	3.32	2.43
	3.2	7.01	8.93	97.96	52.38	21.77	17.46	3.31	2.42
	3.6	7.81	9.95	107.75	57.58	23.94	19.19	3.29	2.41
	4.0	8.59	10.95	117.06	62.55	26.01	20.85	3.27	2.39
	4.2	8.98	11.44	121.55	64.96	27.01	21.65	3.26	2.38
100 x 38	1.8	3.73	4.75	57.67	12.72	11.53	6.70	3.48	1.64
	2.0	4.13	5.26	63.29	13.92	12.66	7.32	3.47	1.63
	2.3	4.71	6.00	71.42	15.64	14.28	8.23	3.45	1.61
	2.6	5.28	6.73	79.22	17.29	15.84	9.10	3.43	1.60
	2.8	5.66	7.21	84.23	18.35	16.85	9.66	3.42	1.59
	3.0	6.04	7.69	89.10	19.38	17.82	10.20	3.40	1.59
	3.2	6.40	8.16	93.82	20.39	18.76	10.73	3.39	1.58
	3.6	7.13	9.08	102.85	22.35	20.57	11.76	3.36	1.57
	4.0	7.84	9.99	111.35	24.25	22.27	12.76	3.34	1.56
	4.2	8.19	10.43	115.41	25.19	23.08	13.26	3.33	1.55
100 x 40	1.6	3.38	4.31	53.45	12.86	10.69	6.43	3.52	1.73
	1.8	3.79	4.83	59.41	14.25	11.88	7.12	3.51	1.72
	2.0	4.19	5.34	65.21	15.60	13.04	7.80	3.50	1.71
	2.3	4.78	6.09	73.62	17.54	14.72	8.77	3.48	1.70
	2.6	5.37	6.84	81.68	19.40	16.34	9.70	3.46	1.68
	2.8	5.75	7.32	86.88	20.60	17.38	10.30	3.44	1.68
	3.0	6.13	7.81	91.92	21.76	18.38	10.88	3.43	1.67
	3.2	6.51	8.29	96.82	22.90	19.36	11.45	3.42	1.66
	3.6	7.24	9.23	106.20	25.11	21.24	12.55	3.39	1.65
	4.0	7.97	10.15	115.04	27.24	23.01	13.62	3.37	1.64
	4.2	8.32	10.60	119.27	28.29	23.85	14.15	3.35	1.63
100 x 50	1.6	3.64	4.63	61.20	21.05	12.24	8.42	3.63	2.13
	1.8	4.07	5.19	68.09	23.37	13.62	9.35	3.62	2.12
	2.0	4.50	5.74	74.81	25.63	14.96	10.25	3.61	2.11
	2.3	5.14	6.55	84.60	28.91	16.92	11.56	3.59	2.10
	2.6	5.77	7.36	94.02	32.05	18.80	12.82	3.58	2.09
	2.8	6.19	7.88	100.11	34.08	20.02	13.63	3.56	2.08
	3.0	6.60	8.41	106.04	36.06	21.21	14.42	3.55	2.07
	3.2	7.01	8.93	111.82	37.99	22.36	15.20	3.54	2.06
	3.6	7.81	9.95	122.93	41.72	24.59	16.69	3.52	2.05
	4.0	8.59	10.95	133.48	45.30	26.70	18.12	3.49	2.03
	4.2	8.98	11.44	138.55	47.04	27.71	18.82	3.48	2.03
100 x 60	1.8	4.35	5.55	76.77	35.09	15.35	11.70	3.72	2.52
	2.0	4.82	6.14	84.42	38.54	16.88	12.85	3.71	2.51
	2.3	5.50	7.01	95.58	43.55	19.12	14.52	3.69	2.49
	2.6	6.18	7.88	106.36	48.39	21.27	16.13	3.67	2.48
	2.8	6.63	8.44	113.34	51.51	22.67	17.17	3.66	2.47
	3.0	7.07	9.01	120.16	54.57	24.03	18.19	3.65	2.46
	3.2	7.51	9.57	126.82	57.55	25.36	19.18	3.64	2.45
	3.6	8.37	10.67	139.67	63.31	27.93	21.10	3.62	2.44
	4.0	9.22	11.75	151.93	68.83	30.39	22.94	3.60	2.42
	4.2	9.64	12.28	157.84	71.51	31.57	23.84	3.59	2.41
100 x 80	1.8	4.92	6.27	94.13	67.02	18.83	16.76	3.88	3.27
	2.0	5.45	6.94	103.63	73.75	20.73	18.44	3.87	3.26
	2.3	6.23	7.93	117.54	83.59	23.51	20.90	3.85	3.25
	2.6	7.00	8.92	131.03	93.13	26.21	23.28	3.83	3.23
	2.8	7.51	9.56	139.80	99.32	27.96	24.83	3.82	3.22
	3.0	8.01	10.21	148.39	105.39	29.68	26.35	3.81	3.21
	3.2	8.51	10.85	156.81	111.33	31.36	27.83	3.80	3.20
	3.6	9.50	12.11	173.14	122.85	34.63	30.71	3.78	3.19
	4.0	10.48	13.35	188.81	133.92	37.76	33.48	3.76	3.17
	4.2	10.96	13.96	196.41	139.28	39.28	34.82	3.75	3.16

TUBULARGE
Standard for hollow structural steel section

Side length A x B mm.	wall thickness (t) mm.	Unit mass kg/m.	Informative reference						
			Cross sectional area cm^2	Geometrical moment of inertia cm^4		Modulus of section cm^3		Radius of gyration of area cm	
				Ix	Iy	Zx	Zy	ix	iy
120 x 40	1.8	4.35	5.55	94.48	16.88	15.75	8.44	4.13	1.74
	2.0	4.82	6.14	103.85	18.49	17.31	9.24	4.11	1.74
	2.3	5.50	7.01	117.50	20.81	19.58	10.41	4.09	1.72
	2.6	6.18	7.88	130.66	23.04	21.78	11.52	4.07	1.71
	2.8	6.63	8.44	139.16	24.48	23.19	12.24	4.06	1.70
	3.0	7.07	9.01	147.45	25.88	24.58	12.94	4.05	1.69
	3.2	7.51	9.57	155.54	27.24	25.92	13.62	4.03	1.69
	3.6	8.37	10.67	171.09	29.89	28.51	14.95	4.00	1.67
	4.0	9.22	11.75	185.84	32.45	30.97	16.22	3.98	1.66
	4.2	9.64	12.28	192.92	33.70	32.15	16.85	3.96	1.66
120 x 60	1.8	4.92	6.27	119.63	41.19	19.94	13.73	4.37	2.56
	2.0	5.45	6.94	131.70	45.27	21.95	15.09	4.36	2.55
	2.3	6.23	7.93	149.37	51.21	24.89	17.07	4.34	2.54
	2.6	7.00	8.92	166.50	56.96	27.75	18.99	4.32	2.53
	2.8	7.51	9.56	177.63	60.68	29.60	20.23	4.31	2.52
	3.0	8.01	10.21	188.53	64.32	31.42	21.44	4.30	2.51
	3.2	8.51	10.85	199.20	67.88	33.20	22.63	4.29	2.50
	3.6	9.50	12.11	219.88	74.78	36.65	24.93	4.26	2.49
	4.0	10.48	13.35	239.68	81.40	39.95	27.13	4.24	2.47
	4.2	10.96	13.96	249.27	84.61	41.54	28.20	4.23	2.46
120 x 80	1.8	5.48	6.99	144.78	78.03	24.13	19.51	4.55	3.34
	2.0	6.07	7.74	159.55	85.92	26.59	21.48	4.54	3.33
	2.3	6.95	8.85	181.23	97.48	30.21	24.37	4.52	3.32
	2.6	7.82	9.96	202.34	108.71	33.72	27.18	4.51	3.30
	2.8	8.39	10.68	216.10	116.02	36.02	29.00	4.50	3.30
	3.0	8.96	11.41	229.61	123.18	38.27	30.80	4.49	3.29
	3.2	9.52	12.13	242.87	130.22	40.48	32.55	4.48	3.28
	3.6	10.64	13.55	268.67	143.88	44.78	35.97	4.45	3.26
	4.0	11.73	14.95	293.53	157.04	48.92	39.26	4.43	3.24
	4.2	12.28	15.64	305.61	163.44	50.94	40.86	4.42	3.23
	4.5	13.08	16.67	323.32	172.83	53.89	43.21	4.40	3.22
125 x 75	1.8	5.48	6.99	152.74	69.98	24.44	18.66	4.68	3.16
	2.0	6.07	7.74	168.32	77.04	26.93	20.54	4.66	3.16
	2.3	6.95	8.85	191.19	87.37	30.59	23.30	4.65	3.14
	2.6	7.82	9.96	213.46	97.40	34.15	25.97	4.63	3.13
	2.8	8.39	10.68	227.97	103.92	36.48	27.71	4.62	3.12
	3.0	8.96	11.41	242.22	110.31	38.75	29.42	4.61	3.11
	3.2	9.52	12.13	256.20	116.59	40.99	31.09	4.60	3.10
	3.6	10.64	13.55	283.41	128.77	45.35	34.34	4.57	3.08
	4.0	11.73	14.95	309.61	140.50	49.54	37.47	4.55	3.07
	4.2	12.28	15.64	322.34	146.20	51.57	38.99	4.54	3.06
	4.5	13.08	16.67	340.99	154.57	54.56	41.22	4.52	3.05
125 x 100	2.0	6.86	8.74	206.15	146.85	32.98	29.37	4.86	4.10
	2.3	7.85	10.00	234.48	166.94	37.52	33.39	4.84	4.09
	2.6	8.84	11.26	262.16	186.54	41.95	37.31	4.83	4.07
	2.8	9.49	12.08	280.24	199.34	44.84	39.87	4.82	4.06
	3.0	10.13	12.91	298.04	211.92	47.69	42.38	4.81	4.05
	3.2	10.78	13.73	315.56	224.30	50.49	44.86	4.79	4.04
	3.6	12.05	15.35	349.75	248.45	55.96	49.69	4.77	4.02
	4.0	13.30	16.95	382.84	271.80	61.25	54.36	4.75	4.00
	4.2	13.93	17.74	398.98	283.19	63.84	56.64	4.74	4.00
	4.5	14.85	18.92	422.70	299.93	67.63	59.99	4.73	3.98
150 x 50	1.8	5.48	6.99	188.10	33.83	25.08	13.53	5.19	2.20
	2.0	6.07	7.74	207.24	37.16	27.63	14.86	5.18	2.19
	2.3	6.95	8.85	235.28	42.00	31.37	16.80	5.16	2.18
	2.6	7.82	9.96	262.55	46.67	35.01	18.67	5.14	2.17
	2.8	8.39	10.68	280.30	49.70	37.37	19.88	5.12	2.16
	3.0	8.96	11.41	297.71	52.65	39.69	21.06	5.11	2.15
	3.2	9.52	12.13	314.78	55.54	41.97	22.22	5.09	2.14
	3.6	10.64	13.55	347.91	61.14	46.39	24.45	5.07	2.12
	4.0	11.73	14.95	379.73	66.51	50.63	26.61	5.04	2.11
	4.2	12.28	15.64	395.15	69.13	52.69	27.65	5.03	2.10
	4.5	13.08	16.67	417.69	72.97	55.69	29.19	5.01	2.09
150 x 100	3.2	12.03	15.33	487.20	261.80	64.96	52.36	5.64	4.13
	3.6	13.46	17.15	540.85	290.29	72.11	58.06	5.62	4.11
	4.0	14.87	18.95	592.94	317.91	79.06	63.58	5.59	4.10
	4.2	15.57	19.84	618.42	331.41	82.46	66.28	5.58	4.09
	4.5	16.62	21.17	655.93	351.27	87.46	70.25	5.57	4.07
	5.0	18.33	23.36	716.62	383.40	95.55	76.68	5.54	4.05
	6.0	21.69	27.63	831.37	444.27	110.85	88.85	5.49	4.01
	8.0	28.10	35.79	1036.85	555.08	138.25	111.02	5.38	3.94

TUBULARGE
Standard for hollow structural steel section

Side length A x B mm.	wall thickness (t) mm.	Unit mass kg/m.	Informative reference						
			Cross sectional area cm^2	Geometrical moment of inertia cm^4		Modulus of section cm^3		Radius of gyration of area cm	
				Ix	Iy	Zx	Zy	ix	iy
200 x 100	4.0	18.01	22.95	1197.04	410.12	119.70	82.02	7.22	4.23
	4.2	18.87	24.04	1249.86	427.83	124.99	85.57	7.21	4.22
	4.5	20.15	25.67	1327.88	453.95	132.79	90.79	7.19	4.21
	5.0	22.26	28.36	1454.71	496.32	145.47	99.26	7.16	4.18
	6.0	26.40	33.63	1696.60	576.99	169.66	115.40	7.10	4.14
	8.0	34.38	43.79	2135.73	724.79	213.57	144.96	6.98	4.07
200 x 150	4.0	21.15	26.95	1581.25	1019.37	158.13	135.92	7.66	6.15
	4.2	22.17	28.24	1652.47	1064.95	165.25	141.99	7.65	6.14
	4.5	23.68	30.17	1757.94	1132.42	175.79	150.99	7.63	6.13
	5.0	26.18	33.36	1930.13	1242.45	193.01	165.66	7.61	6.10
	6.0	31.11	39.63	2261.32	1453.81	226.13	193.84	7.55	6.06
	8.0	40.66	51.79	2873.44	1844.27	287.34	245.90	7.45	5.97
	9.0	45.27	57.67	3156.07	2025.15	315.61	270.02	7.40	5.93
250 x 150	4.5	27.21	34.67	2998.80	1370.66	239.90	182.75	9.30	6.29
	5.0	30.11	38.36	3297.67	1505.37	263.81	200.72	9.27	6.26
	6.0	35.82	45.63	3875.46	1765.03	310.04	235.34	9.22	6.22
	8.0	46.94	59.79	4953.71	2247.97	396.30	299.73	9.10	6.13
	9.0	52.34	66.67	5455.83	2473.08	436.47	329.74	9.05	6.09
	12.0	67.93	86.53	6826.76	3096.48	546.14	412.86	8.88	5.98
300 x 150	4.5	30.75	39.17	4673.03	1608.90	311.54	214.52	10.92	6.41
	5.0	34.03	43.36	5144.66	1768.29	342.98	235.77	10.89	6.39
	6.0	40.53	51.63	6060.01	2076.25	404.00	276.83	10.83	6.34
	8.0	53.22	67.79	7781.38	2651.68	518.76	353.56	10.71	6.25
	9.0	59.40	75.67	8589.03	2921.01	572.60	389.47	10.65	6.21
	12.0	77.35	98.53	10812.13	3669.24	720.81	489.23	10.48	6.10
300 x 200	4.5	34.28	43.67	5655.46	3048.10	377.03	304.81	11.38	8.35
	5.0	37.96	48.36	6232.58	3356.38	415.51	335.64	11.35	8.33
	6.0	45.24	57.63	7356.73	3955.48	490.45	395.55	11.30	8.28
	8.0	59.50	75.79	9487.09	5086.56	632.47	508.66	11.19	8.19
	9.0	66.47	84.67	10494.96	5620.36	699.66	562.04	11.13	8.15
	12.0	86.77	110.53	13301.89	7108.32	886.79	710.83	10.97	8.02
400 x 200	4.5	41.34	52.67	11306.35	3908.21	565.32	390.82	14.65	8.61
	5.0	45.81	58.36	12477.42	4307.21	623.87	430.72	14.62	8.59
	6.0	54.66	69.63	14769.07	5084.92	738.45	508.49	14.56	8.55
	8.0	72.06	91.79	19152.63	6561.97	957.63	656.20	14.44	8.46
	9.0	80.60	102.67	21246.13	7263.22	1062.31	726.32	14.38	8.41
	12.0	105.61	134.53	27145.57	9231.84	1357.28	923.18	14.20	8.28
400 x 300	4.5	48.41	61.67	14825.95	9585.17	741.30	639.01	15.51	12.47
	5.0	53.66	68.36	16378.26	10584.25	818.91	705.62	15.48	12.44
	6.0	64.08	81.63	19426.51	12543.61	971.33	836.24	15.43	12.40
	8.0	84.62	107.79	25300.04	16309.92	1265.00	1087.33	15.32	12.30
	9.0	94.73	120.67	28126.99	18118.68	1406.35	1207.91	15.27	12.25
	12.0	124.45	158.53	36181.09	23260.93	1809.05	1550.73	15.11	12.11

TIS 107 - 2533

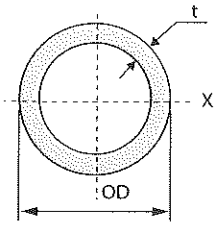
Standard for hollow structural steel sec



มาตรฐานผลิตภัณฑ์อุตสาหกรรม

มอก. 107 - 2533 เหล็กโครงสร้างรูปพรรณกลวง

STANDARD TIS 107 - 2533 (มอก.107)



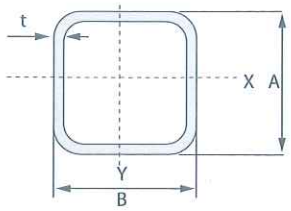
STRUCTURAL ROUND HOLLOW SECTION

Outside Diameter		wall thickness (t)	Unit mass	Informative reference			
				Cross sectional area	Geometrical moment of inertia	Modulus of section	Radius of gyration of area
in	mm.	mm	kg/m	cm^2	cm^4	cm^3	cm
					Ix , Iy	Zx , Zy	ix , iy
15	21.7	2.0	0.972	1.238	0.607	0.560	0.700
20	27.2	2.3	1.41	1.799	1.41	1.03	0.880
25	34.0	2.3	1.80	2.291	2.89	1.70	1.12
32	42.7	2.3	2.29	2.919	5.97	2.80	1.43
40	48.6	2.3	2.63	3.345	8.99	3.70	1.64
		3.2	3.58	4.564	11.8	4.86	1.61
50	60.5	3.2	4.52	5.760	23.7	7.84	2.03
		4.0	5.57	7.100	28.5	9.41	2.00
65	76.3	3.2	5.77	7.349	49.2	12.9	2.59
		4.0	7.13	9.085	59.5	15.6	2.56
80	89.1	3.2	6.78	8.636	79.8	17.9	3.04
		4.0	8.39	10.69	97.0	21.8	3.01
90	101.6	3.2	7.76	9.892	120	23.6	3.48
		4.0	9.63	12.26	146	28.8	3.45
100	114.3	3.2	8.77	11.17	172	30.2	3.93
		4.5	12.2	15.52	234	41.0	3.89
		5.6	15.0	19.12	283	49.6	3.85
125	139.8	4.5	15.0	19.13	438	62.7	4.79
		6.0	19.8	25.22	566	80.9	4.74
150	165.2	4.5	17.8	22.72	734	88.9	5.68
		6.0	23.6	30.01	952	115	5.63
175	190.7	5.0	22.9	29.17	1 260	132	6.57
		7.0	31.7	40.40	1 710	179	6.50
200	216.3	6.0	31.1	39.61	2 190	203	7.44
		8.0	41.1	52.35	2 840	263	7.37

STANDARD	CHEMICAL COMPOSITION					MECHANICAL PROPERTIES		
	C	Si	Mn	P	S	TENSILE	YIELD	ELONGATION
	MAX %	MAX %	MAX %	MAX %	MAX %	STRENGTH	STRENGTH	%
มอก.107 / HS 41	0.28	-	-	0.048	0.048	402 N/mm^2	235 N/mm^2	23
มอก.107 / HS 50	0.21	0.57	1.53	0.048	0.048	490 N/mm^2	314 N/mm^2	23
มอก.107 / HS 51	0.33	0.37	1.03	0.048	0.048	500 N/mm^2	353 N/mm^2	15

DIMENSION TOLERANCE
WALL THICKNESS : 2.0 - 3.2 = ± 0.3 mm.
: 4.0 - 8.0 = ± 10%
LENGTH : + Not limits , - 0 mm.

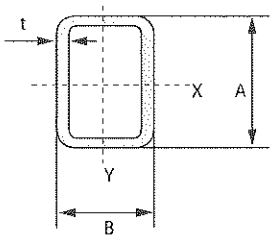
STANDARD TIS 107 - 2533 (มอก.107)



STRUCTURAL SQUARE HOLLOW SECTION

Side length A x B mm.	wall thickness (t) mm.	Unit mass kg/m.	Informative reference						
			Cross sectional area cm^2	Geometrical moment of inertia cm^4		Modulus of section cm^3		Radius of gyration of area cm	
				Ix	Iy	Zx	Zy	ix	iy
25 x 25	2.0	1.36	1.737	1.48	1.48	1.19	1.19	0.924	0.924
	2.3	1.53	1.737	1.61	1.61	1.29	1.29	0.904	0.904
32 x 32	2.3	2.04	2.596	3.71	3.71	2.32	2.32	1.20	1.20
	3.2	2.69	3.423	4.54	4.54	2.84	2.84	1.15	1.15
38 x 38	2.3	2.47	3.148	6.54	6.54	3.44	3.44	1.44	1.44
	3.2	3.29	4.191	8.18	8.18	4.30	4.30	1.40	1.40
50 x 50	2.3	3.34	4.252	15.9	15.9	6.34	6.34	1.93	1.93
	3.2	4.50	5.727	20.4	20.4	8.16	8.16	1.86	1.86
60 x 60	2.3	4.06	5.172	28.3	28.3	9.44	9.44	2.34	2.34
	3.2	5.50	7.007	36.9	36.9	12.3	12.3	2.30	2.30
	4.0	6.71	8.548	43.6	43.6	14.5	14.5	2.26	2.26
75 x 75	3.2	7.01	8.927	75.5	75.5	20.1	20.1	2.91	2.91
	4.0	8.59	10.948	90.2	90.2	24.1	24.1	2.87	2.87
90 x 90	3.2	8.51	10.85	135	135	29.9	29.9	3.52	3.52
	4.0	10.48	13.35	162	162	36.0	36.0	3.48	3.48
	4.5	11.67	14.87	178	178	39.5	39.5	3.46	3.46
100 x 100	3.2	9.52	12.13	187	187	37.5	37.5	3.93	3.93
	4.0	11.7	14.95	226	226	45.3	45.3	3.89	3.89
	4.5	13.1	16.67	249	249	49.9	49.9	3.87	3.87
150 x 150	4.5	20.1	25.67	896	896	120	120	5.91	5.91
	6.0	26.4	33.63	1 150	1 150	153	153	5.84	5.84
175 x 175	4.5	23.7	30.17	1 450	1 450	166	166	6.93	6.93
	6.0	31.1	39.63	1 860	1 860	213	213	6.86	6.86
200 x 200	6.0	35.8	45.63	2 830	2 830	283	283	7.88	7.88
	8.0	46.9	59.79	3 620	3 620	362	362	7.78	7.78
	9.0	52.3	66.67	3 990	3 990	399	399	7.73	7.73
250 x 250	6.0	45.2	57.63	5 670	5 670	454	454	9.92	9.92
	8.0	59.2	75.79	7 320	7 320	585	585	9.82	9.82
	9.0	66.5	84.67	8 090	8 090	647	647	9.78	9.78
300 x 300	6.0	54.7	69.63	9 960	9 960	664	664	12.0	12.0
	9.0	80.6	102.7	14 300	14 300	956	956	11.8	11.8
	12.0	106	134.5	18 300	18 300	1 220	1 220	11.7	11.7
350 x 350	9.0	94.7	120.7	23 200	23 200	1 320	1 320	13.9	13.9
	12.0	124	158.5	29 800	29 800	1 700	1 700	13.7	13.7

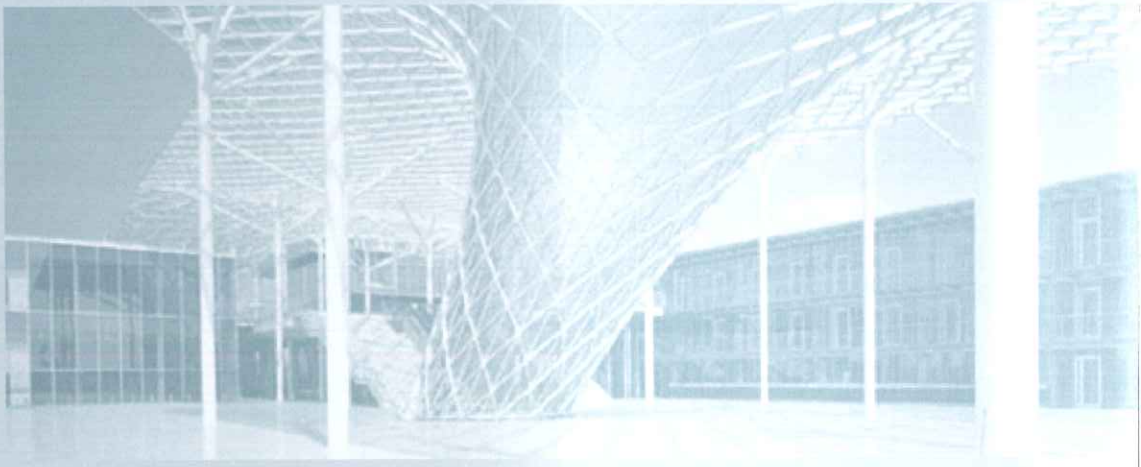
STANDARD TIS 107 - 2533 (มอก.107)



STRUCTURAL RECTANGULAR HOLLOW SECTION

Side length A x B mm.	wall thickness (t) mm.	Unit mass kg/m.	Informative reference							
			Cross sectional area cm^2	Geometrical moment of inertia cm^4		Modulus of section cm^3		Radius of gyration of area cm	
				Ix	Iy	Zx	Zy	ix	iy
50 x 25	2.3	2.44	3.102	9.31	3.10	3.72	2.48	1.73	1.00
	3.2	3.24	4.127	11.6	3.80	4.65	3.04	1.68	0.960
60 x 30	2.3	2.98	3.792	16.8	5.65	5.61	3.76	2.11	1.22
	3.2	3.99	5.087	21.4	7.08	7.15	4.72	2.05	1.18
75 x 38	2.3	3.81	4.850	34.6	12.0	9.23	6.30	2.67	1.57
	3.2	5.15	6.559	45.0	15.4	12.0	8.09	2.62	1.53
75 x 45	2.3	4.06	5.172	38.9	17.6	10.4	7.82	2.74	1.84
	3.2	5.50	7.007	50.8	22.8	13.5	10.1	2.69	1.80
90 x 45	2.3	4.60	5.862	61.0	20.8	13.6	9.22	3.23	1.88
	3.2	6.25	7.967	80.2	27.0	17.8	12.0	3.17	1.84
100 x 50	3.2	7.01	8.927	112	38.0	22.5	15.2	3.55	2.06
	4.0	8.59	10.95	142	46.7	28.4	18.7	3.55	2.03
	4.5	9.55	12.17	147	48.9	29.3	19.5	3.47	2.00
125 x 50	3.2	8.26	10.53	198	46.7	31.6	18.7	4.33	2.11
	4.0	10.2	12.95	238	55.6	38.0	22.0	4.28	2.07
	4.5	11.3	14.42	261	60.6	41.7	24.2	4.25	2.05
125 x 75	3.2	9.52	12.13	257	117	41.1	31.1	4.60	3.10
	4.0	11.7	14.95	311	141	49.7	37.5	4.56	3.07
	4.5	13.1	16.67	342	155	54.8	41.2	4.53	3.04
150 x 80	4.5	15.2	19.37	563	211	75.0	52.9	5.39	3.30
	6.0	19.8	25.23	710	264	94.7	66.1	5.31	3.24
150 x 100	4.5	16.6	21.17	658	352	87.7	70.4	5.58	4.08
	6.0	21.7	27.63	835	444	111	88.8	5.50	4.01
200 x 100	4.5	20.1	25.67	1 330	455	133	90.9	7.20	4.21
	6.0	26.4	33.63	1 700	577	170	115	7.12	4.14

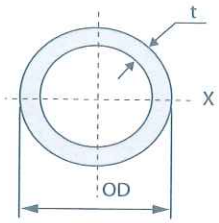
JIS G 3444 : 1994



Carbon steel tubes for
General structural purpose

STANDARD JIS G 3444-1994

Carbon steel tubes for general structural purpose



STRUCTURAL ROUND HOLLOW SECTION

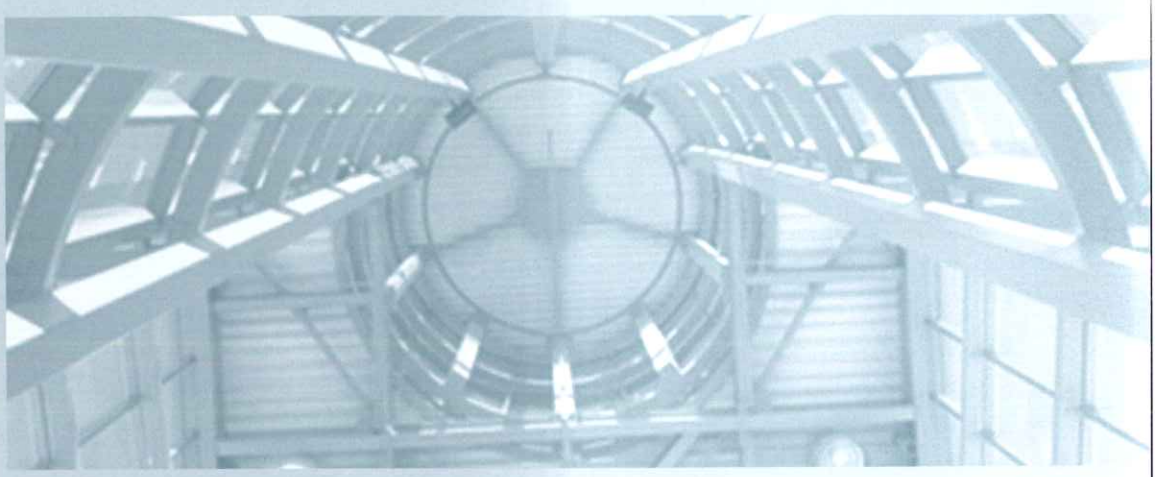
Outside Diameter		wall thickness (t)	Unit mass	Informative reference			
in	mm.	mm	kg/m	Cross sectional area cm^2	Geometrical moment of inertia cm^4	Modulus of section cm^3	Radius of gyration of area cm
					Ix , Iy	Zx , Zy	ix , iy
1/2"	21.7	2.0	0.972	1.238	0.607	0.560	0.700
3/4"	27.2	2.0	1.24	1.583	1.26	0.930	0.890
		2.3	1.41	1.799	1.41	1.03	0.880
1"	34.0	2.3	1.80	2.291	2.89	1.70	1.12
1-1/4"	42.7	2.3	2.29	2.919	5.97	2.80	1.43
		2.5	2.48	3.157	6.40	3.00	1.42
1-1/2"	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
2"	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
2-1/2"	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	2.58
3"	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
3-1/2"	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
4"	114.3	3.2	8.77	11.17	172	30.2	3.93
		3.5	9.58	12.18	187	32.7	3.92
		4.5	12.2	15.52	234	41.0	3.89
5"	139.8	3.6	12.1	15.40	357	51.1	4.82
		4.0	13.4	17.07	394	56.3	4.80
		4.5	15.02	19.13	438	62.7	4.79
		6.0	19.80	25.22	566	80.9	4.74
6"	165.2	4.5	17.8	22.72	734	88.9	5.68
		5.0	19.8	25.16	808	97.8	5.67
		6.0	23.6	30.01	952	115	5.63
		7.1	27.7	35.26	1100	134	5.60
8"	216.3	4.5	23.5	29.94	1680	155	7.49
		5.8	30.1	38.36	2130	197	7.45
		6.0	31.1	39.64	2190	203	7.44
		7.0	36.1	46.03	2520	233	7.40
		8.0	41.1	52.35	2840	263	7.37
		8.2	42.1	53.61	2910	269	7.36
10"	267.4	6.0	38.7	49.27	4210	315	9.24
		6.6	42.4	54.08	4600	344	9.22
		7.0	45.0	57.26	2860	363	9.21
		8.0	51.2	65.19	5490	411	9.18
		9.0	57.3	73.06	6110	457	9.14
		9.3	59.2	75.41	6290	470	9.13
12"	318.5	6.0	46.2	58.91	7190	452	11.1
		6.9	53.0	67.55	8200	515	11.0
		8.0	61.3	78.04	9410	591	11.0
		9.0	68.7	87.51	10500	659	10.9
		10.3	78.3	99.73	11900	744	10.9

STANDARD JIS G 3444-1994

Carbon steel tubes for general structural purpose

Outside Diameter		wall thickness (t)	Unit Mass	Informative reference			
in	mm.	mm	kg/m	Cross sectional area cm^2	Geometrical moment of inertia cm^4 Ix , Iy	Modulus of section cm^3 Zx , Zy	Radius of gyration of area cm ix , iy
14"	355.6	6.4	55.1	70.21	10700	602	12.3
		7.9	67.7	86.29	13000	734	12.3
		9.0	76.9	98.00	14700	828	12.3
		9.5	81.1	103.3	15500	871	12.2
		12.0	102	129.5	19100	1080	12.2
		12.7	107	136.8	20100	1130	12.1
16"	406.4	7.9	77.6	98.90	19600	967	14.1
		9.0	88.2	112.4	22200	1090	14.1
		9.5	93.0	118.5	23300	1150	14.0
		12.0	117	148.7	28900	1420	14.0
		12.7	123	157.1	30500	1500	13.9
		16.0	154	196.2	37400	1840	13.8
18"	457.2	9.0	99.5	126.7	31800	1400	15.8
		9.5	105	133.6	33500	1470	15.8
		12.0	132	167.8	41600	1820	15.7
		12.7	139	177.3	43800	1920	15.7
		16.0	174	221.8	54000	2360	15.6

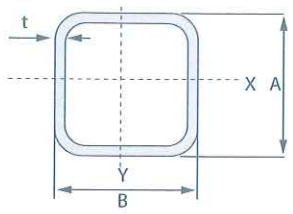
JIS G 3466 : 1988



Carbon steel square pipes for
General structural purpose

STANDARD JIS 3466-1998

Carbon Steel Square pipes For General Structural Purposes

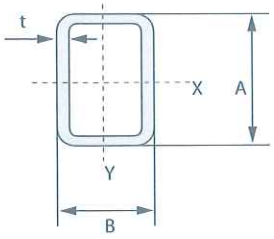


STRUCTURAL SQUARE HOLLOW SECTION

Side length A x B mm.	wall thickness (t) mm.	Unit mass kg/m.	Informative reference							
			Cross sectional area cm^2	Geometrical moment of inertia cm^4		Modulus of section cm^3		Radius of gyration of area cm	
				Ix	Iy	Zx	Zy	ix	iy
40 x 40	1.6	1.88	2.392	5.79	5.79	2.90	2.90	1.56	1.56
	2.3	2.62	3.332	7.73	7.73	3.86	3.86	1.52	1.52
50 x 50	1.6	2.38	3.032	11.7	11.7	4.68	4.68	1.96	1.96
	2.3	3.34	4.252	15.9	15.9	6.34	6.34	1.93	1.93
	3.2	4.50	5.727	20.4	20.4	8.16	8.16	1.89	1.89
60 x 60	1.6	2.88	3.672	20.7	20.7	6.89	6.89	2.37	2.37
	2.3	4.06	5.172	28.3	28.3	9.44	9.44	2.34	2.34
	3.2	5.50	7.007	36.9	36.9	12.3	12.3	2.30	2.30
75 x 75	1.6	3.64	4.632	41.3	41.3	11.0	11.0	2.99	2.99
	2.3	5.14	6.552	57.1	57.1	15.2	15.2	2.95	2.95
	3.2	7.01	8.927	75.5	75.5	20.1	20.1	2.91	2.91
	4.5	9.55	12.17	98.6	98.6	26.3	26.3	2.85	2.85
80 x 80	2.3	5.50	7.012	69.9	69.9	17.5	17.5	3.16	3.16
	3.2	7.51	9.567	92.7	92.7	23.2	23.2	3.11	3.11
	4.5	10.3	13.07	122	122	30.4	30.4	3.05	3.05
90 x 90	2.3	6.23	7.932	101	101	22.4	22.4	3.56	3.56
	3.2	8.51	10.85	135	135	29.9	29.9	3.52	3.52
100 x 100	2.3	6.95	8.852	140	140	27.9	27.9	3.97	3.97
	3.2	9.52	12.13	187	187	37.5	37.5	3.93	3.93
	4.0	11.7	14.95	226	226	45.3	45.3	3.89	3.89
	4.5	13.1	16.67	249	249	49.9	49.9	3.87	3.87
	6.0	17.0	21.63	311	311	62.3	62.3	3.79	3.79
125 x 125	3.2	12.0	15.33	376	376	60.1	60.1	4.95	4.95
	4.5	16.6	21.17	506	506	80.9	80.9	4.89	4.89
	5.0	18.3	23.36	553	553	88.4	88.4	4.86	4.86
	6.0	21.7	27.63	641	641	103	103	4.82	4.82
	9.0	31.1	39.67	865	865	138	138	4.67	4.67
150 x 150	4.5	20.1	25.67	896	896	120	120	5.91	5.91
	5.0	22.3	28.36	982	982	131	131	5.89	5.89
	6.0	26.4	33.63	1150	1150	153	153	5.84	5.84
	9.0	38.2	48.67	1580	1580	210	210	5.69	5.69
200 x 200	4.5	27.2	34.67	2190	2190	219	219	7.95	7.95
	6.0	35.8	45.63	2830	2830	283	283	7.88	7.88
	8.0	46.9	59.79	3620	3620	362	362	7.78	7.78
	9.0	52.3	66.67	3990	3990	399	399	7.73	7.73
	12.0	67.9	86.53	4980	4980	498	498	7.59	7.59
250 x 250	5.0	38.0	48.36	4810	4810	384	384	9.97	9.97
	6.0	45.2	57.63	5670	5670	454	454	9.92	9.92
	8.0	59.5	75.79	7320	7320	585	585	9.82	9.82
	9.0	66.5	84.67	8090	8090	647	647	9.78	9.78
	12.0	86.8	110.5	10300	10300	820	820	9.63	9.63
300 x 300	4.5	41.3	52.67	7630	7630	508	508	12.0	12.0
	6.0	54.7	69.63	9960	9960	664	664	12.0	12.0
	9.0	80.6	102.7	14300	14300	956	956	11.8	11.8
	12.0	106	134.5	18300	18300	1220	1220	11.7	11.7
350 x 350	9.0	94.7	120.7	23200	23200	1320	1320	13.9	13.9
	12.0	124	158.5	29800	29800	1700	1700	13.7	13.7

STANDARD JIS 3466-1998

Carbon Steel Rectangular pipes For General Structural Purposes



STRUCTURAL RECTANGULAR HOLLOW SECTION

Side length A x B mm.	wall thickness (t) mm.	Unit mass kg/m.	Informative reference							
			Cross sectional area cm^2	Geometrical moment of inertia cm^4		Modulus of section cm^3		Radius of gyration of area cm	
				Ix	Iy	Zx	Zy	ix	iy
80 x 40	1.6	2.88	3.672	30.7	10.5	7.68	5.26	2.89	1.69
	2.3	4.06	5.172	42.1	14.3	10.5	7.14	2.85	1.66
	3.2	5.50	7.007	54.9	18.4	13.7	9.21	2.80	1.62
100 x 40	1.6	3.38	4.312	53.5	12.9	10.7	6.44	3.52	1.73
	2.3	4.78	6.092	73.9	17.5	14.8	8.77	3.48	1.70
	4.2	8.32	10.60	120	27.60	24.0	10.60	3.36	1.61
100 x 50	1.6	3.64	4.632	61.3	21.1	12.3	8.43	3.64	2.13
	2.3	5.14	6.552	84.8	29.0	17.0	11.6	3.60	2.10
	3.2	7.01	8.927	112	38.0	22.5	15.2	3.55	2.06
	4.5	9.55	12.17	147	48.9	29.3	19.5	3.47	2.00
125 x 75	2.3	6.95	8.852	192	87.5	30.6	23.3	4.65	3.14
	3.2	9.52	12.13	257	117	41.1	31.1	4.60	3.10
	4.0	11.7	14.95	311	141	49.7	37.5	4.56	3.07
	4.5	13.1	16.67	342	155	54.8	41.2	4.53	3.04
150 x 75	3.2	10.8	13.73	402	137	53.6	36.6	5.41	3.16
150 x 100	3.2	12.0	15.33	488	262	65.1	52.5	5.64	4.14
	4.5	16.6	21.17	658	352	87.7	70.4	5.58	4.08
	6.0	21.7	27.63	835	444	111	88.8	5.50	4.01
	9.0	31.1	39.67	1130	595	151	119	5.33	3.87
200 x 100	4.5	20.1	25.67	1330	455	133	90.9	7.20	4.21
	6.0	26.4	33.63	1700	577	170	115	7.12	4.14
	9.0	38.2	48.67	2350	782	235	156	6.94	4.01
200 x 150	4.5	23.7	30.17	1760	1130	176	151	7.64	6.13
	6.0	31.1	39.63	2270	1460	227	194	7.56	6.06
	9.0	45.3	57.67	3170	2020	317	270	7.41	5.93
250 x 150	6.0	35.8	45.63	3890	1770	311	236	9.23	6.23
	9.0	52.3	66.67	5480	2470	438	330	9.06	6.09
	12.0	67.9	86.53	6850	3070	548	409	8.90	5.95

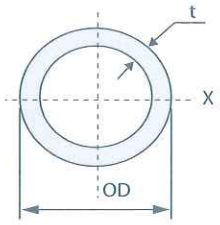
ASTM A 500



Cold-formed welded c
rounds and shapes

STANDARD ASTM A 500 : 2001

Cold Formed Carbon Steel Structural Tubing In Round And Shapes

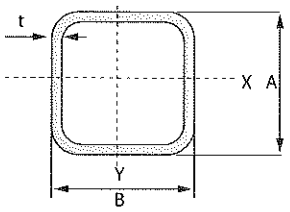


STRUCTURAL ROUND HOLLOW SECTION

Outside Diameter		wall thickness (t)	Unit Mass	Informative reference			
in	mm.	mm	kg/m	Cross sectional area cm^2	Geometrical moment of inertia cm^4 Ix , Iy	Modulus of section cm^3 Zx , Zy	Radius of gyration of area cm ix , iy
1/2"	21.3	2.77	1.27	1.61	0.71	0.66	0.66
3/4"	26.7	2.87	1.69	2.15	1.55	1.16	0.85
1"	33.4	2.64	2.00	2.55	3.04	1.82	1.09
		3.38	2.50	3.19	3.64	2.18	1.07
1-1/4"	42.2	2.79	2.71	3.45	6.74	3.19	1.40
		3.56	3.39	4.32	8.13	3.85	1.37
1-1/2"	48.3	2.90	3.25	4.14	10.70	4.43	1.61
		3.68	4.05	5.16	12.93	5.35	1.58
2"	60.3	3.70	5.16	6.58	26.46	8.78	2.01
		3.91	5.44	6.93	27.66	9.18	2.00
2-1/2"	73	3.96	6.74	8.59	51.34	14.07	2.44
		4.78	8.04	10.24	59.89	16.41	2.42
		5.16	8.63	11.00	63.63	17.43	2.41
3"	88.9	3.96	8.30	10.57	95.51	21.49	3.01
		4.78	9.92	12.63	112.09	25.22	2.98
		5.49	11.29	14.39	125.65	28.27	2.96
3-1/2"	101.6	3.96	9.54	12.15	144.99	28.54	3.45
		4.78	11.41	14.54	170.78	33.62	3.43
		5.74	13.57	17.29	199.27	39.23	3.40
4"	114.3	3.96	10.78	13.73	209.18	36.60	3.90
		4.78	12.91	16.45	247.06	43.23	3.88
		5.56	14.91	18.99	281.47	49.25	3.85
		6.02	16.08	20.48	301.05	52.68	3.83
5"	141.3	6.55	21.77	27.73	630.83	89.29	4.77
6"	168.3	7.11	28.26	36.00	1171.62	139.23	5.70
		10.97	42.56	54.22	1685.81	200.33	5.58
8"	219.1	8.18	42.55	54.20	3018.69	275.55	7.46
		12.70	64.64	82.35	4401.84	401.81	7.31
10"	273.1	9.27	60.31	76.83	6693.42	490.18	9.33
		12.70	81.56	103.89	8827.11	646.44	9.22
12"	323.8	9.53	73.86	94.09	11626.81	718.15	11.12
		12.70	97.44	124.12	15041.35	929.05	11.01
14"	355.6	9.53	81.33	103.61	15522.94	873.06	12.24
		12.70	107.40	136.81	20135.45	1132.48	12.13
16"	406.4	9.53	93.27	118.82	23407.12	1151.93	14.04
		12.70	123.31	157.08	30465.73	1499.30	13.93
18"	457.2	9.53	105.21	134.03	33591.05	1469.42	15.83
		12.70	139.22	177.35	43836.24	1917.60	15.72

STANDARD ASTM A 500 : 2001

Cold Formed Carbon Steel Structural Tubing In Round And Shapes

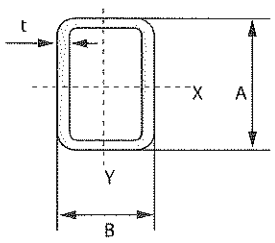


STRUCTURAL SQUARE HOLLOW SECTION

Side length A x B mm.	wall thickness (t) mm.	Unit mass kg/m.	Informative reference						
			Cross sectional area cm^2	Geometrical moment of inertia cm^4		Modulus of section cm^3		Radius of gyration of area cm	
				Ix	Iy	Zx	Zy	ix	iy
25 x 25	2.41	1.59	2.03	1.73	1.73	1.38	1.38	0.92	0.92
	3.38	2.11	2.68	2.42	2.42	1.91	1.91	0.95	0.95
50 x 50	2.79	3.98	5.07	18.42	18.42	7.37	7.37	1.91	1.91
	3.18	4.47	5.70	20.35	20.35	8.14	8.14	1.89	1.89
	3.91	5.35	6.81	23.69	23.69	9.48	9.48	1.86	1.86
75 x 75	3.96	8.52	10.85	89.33	89.33	23.82	23.82	2.87	2.87
100 x 100	4.78	13.83	17.62	260.97	260.97	52.19	52.19	3.85	3.85
125 x 125	4.78	17.58	22.40	530.72	530.72	84.92	84.92	4.87	4.87
	6.35	22.84	29.10	668.70	668.70	106.99	106.99	4.79	4.79
	7.92	27.85	35.48	792.55	792.55	126.81	126.81	4.73	4.73
	9.52	32.69	41.64	907.80	907.80	145.25	145.25	4.67	4.67
150 x 150	4.78	21.33	27.18	942.30	942.30	125.64	125.64	5.89	5.89
	6.35	27.83	35.45	1197.34	1197.34	159.65	159.65	5.81	5.81
	7.92	34.07	43.40	1429.30	1429.30	190.57	190.57	5.74	5.74
	9.52	40.16	51.16	1645.51	1645.51	219.40	219.40	5.67	5.67
	12.70	51.49	65.59	2032.98	2032.98	271.06	271.06	5.57	5.57
200 x 200	6.35	37.80	48.15	2968.71	2968.71	296.87	296.87	7.85	7.85
	7.92	46.50	59.24	3581.11	3581.11	358.11	358.11	7.78	7.78
	9.52	55.11	70.20	4161.56	4161.56	416.16	416.16	7.70	7.70
	12.70	71.43	90.99	5202.67	5202.67	520.27	520.27	7.56	7.56
250 x 250	6.35	47.77	60.85	5956.78	5956.78	476.54	476.54	9.89	9.89
	7.92	58.93	75.08	7234.00	7234.00	578.72	578.72	9.82	9.82
	9.52	70.05	89.24	8461.81	8461.81	676.95	676.95	9.74	9.74
	12.70	91.37	116.39	10699.15	10699.15	855.93	855.93	9.59	9.59

STANDARD ASTM A 500 : 2001

Cold Formed Carbon Steel Structural Tubing In Round And Shapes



STRUCTURAL RECTANGULAR HOLLOW SECTION

Side length A x B mm.	wall thickness (t) mm.	Unit mass kg/m.	Informative reference						
			Cross sectional area cm^2	Geometrical moment of inertia cm^4		Modulus of section cm^3		Radius of gyration of area cm	
				Ix	Iy	Zx	Zy	ix	iy
75 x 50	3.58	6.36	8.11	59.64	31.88	15.90	12.75	2.71	1.98
100 x 50	3.96	8.52	10.85	132.45	44.95	26.49	17.98	3.49	2.04
	4.78	10.08	12.84	152.53	51.97	30.51	20.79	3.45	2.01
125 x 75	4.78	13.83	17.62	357.92	162.18	57.27	43.25	4.51	3.03
150 x 75	4.78	15.71	20.01	564.15	191.69	75.22	51.12	5.31	3.10
150 x 100	4.78	17.58	22.40	690.20	369.41	92.03	73.88	5.55	4.06
	6.35	22.84	29.10	869.54	464.61	115.94	92.92	5.47	4.00
	7.92	27.85	35.48	1029.19	550.87	137.23	110.17	5.39	3.94
	9.52	32.69	41.64	1175.10	633.21	156.68	126.64	5.31	3.90
200 x 100	4.78	21.33	27.18	1399.40	477.85	139.94	95.57	7.18	4.19
	6.35	27.83	35.45	1777.65	604.05	177.76	120.81	7.08	4.13
	7.92	34.07	43.40	2119.25	719.16	211.92	143.83	6.99	4.07
	9.52	40.16	51.16	2433.07	828.77	243.31	165.75	6.90	4.02
250 x 150	6.35	37.80	48.15	4071.50	1852.94	325.72	247.06	9.20	6.20
	7.92	46.50	59.24	4912.50	2229.52	393.00	297.27	9.11	6.13
	9.52	55.11	70.20	5707.64	2586.31	456.61	344.84	9.02	6.07
	12.70	71.43	90.99	7119.97	3233.45	569.60	431.13	8.85	5.96

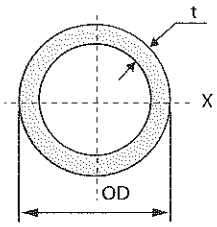
EN 10219 : 1997



Cold-formed welded stuctural hollow section of non-alloy and fire grain steels

STANDARD EN 10219-1997

Cold Formed Welded Structural Hollow Sections Of Non-alloy and Fine Grain Steels



STRUCTURAL ROUND HOLLOW SECTION

Outside Diameter		wall thickness (t)	Unit Mass	Informative reference			
in	mm.	mm	kg/m	Cross sectional area cm^2	Geometrical moment of inertia cm^4 Ix , Iy	Modulus of section cm^3 Zx , Zy	Radius of gyration of area cm ix , iy
1/2"	21.7	1.0	0.51	0.65	0.35	0.32	0.73
		1.2	0.61	0.77	0.41	0.38	0.73
		1.4	0.70	0.89	0.46	0.43	0.72
		1.6	0.79	1.01	0.51	0.47	0.71
		1.8	0.88	1.13	0.56	0.52	0.71
		2.0	0.97	1.24	0.61	0.56	0.70
		2.3	1.10	1.40	0.67	0.62	0.69
		2.5	1.18	1.51	0.71	0.65	0.68
		2.8	1.31	1.66	0.76	0.70	0.68
3/4"	27.2	1.0	0.65	0.82	0.71	0.52	0.93
		1.2	0.77	0.98	0.83	0.61	0.92
		1.4	0.89	1.13	0.95	0.70	0.91
		1.6	1.01	1.29	1.06	0.78	0.91
		1.8	1.13	1.44	1.16	0.86	0.90
		2.0	1.24	1.58	1.26	0.93	0.89
		2.3	1.41	1.80	1.41	1.03	0.88
		2.5	1.52	1.94	1.49	1.10	0.88
		2.8	1.68	2.15	1.62	1.19	0.87
1"	34	1.2	0.97	1.24	1.67	0.98	1.16
		1.4	1.13	1.43	1.91	1.12	1.15
		1.6	1.28	1.63	2.14	1.26	1.15
		1.8	1.43	1.82	2.37	1.39	1.14
		2.0	1.58	2.01	2.58	1.52	1.13
		2.3	1.80	2.29	2.89	1.70	1.12
		2.5	1.94	2.47	3.09	1.82	1.12
		2.8	2.15	2.74	3.37	1.98	1.11
		3.0	2.29	2.92	3.54	2.08	1.10
		3.2	2.43	3.10	3.71	2.18	1.09
		3.5	2.63	3.35	3.95	2.32	1.09
1-1/4"	42.7	1.4	1.43	1.82	3.88	1.82	1.46
		1.6	1.62	2.07	4.37	2.05	1.45
		1.8	1.82	2.31	4.85	2.27	1.45
		2.0	2.01	2.56	5.31	2.49	1.44
		2.3	2.29	2.92	5.97	2.80	1.43
		2.5	2.48	3.16	6.40	3.00	1.42
		2.8	2.76	3.51	7.02	3.29	1.41
		3.0	2.94	3.74	7.41	3.47	1.41
		3.2	3.12	3.97	7.80	3.65	1.40
1-1/2"	48.6	3.5	3.38	4.31	8.35	3.91	1.39
		1.4	1.63	2.08	5.79	2.38	1.67
		1.6	1.85	2.36	6.53	2.69	1.66
		1.8	2.08	2.65	7.26	2.99	1.66
		2.0	2.30	2.93	7.96	3.28	1.65
		2.3	2.63	3.35	8.99	3.70	1.64
		2.5	2.84	3.62	9.65	3.97	1.63
		2.8	3.16	4.03	10.60	4.36	1.62
		3.0	3.37	4.30	11.22	4.62	1.62
		3.2	3.58	4.56	11.82	4.86	1.61
		3.5	3.89	4.96	12.68	5.22	1.60
		4.0	4.40	5.60	14.05	5.78	1.58
2"	60.5	1.6	2.32	2.96	12.85	4.25	2.08
		1.8	2.61	3.32	14.31	4.73	2.08
		2.0	2.89	3.68	15.74	5.20	2.07
		2.3	3.30	4.21	17.83	5.90	2.06
		2.5	3.58	4.56	19.19	6.34	2.05
		2.8	3.98	5.08	21.17	7.00	2.04
		3.0	4.25	5.42	22.46	7.42	2.04
		3.2	4.52	5.76	23.72	7.84	2.03
		3.5	4.92	6.27	25.55	8.45	2.02
		4.0	5.57	7.10	28.47	9.41	2.00
		4.5	6.21	7.92	31.23	10.33	1.99

STANDARD EN 10219-1997

Cold Formed Welded Structural Hollow Sections Of Non-alloy and Fine Grain Steels

Outside Diameter		wall thickness (t)	Unit Mass	Informative reference			
in	mm.	mm	kg/m	Cross sectional area cm^2	Geometrical moment of inertia cm^4	Modulus of section cm^3	Radius of gyration of area cm
					Ix , Iy	Zx , Zy	ix , iy
2-1/2"	76.3	1.8	3.31	4.21	29.25	7.67	2.63
		2.0	3.66	4.67	32.24	8.45	2.63
		2.3	4.20	5.35	36.64	9.60	2.62
		2.5	4.55	5.80	39.51	10.36	2.61
		2.8	5.08	6.47	43.72	11.46	2.60
		3.0	5.42	6.91	46.48	12.18	2.59
		3.2	5.77	7.35	49.18	12.89	2.59
		3.5	6.28	8.00	53.15	13.93	2.58
		4.0	7.13	9.09	59.55	15.61	2.56
		4.5	7.97	10.15	65.67	17.21	2.54
		5.0	8.79	11.20	71.52	18.75	2.53
3"	89.1	1.8	3.88	4.94	47.05	10.56	3.09
		2.0	4.30	5.47	51.92	11.66	3.08
		2.3	4.92	6.27	59.11	13.27	3.07
		2.5	5.34	6.80	63.81	14.32	3.06
		2.8	5.96	7.59	70.75	15.88	3.05
		3.0	6.37	8.11	75.29	16.90	3.05
		3.2	6.78	8.64	79.76	17.90	3.04
		3.5	7.39	9.41	86.35	19.38	3.03
		4.0	8.39	10.69	97.02	21.78	3.01
		4.5	9.39	11.96	107.30	24.09	3.00
		5.0	10.37	13.21	117.21	26.31	2.98
3-1/2"	101.6	2.5	6.11	7.78	95.61	18.82	3.50
		2.8	6.82	8.69	106.13	20.89	3.49
		3.0	7.29	9.29	113.04	22.25	3.49
		3.2	7.77	9.89	119.85	23.59	3.48
		3.5	8.47	10.79	129.92	25.58	3.47
		4.0	9.63	12.26	146.28	28.80	3.45
		4.5	10.78	13.73	162.13	31.92	3.44
		5.0	11.91	15.17	177.47	34.93	3.42
4"	114.3	2.5	6.89	8.78	137.26	24.02	3.95
		2.8	7.70	9.81	152.52	26.69	3.94
		3.0	8.23	10.49	162.55	28.44	3.94
		3.2	8.77	11.17	172.47	30.18	3.93
		3.5	9.56	12.18	187.15	32.75	3.92
		4.0	10.88	13.86	211.07	36.93	3.90
		4.5	12.19	15.52	234.32	41.00	3.89
		5.0	13.48	17.17	256.92	44.96	3.87
		6.0	16.03	20.41	300.21	52.53	3.83
5"	139.8	3.5	11.76	14.99	348.26	49.82	4.82
		4.0	13.40	17.07	393.73	56.33	4.80
		4.5	15.02	19.13	438.17	62.69	4.79
		5.0	16.62	21.17	481.61	68.90	4.77
		6.0	19.80	25.22	565.53	80.90	4.74
6"	168.3	3.5	14.22	18.12	615.45	73.14	5.83
		4.0	16.21	20.65	697.09	82.84	5.81
		4.5	18.18	23.16	777.22	92.36	5.79
		5.0	20.14	25.65	855.85	101.70	5.78
		6.0	24.02	30.59	1008.69	119.87	5.74
8"	219.1	4.0	21.22	27.03	1563.84	142.75	7.61
		4.5	23.82	30.34	1747.24	159.49	7.59
		5.0	26.40	33.63	1928.04	176.00	7.57
		6.0	31.53	40.17	2281.95	208.30	7.54
		9.0	46.63	59.40	3283.80	299.75	7.43
10"	273.1	4.5	29.81	37.97	3425.41	250.85	9.50
		5.0	33.06	42.11	3785.05	277.19	9.48
		6.0	39.52	50.35	4492.13	328.97	9.45
		9.0	58.62	74.67	6517.96	477.33	9.34
		12.0	77.27	98.43	8405.78	615.58	9.24
12"	323.9	5.0	39.32	50.09	6369.42	393.30	11.28
		6.0	47.04	59.92	7572.47	467.58	11.24
		9.0	69.89	89.04	11045.24	682.02	11.14
		12.0	92.30	117.58	14319.56	884.20	11.04
14"	355.6	5.0	43.23	55.07	8463.58	476.02	12.40
		6.0	51.73	65.90	10070.55	566.40	12.36
		9.0	76.93	98.00	14725.86	828.23	12.26
		12.0	101.68	129.53	19139.47	1076.46	12.16
		16.0	134.00	170.70	24663.00	1387.12	12.02
16"	406.4	5.0	49.50	63.05	12700.75	625.04	14.19
		6.0	59.25	75.47	15128.33	744.50	14.16
		9.0	88.20	112.36	22192.62	1092.16	14.05
		12.0	116.72	148.69	28937.01	1424.07	13.95
		16.0	154.05	196.24	37448.82	1842.95	13.81
18"	457.2	6.0	66.76	85.05	21646.87	946.93	15.95
		9.0	99.48	126.73	31834.13	1392.57	15.85
		12.0	131.75	167.84	41612.33	1820.31	15.75
		16.0	174.09	221.77	54032.76	2363.64	15.61

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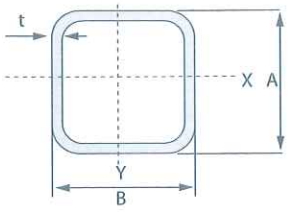
Cold Formed Welded Structural Hollow Sections Of Non-alloy and Fine Grain Steels



STRUCTURAL SQUARE HOLLOW SECTION

Side length A x B mm.	wall thickness (t) mm.	Unit mass kg/m.	Informative reference							
			Cross sectional area cm^2	Geometrical moment of inertia cm^4		Modulus of section cm^3		Radius of gyration of area cm	
				Ix	Iy	Zx	Zy	ix	iy
25 x 25	1.0	0.73	0.93	0.88	0.88	0.71	0.71	0.97	0.97
	1.2	0.87	1.11	1.02	1.02	0.82	0.82	0.96	0.96
	1.4	1.00	1.27	1.15	1.15	0.92	0.92	0.95	0.95
	1.6	1.12	1.43	1.28	1.28	1.02	1.02	0.94	0.94
	1.8	1.25	1.59	1.39	1.39	1.12	1.12	0.94	0.94
	2.0	1.36	1.74	1.51	1.51	1.20	1.20	0.93	0.93
	2.3	1.53	1.95	1.67	1.67	1.33	1.33	0.92	0.92
	2.6	1.69	2.16	1.83	1.83	1.46	1.46	0.92	0.92
	2.8	1.79	2.28	1.94	1.94	1.55	1.55	0.92	0.92
	3.0	1.89	2.41	2.06	2.06	1.65	1.65	0.92	0.92
40 x 40	1.2	1.43	1.83	4.52	4.52	2.26	2.26	1.57	1.57
	1.4	1.66	2.11	5.16	5.16	2.58	2.58	1.56	1.56
	1.6	1.88	2.39	5.78	5.78	2.89	2.89	1.55	1.55
	1.8	2.09	2.67	6.36	6.36	3.18	3.18	1.54	1.54
	2.0	2.31	2.94	6.92	6.92	3.46	3.46	1.54	1.54
	2.3	2.62	3.33	7.72	7.72	3.86	3.86	1.52	1.52
	2.6	2.92	3.72	8.47	8.47	4.24	4.24	1.51	1.51
	2.8	3.11	3.96	8.95	8.95	4.47	4.47	1.50	1.50
	3.0	3.30	4.21	9.41	9.41	4.71	4.71	1.50	1.50
	3.2	3.49	4.45	9.87	9.87	4.93	4.93	1.49	1.49
50 x 50	1.4	2.10	2.67	10.39	10.39	4.16	4.16	1.97	1.97
	1.6	2.38	3.03	11.68	11.68	4.67	4.67	1.96	1.96
	1.8	2.66	3.39	12.91	12.91	5.17	5.17	1.95	1.95
	2.0	2.93	3.74	14.11	14.11	5.64	5.64	1.94	1.94
	2.3	3.34	4.25	15.82	15.82	6.33	6.33	1.93	1.93
	2.6	3.73	4.76	17.44	17.44	6.97	6.97	1.91	1.91
	2.8	3.99	5.08	18.47	18.47	7.39	7.39	1.91	1.91
	3.0	4.25	5.41	19.47	19.47	7.79	7.79	1.90	1.90
	3.2	4.50	5.73	20.44	20.44	8.18	8.18	1.89	1.89
	3.6	4.98	6.35	22.31	22.31	8.92	8.92	1.87	1.87
	1.6	2.88	3.67	20.64	20.64	6.88	6.88	2.37	2.37
60 x 60	1.8	3.22	4.11	22.89	22.89	7.63	7.63	2.36	2.36
	2.0	3.56	4.54	25.08	25.08	8.36	8.36	2.35	2.35
	2.3	4.06	5.17	28.23	28.23	9.41	9.41	2.34	2.34
	2.6	4.55	5.80	31.24	31.24	10.41	10.41	2.32	2.32
	2.8	4.87	6.20	33.18	33.18	11.06	11.06	2.31	2.31
	3.0	5.19	6.61	35.05	35.05	11.68	11.68	2.30	2.30
	3.2	5.50	7.01	36.88	36.88	12.29	12.29	2.29	2.29
	3.6	6.11	7.79	40.38	40.38	13.46	13.46	2.28	2.28
	4.0	6.71	8.55	43.70	43.70	14.57	14.57	2.26	2.26

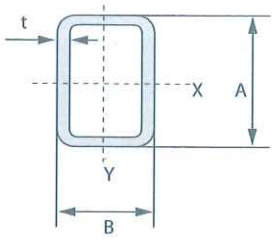
STANDARD EN 10219-1997

Cold Formed Welded Structural Hollow Sections Of Non-alloy and Fine Grain Steels

Side length A x B mm.	wall thickness (t) mm.	Unit mass kg/m.	Informative reference							
			Cross sectional area cm^2	Geometrical moment of inertia cm^4		Modulus of section cm^3		Radius of gyration of area cm	
				Ix	Iy	Zx	Zy	ix	iy
90 x 90	1.8	4.92	6.27	80.60	80.60	17.91	17.91	3.59	3.59
	2.0	5.45	6.94	88.72	88.72	19.72	19.72	3.58	3.58
	2.3	6.23	7.93	100.60	100.60	22.35	22.35	3.56	3.56
	2.6	7.00	8.92	112.12	112.12	24.92	24.92	3.55	3.55
	2.8	7.51	9.56	119.61	119.61	26.58	26.58	3.54	3.54
	3.0	8.01	10.21	126.95	126.95	28.21	28.21	3.53	3.53
	3.2	8.51	10.85	134.14	134.14	29.81	29.81	3.52	3.52
	3.6	9.50	12.11	148.08	148.08	32.91	32.91	3.50	3.50
	4.0	10.48	13.35	161.47	161.47	35.88	35.88	3.48	3.48
	4.5	11.67	14.87	177.46	177.46	39.44	39.44	3.45	3.45
100 x 100	1.8	5.48	6.99	111.49	111.49	22.30	22.30	3.99	3.99
	2.0	6.07	7.74	122.84	122.84	24.57	24.57	3.98	3.98
	2.3	6.95	8.85	139.49	139.49	27.90	27.90	3.97	3.97
	2.6	7.82	9.96	155.70	155.70	31.14	31.14	3.95	3.95
	2.8	8.39	10.68	166.26	166.26	33.25	33.25	3.94	3.94
	3.0	8.96	11.41	176.63	176.63	35.33	35.33	3.93	3.93
	3.2	9.52	12.13	186.81	186.81	37.36	37.36	3.92	3.92
	3.6	10.64	13.55	206.61	206.61	41.32	41.32	3.91	3.91
	4.0	11.73	14.95	225.70	225.70	45.14	45.14	3.89	3.89
	4.5	13.08	16.67	248.59	248.59	49.72	49.72	3.86	3.86
150 x 150	4.0	18.01	22.95	806.16	806.16	107.49	107.49	5.93	5.93
	4.5	20.15	25.67	894.18	894.18	119.22	119.22	5.90	5.90
	5.0	22.26	28.36	979.54	979.54	130.60	130.60	5.88	5.88
	6.0	26.40	33.63	1142.59	1142.59	152.35	152.35	5.83	5.83
	6.3	27.62	35.19	1189.59	1189.59	158.61	158.61	5.81	5.81
	9.0	38.21	48.67	1577.22	1577.22	210.30	210.30	5.69	5.69
200 x 200	4.5	27.21	34.67	2187.99	2187.99	218.80	218.80	7.94	7.94
	5.0	30.11	38.36	2405.54	2405.54	240.55	240.55	7.92	7.92
	6.0	35.82	45.63	2826.04	2826.04	282.60	282.60	7.87	7.87
	6.3	37.52	47.79	2948.47	2948.47	294.85	294.85	7.85	7.85
	9.0	52.34	66.67	3977.50	3977.50	397.75	397.75	7.72	7.72
	12.0	67.93	86.53	4984.80	4984.80	498.48	498.48	7.59	7.59
250 x 250	4.5	34.28	43.67	4355.04	4355.04	348.40	348.40	9.99	9.99
	5.0	37.96	48.36	4798.50	4798.50	383.88	383.88	9.96	9.96
	6.0	45.24	57.63	5661.90	5661.90	452.95	452.95	9.91	9.91
	6.3	47.41	60.39	5914.88	5914.88	473.19	473.19	9.90	9.90
	9.0	66.47	84.67	8070.69	8070.69	645.66	645.66	9.76	9.76
	12.0	86.77	110.53	10228.28	10228.28	818.26	818.26	9.62	9.62
300 x 300	4.5	41.34	52.67	7620.31	7620.31	508.02	508.02	12.03	12.03
	5.0	45.81	58.36	8408.41	8408.41	560.56	560.56	12.00	12.00
	6.0	54.66	69.63	9950.17	9950.17	663.34	663.34	11.95	11.95
	6.3	57.30	72.99	10403.83	10403.83	693.59	693.59	11.94	11.94
	9.0	80.60	102.67	14306.82	14306.82	953.79	953.79	11.80	11.80
	12.0	105.61	134.53	18281.41	18281.41	1218.76	1218.76	11.66	11.66
350 x 350	6.0	64.08	81.63	15990.86	15990.86	913.76	913.76	14.00	14.00
	6.3	67.19	85.59	16730.31	16730.31	956.02	956.02	13.98	13.98
	9.0	94.73	120.67	23135.87	23135.87	1322.05	1322.05	13.85	13.85
	12.0	124.45	158.53	29744.19	29744.19	1699.67	1699.67	13.70	13.70

STANDARD EN 10219-1997

Cold Formed Welded Structural Hollow Sections Of Non-alloy and Fine Grain Steels



STRUCTURAL RECTANGULAR HOLLOW SECTION

Side length A x B mm.	wall thickness (t) mm.	Unit mass kg/m.	Informative reference						
			Cross sectional area cm^2	Geometrical moment of inertia cm^4		Modulus of section cm^3		Radius of gyration of area cm	
				Ix	Iy	Zx	Zy	ix	iy
60 x 40	1.4	2.10	2.67	13.51	7.25	4.50	3.63	2.25	1.65
	1.6	2.38	3.03	15.18	8.14	5.06	4.07	2.24	1.64
	1.8	2.66	3.39	16.79	8.99	5.60	4.50	2.23	1.63
	2.0	2.93	3.74	18.35	9.82	6.12	4.91	2.22	1.62
	2.3	3.34	4.25	20.57	10.99	6.86	5.50	2.20	1.61
	2.6	3.73	4.76	22.67	12.11	7.56	6.06	2.18	1.60
	2.8	3.99	5.08	24.01	12.83	8.00	6.42	2.17	1.59
	3.0	4.25	5.41	25.30	13.53	8.43	6.76	2.16	1.58
	3.2	4.50	5.73	26.54	14.21	8.85	7.11	2.15	1.58
	3.6	4.98	6.35	28.91	15.53	9.64	7.77	2.13	1.56
80 x 40	1.6	2.88	3.67	30.64	10.50	7.66	5.25	2.89	1.69
	1.8	3.22	4.11	33.99	11.62	8.50	5.81	2.88	1.68
	2.0	3.56	4.54	37.24	12.71	9.31	6.35	2.86	1.67
	2.3	4.06	5.17	41.92	14.27	10.48	7.13	2.85	1.66
	2.6	4.55	5.80	46.38	15.76	11.60	7.88	2.83	1.65
	2.8	4.87	6.20	49.24	16.71	12.31	8.36	2.82	1.64
	3.0	5.19	6.61	52.00	17.65	13.00	8.82	2.81	1.63
	3.2	5.50	7.01	54.67	18.55	13.67	9.28	2.79	1.63
	3.6	6.11	7.79	59.77	20.32	14.94	10.16	2.77	1.62
	4.0	6.71	8.55	64.54	22.89	16.70	11.44	2.74	1.60
80 x 60	1.8	3.79	4.83	45.00	28.99	11.25	9.66	3.05	2.45
	2.0	4.19	5.34	49.41	31.81	12.35	10.60	3.04	2.44
	2.3	4.78	6.09	55.81	35.89	13.95	11.96	3.03	2.43
	2.6	5.37	6.84	61.96	39.82	15.49	13.27	3.01	2.41
	2.8	5.75	7.32	65.93	42.35	16.48	14.12	3.00	2.40
	3.0	6.13	7.81	69.80	44.81	17.45	14.94	2.99	2.40
	3.2	6.51	8.29	73.56	47.21	18.39	15.74	2.98	2.39
	3.6	7.24	9.23	80.80	51.84	20.20	17.28	2.96	2.37
	4.0	7.97	10.15	87.66	56.27	21.92	18.76	2.94	2.35
	4.2	8.32	10.60	90.97	58.41	22.74	19.47	2.93	2.35
90 x 50	1.8	3.79	4.83	52.59	21.28	11.69	8.51	3.30	2.10
	2.0	4.19	5.34	57.74	23.33	12.83	9.33	3.29	2.09
	2.3	4.78	6.09	65.21	26.29	14.49	10.52	3.27	2.08
	2.6	5.37	6.84	72.39	29.13	16.09	11.65	3.25	2.06
	2.8	5.75	7.32	77.01	30.96	17.11	12.38	3.24	2.06
	3.0	6.13	7.81	81.52	32.74	18.11	13.10	3.23	2.05
	3.2	6.51	8.29	85.90	34.48	19.09	13.79	3.22	2.04
	3.6	7.24	9.23	94.30	37.84	20.96	15.14	3.20	2.02
	4.0	7.97	10.15	102.26	41.06	22.72	16.42	3.17	2.01
	4.2	8.32	10.60	106.07	42.62	23.57	17.05	3.16	2.01
100 x 40	1.6	3.38	4.31	53.45	12.86	10.69	6.43	3.52	1.73
	1.8	3.79	4.83	59.41	14.25	11.88	7.12	3.51	1.72
	2.0	4.19	5.34	65.21	15.60	13.04	7.80	3.50	1.71
	2.3	4.78	6.09	73.62	17.54	14.72	8.77	3.48	1.70
	2.6	5.37	6.84	81.68	19.40	16.34	9.70	3.46	1.68
	2.8	5.75	7.32	86.88	20.60	17.38	10.30	3.44	1.68
	3.0	6.13	7.81	91.92	21.76	18.38	10.88	3.43	1.67
	3.2	6.51	8.29	96.82	22.90	19.36	11.45	3.42	1.66
	3.6	7.24	9.23	106.20	25.11	21.24	12.55	3.39	1.65
	4.0	7.97	10.15	115.04	27.24	23.01	13.62	3.37	1.64
	4.2	8.32	10.60	119.27	28.29	23.85	14.15	3.35	1.63

STANDARD EN 10219-1997

Cold Formed Welded Structural Hollow Sections Of Non-alloy and Fine Grain Steels

Side length A x B mm.	wall thickness (t) mm.	Unit mass kg/m.	Informative reference						
			Cross sectional area cm^2	Geometrical moment of inertia cm^4		Modulus of section cm^3		Radius of gyration of area cm	
				Ix	Iy	Zx	Zy	ix	iy
100 x 50	1.6	3.64	4.63	61.20	21.05	12.24	8.42	3.63	2.13
	1.8	4.07	5.19	68.09	23.37	13.62	9.35	3.62	2.12
	2.0	4.50	5.74	74.81	25.63	14.96	10.25	3.61	2.11
	2.3	5.14	6.55	84.60	28.91	16.92	11.56	3.59	2.10
	2.6	5.77	7.36	94.02	32.05	18.80	12.82	3.58	2.09
	2.8	6.19	7.88	100.11	34.08	20.02	13.63	3.56	2.08
	3.0	6.60	8.41	106.04	36.06	21.21	14.42	3.55	2.07
	3.2	7.01	8.93	111.82	37.99	22.36	15.20	3.54	2.06
	3.6	7.81	9.95	122.93	41.72	24.59	16.69	3.52	2.05
	4.0	8.59	10.95	133.48	45.30	26.70	18.12	3.49	2.03
	4.2	8.98	11.44	138.55	47.04	27.71	18.82	3.48	2.03
100 x 60	1.8	4.35	5.55	76.77	35.09	15.35	11.70	3.72	2.52
	2.0	4.82	6.14	84.42	38.54	16.88	12.85	3.71	2.51
	2.3	5.50	7.01	95.58	43.55	19.12	14.52	3.69	2.49
	2.6	6.18	7.88	106.36	48.39	21.27	16.13	3.67	2.48
	2.8	6.63	8.44	113.34	51.51	22.67	17.17	3.66	2.47
	3.0	7.07	9.01	120.16	54.57	24.03	18.19	3.65	2.46
	3.2	7.51	9.57	126.82	57.55	25.36	19.18	3.64	2.45
	3.6	8.37	10.67	139.67	63.31	27.93	21.10	3.62	2.44
	4.0	9.22	11.75	151.93	68.83	30.39	22.94	3.60	2.42
	4.2	9.64	12.28	157.84	71.51	31.57	23.84	3.59	2.41
150 x 100	3.2	12.03	15.33	487.20	261.80	64.96	52.36	5.64	4.13
	3.6	13.46	17.15	540.85	290.29	72.11	58.06	5.62	4.11
	4.0	14.87	18.95	592.94	317.91	79.06	63.58	5.59	4.10
	4.2	15.57	19.84	618.42	331.41	82.46	66.28	5.58	4.09
	4.5	16.62	21.17	655.93	351.27	87.46	70.25	5.57	4.07
	5.0	18.33	23.36	716.62	383.40	95.55	76.68	5.54	4.05
	6.0	21.69	27.63	831.37	444.27	110.85	88.85	5.49	4.01
200 x 100	4.0	18.01	22.95	1197.04	410.12	119.70	82.02	7.22	4.23
	4.2	18.87	24.04	1249.86	427.83	124.99	85.57	7.21	4.22
	4.5	20.15	25.67	1327.88	453.95	132.79	90.79	7.19	4.21
	5.0	22.26	28.36	1454.71	496.32	145.47	99.26	7.16	4.18
	6.0	26.40	33.63	1696.60	576.99	169.66	115.40	7.10	4.14
250 x 150	4.5	27.21	34.67	2998.80	1370.66	239.90	182.75	9.30	6.29
	5.0	30.11	38.36	3297.67	1505.37	263.81	200.72	9.27	6.26
	6.0	35.82	45.63	3875.46	1765.03	310.04	235.34	9.22	6.22
	9.0	52.34	66.67	5455.83	2473.08	436.47	329.74	9.05	6.09
	12.0	67.93	86.53	6826.76	3096.48	546.14	412.86	8.88	5.98
300 x 150	4.5	30.75	39.17	4673.03	1608.90	311.54	214.52	10.92	6.41
	5.0	34.03	43.36	5144.66	1768.29	342.98	235.77	10.89	6.39
	6.0	40.53	51.63	6060.01	2076.25	404.00	276.83	10.83	6.34
	9.0	59.40	75.67	8589.03	2921.01	572.60	389.47	10.65	6.21
	12.0	77.35	98.53	10812.13	3669.24	720.81	489.23	10.48	6.10
300 x 200	4.5	34.28	43.67	5655.46	3048.10	377.03	304.81	11.38	8.35
	5.0	37.96	48.36	6232.58	3356.38	415.51	335.64	11.35	8.33
	6.0	45.24	57.63	7356.73	3955.48	490.45	395.55	11.30	8.28
	9.0	66.47	84.67	10494.96	5620.36	699.66	562.04	11.13	8.15
	12.0	86.77	110.53	13301.89	7108.32	886.79	710.83	10.97	8.02
400 x 200	4.5	41.34	52.67	11306.35	3908.21	565.32	390.82	14.65	8.61
	5.0	45.81	58.36	12477.42	4307.21	623.87	430.72	14.62	8.59
	6.0	54.66	69.63	14769.07	5084.92	738.45	508.49	14.56	8.55
	9.0	80.60	102.67	21246.13	7263.22	1062.31	726.32	14.38	8.41
	12.0	105.61	134.53	27145.57	9231.84	1357.28	923.18	14.20	8.28
400 x 300	4.5	48.41	61.67	14825.95	9585.17	741.30	639.01	15.51	12.47
	5.0	53.66	68.36	16378.26	10584.25	818.91	705.62	15.48	12.44
	6.0	64.08	81.63	19426.51	12543.61	971.33	836.24	15.43	12.40
	9.0	94.73	120.67	28126.99	18118.68	1406.35	1207.91	15.27	12.25
	12.0	124.45	158.53	36181.09	23260.93	1809.05	1550.73	15.11	12.11

TIS 1228-2549

Cold formed stuctural steel sections

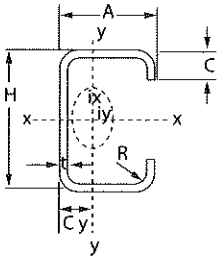


มาตรฐานผลิตภัณฑ์อุตสาหกรรม

มอก. 1228 - 2549 เหล็กโครงสร้างรูปพรรณขึ้นรูปเย็น

STANDARD TIS 1228-2549
Lip Channel Steel

STANDARD TIS 1228-2537 LIP CHANNEL STEEL														
Dimension H x A x C	Thickness t	Calculate Weight	Cross section area	Center of Gravity		Secondary Moment of Area		Radius of Gyration of Area		Modulus of Section		Center of Shear		Pieces per Bundle
				Cx	Cy	Ix	Iy	ix	iy	Zx	Zy	Sx	Sy	
mm.	mm.	Kg./m.	cm.^{2}	cm.	cm.	cm.^{4}	cm.^{4}	cm.	cm.	cm.^{3}	cm.^{3}	cm.	cm.	
75x45x15	1.6	2.32	2.952	0	1.72	27.1	8.71	3.03	1.72	7.24	3.13	4.1	0	100
	2.0	2.86	3.637	0	1.72	33.0	10.5	3.01	1.70	8.79	3.76	4.0	0	100
	2.3	3.25	4.137	0	1.72	37.1	11.8	3.00	1.69	9.90	4.24	4.0	0	100
100x50x20	1.6	2.88	3.672	0	1.87	58.4	14.0	3.99	1.95	11.7	4.47	4.5	0	80
	2.0	3.56	4.537	0	1.86	71.4	16.9	3.97	1.93	14.3	5.40	4.4	0	80
	2.3	4.06	5.172	0	1.86	80.7	19.0	3.95	1.92	16.1	6.06	4.4	0	80
	2.8	4.87	6.205	0	1.88	99.8	23.2	3.96	1.91	20.0	7.44	4.3	0	80
	3.2	5.50	7.007	0	1.86	107	24.5	3.90	1.87	21.3	7.81	4.4	0	80
125x50x20	2.3	4.51	5.747	0	1.69	137	20.6	4.88	1.89	21.9	6.22	4.1	0	60
	3.2	6.13	7.807	0	1.68	181	26.6	4.82	1.85	29.0	8.02	4.0	0	60
150x50x20	2.3	4.96	6.322	0	1.55	210	21.9	5.77	1.86	28.0	6.33	3.8	0	60
	3.2	6.76	8.607	0	1.54	280	28.3	5.71	1.81	37.4	8.19	3.8	0	60



CHEMICAL COMPOSITION				MECHANICAL PROPERTIES		
C MAX %	Mn MAX %	P MAX %	S MAX %	TENSILE STRENGTH	YIELD STRENGTH	ELONGATION %
0.25	-	0.05	0.05	400-510 N/mm^2	245 N/mm^2 (min)	21

DIMENSION TOLERANCE

A	: ±1.5 mm.	
H < 150 mm.	: ±1.5 mm.	
H 150 - 300 mm.	: ±2.0 mm.	
C	: ±2.0 mm.	
THICKNESS	: 1.6 mm.	= ±0.22 mm.
	: 2.0 & 2.3 mm.	= ±0.25 mm.
	: 2.8 mm.	= ±0.28 mm.
	: 3.2 mm.	= ±0.30 mm.

WEIGHT	: ±10%
LENGTH (< 7 m.)	: +40 mm., -0 mm.
ANGLE	: ±1.5
CURVATURE	: 0.2% x LENGTH

TIS 1228-2549

Water&General
Application



STANDARD SPECIFICATION

Water & General Application

Standard	Classification	Grade	Mechanical Properties			Chemical Composition %					Tolerance		Hydrostatic Test
			Tensile Strength Min. Mpa.	Yield Strength Min. Mpa.	Elongation Min %	C Max. %	Si Max. %	Mn Max. %	P Max. %	S Max. %	Outside Diameter	Wall Thickness	
Commercial	E.R.W. Carbon Steel Tube	Class A1	320-460	-	20	0.20	-	1.20	0.045	0.045	see table	± 15%	50 Bar/ 5 sec.
	Welded Steel Tubes	Class M	320-460	195	20	0.20	-	1.20	0.045	0.045			
BS 1387 : 1985	Steel Tubes Medium Weight suitable for screwing	Light	320-460	195	20	0.20	-	1.20	0.045	0.045	see table	+ Not Limit , - 8%	50 Bar/ 5 sec.
		Medium	320-460	195	20	0.20	-	1.20	0.045	0.045		+ Not Limit , - 10%	
		Heavy	320-460	195	20	0.20	-	1.20	0.045	0.045		+ Not Limit , - 10%	
DIN 2440 / 2444	Carbon Steel Pipes for Ordinary Piping	ST33-2	340-510	235	11-18	0.17	0.55	1.60	0.050	0.050	see table	-12.5%	50 Bar/ 5 sec.
JIS G3452 : 1997	Carbon Steel Pipes for Ordinary Piping	SGP	290	-	30	-	-	-	0.040	0.040	≤ 40 mm.; ± 0.5 mm. ≥ 50 - 125 mm.; ±1% ≥ 150 - 175 mm.; ±1.6% ≥ 200 mm.; ± 0.8%	+ Not Limit, - 12.5%	2.5 Mpa
TIS 276 & 277 - 2532	Steel Pipe & Galvanized Steel Pipe	TYPE 2	320	-	20	-	-	-	-	-	See Table	-12.5%	5 Mpa/ 5 sec.
		TYPE 4	320	-	20	-	-	-	-	-			
ASTM A-53	Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welde	Grade A	330	205	-	0.25	-	0.95	0.050	0.045	≤ 1.1/2" ; ± 0.4 mm. > 2" ; ± 1%	-12.5%	See Table
		Grade B	415	240	-	0.30	-	1.20	0.050	0.045			

STANDARD COMMERCIAL

Quality Class A1 Black & Galvanized Steel Pipe

Nominal size DN	Designation of Thread	Outside Diameter MIN. mm.	Outside Diameter MAX. mm.	Wall Thickness mm.	Calculated Weight Plain Ends kg/m	Calculated Weight Threads & Coupling kg/m	Threads Per 25.4 mm.	Number of piece per Bundle
15	1/2	20.2	21.4	1.9	0.90	0.91	14	169
20	3/4	26.0	26.9	2.0	1.24	1.25	14	127
25	1	32.0	33.8	2.3	1.81	1.83	11	91
32	1 1/4	40.8	42.5	2.3	2.40	2.43	11	61
40	1 1/2	47.0	48.4	2.3	2.86	2.90	11	44
50	2	59.0	60.2	2.3	3.67	3.74	11	37
65	2 1/2	74.0	76.0	2.8	5.03	5.15	11	24
80	3	87.2	88.7	2.9	6.21	6.38	11	19
100	4	113.0	113.9	3.2	8.70	9.01	11	14
125	5	137.8	140.6	4.0	12.16	12.65	11	7
150	6	163.0	166.1	4.0	14.43	15.00	11	7

STANDARD COMMERCIAL

Quality Structural Class - M Black & Galvanized Steel Pipe

Nominal size DN	Designation of Thread	Outside Diameter MIN. mm.	Outside Diameter MAX. mm.	Wall Thickness mm.	Calculated Weight Plain Ends kg/m	Calculated Weight Threads & Coupling kg/m	Threads Per 25.4 mm.	Number of piece per Bundle
15	1/2	20.2	21.4	2.2	0.90	0.91	14	169
20	3/4	26.0	26.9	2.3	1.24	1.25	14	127
25	1	32.0	33.8	2.9	1.81	1.83	11	91
32	1 1/4	40.8	42.5	2.9	2.40	2.43	11	61
40	1 1/2	47.0	48.4	2.9	2.86	2.90	11	44
50	2	59.0	60.2	2.9	3.67	3.74	11	37
65	2 1/2	74.0	76.0	3.2	5.03	5.15	11	24
80	3	87.2	88.7	3.4	6.21	6.38	11	19
100	4	113.0	113.9	3.8	8.70	9.01	11	14

CHEMICAL COMPOSITION				MECHANICAL PROPERTIES			HYDROSTATIC TEST
C MAX %	Mn MAX %	P MAX %	S MAX %	TENSILE STRENGTH	YIELD STRENGTH MIN	ELONGATION MIN %	(BAR)
-	-	-	-	320 - 460 N/mm²	-	20	50

DIMENSION TOLERANCE

WALL THICKNESS : ± 15 %

LENGTH : + 50 mm., - 0 mm.

STANDARD BS 1387 : 1985

Class Light Black & Galvanized Steel Pipe

Nominal size DN	Designation of Thread	Outside Diameter MIN. mm.	Outside Diameter MAX. mm.	Wall Thickness mm.	Calculated Weight Plain Ends kg/m	Calculated Weight Threads & Coupling kg/m	Threads Per 25.4 mm.	Number of piece per Bundle
15	1/2	21.0	21.4	2.0	0.947	0.956	14	169
20	3/4	26.4	26.9	2.3	1.38	1.39	14	127
25	1	33.2	33.8	2.6	1.98	2.00	11	91
32	1 1/4	41.9	42.5	2.6	2.54	2.57	11	61
40	1 1/2	47.8	48.4	2.9	3.23	3.27	11	44
50	2	59.6	60.2	2.9	4.08	4.15	11	37
65	2 1/2	75.2	76.0	3.2	5.71	5.83	11	24
80	3	87.9	88.7	3.2	6.72	6.89	11	19
100	4	113.0	113.9	3.6	9.75	10.00	11	14

CHEMICAL COMPOSITION C MAX %	Mn MAX %	P MAX %	S MAX %	MECHANICAL PROPERTIES TENSILE STRENGTH	YIELD STRENGTH MIN	ELONGATION MIN %	HYDROSTATIC TEST (BAR)
0.20	1.20	0.045	0.045	320 - 460 N/mm²	195 N/mm²	20	50

TOLERANCE	CLASS LIGHT	CLASS MEDIUM	CLASS HEAVY
WALL THICKNESS :	- 8% + NOT LIMIT	- 10% + NOT LIMIT	- 10% + NOT LIMIT
WEIGHT :	+10% , -8% PER PIECE / ±4% PER BUNDLE (OVER 500 ft)		
LENGTH :	+ 50 mm., - 0 mm.		

STANDARD BS 1387 : 1985

Class Medium Black & Galvanized Steel Pipe

Nominal size DN	Designation of Thread	Outside Diameter MIN. mm.	Outside Diameter MAX. mm.	Wall Thickness mm.	Calculated Weight Plain Ends kg/m	Calculated Weight Threads & Coupling kg/m	Threads Per 25.4 mm.	Number of piece per Bundle
15	1/2	21.1	21.7	2.6	1.21	1.22	14	169
20	3/4	26.6	27.2	2.6	1.56	1.57	14	127
25	1	33.4	34.2	3.2	2.41	2.43	11	91
32	1 1/4	42.1	42.9	3.2	3.10	3.13	11	61
40	1 1/2	48.0	48.8	3.2	3.57	3.61	11	44
50	2	59.8	60.8	3.6	5.03	5.10	11	37
65	2 1/2	75.4	76.6	3.6	6.43	6.55	11	24
80	3	88.1	89.5	4.0	8.37	8.54	11	19
100	4	113.3	114.9	4.5	12.20	12.50	11	14
125	5	138.7	140.6	5.0	16.60	17.10	11	7
150	6	164.1	166.1	5.0	19.70	20.30	11	7

CHEMICAL COMPOSITION C MAX %	Mn MAX %	P MAX %	S MAX %	MECHANICAL PROPERTIES TENSILE STRENGTH	YIELD STRENGTH MIN	ELONGATION MIN %	HYDROSTATIC TEST (BAR)
0.20	1.20	0.045	0.045	320 - 460 N/mm²	195 N/mm²	20	50

TOLERANCE	CLASS LIGHT	CLASS MEDIUM	CLASS HEAVY
WALL THICKNESS :	- 8% + NOT LIMIT	- 10% + NOT LIMIT	- 10% + NOT LIMIT
WEIGHT :	+10% , -8% PER PIECE / ±4% PER BUNDLE (OVER 500 ft)		
LENGTH :	+ 50 mm., - 0 mm.		

STANDARD BS 1387 : 1985

Class Heavy Black & Galvanized Steel Pipe

Nominal size DN	Designation of Thread	Outside Diameter MIN. mm.	Outside Diameter MAX. mm.	Wall Thickness mm.	Calculated Weight Plain Ends kg/m	Calculated Weight Threads & Coupling kg/m	Threads Per 25.4 mm.	Number of piece per Bundle
15	1/2	21.1	21.7	3.2	1.44	1.45	14	169
20	3/4	26.6	27.2	3.2	1.87	1.88	14	127
25	1	33.4	34.2	4.0	2.94	2.96	11	91
32	1 1/4	42.1	42.9	4.0	3.80	3.83	11	61
40	1 1/2	48.0	48.8	4.0	4.38	4.42	11	44
50	2	59.8	60.8	4.5	6.19	6.26	11	37
65	2 1/2	75.4	76.6	4.5	7.93	8.05	11	24
80	3	88.1	89.5	5.0	10.30	10.50	11	19
100	4	113.3	114.9	5.4	14.50	14.80	11	14
125	5	138.7	140.6	5.4	17.90	18.40	11	7
150	6	164.1	166.1	5.4	21.30	21.90	11	7

CHEMICAL COMPOSITION C MAX %	Mn MAX %	P MAX %	S MAX %	MECHANICAL PROPERTIES TENSILE STRENGTH	YIELD STRENGTH MIN	ELONGATION MIN %	HYDROSTATIC TEST (BAR)
0.20	1.20	0.045	0.045	320 - 460 N/mm²	195 N/mm²	20	50

TOLERANCE	CLASS LIGHT	CLASS MEDIUM	CLASS HEAVY
WALL THICKNESS :	- 8% + NOT LIMIT	- 10% + NOT LIMIT	- 10% + NOT LIMIT
WEIGHT :	+10%, -8% PER PIECE / ±4% PER BUNDLE (OVER 500 ft)		
LENGTH :	+ 50 mm., - 0 mm.		

STANDARD DIN 2440 / 2444

Black & Galvanized Steel Pipe

STANDARD DIN 2440 / 2444 : BLACK & GALVANIZED STEEL PIPE								
Nominal size DN	Designation of Thread	Outside Diameter MIN. mm.	Outside Diameter MAX. mm.	Wall Thickness mm.	Calculated Weight Plain Ends kg/m	Calculated Weight Threads & Coupling kg/m	Threads Per 25.4 mm.	Number of piece per Bundle
15	1/2	21.0	21.8	2.65	1.22	1.23	14	169
20	3/4	26.5	27.3	2.65	1.58	1.59	14	127
25	1	33.3	34.2	3.25	2.44	2.46	11	91
32	1 1/4	42.0	42.9	3.25	3.14	3.17	11	61
40	1 1/2	47.9	48.8	3.25	3.61	3.65	11	44
50	2	59.7	60.8	3.65	5.10	5.17	11	37
65	2 1/2	75.3	76.6	3.65	6.51	6.63	11	24
80	3	88.0	89.5	4.05	8.47	8.64	11	19
100	4	113.1	115.0	4.50	12.1	12.4	11	14
125	5	138.5	140.8	4.85	16.2	16.7	11	7
150	6	163.9	166.5	4.85	19.2	19.8	11	7

CHEMICAL COMPOSITION C MAX %	Mn MAX %	P MAX %	S MAX %	MECHANICAL PROPERTIES TENSILE STRENGTH	YIELD STRENGTH	ELONGATION %	HYDROSTATIC TEST BAR
-	-	-	-	310 - 540 N/mm²	185 N/mm²	12-18	50

DIMENSION TOLERANCE

WALL THICKNESS : - 12.5% , + Fixed by the permissible weight deviation

LENGTH : +100 mm., - 50 mm.

WEIGHT : + 10% PER PIECE

: + 7.5% for a consignment of not less than 10 t.

STANDARD JIS 3452 : 1997

Carbon Steel Pipes for Ordinary Piping

STANDARD JIS 3452 : 1997 : CARBON STEEL PIPES FOR ORDINARY PIPING							
Nominal size DN	Designation of Thread	Outside Diameter		Wall Thickness mm.	Calculated Weight		Hydrostatic test Mpa
		MIN. mm.	MAX. mm.		lb. / ft.	kg. / m.	
15	1/2	21.2	22.2	2.8	0.88	1.31	2.5
20	3/4	26.7	27.7	2.8	1.12	1.68	2.5
25	1	33.5	34.5	3.2	1.63	2.43	2.5
32	1 1/4	42.2	43.2	3.5	2.27	3.38	2.5
40	1 1/2	48.1	49.1	3.5	2.61	3.89	2.5
50	2	59.9	61.1	3.8	3.56	5.31	2.5
65	2 1/2	75.55	77.05	4.2	5.01	7.47	2.5
80	3	88.2	90.0	4.2	5.90	8.79	2.5
90	3 1/2	100.6	102.6	4.2	6.78	10.10	2.5
100	4	113.15	115.45	4.5	8.20	12.20	2.5
125	5	138.4	141.2	4.5	10.07	15.00	2.5
150	6	163.6	166.8	5.0	13.30	19.80	2.5
200	8	214.7	217.9	5.3	20.22	30.10	2.5
250	10	265.7	269.1	6.6	28.49	42.40	2.5
300	12	316.0	321.0	6.9	35.61	53.00	2.5
350	14	352.8	358.4	7.9	45.49	67.70	2.5
400	16	403.2	409.6	7.9	52.14	77.60	2.5
450	18	453.6	460.8	7.9	58.79	87.50	2.5

CHEMICAL COMPOSITION				MECHANICAL PROPERTIES		
C MAX %	Mn MAX %	P MAX %	S MAX %	TENSILE STRENGTH	YIELD STRENGTH	ELONGATION %
-	-	0.04	0.04	290 N/mm^2	-	30

DIMENSION TOLERANCE

WALL THICKNESS : - 12.5% , + Fixed by the permissible weight deviation

LENGTH : + Not limits , - 0 mm.

STANDARD TIS 276-2532 AND 277-2532

Black & Galvanized Steel Pipe

Nominal size DN (NB)	Outside Diameter Min mm.	Outside Diameter Max mm.	Wall Thickness mm.	Calculated Weight kg/m	Threads Per 25.4 mm.	Number of piece per Bundle
TYPE 2						
15 (1/2)	21.0	21.8	2.6	1.21	14	169
20 (3/4)	26.5	27.3	2.6	1.56	14	127
25 (1)	33.3	34.2	3.2	2.41	11	91
32 (1 1/4)	42.0	42.9	3.2	3.10	11	61
40 (1 1/2)	47.9	48.8	3.2	3.56	11	44
50 (2)	59.7	60.8	3.6	5.03	11	37
65 (2 1/2)	75.3	76.6	3.6	6.42	11	24
80 (3)	88.0	89.5	4.0	8.36	11	19
100 (4)	113.1	115.0	4.5	12.20	11	14
125 (5)	138.5	140.8	5.0	16.60	11	7
150 (6)	163.9	166.5	5.0	19.80	11	7
TYPE 4						
65 (2 1/2)	72.3	73.7	5.2	8.60	8	24
80 (3)	88.0	89.8	5.5	11.30	8	19
100 (4)	113.2	115.4	6.0	16.10	8	14
125 (5)	139.9	142.7	6.6	21.80	8	7
150 (6)	166.6	170.0	7.1	28.30	8	7
200 (8)	216.9	221.3	7.0	36.80	8	7
200 (8)	216.9	221.3	8.2	42.50	8	7

TIS 276-2532
TIS 277-2532

CHEMICAL COMPOSITION				MECHANICAL PROPERTIES			HYDROSTATIC TEST (BAR)
C MAX %	Mn MAX %	P MAX %	S MAX %	TENSILE STRENGTH MIN	YIELD STRENGTH	ELONGATION MIN %	
-	-	-	-	320 N/mm²	-	20	50

TOLERANCE	TYPE 2	TYPE 4
WALL THICKNESS :	- 12.5% + NOT LIMIT	
WEIGHT :	+10% , -8% PER METER	± 5% PER METER
LENGTH :	+ 50 mm., - 0 mm.	

STANDARD ASTM A-53 : 1995

Grade A & B Black & Galvanized Steel Pipe

Nominal Pipe Size	Outside Diameter		Weight Class	Schedule No.	Wall Thickness	Plain End						Number of pieces per bundle
						Calculated Weight		Test Pressure				
								Grade A		Grade B		
in	in	mm.			mm.	lb./ft.	kg./m.	psi	Mpa.	psi	Mpa.	
1/2	0.840	21.3	STD	40	2.77	0.85	1.27	700	4.83	700	4.83	169
3/4	1.050	26.7	STD	40	2.87	1.13	1.69	700	4.83	700	4.83	127
1	1.315	33.4	STD	40	3.38	1.68	2.50	700	4.83	700	4.83	91
1 1/4	1.660	42.2	STD	40	3.56	2.27	3.39	1,200	8.27	1,300	8.96	61
1 1/2	1.900	48.3	STD	40	3.68	2.72	4.05	1,200	8.27	1,300	8.96	44
2	2.375	60.3	STD	40	3.91	3.65	5.44	2,300	15.86	2,500	17.24	37
2 1/2	2.875	73.0	STD	40	5.16	5.79	8.63	2,500	17.24	2,500	17.24	24
3	3.500	88.9	STD	40	5.49	7.58	11.29	2,220	15.31	2,500	17.24	19
3 1/2	4.000	101.6	STD	40	5.74	9.11	13.57	2,030	14.00	2,370	16.34	14
4	4.500	114.3	STD	40	6.02	10.79	16.07	1,900	13.10	2,210	15.24	14
5	5.563	141.3	STD	40	6.55	14.62	21.77	1,670	11.51	1,950	13.44	7
6	6.625	168.3	-	-	4.78	12.94	19.27	1,020	7.03	1,190	8.20	7
			-	-	5.56	15.00	22.31	1,190	8.20	1,390	9.58	7
			-	-	6.35	17.04	25.36	1,360	9.38	1,580	10.89	7
			STD	40	7.11	18.99	28.26	1,520	10.48	1,780	12.27	7
			-	-	7.92	21.06	31.32	1,700	11.72	1,980	13.65	7
			-	-	8.74	23.10	34.39	1,870	12.89	2,180	15.03	7
			-	-	9.52	25.05	37.28	2,040	14.07	2,380	16.41	7
			XS	80	10.97	28.60	42.56	2,350	16.20	2,740	18.89	7
8	8.625	219.1	-	-	4.78	16.96	25.26	780	5.38	920	6.34	5
			-	-	5.16	18.28	27.22	850	5.86	1,000	6.89	5
			-	-	5.56	19.68	29.28	910	6.27	1,070	7.38	5
			-	20	6.35	22.38	33.31	1,040	7.17	1,220	8.41	5
			-	30	7.04	24.72	36.31	1,160	8.00	1,350	9.31	5
			-	-	7.92	27.73	41.24	1,300	8.96	1,520	10.48	5
			STD	40	8.18	28.58	42.55	1,340	9.24	1,570	10.82	5
			-	-	8.74	30.45	45.34	1,440	9.93	1,680	11.58	5
			-	-	9.52	33.07	49.20	1,570	10.82	1,830	12.62	5
			-	60	10.31	35.67	53.08	1,700	11.72	2,000	13.79	5
			-	-	11.13	38.33	57.08	1,830	12.62	2,130	14.69	5
			XS	80	12.70	43.43	64.64	2,090	14.41	2,430	16.75	5
10	10.750	273.0	-	-	4.78	21.23	31.62	630	4.34	730	5.03	5
			-	-	5.16	22.89	34.08	680	4.69	800	5.52	5
			-	-	5.56	24.65	36.67	730	5.03	860	5.93	5
			-	20	6.35	28.06	41.75	840	5.79	980	6.76	5
			-	-	7.09	31.23	46.49	930	6.41	1,090	7.52	5
			-	30	7.80	34.27	51.01	1,030	7.10	1,200	8.27	5
			-	-	8.74	38.27	56.96	1,150	7.93	1,340	9.24	5
			-	40	9.27	40.52	60.29	1,220	8.41	1,430	9.86	5
			-	-	11.13	48.28	71.87	1,470	10.14	1,710	11.79	5
			XS	60	12.70	54.79	81.52	1,670	11.51	1,950	13.44	5
			-	80	15.09	64.49	95.97	1,990	13.72	2,320	16.00	5
12	12.750	323.8	-	-	5.16	27.23	40.55	570	3.93	670	4.62	
			-	-	5.56	29.34	43.63	620	4.27	720	4.96	
			-	20	6.35	33.41	49.71	710	4.90	820	5.65	
			-	-	7.14	37.46	55.75	790	5.45	930	6.41	
			-	-	7.92	41.48	61.69	880	6.07	1,030	7.10	
			-	30	8.38	43.81	65.18	930	6.41	1,090	7.52	
			-	-	8.74	45.62	67.90	970	6.69	1,130	7.79	
			STD	-	9.52	49.61	73.78	1,060	7.31	1,240	8.55	
			-	40	10.31	53.57	79.70	1,150	7.93	1,340	9.24	
			-	-	11.13	57.65	85.82	1,240	8.55	1,440	9.93	
			XS	-	12.70	65.48	97.43	1,410	9.72	1,650	11.38	
			-	60	14.27	73.22	108.92	1,590	10.96	1,850	12.76	
			-	80	17.48	88.71	132.04	1,940	13.38	2,270	15.65	

STANDARD ASTM A-53 : 1995

Grade A & B Black & Galvanized Steel Pipe

Nominal Pipe Size	Outside Diameter		Weight Class	Schedule No.	Wall Thickness	Plain End						Number of pieces per bundle
						Calculated Weight		Test Pressure				
								Grade A		Grade B		
in	in	mm.			mm.	lb. / ft.	kg. / m.	psi	Mpa.	psi	Mpa.	
14	14.000	355.6	-	-	5.33	30.96	46.04	540	3.72	630	4.34	
			-	-	5.56	32.26	47.99	560	3.86	660	4.55	
			-	10	6.35	36.75	54.69	640	4.41	750	5.17	
			-	-	7.14	41.21	61.35	720	4.96	840	5.79	
			-	20	7.92	45.65	67.90	800	5.52	940	6.48	
			-	-	8.74	50.22	74.76	880	6.07	1,030	7.10	
			STD	30	9.52	54.62	81.25	960	6.62	1,120	7.72	
			-	40	11.13	63.50	94.55	1,130	7.79	1,310	9.03	
			-	-	11.91	67.84	100.94	1,210	8.34	1,410	9.72	
			XS	-	12.70	72.16	107.39	1,290	8.89	1,500	10.34	
			-	60	15.09	85.13	126.71	1,530	10.55	1,790	12.34	
16	16.000	406.4	-	-	5.56	36.95	54.96	490	3.38	570	3.93	
			-	10	6.35	42.09	62.64	560	3.86	660	4.55	
			-	-	7.14	47.22	70.30	630	4.34	740	5.10	
			-	20	7.92	52.32	77.83	700	4.83	820	5.65	
			-	-	8.74	57.57	85.71	770	5.31	900	6.21	
			STD	30	9.52	62.64	93.17	840	5.79	980	6.76	
			-	-	11.13	72.86	108.49	990	6.83	1,150	7.93	
			-	-	11.91	77.87	115.86	1,060	7.31	1,230	8.48	
			XS	40	12.70	82.85	123.30	1,120	7.72	1,310	9.03	
			-	60	16.66	107.60	160.12	1,480	10.20	1,720	11.86	
18	18.000	457.0	-	10	6.35	47.44	70.60	500	3.45	580	4.00	
			-	-	7.14	53.23	79.24	560	3.86	660	4.55	
			-	20	7.92	58.99	87.75	620	4.27	730	5.03	
			-	-	8.74	64.93	96.66	690	4.76	800	5.52	
			STD	-	9.52	70.65	105.10	750	5.17	880	6.07	
			-	-	10.31	76.36	113.62	810	5.58	950	6.55	
			-	30	11.13	82.23	122.43	880	6.07	1,020	7.03	
			-	-	11.91	87.89	130.78	940	6.48	1,090	7.52	
			XS	-	12.70	93.54	139.20	1,000	6.89	1,170	8.07	
			-	40	14.27	104.76	155.87	1,120	7.72	1,310	9.03	

ELECTRIC RESISTANCE WELDED (TYPE-E)	CHEMICAL COMPOSITION				MECHANICAL PROPERTIES	
	C MAX %	Mn MAX %	P MAX %	S MAX %	TENSILE STRENGTH MIN	YIELD STRENGTH MIN
Grade A	0.25	0.95	0.05	0.06	330 N/mm²	205 N/mm²
Grade B	0.30	1.20	0.05	0.06	415 N/mm²	240 N/mm²

DIMENSION TOLERANCE

Outside Diameter : 1 1/2" and under + 1/64" (0.4 mm.)
: 2" and over + 1 %

Thickness : - 12.5 % , + not limit

Weight : + 10 %

Furniture & Machine Structural Application





Furniture Application

Round Tube For Furniture And General Structural Purposes

ROUND TUBE FOR FURNITURE AND GENERAL STRUCTURAL PURPOSES																							
Nominal size (NB)	Outside Diameter (mm.)	Calculate Weight Kgs. / m.																					Piece per Bundles
		0.4	0.5	0.6	0.7	0.8	0.9	1	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.5	
3/8"	9.5		0.12	0.14	0.16	0.19	0.21	0.24															800
1/2"	12.7	0.13	0.16	0.19	0.22	0.24	0.28	0.31	0.33	0.36	0.37	0.39	0.44										600
5/8"	15.9		0.20	0.24	0.27	0.31	0.35	0.38	0.41	0.45	0.47	0.50	0.55										500
3/4"	19.1		0.24	0.28	0.33	0.37	0.42	0.46	0.50	0.55	0.57	0.61	0.67										400
7/8"	22.2			0.33	0.38	0.43	0.49	0.54	0.59	0.64	0.67	0.72	0.79										300
1"	25.4			0.38	0.44	0.50	0.56	0.62	0.67	0.73	0.77	0.83	0.91										200
1.1/8"	28.6			0.42	0.49	0.56	0.63	0.70	0.76	0.83	0.88	0.94	1.02										200
1.1/4"	31.8			0.47	0.55	0.62	0.70	0.78	0.85	0.92	0.98	1.05	1.14										200
1-3/8"	34.9									1.00	1.08	1.16	1.24	1.31	1.39	1.47	1.55	1.62	1.70	1.77	1.85	1.92	2.00	100
1.1/2"	38.1									1.09	1.18	1.27	1.35	1.44	1.53	1.61	1.70	1.78	1.86	1.95	2.03	2.11	2.19	100
1-5/8"	41.3									1.19	1.28	1.38	1.47	1.57	1.66	1.75	1.85	1.94	2.03	2.12	2.21	2.30	2.39	80
1-3/4"	44.4									1.28	1.38	1.48	1.59	1.69	1.79	1.89	1.99	2.09	2.19	2.29	2.39	2.49	2.58	80
1-7/8"	47.6									1.37	1.48	1.60	1.71	1.82	1.92	2.03	2.14	2.25	2.36	2.46	2.57	2.68	2.78	60
2"	50.8									1.47	1.59	1.71	1.82	1.94	2.06	2.18	2.29	2.41	2.52	2.64	2.75	2.86	2.98	60
2-3/8"	60.3											2.03	2.18	2.32	2.46	2.60	2.74	2.88	3.01	3.15	3.29	3.43	3.56	40
3"	76.2											2.58	2.76	2.94	3.12	3.30	3.48	3.66	3.84	4.01	4.19	4.37	4.54	20

Furniture Application

Square And Rectangular Tube For Furniture And General Structural Purposes

SQUARE AND RECTANGULAR TUBE FOR FURNITURE AND GENERAL STRUCTURAL PURPOSES																								
Nominal size (NB)	Outside Diameter (mm.)	Calculate Weight Kgs. / m.																						Piece per Bundles
		0.4	0.5	0.6	0.7	0.8	0.9	1	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.5	
1/2" x 1/2"	12.7 x 12.7		0.20	0.24	0.28	0.31	0.35	0.39	0.42	0.46			0.57											500
5/8" x 5/8"	15.9 x 15.9			0.29	0.34	0.38	0.42	0.47	0.51	0.56			0.68											400
3/4" x 3/4"	19.1 x 19.1			0.34	0.40	0.45	0.51	0.57	0.61	0.76			0.82											300
7/8" x 7/8"	22.2 x 22.2			0.42	0.49	0.56	0.63	0.70	0.76	0.83			1.02											225
1" x 1"	25.4 x 25.4			0.47	0.55	0.62	0.70	0.78	0.85	0.92			1.14											225
3" x 1.1/2"	75 x 38									2.05	2.22	2.38	2.55	2.71	2.87	3.03	3.18	3.34	3.50	3.65	3.81	3.96	4.11	30
1.1/2" x 1.1/2"	38 x 38									1.36	1.46	1.57	1.67	1.78	1.88	1.98	2.08	2.18	2.28	2.38	2.47	2.57	2.66	50
2" x 1"	50 x 25									1.34	1.44	1.55	1.65	1.75	1.85	1.95	2.05	2.15	2.25	2.34	2.44	2.53	2.62	50

CHEMICAL COMPOSITION				MECHANICAL PROPERTIES		
C MAX %	Mn MAX %	P MAX %	S MAX %	TENSILE STRENGTH	YIELD STRENGTH	ELONGATION %
0.12	0.50	0.04	0.045	275 N/mm^2	-	36

DIMENSION TOLERANCE

WALL THICKNESS : 0.40 - 0.60 mm. = ± 0.05 mm.
0.80 - 1.00 mm. = ± 0.08 mm.
1.25 - 1.60 mm. = ± 0.11 mm.
0.60 - 0.80 mm. = ± 0.06 mm.
1.00 - 1.25 mm. = ± 0.09 mm.

OUTSIDE DIAMETER : ± 1.0%

LENGTH : + 50 mm., - 0 mm.

Machine Structural Application

JIS G 3445 Carbon Steel Tubes for Machine Structural Purpose
Standard Specification

Grade		Designation	Mechanical Properties				Chemical Composition %						Flattening strength	Bending strength	
			Tensile Strength	Yield Strength	Elongation No.12 test pieces Longitudinal direction	Elongation No.5 test pieces Transverse direction	C	Si	Mn	P	S	Nb or V	Distance between flat plates (H) (D is outside dia. of the tube)	Bend angle (°)	Inside redius (D is outside dia. of the tube)
			Min. Mpa.	Min. Mpa.	Min %	Min %	Max. %	Max. %	Max. %	Max. %	Max. %	Max. %			
Grade 11	A	STKM 11 A	290	-	35	30	0.12	0.35	0.60	0.040	0.040	-	1D/2	180	4 D
Grade 12	A	STKM 12 A	340	175	35	30	0.20	0.35	0.60	0.040	0.040	-	2D/3	90	6 D
	B	STKM 12 B	390	275	25	20							2D/3	90	6 D
	C	STKM 12 C	470	355	20	15							-	-	-
Grade 13	A	STKM 13 A	370	215	30	25	0.25	0.35	0.30-0.90	0.040	0.040	-	2D/3	90	6 D
	B	STKM 13 B	440	305	20	15							3D/4	90	6 D
	C	STKM 13 C	510	380	15	10							-	-	-
Grade 14	A	STKM 14 A	410	245	25	20	0.30	0.35	0.30-1.00	0.040	0.040	-	3D/4	90	6 D
	B	STKM 14 B	500	355	15	10							7D/8	90	8 D
Grade 15	A	STKM 15 A	470	275	22	17	0.25-0.35	0.35	0.30-1.00	0.040	0.040	-	3D/4	90	6 D
Grade 16	A	STKM 16 A	510	325	20	15	0.35-0.45	0.40	0.40-1.00	0.040	0.040	-	7D/8	90	8 D
Grade 17	A	STKM 17 A	550	345	20	15	0.45-0.55	0.40	0.40-1.00	0.040	0.040	-	7D/8	90	8 D
Grade 18	A	STKM 18 A	440	275	25	20	0.18	0.55	1.50	0.040	0.040	-	7D/8	90	6 D
	B	STKM 18 B	490	315	23	18							7D/8	90	8 D
Grade 19	A	STKM 19 A	490	315	23	18	0.25	0.55	1.50	0.040	0.040	-	7D/8	90	6 D

STANDARD JIS G3445-1988

Carbon Steel Tubes For Machine Structural Purpose
JIS G3445-1988 STKM 11A

Size		Outside Diameter		Wall Thickness	Calculated Weight	Calculated Weight
in	mm.	min. (mm.)	max. (mm.)	(mm.)	per meter	per pc (6m.)
3/8	9.5	9.0	10.0	0.9	0.19	1.14
1/2	12.7	12.2	13.2	0.9	0.26	1.56
1/2	12.7	12.2	13.2	1.2	0.34	2.04
5/8	15.9	15.4	16.4	0.9	0.33	1.98
5/8	15.9	15.4	16.4	1.2	0.43	2.58
11/16	17.3	16.8	17.8	0.9	0.36	2.16
11/16	17.3	16.8	17.8	1.2	0.48	2.88
11/16	17.3	16.8	17.8	1.6	0.62	3.72
3/4	19.1	18.6	19.6	0.9	0.40	2.4
3/4	19.1	18.6	19.6	1.2	0.53	3.18
3/4	19.1	18.6	19.6	1.6	0.69	4.14
7/8	22.2	21.7	22.7	0.9	0.47	2.82
7/8	22.2	21.7	22.7	1.2	0.62	3.72
7/8	22.2	21.7	22.7	1.6	0.81	4.86
7/8	22.2	21.7	22.7	2.0	0.99	5.94
1	25.4	24.5	25.9	0.9	0.54	3.24
1	25.4	24.5	25.9	1.2	0.72	4.32
1	25.4	24.5	25.9	1.6	0.94	5.64
1	25.4	24.5	25.9	2.0	1.15	6.90
1 1/8	28.6	28.1	29.1	1.2	0.81	4.86
1 1/8	28.6	28.1	29.1	1.6	1.07	6.42
1 1/8	28.6	28.1	29.1	2.0	1.31	7.86
1 1/4	31.8	31.3	32.3	1.2	0.91	5.46
1 1/4	31.8	31.3	32.3	1.6	1.19	7.14
1 1/4	31.8	31.3	32.3	2.0	1.47	8.82
1 3/8	34.9	34.4	35.4	1.2	1.00	6.00
1 3/8	34.9	34.4	35.4	1.6	1.31	7.86
1 3/8	34.9	34.4	35.4	2.0	1.62	9.72
1 1/2	38.1	37.6	38.6	1.2	1.09	6.54
1 1/2	38.1	37.6	38.6	1.6	1.44	8.64
1 1/2	38.1	37.6	38.6	2.0	1.78	10.68
1 5/8	41.3	40.8	41.8	1.2	1.19	7.14
1 5/8	41.3	40.8	41.8	1.6	1.57	9.42
1 5/8	41.3	40.8	41.8	2.0	1.94	11.64
1 3/4	44.5	44.0	45.0	1.2	1.28	7.68
1 3/4	44.5	44.0	45.0	1.6	1.69	10.14
1 3/4	44.5	44.0	45.0	2.0	2.10	12.60
1 7/8	47.6	47.1	48.1	1.2	1.37	8.22
1 7/8	47.6	47.1	48.1	1.6	1.81	10.86
1 7/8	47.6	47.1	48.1	2.0	2.25	13.50
2	50.8	50.3	51.3	1.6	1.94	11.64
2	50.8	50.3	51.3	2.0	2.41	14.46
2	50.8	50.3	51.3	3.0	3.54	21.24
2 1/4	57.2	56.6	57.8	1.6	2.19	13.14
2 1/4	57.2	56.6	57.8	2.0	2.72	16.32
2 1/4	57.2	56.6	57.8	3.0	4.01	24.06
2 3/8	60.4	59.8	61.0	1.6	2.32	13.92
2 3/8	60.4	59.8	61.0	2.0	2.88	17.28
2 3/8	60.4	59.8	61.0	3.0	4.25	25.5
2 1/2	63.5	62.9	64.1	1.6	2.44	14.64
2 1/2	63.5	62.9	64.1	2.0	3.03	18.18
2 1/2	63.5	62.9	64.1	3.0	4.48	26.88

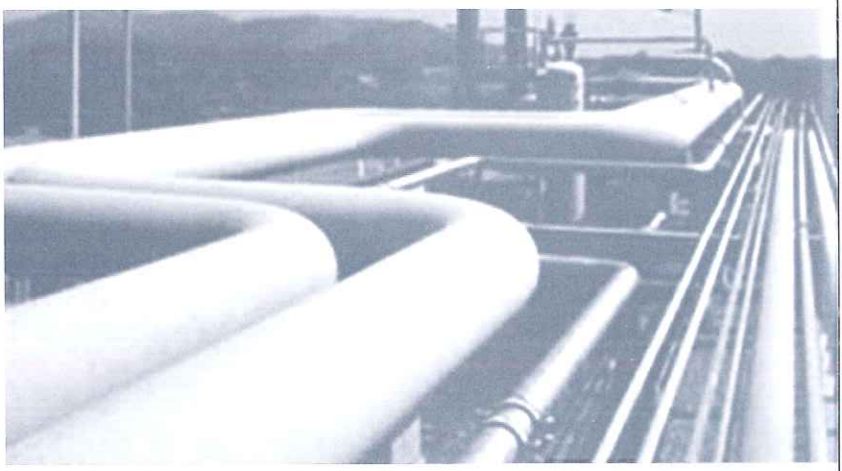
STANDARD JIS G3445-1988

Carbon Steel Tubes For Machine Structural Purpose
JIS G3445-1988 STKM 11A

Division	Tolerances on outside diameter	
No. 1	Under 50 mm	± 0.5 mm
	50 mm or over	± 1 %
No. 2	Under 50 mm	± 0.25 mm
	50 mm or over	± 0.5 %
No. 3	Under 25 mm	+ 0.12 mm
	25 mm or over to and excl. 40 mm	+ 0.15 mm
	40 mm or over to and excl. 50 mm	+ 0.18 mm
	50 mm or over to and excl. 60 mm	+ 0.20 mm
	60 mm or over to and excl. 70 mm	+ 0.23 mm
	70 mm or over to and excl. 80 mm	+ 0.25 mm
	80 mm or over to and excl. 90 mm	+ 0.30 mm
	90 mm or over to and excl. 100 mm	+ 0.40 mm
	100 mm or over	± 0.5 %

Division	Tolerances on wall thickness	
No. 1	Under 4 mm	+ 0.6 mm - 0.5 mm
	4 mm or over	+ 15% - 12.5%
No. 2	Under 3 mm	± 0.3 mm
	3 mm or over	± 10 %
No. 3	Under 2 mm	± 0.15 mm
	2 mm or over	± 8 %

Oil & Gas
Application



Api pipe

API SPECIFICATION FOR ERW STEEL PIPES

Tensile and Chemical Requirement (Excerpts from API Specification, 43RD edition, March 2004)

Application	Grade		PSL	Tensile Requirements				
				Yield Strength		Tensile Strength		Elongation
				psi	Mpa	psi	Mpa	% min
Line Pipe	API 5L	Grade A	1	30000 (min)	207 (min)	48000 (min)	331 (min)	(N1)
	API 5L	Grade B	1	35000 (min)	241 (min)	60000 (min)	414 (min)	
			2	35,000 - 65,000	241 - 448	60,000 - 110,000	414 - 758	
	API 5L	Grade X42	1	42000 (min)	290 (min)	60000 (min)	414 (min)	
			2	42,000 - 72,000	290 - 496	60,000 - 110,000	414 - 758	
	API 5L	Grade X46	1	46000 (min)	317 (min)	63000 (min)	434 (min)	
			2	46,000 - 76,000	317 - 524	63,000 - 110,000	434 - 758	
	API 5L	Grade X52	1	52000 (min)	359 (min)	66000 (min)	455 (min)	
			2	52,000 - 77,000	359 - 531	66,000 - 110,000	455 - 758	
	API 5L	Grade X56	1	56000 (min)	386 (min)	71000 (min)	490 (min)	
			2	56,000 - 79,000	386 - 544	71,000 - 110,000	490 - 758	
	API 5L	Grade X60	1	60000 (min)	414 (min)	75000 (min)	517 (min)	
			2	60,000 - 82,000	414 - 565	75,000 - 110,000	517 - 758	
	API 5L	Grade X65	1	65000 (min)	448 (min)	77000 (min)	531 (min)	
			2	65,000 - 87,000	448 - 600	77,000 - 110,000	531 - 758	
	API 5L	Grade X70	1	70000 (min)	483 (min)	82000 (min)	565 (min)	
			2	70,000 - 90,000	483 - 621	82,000 - 110,000	565 - 758	
	API 5L	Grade X80	2	80,000 - 100,000 (N2)	552 - 690	90,000 - 120,000	621 - 827	

Application	Grade		PSL	Tensile Requirements					
				C (N3)	Si	Mn (N3)	Tensile Strength		Others
				psi	max	max	psi	Mpa	
Line Pipe	API 5L	Grade A	1	0.22	-	0.90	0.03	0.03	-
	API 5L	Grade B	1	0.26	-	1.20	0.03	0.03	(N4), (N5), (N6)
			2	0.22	-	1.20	0.025	0.015	(N6), (N8)
	API 5L	Grade X42	1	0.26	-	1.30	0.03	0.03	(N5), (N6)
			2	0.22	-	1.30	0.025	0.015	(N5), (N6)
	API 5L	Grade X46	1	0.26	-	1.40	0.03	0.03	(N5), (N6)
			2	0.22	-	1.40	0.025	0.015	(N5), (N6)
	API 5L	Grade X52	1	0.26	-	1.40	0.03	0.03	(N5), (N6)
			2	0.22	-	1.40	0.025	0.015	(N5), (N6)
	API 5L	Grade X56	1	0.26	-	1.40	0.03	0.03	(N5), (N6)
			2	0.22	-	1.40	0.025	0.015	(N5), (N6)
	API 5L	Grade X60	1	0.26	-	1.40	0.03	0.03	(N5), (N6), (N7)
			2	0.22	-	1.40	0.025	0.015	(N5), (N6), (N7)
	API 5L	Grade X65	1	0.26	-	1.45	0.03	0.03	(N5), (N6), (N7)
			2	0.22	-	1.45	0.025	0.015	(N5), (N6), (N7)
	API 5L	Grade X70	1	0.26	-	1.65	0.03	0.03	(N5), (N6), (N7)
			2	0.22	-	1.65	0.025	0.015	(N5), (N6), (N7)
	API 5L	Grade X80	2	0.22	-	1.85	0.025	0.015	(N5), (N6), (N7)

Please refer to next page for notes explanation

API PIPE

Nominal Size	Outside Diameter		Wall Thickness		Weight			Minimum Test Pressure (psi)										
								API 5L										
	in	mm	in	mm	lb/ft	kg/m	kg/ft		Grade A	Grade B	Grade X42	Grade X46	Grade X52	Grade X56	Grade X60	Grade X65	Grade X70	Grade X80
0.84	0.840	21.3	0.109	2.77	0.85	1.27	0.39	Std.	700	700	-	-	-	-	-	-	-	-
			0.147	3.73	1.09	1.62	0.49	Std.	850	850	-	-	-	-	-	-	-	-
			0.294	7.47	1.72	2.55	0.78	Std.	1000	1000	-	-	-	-	-	-	-	-
1.05	1.050	26.7	0.113	2.87	1.13	1.69	0.51	Std.	700	700	-	-	-	-	-	-	-	-
			0.154	3.91	1.48	2.20	0.67	Std.	850	850	-	-	-	-	-	-	-	-
			0.308	7.82	2.44	3.64	1.11	Std.	1000	1000	-	-	-	-	-	-	-	-
1.315	1.315	33.4	0.133	3.38	1.68	2.50	0.76	Std.	700	700	-	-	-	-	-	-	-	-
			0.179	4.55	2.17	3.24	0.99	Std.	850	850	-	-	-	-	-	-	-	-
			0.358	9.09	3.66	5.45	1.66	Std.	1000	1000	-	-	-	-	-	-	-	-
1.66	1.660	42.2	0.140	3.56	2.27	3.39	1.03	Std.	1200	1300	-	-	-	-	-	-	-	-
			0.191	4.85	3.00	4.47	1.36	Std.	1800	1900	-	-	-	-	-	-	-	-
			0.382	9.70	5.22	7.77	2.37	Std.	2200	2300	-	-	-	-	-	-	-	-
1.90	1.900	48.3	0.145	3.68	2.72	4.05	1.23	Std.	1200	1300	-	-	-	-	-	-	-	-
			0.200	5.08	3.63	5.41	1.65	Std.	1800	1900	-	-	-	-	-	-	-	-
			0.400	10.16	6.41	9.56	2.91	Std.	2200	2300	-	-	-	-	-	-	-	-
2 3/8	2.375	60.3	0.083	2.11	2.03	3.03	0.92	Std.	1260	1470	1760	1930	2180	2350	2520	2730	2940	-
								Alt.	1570	1830	2200	2410	2730	2940	3150	3410	3670	-
			0.109	2.77	2.64	3.93	1.20	Std.	1650	1930	2310	2530	2860	3000	3000	3000	3000	-
								Alt.	2070	2410	2890	3170	3580	3860	4130	4470	4820	-
			0.125	3.18	3.01	4.48	1.37	Std.	1890	2210	2650	2910	3000	3000	3000	3000	3000	-
								Alt.	2370	2500	3320	3630	4110	4420	4740	5130	5530	-
			0.141	3.58	3.37	5.01	1.53	Std.	2140	2490	2990	3000	3000	3000	3000	3000	3000	-
								Alt.	2500	2500	3740	4100	4630	4990	5340	5790	6230	-
			0.154	3.91	3.66	5.44	1.66	Std.	2330	2500	3000	3000	3000	3000	3000	3000	3000	-
								Alt.	2500	2500	4090	4470	5060	5450	5840	6320	6810	-
			0.172	4.37	4.05	6.03	1.84	Std.	2500	2500	3000	3000	3000	3000	3000	3000	3000	-
								Alt.	2500	2500	4560	5000	5650	6080	6520	7060	7260	-
			0.188	4.78	4.40	6.54	1.99	Std.	2500	2500	3000	3000	3000	3000	3000	3000	3000	-
								Alt.	2500	2500	4990	5460	6170	6650	7120	7260	7260	-
			0.218	5.54	5.03	7.48	2.28	Std.	2500	2500	3000	3000	3000	3000	3000	3000	3000	-
								Alt.	2500	2500	5780	6330	7160	7260	7260	7260	7260	-
			0.250	6.35	5.68	8.45	2.57	Std.	2500	2500	3000	3000	3000	3000	3000	3000	3000	-
								Alt.	2500	2500	6630	7260	7260	7260	7260	7260	7260	-
			0.281	7.14	6.29	9.36	2.85	Std.	2500	2500	3000	3000	3000	3000	3000	3000	3000	-
								Alt.	2500	2500	7260	7260	7260	7260	7260	7260	7260	-
			0.436	11.07	9.04	13.44	4.10	Std.	2500	2500	3000	3000	3000	3000	3000	3000	3000	-
								Alt.	2500	2500	7260	7260	7260	7260	7260	7260	7260	-
2 7/8	2.875		0.083	2.11	2.48	3.69	1.12	Std.	1040	1210	1460	1590	1800	1940	2080	2250	2430	-
								Alt.	1300	1520	1820	1990	2250	2430	2600	2810	3030	-
			0.109	2.77	3.22	4.80	1.46	Std.	1360	1590	1910	2090	2370	2550	2730	2960	3000	-
								Alt.	1710	1990	2390	2620	2960	3180	3410	3700	3980	-
			0.125	3.18	3.67	5.48	1.67	Std.	1570	1830	2190	2400	2710	2920	3000	3000	3000	-
								Alt.	1960	2280	2740	3000	3390	3650	3910	4240	4570	-
			0.141	3.58	4.12	6.13	1.87	Std.	1770	2060	2470	2710	3000	3000	3000	3000	3000	-
								Alt.	2210	2500	3090	3380	3830	4120	4410	4780	5150	-
			0.156	3.96	4.53	6.74	2.05	Std.	1950	2280	2730	3000	3000	3000	3000	3000	3000	-
								Alt.	2440	2500	3420	3740	4230	4560	4880	5290	5700	-
			0.172	4.37	4.97	7.40	2.25	Std.	2150	2500	3000	3000	3000	3000	3000	3000	3000	-
								Alt.	2500	2500	3770	4130	4670	5030	5380	5830	6280	-
			0.188	4.78	5.40	8.04	2.45	Std.	2350	2500	3000	3000	3000	3000	3000	3000	3000	-
								Alt.	2500	2500	4120	4510	5100	5490	5890	6380	6870	-
			0.203	5.16	5.80	8.63	2.63	Std.	2500	2500	3000	3000	3000	3000	3000	3000	3000	-
								Alt.	2500	2500	4450	4870	5510	5930	6350	6880	7260	-
			0.216	5.49	6.14	9.14	2.79	Std.	2500	2500	3000	3000	3000	3000	3000	3000	3000	-
								Alt.	2500	2500	4730	5180	5860	6310	6760	7260	7260	-
			0.250	6.35	7.02	10.44	3.18	Std.	2500	2500	3000	3000	3000	3000	3000	3000	3000	-
								Alt.	2500	2500	5480	6000	6780	7260	7260	7260	7260	-
			0.276	7.01	7.67	11.41	3.48	Std.	2500	2500	3000	3000	3000	3000	3000	3000	3000	-
								Alt.	2500	2500	6050	6620	7260	7260	7260	7260	7260	-
			0.552	14.02	13.71	20.39	6.22	Std.	2500	2500	3000	3000	3000	3000	3000	3000	3000	-
								Alt.	2500	2500	7260	7260	7260	7260	7260	7260	7260	-
3 1/2	3.500	88.9	0.083	2.11	3.03	4.52	1.38	Std.	850	1000	1200	1310	1480	1590	1710	1850	1990	-
								Alt.	1070	1250	1490	1640	1850	1990	2130	2310	2490	-
			0.109	2.77	3.95	5.88	1.79	Std.	1120	1310	1570	1720	1940	2090	2240	2430	2620	-
								Alt.	1400	1640	1960	2150	2430	2620	2800	3040	3270	-
			0.125	3.18	4.51	6.72	2.05	Std.	1290	1500	1800	1970	2230	2400	2570	2790	3000	-
								Alt.	1610	1880	2250	2460	2790	3000	3210	3480	3750	-
			0.141	3.58	5.06	7.53	2.30	Std.	1450	1690	2030	2220	2510	2710	2900	3000	3000	-
								Alt.	1810	2120	2540	2780	3140	3380	3630	3930	4230	-
			0.156	3.96	5.58	8.29	2.53	Std.	1600	1870	2250	2460	2780	3000	3000	3000	3000	-
								Alt.	2010	2340	2810	3080	3480	3740	4010	4350	4680	-
			0.172	4.37	6.12	9.11	2.78	Std.	1770	2060	2480	2710	3000	3000	3000	3000	3000	-
								Alt.	2210	2500	3100	3390	3830	4130	4420	4790	5160	-
			0.188	4.78	6.66	9.92	3.02	Std.	1930	2260	2710	2970	3000	3000	3000	3000	3000	-
								Alt.	2420	2500	3380	3710	4190	4510	4830	5240	5640	-
			0.216	5.49	7.58	11.29	3.44	Std.	2220	2500	3000	3000	3000	3000	3000	3000	3000	-
								Alt.	2500	2500	3890	4260	4810	5180	5550	6020	6480	-
			0.250	6.35	8.69	12.93	3.94	Std.	2500	2500	3000	3000	3000	3000	3000	3000	3000	-
								Alt.	2500	2500	4500	4930	5570	6000	6430	6960	7260	-
			0.281	7.14	9.67	14.40	4.39	Std.	2500	2500	3000	3000	3000	3000	3000	3000	3000	-
								Alt.	2500	2500	5060	5540	6260	6740	7230	7260	7260	-
			0.300	7.62	10.26	15.27	4.66	Std.	2500	2500	3000	3000	3000	3000	3000	3000	3000	-
								Alt.	2500	2500	5400	5910	6690	7200	7260	7260	7260	-
			0.600	15.24	18.60	27.68	8.44	Std.	2500	2500	3000	3000	3000	3000	3000	3000	3000	-
								Alt.	2500	2500	7260	7260	7260	7260	7260	7260	7260	-

Please check with the manufacturer the availability of the product

API PIPE

Nominal Size	Outside Diameter		Wall Thickness		Weight			Minimum Test Pressure (psi)										
								API 5L										
	in	mm	in	mm	lb/ft	kg/m	kg/ft		Grade A	Grade B	Grade X42	Grade X46	Grade X52	Grade X56	Grade X60	Grade X65	Grade X70	Grade X80
4	4.000	101.6	0.083	2.11	3.48	5.18	1.58	Std.	750	870	1050	1150	1290	1390	1490	1620	1740	-
								Alt.	930	1090	1310	1430	1620	1740	1870	2020	2180	-
			0.109	2.77	4.53	6.75	2.06	Std.	980	1140	1370	1500	1700	1830	1960	2130	2290	-
								Alt.	1230	1430	1720	1880	2130	2290	2450	2660	2860	-
			0.125	3.18	5.18	7.72	2.35	Std.	1130	1310	1580	1730	1950	2100	2250	2440	2630	-
								Alt.	1410	1640	1970	2160	2440	2630	2810	3050	3280	-
			0.141	3.58	5.82	8.65	2.64	Std.	1270	1480	1780	1950	2200	2370	2540	2750	2960	-
								Alt.	1590	1850	2220	2430	2750	2960	3170	3440	3700	-
			0.156	3.96	6.41	9.53	2.91	Std.	1400	1640	1970	2150	2430	2620	2810	3000	3000	-
								Alt.	1760	2050	2460	2690	3040	3280	3510	3800	4100	-
			0.172	4.37	7.04	10.48	3.19	Std.	1550	1810	2170	2370	2680	2890	3000	3000	3000	-
								Alt.	1940	2260	2710	2970	3350	3610	3870	4190	4520	-
			0.188	4.78	7.66	11.41	3.48	Std.	1690	1970	2370	2590	2930	3000	3000	3000	3000	-
								Alt.	2120	2470	2960	3240	3670	3950	4230	4580	4940	-
			0.266	5.74	9.12	13.57	4.14	Std.	2030	2370	2850	3000	3000	3000	3000	3000	3000	-
								Alt.	2540	2800	3560	3900	4410	4750	5090	5510	5930	-
			0.250	6.35	10.02	14.92	4.55	Std.	2250	2630	3000	3000	3000	3000	3000	3000	3000	-
								Alt.	2800	2800	3940	4310	4880	5250	5630	6090	6560	-
			0.281	7.14	11.17	16.63	5.07	Std.	2530	2800	3000	3000	3000	3000	3000	3000	3000	-
								Alt.	2800	2800	4430	4850	5480	5900	6320	6850	7260	-
			0.318	8.05	12.52	18.57	5.66	Std.	2800	2800	3000	3000	3000	3000	3000	3000	3000	-
								Alt.	2800	2800	5010	5490	6200	6680	7160	7260	7260	-
4 1/2	4.500	114.3	0.083	2.11	3.92	5.84	1.78	Std.	660	770	930	1020	1150	1240	1330	1440	1550	1770
								Alt.	830	970	1160	1270	1440	1550	1660	1800	1940	2210
			0.125	3.18	5.85	8.71	2.66	Std.	1000	1170	1400	1530	1730	1870	2000	2170	2330	2670
								Alt.	1250	1460	1750	1920	2170	2330	2500	2710	2920	3330
			0.141	3.58	6.57	9.77	2.98	Std.	1130	1320	1580	1730	1960	2110	2260	2440	2630	3000
								Alt.	1410	1650	1970	2160	2440	2630	2820	3060	3290	3760
			0.156	3.96	7.24	10.78	3.28	Std.	1250	1460	1750	1910	2160	2330	2500	2700	2910	3000
								Alt.	1560	1820	2180	2390	2700	2910	3120	3380	3640	4160
			0.172	4.37	7.96	11.85	3.61	Std.	1380	1610	1930	2110	2390	2570	2750	2980	3000	3000
								Alt.	1720	2010	2410	2640	2980	3210	3440	3730	4010	4590
			0.188	4.78	8.67	12.91	3.93	Std.	1500	1750	2110	2310	2610	2810	3000	3000	3000	3000
								Alt.	1880	2190	2630	2880	3260	3510	3760	4070	4390	5010
			0.203	5.16	9.32	13.89	4.23	Std.	1620	1890	2270	2490	2810	3000	3000	3000	3000	3000
								Alt.	2030	2370	2840	3110	3520	3790	4060	4400	4740	5410
			0.219	5.56	10.02	14.91	4.54	Std.	1750	2040	2450	2690	3000	3000	3000	3000	3000	3000
								Alt.	2190	2560	3070	3360	3800	4090	4380	4750	5110	5840
			0.237	6.02	10.80	16.07	4.90	Std.	1900	2210	2650	2910	3000	3000	3000	3000	3000	3000
								Alt.	2370	2770	3320	3630	4110	4420	4740	5140	5530	6320
			0.250	6.35	11.36	16.90	5.15	Std.	2000	2330	2800	3000	3000	3000	3000	3000	3000	3000
								Alt.	2500	2800	3500	3830	4330	4670	5000	5420	5830	6670
			0.281	7.14	12.67	18.87	5.75	Std.	2250	2620	3000	3000	3000	3000	3000	3000	3000	3000
								Alt.	2800	2800	3930	4310	4870	5250	5620	6090	6560	7260
			0.312	7.92	13.97	20.78	6.33	Std.	2500	2800	3000	3000	3000	3000	3000	3000	3000	3000
								Alt.	2800	2800	4370	4780	5410	5820	6240	6760	7260	7260
			0.337	8.56	15.00	22.32	6.80	Std.	2700	2800	3000	3000	3000	3000	3000	3000	3000	3000
								Alt.	2800	2800	4720	5170	5840	6290	6740	7260	7260	7260
			0.438	11.13	19.02	28.32	8.63	Std.	2800	2800	3000	3000	3000	3000	3000	3000	3000	3000
								Alt.	2800	2800	6130	6720	7260	7260	7260	7260	7260	7260
			0.531	13.49	22.53	33.54	10.22	Std.	2800	2800	3000	3000	3000	3000	3000	3000	3000	3000
								Alt.	2800	2800	7260	7260	7260	7260	7260	7260	7260	7260
5 9/16	5.563	141.3	0.083	2.11	4.86	7.24	2.21	Std.	540	630	750	820	930	1000	1070	1160	1250	1430
								Alt.	670	780	940	1030	1160	1250	1340	1450	1570	1790
			0.125	3.18	7.27	10.83	3.30	Std.	810	940	1130	1240	1400	1510	1620	1750	1890	2160
								Alt.	1010	1180	1420	1550	1750	1890	2020	2190	2360	2700
			0.156	3.96	9.02	13.41	4.09	Std.	1010	1180	1410	1550	1750	1880	2020	2190	2360	2690
								Alt.	1260	1470	1770	1930	2190	2360	2520	2730	2940	3370
			0.188	4.78	10.80	16.09	4.90	Std.	1220	1420	1700	1870	2110	2270	2430	2640	2840	3000
								Alt.	1520	1770	2130	2330	2640	2840	3040	3290	3550	4060
			0.219	5.56	12.51	18.61	5.67	Std.	1420	1650	1980	2170	2460	2650	2830	3000	3000	3000
								Alt.	1770	2070	2480	2720	3070	3310	3540	3840	4130	4720
			0.258	6.55	14.63	21.77	6.63	Std.	1670	1950	2340	2560	2890	3000	3000	3000	3000	3000
								Alt.	2090	2430	2920	3220	3620	3900	4170	4520	4870	5570
			0.281	7.14	15.87	23.62	7.20	Std.	1820	2120	2550	2790	3000	3000	3000	3000	3000	3000
								Alt.	2270	2650	3180	3490	3940	4240	4550	4920	5300	6060
			0.312	7.92	17.51	26.05	7.94	Std.	2020	2360	2830	3000	3000	3000	3000	3000	3000	3000
								Alt.	2520	2800	3530	3870	4370	4710	5050	5470	5890	6730
			0.344	8.74	19.19	28.57	8.71	Std.	2230	2600	3000	3000	3000	3000	3000	3000	3000	3000
								Alt.	2780	2800	3900	4270	4820	5190	5570	6030	6490	7260
			0.375	9.52	20.80	30.94	9.43	Std.	2430	2800	3000	3000	3000	3000	3000	3000	3000	3000
								Alt.	2800	2800	4250	4650	5260	5660	6070	6570	7080	7260
			0.500	12.70	27.06	40.28	12.28	Std.	2800	2800	3000	3000	3000	3000	3000	3000	3000	3000
								Alt.	2800	2800	5660	6200	7010	7260	7260	7260	7260	7260
			0.625	15.88	32.99	49.11	14.97	Std.	2800	2800	3000	3000	3000	3000	3000	3000	3000	3000
								Alt.	2800	2800	7080	7260	7260	7260	7260	7260	7260	7260

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API PIPE

Nominal Size	Outside Diameter		Wall Thickness		Weight			Minimum Test Pressure (psi)										
								API 5L										
	in	mm	in	mm	lb/ft	kg/m	kg/ft		Grade A	Grade B	Grade X42	Grade X46	Grade X52	Grade X56	Grade X60	Grade X65	Grade X70	Grade X80
6 5/8	6.625	168.3	0.125	3.18	8.69	12.95	3.95	Std.	680	790	1190	1300	1470	1580	1700	1840	1980	2260
								Alt.	850	990	1190	1300	1470	1580	1700	1840	1980	2260
			0.141	3.58	9.77	14.54	4.43	Std.	770	890	1340	1470	1660	1790	1920	2080	2230	2550
								Alt.	960	1120	1340	1470	1660	1790	1920	2080	2230	2550
			0.156	3.96	10.79	16.05	4.89	Std.	850	990	1480	1620	1840	1980	2120	2300	2470	2830
								Alt.	1060	1240	1480	1620	1840	1980	2120	2300	2470	2830
			0.172	4.37	11.87	17.67	5.38	Std.	930	1090	1640	1790	2030	2180	2340	2530	2730	3000
								Alt.	1170	1360	1640	1790	2030	2180	2340	2530	2730	3120
			0.188	4.78	12.94	19.27	5.87	Std.	1020	1190	1790	1960	2210	2380	2550	2770	2980	3000
								Alt.	1280	1490	1790	1960	2210	2380	2550	2770	2980	3410
			0.203	5.16	13.94	20.76	6.33	Std.	1100	1290	1930	2110	2390	2570	2760	2990	3000	3000
								Alt.	1380	1610	1930	2110	2390	2570	2760	2990	3220	3680
			0.219	5.56	15.00	22.31	6.80	Std.	1190	1390	2080	2280	2580	2780	2980	3000	3000	3000
								Alt.	1490	1740	2080	2280	2580	2780	2980	3220	3470	3970
			0.250	6.35	17.04	25.36	7.73	Std.	1360	1580	2380	2600	2940	3000	3000	3000	3000	3000
								Alt.	1700	1980	2380	2600	2940	3170	3400	3680	3960	4530
			0.280	7.11	18.99	28.26	8.61	Std.	1520	1780	2660	2920	3000	3000	3000	3000	3000	3000
								Alt.	1900	2220	2660	2920	3300	3550	3800	4120	4440	5070
			0.312	7.92	21.06	31.32	9.55	Std.	1700	1980	2970	3000	3000	3000	3000	3000	3000	3000
								Alt.	2120	2470	2970	3250	3670	3960	4240	4590	4940	5650
			0.344	8.74	23.10	34.39	10.48	Std.	1870	2180	3000	3000	3000	3000	3000	3000	3000	3000
								Alt.	2340	2730	3270	3580	4050	4360	4670	5060	5450	6230
			0.375	9.52	25.05	37.28	11.36	Std.	2040	2380	3000	3000	3000	3000	3000	3000	3000	3000
								Alt.	2550	2800	3570	3910	4420	4750	5090	5520	5940	6790
			0.432	10.97	28.60	42.56	12.97	Std.	2350	2740	3000	3000	3000	3000	3000	3000	3000	3000
								Alt.	2800	2800	4110	4500	5090	5480	5870	6360	6850	7260
			0.500	12.70	32.74	48.73	14.85	Std.	2720	2800	3000	3000	3000	3000	3000	3000	3000	3000
								Alt.	2800	2800	4750	5210	5890	6340	6790	7260	7260	7260
			0.562	14.27	36.43	54.20	16.52	Std.	2800	2800	3000	3000	3000	3000	3000	3000	3000	3000
								Alt.	2800	2800	5340	5850	6620	7130	7260	7260	7260	7260
			0.625	15.88	40.09	59.69	18.19	Std.	2800	2800	3000	3000	3000	3000	3000	3000	3000	3000
								Alt.	2800	2800	5940	6510	7260	7260	7260	7260	7260	7260
			0.719	18.26	45.39	67.56	20.59	Std.	2800	2800	3000	3000	3000	3000	3000	3000	3000	3000
								Alt.	2800	2800	6840	7260	7260	7260	7260	7260	7260	7260
8 5/8	8.625	219.1	0.125	3.18	11.36	16.93	5.16	Std.	520	610	910	1000	1130	1220	1300	1410	1520	1740
								Alt.	650	760	910	1000	1130	1220	1300	1410	1520	1740
			0.156	3.96	14.12	21.01	6.40	Std.	650	760	1140	1250	1410	1520	1630	1760	1900	2170
								Alt.	810	950	1140	1250	1410	1520	1630	1760	1900	2170
			0.188	4.78	16.96	25.26	7.70	Std.	780	920	1370	1500	1700	1830	1960	2130	2290	2620
								Alt.	980	1140	1370	1500	1700	1830	1960	2130	2290	2620
			0.203	5.16	18.28	27.22	8.30	Std.	850	990	1480	1620	1840	1980	2120	2290	2470	2820
								Alt.	1060	1240	1480	1620	1840	1980	2120	2290	2470	2820
			0.219	5.56	19.68	29.28	8.92	Std.	910	1070	1600	1750	1980	2130	2290	2480	2670	3000
								Alt.	1140	1330	1600	1750	1980	2130	2290	2480	2670	3050
			0.250	6.35	22.38	33.31	10.15	Std.	1040	1220	1830	2000	2260	2430	2610	2830	3000	3000
								Alt.	1300	1520	1830	2000	2260	2430	2610	2830	3040	3480
			0.277	7.04	24.72	36.81	11.22	Std.	1160	1350	2020	2220	2510	2700	2890	3000	3000	3000
								Alt.	1450	1690	2020	2220	2510	2700	2890	3130	3370	3850
			0.312	7.92	27.73	41.24	12.57	Std.	1300	1520	2280	2500	2820	3000	3000	3000	3000	3000
								Alt.	1630	1900	2280	2500	2820	3040	3260	3530	3800	4340
			0.322	8.18	28.58	42.55	12.97	Std.	1340	1570	2350	2580	2910	3000	3000	3000	3000	3000
								Alt.	1680	1960	2350	2580	2910	3140	3360	3640	3920	4480
			0.344	8.74	30.45	45.34	13.82	Std.	1440	1680	2510	2750	3000	3000	3000	3000	3000	3000
								Alt.	1790	2090	2510	2750	3110	3350	3590	3890	4190	4790
			0.375	9.52	33.07	49.20	15.00	Std.	1570	1830	2740	3000	3000	3000	3000	3000	3000	3000
								Alt.	1960	2280	2740	3000	3390	3650	3910	4240	4570	5220
			0.438	11.13	38.33	57.08	17.40	Std.	1830	2130	3000	3000	3000	3000	3000	3000	3000	3000
								Alt.	2290	2670	3200	3500	3960	4270	4570	4950	5330	6090
			0.500	12.70	43.43	64.64	19.70	Std.	2090	2430	3000	3000	3000	3000	3000	3000	3000	3000
								Alt.	2610	2800	3650	4000	4520	4870	5220	5650	6090	6960
			0.562	14.27	48.44	72.08	21.97	Std.	2350	2740	3000	3000	3000	3000	3000	3000	3000	3000
								Alt.	2800	2800	4110	4500	5080	5470	5860	6350	6840	7260
			0.625	15.88	53.45	79.58	24.26	Std.	2610	2800	3000	3000	3000	3000	3000	3000	3000	3000
								Alt.	2800	2800	4570	5000	5650	6090	6520	7070	7260	7260
			0.719	18.26	60.77	90.44	27.57	Std.	2800	2800	3000	3000	3000	3000	3000	3000	3000	3000
								Alt.	2800	2800	5250	5750	7000	7000	7260	7260	7260	7260

Please check with the manufacturer the availability of the product

API PIPE

Nominal Size	Outside Diameter		Wall Thickness		Weight			Minimum Test Pressure (psi)										
								API 5L										
	in	mm	in	mm	lb/ft	kg/m	kg/ft		Grade A	Grade B	Grade X42	Grade X46	Grade X52	Grade X56	Grade X60	Grade X65	Grade X70	Grade X80
10 3/4	10.750	273	0.156	3.96	17.67	26.27	8.01	Std.	520	610	1040	1130	1280	1380	1480	1600	1730	1970
								Alt.	650	760	1040	1130	1280	1380	1480	1600	1730	1970
			0.188	4.78	21.23	31.62	9.64	Std.	630	730	1250	1370	1550	1660	1780	1930	2080	2380
								Alt.	790	920	1250	1370	1550	1660	1780	1930	2080	2380
			0.203	5.16	22.89	34.08	10.39	Std.	680	790	1350	1480	1670	1800	1930	2090	2250	2570
								Alt.	850	990	1350	1480	1670	1800	1930	2090	2250	2570
			0.219	5.56	24.65	36.67	11.18	Std.	730	860	1450	1590	1800	1940	2080	2250	2420	2770
								Alt.	920	1070	1450	1590	1800	1940	2080	2250	2420	2770
			0.250	6.35	28.06	41.75	12.73	Std.	840	980	1660	1820	2060	2210	2370	2570	2770	3000
								Alt.	1050	1220	1660	1820	2060	2210	2370	2570	2770	3160
			0.279	7.09	31.23	46.49	14.17	Std.	930	1090	1850	2030	2290	2470	2650	2870	3000	3000
								Alt.	1170	1360	1850	2030	2290	2470	2650	2870	3090	3530
			0.307	7.80	34.27	51.01	15.55	Std.	1030	1200	2040	2230	2520	2720	2910	3000	3000	3000
								Alt.	1290	1500	2040	2230	2520	2720	2910	3160	3400	3880
			0.344	8.74	38.27	56.96	17.36	Std.	1150	1340	2280	2500	2830	3000	3000	3000	3000	3000
								Alt.	1440	1680	2280	2500	2830	3050	3260	3540	3810	4350
			0.365	9.27	40.52	60.29	18.38	Std.	1220	1430	2420	2660	3000	3000	3000	3000	3000	3000
								Alt.	1530	1780	2420	2660	3000	3230	3460	3750	4040	4620
			0.438	11.13	48.28	71.87	21.91	Std.	1470	1710	2910	3000	3000	3000	3000	3000	3000	3000
								Alt.	1830	2140	2910	3190	3600	3880	4160	4500	4850	5540
			0.500	12.70	54.79	81.52	24.85	Std.	1670	1950	3000	3000	3000	3000	3000	3000	3000	3000
								Alt.	2090	2440	3320	3640	4110	4430	4740	5140	5530	6330
			0.562	14.27	61.21	91.05	27.75	Std.	1880	2200	3000	3000	3000	3000	3000	3000	3000	3000
								Alt.	2350	2740	3730	4090	4620	4980	5330	5780	6220	7110
			0.625	15.88	67.65	100.69	30.69	Std.	2090	2440	3000	3000	3000	3000	3000	3000	3000	3000
								Alt.	2620	2800	4150	4550	5140	5530	5930	6420	6920	7260
			0.719	18.26	77.10	114.71	34.96	Std.	2410	2800	3000	3000	3000	3000	3000	3000	3000	3000
								Alt.	2800	2800	4780	5230	5910	6370	6820	7260	7260	7260
12 3/4	12.750	323.8	0.172	4.37	23.13	34.42	10.49	Std.	490	570	960	1050	1190	1280	1380	1490	1610	1830
								Alt.	610	710	960	1050	1190	1280	1380	1490	1610	1830
			0.188	4.78	25.25	37.60	11.46	Std.	530	620	1050	1150	1300	1400	1500	1630	1750	2010
								Alt.	660	770	1050	1150	1300	1400	1500	1630	1750	2010
			0.203	5.16	27.23	40.55	12.36	Std.	570	670	1140	1250	1410	1520	1620	1760	1890	2170
								Alt.	720	840	1140	1250	1410	1520	1620	1760	1890	2170
			0.219	5.56	29.34	43.63	13.30	Std.	620	720	1230	1340	1520	1640	1750	1900	2040	2340
								Alt.	770	900	1230	1340	1520	1640	1750	1900	2040	2340
			0.250	6.35	33.41	49.71	15.15	Std.	710	820	1400	1530	1730	1870	2000	2170	2330	2670
								Alt.	880	1030	1400	1530	1730	1870	2000	2170	2330	2670
			0.281	7.14	37.46	55.76	16.99	Std.	790	930	1570	1720	1950	2100	2250	2440	2620	3000
								Alt.	990	1160	1570	1720	1950	2100	2250	2440	2620	3000
			0.312	7.92	41.48	61.69	18.80	Std.	880	1030	1750	1910	2160	2330	2500	2700	2910	3000
								Alt.	1100	1280	1750	1910	2160	2330	2500	2700	2910	3330
			0.330	8.38	43.81	65.18	19.87	Std.	930	1090	1850	2020	2290	2460	2640	2860	3000	3000
								Alt.	1160	1360	1850	2020	2290	2460	2640	2860	3080	3520
			0.344	8.74	45.62	67.90	20.70	Std.	970	1130	1930	2110	2390	2570	2750	2980	3000	3000
								Alt.	1210	1420	1930	2110	2390	2570	2750	2980	3210	3670
			0.375	9.52	49.61	73.78	22.49	Std.	1060	1240	2100	2300	2600	2800	3000	3000	3000	3000
								Alt.	1320	1540	2100	2300	2600	2800	3000	3250	3500	4000
			0.406	10.13	53.57	78.36	23.88	Std.	1150	1340	2270	2490	2810	3000	3000	3000	3000	3000
								Alt.	1430	1670	2270	2490	2810	3030	3250	3520	3790	4330
			0.438	11.13	57.65	85.82	26.16	Std.	1240	1440	2450	2690	3000	3000	3000	3000	3000	3000
								Alt.	1550	1800	2450	2690	3040	3270	3500	3800	4090	4670
			0.500	12.70	65.48	97.43	29.70	Std.	1410	1650	2800	3000	3000	3000	3000	3000	3000	3000
								Alt.	1760	2060	2800	3070	3470	3730	4000	4330	4670	5330
			0.562	14.27	73.22	108.92	33.20	Std.	1590	1850	3000	3000	3000	3000	3000	3000	3000	3000
								Alt.	1980	2310	3150	3450	3900	4200	4500	4870	5250	5990
			0.625	15.88	81.01	120.58	36.75	Std.	1760	2060	3000	3000	3000	3000	3000	3000	3000	3000
								Alt.	2210	2570	3500	3830	4330	4670	5000	5420	5830	6670
			0.688	17.48	88.71	132.04	40.25	Std.	1940	2270	3000	3000	3000	3000	3000	3000	3000	3000
								Alt.	2430	2800	3850	4220	4770	5140	5500	5960	6420	7260
14	14.000	355.6	0.188	4.78	27.76	41.35	12.60	Std.	480	560	960	1050	1190	1280	1370	1480	1600	1830
								Alt.	600	710	960	1050	1190	1280	1370	1480	1600	1830
			0.203	5.16	29.94	44.59	13.59	Std.	520	610	1040	1130	1280	1380	1480	1600	1730	1970
								Alt.	650	760	1040	1130	1280	1380	1480	1600	1730	1970
			0.210	5.33	30.96	46.04	14.03	Std.	540	630	1070	1170	1330	1430	1530	1660	1790	2040
								Alt.	680	790	1070	1170	1330	1430	1530	1660	1790	2040
			0.219	5.56	32.26	47.99	14.63	Std.	560	660	1120	1220	1380	1490	1600	1730	1860	2130
								Alt.	700	820	1120	1220	1380	1490	1600	1730	1860	2130
			0.250	6.35	36.75	54.69	16.67	Std.	640	750	1280	1400	1580	1700	1820	1970	2130	2430
								Alt.	800	940	1280	1400	1580	1700	1820	1970	2130	2430
			0.281	7.14	41.21	61.35	18.70	Std.	720	840	1430	1570	1770	1910	2050	2220	2390	2730
								Alt.	900	1050	1430	1570	1770	1910	2050	2220	2390	2730
			0.312	7.92	45.65	67.90	20.70	Std.	800	940	1590	1740	1970	2120	2270	2460	2650	3000
								Alt.	1000	1170	1590	1740	1970	2120	2270	2460	2650	3030
			0.344	8.74	50.22	74.76	22.79	Std.	880	1030	1750	1920	2170	2340	2510	2720	2920	3000
								Alt.	1110	1290	1750	1920	2170	2340	2510	2720	2920	3340

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API PIPE

Nominal Size	Outside Diameter		Wall Thickness		Weight			Minimum Test Pressure (psi)										
								API 5L										
	in	mm	in	mm	lb/ft	kg/m	kg/ft		Grade A	Grade B	Grade X42	Grade X46	Grade X52	Grade X56	Grade X60	Grade X65	Grade X70	Grade X80
14	14.000	355.6	0.375	9.52	54.62	81.25	24.76	Std.	960	1130	1910	2090	2370	2550	2730	2960	3000	3000
								Alt.	1210	1410	1910	2090	2370	2550	2730	2960	3190	3640
			0.406	10.31	59.00	87.79	26.76	Std.	1040	1220	2070	2270	2560	2760	2960	3000	3000	3000
								Alt.	1310	1520	2070	2270	2560	2760	2960	3200	3450	3940
			0.438	11.13	63.50	94.55	28.82	Std.	1130	1310	2230	2450	2770	2980	3000	3000	3000	3000
								Alt.	1410	1640	2230	2450	2770	2980	3190	3460	3720	4250
			0.469	11.91	67.84	100.94	30.77	Std.	1210	1410	2390	2620	2960	3000	3000	3000	3000	3000
								Alt.	1510	1760	2390	2620	2960	3190	3420	3700	3990	4560
			0.500	12.70	72.16	107.39	32.73	Std.	1290	1500	2550	2790	3000	3000	3000	3000	3000	3000
								Alt.	1610	1880	2550	2790	3160	3400	3640	3950	4250	4860
			0.562	14.27	80.73	120.11	36.61	Std.	1450	1690	2870	3000	3000	3000	3000	3000	3000	3000
								Alt.	1810	2110	2870	3140	3550	3820	4090	4440	4780	5460
			0.594	15.09	89.36	126.71	38.62	Std.	1610	1880	3000	3000	3000	3000	3000	3000	3000	3000
								Alt.	2010	2340	3190	3490	3950	4250	4550	4930	5310	6070
			0.625	15.88	89.36	133.03	40.55	Std.	1610	1880	3000	3000	3000	3000	3000	3000	3000	3000
								Alt.	2010	2340	3190	3490	3950	4250	4550	4930	5310	6070
			0.688	17.48	97.91	145.75	44.42	Std.	1770	2060	3000	3000	3000	3000	3000	3000	3000	3000
								Alt.	2210	2580	3510	3840	4340	4680	5010	5430	5850	6680
16	16.000	406.4	0.188	4.78	31.78	47.34	14.43	Std.	420	490	840	920	1040	1120	1200	1300	1400	1600
								Alt.	530	620	840	920	1040	1120	1200	1300	1400	1600
			0.203	5.16	34.28	51.06	15.56	Std.	460	530	910	990	1120	1210	1290	1400	1510	1730
								Alt.	570	670	910	990	1120	1210	1290	1400	1510	1730
			0.219	5.56	36.95	54.96	16.75	Std.	490	570	980	1070	1210	1300	1400	1510	1630	1860
								Alt.	620	720	980	1070	1210	1300	1400	1510	1630	1860
			0.250	6.35	42.09	62.64	19.09	Std.	560	660	1120	1220	1380	1490	1590	1730	1860	2130
								Alt.	700	820	1120	1220	1380	1490	1590	1730	1860	2130
			0.281	7.14	47.22	70.30	21.43	Std.	630	740	1250	1370	1550	1670	1790	1940	2090	2390
								Alt.	790	920	1250	1370	1550	1670	1790	1940	2090	2390
			0.312	7.92	52.32	77.83	23.72	Std.	700	820	1390	1520	1720	1860	1990	2150	2320	2650
								Alt.	880	1020	1390	1520	1720	1860	1990	2150	2320	2650
			0.344	8.74	57.57	85.71	26.12	Std.	770	900	1540	1680	1900	2050	2190	2380	2560	2920
								Alt.	970	1130	1540	1680	1900	2050	2190	2380	2560	2920
			0.375	9.52	62.64	93.17	28.40	Std.	840	980	1670	1830	2070	2230	2390	2590	2790	3000
								Alt.	1050	1230	1670	1830	2070	2230	2390	2590	2790	3190
			0.406	10.31	67.68	100.70	30.69	Std.	910	1070	1810	1980	2240	2420	2590	2800	3000	3000
								Alt.	1140	1330	1810	1980	2240	2420	2590	2800	3020	3450
			0.438	11.13	72.86	108.49	33.07	Std.	990	1150	1950	2140	2420	2610	2790	3000	3000	3000
								Alt.	1230	1440	1950	2140	2420	2610	2790	3020	3260	3630
			0.469	11.91	77.87	115.86	35.31	Std.	1060	1230	2090	2290	2590	2790	2990	3000	3000	3000
								Alt.	1320	1540	2090	2290	2590	2790	2990	3240	3490	3630
			0.500	12.70	82.85	123.30	37.58	Std.	1130	1310	2230	2440	2760	2980	3000	3000	3000	3000
								Alt.	1410	1640	2230	2440	2760	2980	3190	3450	3630	3630
			0.562	14.27	92.75	137.99	42.06	Std.	1260	1480	2510	2750	3000	3000	3000	3000	3000	3000
								Alt.	1580	1840	2510	2750	3110	3340	3580	3630	3630	3630
			0.625	15.88	102.73	152.93	46.61	Std.	1410	1640	2790	3000	3000	3000	3000	3000	3000	3000
								Alt.	1760	2050	2790	3050	3450	3630	3630	3630	3630	3630
			0.688	17.48	112.62	167.65	51.10	Std.	1550	1810	3000	3000	3000	3000	3000	3000	3000	3000
								Alt.	1940	2260	3070	3360	3630	3630	3630	3630	3630	3630
18	18.000	457.2	0.188	4.78	35.80	53.33	16.25	Std.	380	440	750	820	920	990	1070	1150	1240	1420
								Alt.	470	550	750	820	920	990	1070	1150	1240	1420
			0.219	5.56	41.63	61.92	18.87	Std.	440	510	870	950	1080	1160	1240	1340	1450	1650
								Alt.	550	640	870	950	1080	1160	1240	1340	1450	1650
			0.250	6.35	47.44	70.60	21.52	Std.	500	580	990	1090	1230	1320	1420	1530	1650	1890
								Alt.	630	730	990	1090	1230	1320	1420	1530	1650	1890
			0.281	7.14	53.23	79.24	24.15	Std.	560	660	1110	1220	1380	1490	1590	1730	1860	2120
								Alt.	700	820	1110	1220	1380	1490	1590	1730	1860	2120
			0.312	7.92	58.99	87.75	26.75	Std.	620	730	1240	1360	1530	1650	1770	1920	2060	2360
								Alt.	780	910	1240	1360	1530	1650	1770	1920	2060	2360
			0.344	8.74	64.93	96.66	29.46	Std.	690	800	1360	1490	1690	1820	1950	2110	2270	2600
								Alt.	860	1000	1360	1490	1690	1820	1950	2110	2270	2600
			0.375	9.52	70.65	105.10	32.03	Std.	750	880	1490	1630	1840	1980	2130	2300	2480	2830
								Alt.	940	1090	1490	1630	1840	1980	2130	2300	2480	2830
			0.406	10.31	76.36	113.62	34.63	Std.	810	950	1610	1760	1990	2150	2300	2490	2680	3000
								Alt.	1020	1180	1610	1760	1990	2150	2300	2490	2680	3070
			0.438	11.13	82.23	122.43	37.32	Std.	880	1020	1740	1900	2150	2320	2480	2690	2900	3000
								Alt.	1100	1280	1740	1900	2150	2320	2480	2690	2900	3310
			0.469	11.91	87.89	130.78	39.86	Std.	940	1090	1860	2040	2300	2480	2660	2880	3000	3000
								Alt.	1170	1370	1860	2040	2300	2480	2660	2880	3100	3540
			0.500	12.70	93.54	139.21	42.43	Std.	1000	1170	1980	2170	2460	2640	2830	3000	3000	3000
								Alt.	1250	1460	1980	2170	2460	2640	2830	3070	3310	3630
			0.562	14.27	104.76	155.87	47.51	Std.	1120	1310	2230	2440	2760	2970	3000	3000	3000	3000
								Alt.	1410	1640	2230	2440	2760	2970	3180	3450	3630	3630
			0.625	15.88	116.09	172.82	52.68	Std.	1250	1460	2480	2720	3000	3000	3000	3000	3000	3000
								Alt.	1560	1820	2480	2720	3070	3310	3540	3630	3630	3630
			0.688	17.48	127.32	189.54	57.77	Std.	1380	1610	2730	2990	3000	3000	3000	3000	3000	3000
								Alt.	1720	2010	2730	2990	3380	3630	3630	3630	3630	3630

Please check with the manufacturer the availability of the product

Others





Hot Rolled Steel Sheets

HOT ROLLED STEEL SHEETS						
Thickness	Calculate Weight					
	Width x Length			Width x Length		
	4' x 8' 1,219 mm. X 2,438 mm.			5' x 10' 1,524 mm. X 3,048 mm.		
mm.	kgs. / pc.	lb. / pc.	pcs. / MT.	kgs. / pc.	lb. / pc.	pcs. / MT.
1.20	27.996	61.719	35.7	43.757	96.467	22.9
1.40	32.661	72.005	30.6	51.050	112.545	19.6
1.50	34.994	77.149	28.6	54.697	120.584	18.3
1.60	37.327	82.292	26.8	58.343	128.623	17.1
1.80	41.993	92.578	23.8	65.636	144.701	15.2
1.90	44.326	97.722	22.6	69.282	152.740	14.4
2.00	46.659	102.865	21.4	72.929	160.779	13.7
2.20	51.325	113.151	19.5	80.222	176.587	12.5
2.30	53.658	118.295	18.6	83.868	184.896	11.9
2.50	58.324	128.581	17.1	91.161	200.974	11.0
2.80	65.323	144.011	15.3	102.100	225.091	9.8
2.90	67.656	149.154	14.8	105.747	233.130	9.5
3.00	69.989	154.297	14.3	109.393	241.169	9.1
3.20	74.655	164.584	13.4	116.686	257.246	8.6
3.80	88.652	195.443	11.3	138.565	305.480	7.2
4.00	93.318	205.730	10.7	145.858	321.558	6.9
4.30	100.317	221.159	10.0	156.797	345.675	6.4
4.50	104.983	231.446	9.5	164.090	361.753	6.1
5.00	116.648	257.162	8.6	182.322	401.948	5.5
5.80	135.312	298.308	7.4	211.494	466.259	4.7
6.00	139.978	308.594	7.1	218.787	482.337	4.6
7.50	174.972	385.743	5.7	273.483	602.921	3.7
8.00	186.637	411.459	5.4	291.716	643.116	3.4
9.00	209.966	462.892	4.8	328.180	723.506	3.0
10.00	233.296	514.324	4.3	364.644	803.895	2.7
11.00	256.625	565.756	3.9	401.109	884.285	2.5
12.00	279.955	617.189	3.6	437.573	964.674	2.3

Load Comparison Of Structure Steel Column (Ton)

การเปรียบเทียบการรับน้ำหนักเสาโครงสร้างเหล็ก (ตัน)

Structure Steel : WF 150x150x7x10x31.5 Fy = 248 Mpa Weight (kg/m.) = 31.5

เหล็กโครงสร้างหน้าตัดปีกกว้าง: 150x150x7x10x31.5 Fy = 248 Mpa น้ำหนัก (กก/ม) = 31.5

Tubularge		Ø 5"	Ø 6"	Ø 8"	WF 150 x 150 x 7 x 10 x 31.5 kg/m.
Wall Thickness (mm.) / ความหนาผนัง (มม.)		6.0	6.0	5.0	
Weight (kg/m.) / น้ำหนัก (กก/ม.)		19.80	24.02	26.40	
Economize (%) / ประหยัด (%)		37.1	23.7	16.2	
Effective Length kL (m.) ความยาวประสิทธิผล kL (เมตร)	0.0	38	46	50	60
	0.6	37	45	50	58
	0.9	36	44	49	57
	1.2	36	44	49	55
	1.5	35	43	48	54
	1.8	34	42	48	52
	2.1	33	41	47	50
	2.4	32	40	46	48
	2.7	31	40	46	45
	3.0	30	39	45	43
	3.4	29	38	44	40
	3.7	28	37	43	38
	4.0	27	35	43	35
	4.3	25	34	42	32
	4.6	24	33	41	29
	4.9	23	32	40	26
	5.2	21	31	39	23
	5.5	20	29	38	20
	5.8	18	28	37	18
	6.1	16	26	36	16
	6.4	15	25	35	15
	6.7	14	24	34	14
	7.0	12	22	33	12
	7.3	11	20	32	11
	7.6	11	19	31	
	7.9	10	17	30	
	8.2	9	16	28	
	8.5	8	15	27	
	8.8	8	14	26	
	9.1	7	13	25	

Tubularge		150 x 150	150 x 150	170 x 170	WF 150 x 150 x 7 x 10 x 31.5 kg/m.
Wall Thickness (mm.) / ความหนาผนัง (มม.)		4.0	6.0	5.0	
Weight (kg/m.) / น้ำหนัก (กก/ม.)		18.01	26.40	26.18	
Economize (%) / ประหยัด (%)		42.8	16.2	16.9	
Effective Length kL (m.) ความยาวประสิทธิผล kL (เมตร)	0.0	34	50	50	60
	0.6	34	49	49	58
	0.9	33	49	49	57
	1.2	33	48	48	55
	1.5	32	47	47	54
	1.8	32	46	47	52
	2.1	31	46	46	50
	2.4	31	45	45	48
	2.7	30	44	45	45
	3.0	29	43	44	43
	3.4	28	42	43	40
	3.7	28	40	42	38
	4.0	27	39	41	35
	4.3	26	38	40	32
	4.6	25	37	39	29
	4.9	24	35	38	26
	5.2	23	34	37	23
	5.5	23	33	36	20
	5.8	22	31	35	18
	6.1	21	30	34	16
	6.4	20	28	33	15
	6.7	18	26	31	14
	7.0	17	25	30	12
	7.3	16	23	29	11
	7.6	15	21	28	
	7.9	14	20	26	
	8.2	13	18	25	
	8.5	12	17	23	
	8.8	11	16	22	
	9.1	10	15	21	

Load Comparison Of Structure Steel Column (Ton)

การเปรียบเทียบการรับน้ำหนักเสาโครงสร้างเหล็ก (ตัน)

Structure Steel : WF 200x200x8x12x49.9 Fy = 248 Mpa Weight (kg/m.) = 49.9

เหล็กโครงสร้างหน้าตัดปีกกว้าง: 200x200x8x12x49.9 Fy = 248 Mpa น้ำหนัก (กก/ม) = 49.9

Tubularge		Ø 8"	Ø 10"	Ø 8"	WF 200 x 200 x 8 x 12 x 49.91 kg/m.
Wall Thickness (mm.) / ความหนาผนัง (มม.)		6.0	6.0	5.0	
Weight (kg/m.) / น้ำหนัก (กก/ม.)		31.53	39.52	26.40	
Economize (%) / ประหยัด (%)		36.8	20.8	16.2	
Effective Length kL (m.) ความยาวประสิทธิผล kL (เมตร)	0.0	60	76	75	60
	0.6	59	75	74	58
	0.9	59	74	74	57
	1.2	58	73	73	55
	1.5	57	73	73	54
	1.8	57	72	72	52
	2.1	56	72	72	50
	2.4	55	71	71	48
	2.7	54	70	71	45
	3.0	54	69	70	43
	3.4	53	69	70	40
	3.7	52	68	69	38
	4.0	51	67	69	35
	4.3	50	66	68	32
	4.6	49	65	68	29
	4.9	48	64	67	26
	5.2	47	63	66	23
	5.5	45	62	65	20
	5.8	44	61	64	18
	6.1	43	60	63	16
	6.4	42	59	62	15
	6.7	41	58	61	14
	7.0	39	56	60	12
	7.3	38	55	59	11
	7.6	37	54	59	
	7.9	35	53	58	
	8.2	34	52	57	
	8.5	32	50	56	
	8.8	31	49	55	
	9.1	29	48	54	

Tubularge		200 x 200	250 x 250	300 x 300	WF 200 x 200 x 8 x 12 x 49.91 kg/m.
Wall Thickness (mm.) / ความหนาผนัง (มม.)		6.3	5.0	4.5	
Weight (kg/m.) / น้ำหนัก (กก/ม.)		37.52	37.96	41.34	
Economize (%) / ประหยัด (%)		24.8	23.9	17.2	
Effective Length kL (m.) ความยาวประสิทธิผล kL (เมตร)	0.0	72	73	79	95
	0.6	71	72	78	93
	0.9	70	71	78	91
	1.2	69	71	77	90
	1.5	69	70	77	88
	1.8	68	70	76	86
	2.1	67	69	76	84
	2.4	66	68	75	82
	2.7	65	68	75	80
	3.0	64	67	74	77
	3.4	63	66	74	75
	3.7	62	66	73	72
	4.0	61	65	72	69
	4.3	60	64	72	66
	4.6	59	63	71	63
	4.9	58	62	70	60
	5.2	56	61	70	57
	5.5	55	60	69	53
	5.8	54	60	68	50
	6.1	52	59	67	46
	6.4	51	58	66	42
	6.7	50	57	66	38
	7.0	48	56	65	35
	7.3	47	55	64	32
	7.6	45	53	63	30
	7.9	44	52	62	28
	8.2	42	51	61	26
	8.5	40	50	60	24
	8.8	39	49	59	22
	9.1	37	48	58	21

Load Comparison Of Structure Steel Column (Ton)

การเปรียบเทียบการรับน้ำหนักเสาโครงสร้างเหล็ก (ตัน)

Structure Steel : WF 250x250x9x14x72.4 Fy = 248 Mpa Weight (kg/m.) = 72.4

เหล็กโครงสร้างหน้าตัดปีกกว้าง: 250x250x9x14x72.4 Fy = 248 Mpa น้ำหนัก (กก/ม) = 72.4

Tubularge		Ø 10"	Ø 12"	Ø 14"	WF 250 x 250 x 9 x 14 x 72.4 kg/m.
Wall Thickness (mm.) / ความหนาผนัง (มม.)		9.0	6.0	6.0	
Weight (kg/m.) / น้ำหนัก (กก/ม.)		58.62	47.00	51.73	
Economize (%) / ประหยัด (%)		19	35.1	28.5	
Effective Length kL (m.) ความยาวประสิทธิผล kL (เมตร)	0.0	112	90	99	138
	0.6	111	89	98	136
	0.9	110	88	97	134
	1.2	109	88	97	132
	1.5	108	87	96	130
	1.8	107	87	96	128
	2.1	106	86	95	126
	2.4	105	85	94	124
	2.7	104	85	94	121
	3.0	103	84	93	119
	3.4	101	83	92	116
	3.7	100	82	92	113
	4.0	99	82	91	111
	4.3	97	81	90	108
	4.6	96	80	89	104
	4.9	95	79	88	101
	5.2	93	78	87	98
	5.5	92	77	87	94
	5.8	90	76	86	91
	6.1	88	75	85	87
	6.4	87	74	84	83
	6.7	85	73	83	79
	7.0	83	72	82	75
	7.3	82	71	81	71
	7.6	80	70	80	67
	7.9	78	69	79	63
	8.2	76	68	77	58
	8.5	74	66	76	54
	8.8	72	65	75	50
	9.1	70	64	74	47

Tubularge		250 x 250	300 x 300	350 x 350	WF 250 x 250 x 9 x 14 x 72.4 kg/m.
Wall Thickness (mm.) / ความหนาผนัง (มม.)		9.0	6.3	6.3	
Weight (kg/m.) / น้ำหนัก (กก/ม.)		66.47	57.30	67.19	
Economize (%) / ประหยัด (%)		8.2	20.9	7.2	
Effective Length kL (m.) ความยาวประสิทธิผล kL (เมตร)	0.0	127	109	128	138
	0.6	125	108	127	136
	0.9	125	108	127	134
	1.2	124	107	126	132
	1.5	123	107	126	130
	1.8	122	106	125	128
	2.1	121	105	124	126
	2.4	119	104	123	124
	2.7	118	104	123	121
	3.0	117	103	122	119
	3.4	116	102	121	116
	3.7	114	101	120	113
	4.0	113	100	119	111
	4.3	111	99	119	108
	4.6	110	98	118	104
	4.9	108	97	117	101
	5.2	107	96	116	98
	5.5	105	95	115	94
	5.8	104	94	114	91
	6.1	102	93	113	87
	6.4	100	92	112	83
	6.7	98	91	111	79
	7.0	96	90	110	75
	7.3	95	88	108	71
	7.6	93	87	107	67
	7.9	91	86	106	63
	8.2	89	85	105	58
	8.5	87	83	104	54
	8.8	84	82	102	50
	9.1	82	81	101	47

Mass Equivalents ตารางแปลงหน่วยน้ำหนัก (มวล)

Unit	pound	ounce	gram	kg	slug	stone	tonne
pound	1	16	453.6	0.453597	0.031	0.0135	0.0004536
ounce	0.0625	1	28.3495	0.028349	0.0019		
gram	0.0022	0.0353	1	0.001			
kg	2.2046	35.274	1,000	1	0.0685	0.157	0.001
slug	32.174	514.785	14,593.90	14.5939	1	2.29825	0.014594
stone	13.988	223.99	6,350.00	6.35	0.4351	1	0.00635
tonne	2,204.60			1,000	68.5213	157.48	1

Metric tonne (Tonne) = 1000 kg

US ton (Short Ton) = 0.907185 Metric Tonne UK ton (Long Ton) = 1.01605 Metric Tonne

Area Equivalents ตารางแปลงหน่วยพื้นที่

Unit	$inch^2$	ft^2	acre	cm^2	m^2
$inch^2$	1	0.006944		6.4516	0.0006452
ft^2	144	1		929.0304	0.0929
acre		43,560	1		4,047
cm^2	0.155	6.2288		1	0.0001
m^2	1,550.00	10.76391	0.000247	10,000	1

Length Equivalents ตารางแปลงหน่วยความยาว

Unit	inch	ft	yard	mile	cm	metre	km
inch	1	0.08333	0.027778		2.54	0.0254	
ft	12	1	0.333333		30.48	0.3048	
yard	36	3	1	0.0005682	91.44	0.9144	0.0009144
mile	63,360	5,280	1,760	1		1,609.344	1.609344
cm	0.3937	0.032808	0.010936		1	0.01	
metre	39.3701	3.28084	1.093613	0.0006214	100	1	0.001
km	39,370	3280.8	1,093.61	0.62137	100,000	1,000	1

Density Equivalents ตารางแปลงหน่วยความหนาแน่น

Unit	$lb/inch^3$	lb/ft^3	$gram/cm^3$	kg/m^3	$slug/ft^3$
$lb/inch^3$	1	1,728	27.6799	27,679.90	53.708
lb/ft^3	0.0005787	1	0.01602	16.01846	0.31081
$gram/cm^3$	0.03613	62.4281	1	1,000	1.9403
kg/m^3	0.0000361	0.06243	0.001	1	0.00194
$slug/ft^3$	0.019	32.17	0.51538	515.379	1

Volume Equivalents ตารางแปลงหน่วยปริมาตร

Unit	US.gallon	Im. gallon	$inch^3$	ft^3	liter	m^3	barrel
US.gallon	1	0.83267	231	0.13368	3.7853	0.00378	0.02381
Im. gallon	1.2009	1	277.42	0.16054	4.5459	0.00455	0.02859
$inch^3$	0.004329	0.003604	1	0.000579	0.0164	0.000016	0.0001
ft^3	7.4805	6.2288	1728	1	28.316	0.02832	0.17813
liter	0.26418	0.21997	61.024	0.0353	1	0.001	0.00629
m^3	264.17	219.97	61,023.74	35.3147	1,000	1	6.2899
barrel *	42	34.977	9702	5.614	158.983	0.15876	1

* เป็นหน่วยตวงน้ำมัน (Oil barrel), 1 Barrel = 42 US. Gallons

Area Equivalents ตารางแปลงหน่วยพื้นที่

Unit	mm/s	ft/min	cm/s	ft/s	m/s
mm/s	1	0.19685	0.1	0.003281	0.001
ft/min	5.08	1	0.508	0.016667	0.00508
cm/s	10	1.9685	1	0.032808	0.01
ft/s	304.8	60	30.48	1	0.3048
m/s	1,000	196.85	100	3.2808	1

Volumatic Flow Rate Equivalents ตารางแปลงหน่วยอัตราการไหล

Unit	GPM(US)	GPM(UK)	ft^3/min	ft^3/sec	m^3/hr	m^3/min	liter/sec
GPM(US)	1	0.8327	0.1337	0.00223	0.2271	0.003785	0.06308
GPM(UK)	1.201	1	0.1605	0.002676	0.27275	0.004545	0.0758
ft^3/min	7.481	6.229	1	0.01667	1.699	0.02832	0.4719
ft^3/sec	448.83	373.7	60	1	101.94	1.699	28.32
m^3/hr	4.403	3.666	0.5886	0.00981	1	0.01667	0.2778
m^3/min	0.2642	0.22	35.3147	0.5886	60	1	16.667
liter/sec	15.85	13.2	2.119	0.0353	3.6	0.06	1

Power Equivalents ตารางแปลงหน่วยกำลัง

Unit	pound	ounce	gram	kg	slug
HP	1	550	745.7	0.7457	2,544
ft-lb/sec	0.00182	1	1.3558	0.00136	4.626
Watt	0.00134	1	1	0.001	3.412
kW	1.34	737.6	1,000	1	3,412
Btu/hr	0.00039	0.2161	0.2931	0.00029	1

Pressure Equivalents ตารางแปลงหน่วยความดัน

Unit	PSI	kPa	kg/cm^2	cm H_2O*	feet H_2O*	inches Hg*	mm Hg*	inches H_2O*	Atm.	Bar	mPa
PSI	1	6.894757	0.070307	70.306927	2.306723	2.03602	51.71486	27.68068	0.068046	0.0689476	0.00689
kPa	0.1450377	1	0.0101972	10.19745	0.3345618	0.2952997	7.50061	4.01472	0.0096692	0.01	0.001
kg/cm^2	14.223343	98.06694	1	1,000.03	32.809312	28.95901	735.5588	393.71181	0.9678416	0.9806649	0.09806
cm H_2O	0.0142229	0.0980634	0.001	1	0.032808	0.0289581	0.7355372	0.3937	0.0009678	0.0009806	0.00098
feet H_2O	0.433515	2.968961	0.0304791	30.48	1	0.882646	22.4192	12	0.029499	0.0296896	0.00298
inches Hg	0.4911542	3.386389	0.0345316	34.53253	1.132957	1	25.4	13.595484	0.0334211	0.0338639	0.00386
mm Hg	0.0193368	0.1333225	0.0013595	1.359554	0.0446046	0.0393701	1	0.535255	0.0013158	0.0013332	0.00013
inches H_2O	0.0361263	0.2490819	0.0025422	2.54	0.08333	0.0735539	1.8682683	1	0.0024583	0.0024908	0.000249
Atm.	14.696	101.32535	1.033231	1,033.26	33.8995	29.9213	760	406.794	1	1.0132535	0.1013
Bar	14.5038	100	1.019716	1019.7466	33.4833	29.53	750.0626	401.8596	0.986923	1	0.1
mPa	145.0377	1,000	10.197	10,197.45	334.56	295.299	7500.61	4014.74	9.669	10	1

* Water (H_2O) at standard temperature 68 °F (20 °C) and mercury (Hg) at standard temperature 32 °F (0 °C)

* น้ำ (H_2O) ที่อุณหภูมิมาตรฐาน 68 °F (20 °C) และปรอท (Hg) ที่อุณหภูมิมาตรฐาน 32 °F (0 °C)

This table can be use to calculate pressure unit and also strength and stress transform

ตารางนี้นอกจากใช้ในการแปลงหน่วยความดัน ยังใช้ได้กับการแปลงหน่วยความแข็งแรงและความเค้นของวัสดุ (Strength & Stress) ได้ด้วย