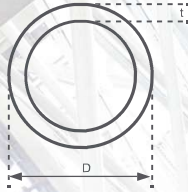


STRUCTURAL
PURPOSE



MITRSTEEL

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89 ถนนพระรามที่ 4 แขวงรองเมือง เขตปทุมวัน
กรุงเทพมหานคร 10330 Tel: (66)02-214-1511

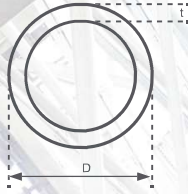


**COLD FORMED WELDED
STRUCTURAL HOLLOW
SECTION OF NON-ALLOY
AND FINE GRAIN STEELS**

เหล็กงานโครงสร้าง

 EN 10219

MATERIAL OF GRADE	CHEMICAL COMPOSITION (%)					YIELD STRENGTH (MIN) N/mm ²	TENSILE STRENGTH (MIN) N/mm ²		ELONGA - TION % (MIN)	IMPACT TEST Test Temperature °C	MINIMUM AVER- AGE ABSORBED ENERGY FOR STANDARD TEST PIECES J
	C Max	Si Max	Mn Max	P Max	S Max						
	t < 3 mm		3 mm ≤ t ≤ 40 mm								
S235JRH	0.170	-	1.400	0.045	0.045	235	360 - 510	340 - 370	24	20	27
S275JOH	0.200	-	1.500	0.040	0.040	275	430 - 580	410 - 560	20	0	27
S275J2H	0.200	-	1.500	0.035	0.035	275	430 - 580	410 - 560	20	-20	27
S355JOH	0.220	0.550	1.600	0.040	0.040	355	510 - 680	490 - 630	20	0	27
S355J2H	0.220	0.550	1.600	0.035	0.035	355	510 - 680	490 - 630	20	-20	27



COLD FORMED WELDED
STRUCTURAL HOLLOW
SECTION OF NON-ALLOY
AND FINE GRAIN STEELS

เหล็กงานโครงสร้าง

EN 10219

Normal Size	Outside diameter	Thickness	Mass / length	Cross Sectional Area	Geometrical moment of inertia	Modulus of section	Radius of gyration
mm	mm	mm	kg/m	cm ²	cm ⁴	cm ³	cm
1/2"	21.3	2.00	0.95	1.21	0.571	0.536	0.686
		2.50	1.16	1.48	0.664	0.623	0.671
		3.00	1.35	1.72	0.741	0.696	0.656
3/4"	26.9	2.00	1.23	1.56	1.22	0.907	0.883
		2.50	1.50	1.92	1.44	1.07	0.867
		3.00	1.77	2.25	1.63	1.21	0.852
1"	33.7	2.00	1.56	1.99	2.51	1.49	1.12
		2.50	1.92	2.45	3	1.78	1.11
		3.00	2.27	2.89	3.44	2.04	1.09
1 1/4"	42.4	2.00	1.99	2.54	5.19	2.45	1.43
		2.50	2.46	3.13	6.26	2.95	1.41
		3.00	2.91	3.71	7.25	3.42	1.4
		4.00	3.79	4.83	8.99	4.24	1.36
1 1/2"	48.3	2.00	2.28	2.91	7.81	3.23	1.64
		2.50	2.82	3.6	9.46	3.92	1.62
		3.00	3.35	4.27	11	4.55	1.61
		4.00	4.37	5.57	13.8	5.7	1.57
2"	60.3	2.00	2.88	3.66	15.6	5.17	2.06
		2.50	3.56	4.54	19	6.3	2.05
		3.00	4.24	5.4	22.2	7.37	2.03
		4.00	5.55	7.07	28.2	9.34	2
2 1/2"	76.1	2.00	3.65	4.66	32	8.4	2.62
		2.50	4.54	5.78	39.2	10.3	2.6
		3.00	5.41	6.89	46.1	12.1	2.59
		4.00	7.11	9.06	59.1	15.5	2.55
		5.00	8.77	11.2	70.9	18.6	2.52
		6.00	10.40	13.2	81.8	21.5	2.49
3"	88.9	2.00	4.29	5.46	51.6	11.6	3.07
		2.50	5.33	6.79	63.4	14.3	3.06
		3.00	6.36	8.1	74.8	16.8	3.04
		4.00	8.38	10.7	96.3	21.7	3
		5.00	10.30	13.2	116	26.2	2.97
		6.00	12.30	15.6	135	30.4	2.94
3 1/2"	101.6	2.00	4.91	6.26	77.6	15.3	3.52
		2.50	6.11	7.78	95.6	18.8	3.50
		3.00	7.29	9.29	113	22.3	3.49
		4.00	9.63	12.3	146	28.8	3.45
		5.00	11.90	15.2	177	34.9	3.42
		6.00	14.10	18	207	40.7	3.39
4"	114.3	2.50	6.89	8.78	137	24	3.95
		3.00	8.23	10.5	163	28.4	3.94
		4.00	10.90	13.9	211	36.9	3.90
		5.00	13.50	17.2	257	45	3.87
		6.00	16.00	20.4	300	52.5	3.83
		6.30	16.80	21.4	313	54.7	3.82
5"	139.7	2.50	8.23	10.5	163	28.4	3.94
		3.00	9.63	12.3	192	34.9	3.87
		4.00	12.30	15.6	243	44.1	3.82
		5.00	15.00	18.9	294	52.5	3.77
		6.00	17.70	22.2	345	60.9	3.72
		8.00	23.40	29.7	462	81.6	3.62

Normal Size	Outside diameter	Thickness	Mass / length	Cross Sectional Area	Geometrical moment of inertia	Modulus of section	Radius of gyration
mm	mm	mm	kg/m	cm ²	cm ⁴	cm ³	cm
6"	168.3	3.00	12.20	15.6	532	63.3	5.85
		4.00	16.20	20.6	697	82.8	5.81
		5.00	20.10	25.7	856	102	5.78
		6.00	24.00	30.6	1009	120	5.74
		6.30	25.20	32.1	1053	125	5.73
		8.00	31.60	40.3	1297	154	5.67
7"	193.7	4.00	18.70	23.8	1073	111	6.71
		5.00	23.30	29.6	1320	136	6.67
		6.00	27.80	35.4	1560	161	6.64
		6.30	29.10	37.1	1630	168	6.63
		8.00	36.60	46.7	2016	208	6.57
		10.00	45.30	57.7	2442	252	6.50
8"	219.1	4.00	21.20	27	1564	143	7.61
		5.00	26.40	33.6	1928	176	7.57
		6.00	31.50	40.2	2282	208	7.54
		6.30	33.10	42.1	2386	218	7.53
		8.00	41.60	53.1	2960	270	7.47
		10.00	51.60	65.7	3598	328	7.40
10"	273	5.00	33.00	42.1	3781	277	9.48
		6.00	39.50	50.3	4487	329	9.44
		6.30	41.40	52.8	4696	344	9.43
		8.00	52.30	66.6	5852	429	9.37
		10.00	64.90	82.6	7154	524	9.31
		12.00	77.20	98.4	8396	615	9.24
12"	323.9	5.00	39.30	50.1	6369	393	11.3
		6.00	47.00	59.9	7572	468	11.2
		6.30	49.30	62.9	7929	490	11.2
		8.00	62.30	79.4	9910	612	11.2
		10.00	77.40	98.6	12158	751	11.1
		12.00	92.30	118	14320	884	11
14"	355.6	5.00	43.20	55.1	8464	476	12.4
		6.00	51.70	65.9	10071	566	12.4
		6.30	54.30	69.1	10547	593	12.4
		8.00	68.60	87.4	13201	742	12.3
		10.00	85.20	109	16223	912	12.2
		12.00	102.00	130	19139	1076	12.2
16"	406.4	5.00	49.20	62.9	10547	593	12.4
		6.00	59.20	75.5	15128	745	14.2
		6.30	62.20	79.2	15849	780	14.1
		8.00	78.60	100	19874	978	14.1
		10.00	97.80	125	24476	1205	14
		12.00	117.00	149	28937	1424	14
12.50	121.00	155	30031	1478	13.9		

Dimension Tolerances

Outside Diameter with $\pm 1\%$
a minimum of $\pm 0.5\text{mm}$ and
a maximum of $\pm 1.0\text{mm}$

Thickness :

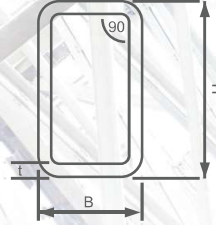
$D \leq 406.4\text{mm}$: $t \leq 5\text{mm} \pm 10\%$
 $t > 5\text{mm} \pm 0.5\text{mm}$

$D > 406.4\text{mm}$: 10% : with \pm
a maximum of 2mm

Weight : $\pm 6\%$



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จังหวัดระยอง 21120 Tel. 66(0)3301-2436-8



COLD FORMED WELDED
STRUCTURAL HOLLOW
SECTION OF NON-ALLOY
AND FINE GRAIN STEELS

เหล็กงานโครงสร้าง



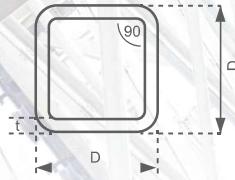
MATERIAL OF GRADE	CHEMICAL COMPOSITION (%)					Yield strength (min) N/mm ²	Tensile strength (min) N/mm ²		ELONGATION % (MIN)	IMPACT TEST		MINIMUM AVERAGE ABSORBED ENERGY FOR STANDARD TEST PIECES J
	C Max	Si Max	Mn Max	P Max	S Max					Test temperature		
							t < 3 mm	3 mm ≤ T ≤ 40 mm		°C		
S235JRH	0.170	-	1.400	0.045	0.045	235	360 - 510	340 - 370	24	20	27	
S275J0H	0.200	-	1.500	0.040	0.040	275	430 - 580	410 - 560	20	0	27	
S275J2H	0.200	-	1.500	0.035	0.035	275	430 - 580	410 - 560	20	-20	27	
S355J0H	0.220	0.550	1.600	0.040	0.040	355	510 - 680	490 - 630	20	0	27	
S355J2H	0.220	0.550	1.600	0.035	0.035	355	510 - 680	490 - 630	20	-20	27	

Length of size		Thickness	Mass/length	Cross Sectional Area	Geometrical moment of inertia (cm ⁴)		Modulus of section (cm ³)		Radius of gyration (cm)		Length of size		Thickness	Mass/length	Cross Sectional Area	Geometrical moment of inertia (cm ⁴)		Modulus of section (cm ³)		Radius of gyration (cm)	
H	B	mm	kg/m	cm ²	Ix	Iy	Zx	Zy	ix	iy	H	B	mm	kg/m	cm ²	Ix	Iy	Zx	Zy	ix	iy
40	20	2.00	1.68	2.14	4.05	1.34	2.02	1.34	1.38	0.793	250	150	5.00	30.10	38.4	3304	1508	264	201	9.28	6.27
60	40	2.00	2.93	3.74	18.4	9.83	6.14	4.92	2.22	1.62	300	150	6.00	35.80	45.6	3886	1768	311	236	9.23	6.23
		2.50	3.60	4.59	22.1	11.7	7.36	5.87	2.19	1.60			6.30	37.20	47.4	4001	1825	320	243	9.18	6.20
		3.00	4.25	5.41	25.4	13.4	8.46	6.72	2.17	1.58			8.00	46.50	59.2	4886	2219	391	296	9.08	6.12
100	50	2.50	5.56	7.09	91.2	31.1	18.2	12.4	3.59	2.09	300	150	10.00	57.00	72.6	5825	2634	466	351	8.96	6.02
		3.00	6.60	8.41	106	36.1	21.3	14.4	3.56	2.07			12.00	66.00	84.1	6458	2925	517	390	8.77	5.90
		4.00	8.59	10.9	134	44.9	26.8	18	3.5	2.03			12.50	68.30	87	6633	3002	531	400	8.73	5.87
		5.00	10.50	13.4	158	52.5	31.6	21	3.44	1.98			6.00	40.50	51.6	6074	2080	405	277	10.8	6.35
120	80	6.00	12.30	15.6	179	58.7	35.8	23.5	3.38	1.94	300	150	6.30	42.20	53.7	6266	2150	418	287	10.8	6.32
		6.30	12.50	15.9	176	58.2	35.1	23.3	3.32	1.91			8.00	52.80	67.2	7684	2623	512	350	10.7	6.25
		8.00	17.00	21.6	406	215	67.7	53.8	4.33	3.15			10.00	64.80	82.6	9209	3125	614	417	10.6	6.15
		8.00	17.00	21.6	406	215	67.7	53.8	4.33	3.15			12.00	75.40	96.1	10298	3498	687	466	10.4	6.03
140	80	5.00	14.40	18.4	353	188	58.9	46.9	4.39	3.20	300	200	6.00	45.20	57.6	7370	3962	491	396	11.3	8.29
		6.30	17.50	22.2	408	217	68.1	54.3	4.28	3.12			6.30	47.10	60	7624	4104	508	410	11.3	8.27
		8.00	21.40	27.2	476	252	79.3	62.9	4.18	3.04			8.00	59.10	75.2	9389	5042	626	504	11.2	8.19
		8.00	21.40	27.2	476	252	79.3	62.9	4.18	3.04			10.00	72.70	92.6	11313	6058	754	606	11.1	8.09
150	100	4.00	13.00	16.5	430	180	61.4	45.1	5.10	3.30	350	250	6.00	45.20	57.6	7370	3962	491	396	11.3	8.29
		5.00	16.00	20.4	517	216	73.9	54	5.04	3.26			6.30	47.10	60	7624	4104	508	410	11.3	8.27
		6.00	18.90	24	597	248	85.3	62	4.98	3.21			8.00	59.10	75.2	9389	5042	626	504	11.2	8.19
		6.30	19.40	24.8	603	251	86.1	62.9	4.93	3.19			10.00	72.70	92.6	11313	6058	754	606	11.1	8.09
150	100	6.30	19.40	24.8	603	251	86.1	62.9	4.93	3.19	350	250	6.00	54.70	69.6	12457	7458	712	597	13.4	10.3
		8.00	23.90	30.4	708	293	101	73.3	4.82	3.10			6.30	57.00	72.6	12923	7744	738	620	13.3	10.3
		8.00	23.90	30.4	708	293	101	73.3	4.82	3.10			8.00	71.60	91.2	16001	9573	914	766	13.2	10.2
		10.00	33.40	42.6	1162	614	155	123	5.22	3.80			10.00	88.40	113	19407	11588	1109	927	13.1	10.1
160	80	4.00	14.20	18.1	598	204	74.7	50.9	5.74	3.35	400	200	8.00	71.60	91.2	18974	6517	949	652	14.4	8.45
		5.00	17.50	22.4	722	244	90.2	61	5.68	3.30			12.00	104.00	132	22197	13261	1268	1061	13	10
		6.00	20.70	26.4	836	281	105	70.2	5.62	3.26			12.50	108.00	137	22922	13690	1310	1095	12.9	9.99
		6.30	21.40	27.3	846	286	106	71.4	5.57	3.24			8.00	71.60	91.2	18974	6517	949	652	14.4	8.45
200	100	4.00	18.00	22.9	1200	411	120	82.2	7.23	4.23	400	200	12.50	108.00	137	22922	13690	1310	1095	12.9	9.99
		5.00	22.30	28.4	1459	497	146	99.4	7.17	4.19			8.00	71.60	91.2	18974	6517	949	652	14.4	8.45
		6.00	26.40	33.6	1703	577	170	115	7.12	4.14			12.50	108.00	137	22922	13690	1310	1095	12.9	9.99
		6.30	27.40	34.8	1739	591	174	118	7.06	4.12			8.00	71.60	91.2	18974	6517	949	652	14.4	8.45
200	100	8.00	33.90	43.2	2091	705	209	141	6.95	4.04	400	200	12.50	108.00	137	22922	13690	1310	1095	12.9	9.99
		10.00	41.30	52.6	2444	818	244	164	6.82	3.94			8.00	71.60	91.2	18974	6517	949	652	14.4	8.45
		10.00	41.30	52.6	2444	818	244	164	6.82	3.94			12.50	108.00	137	22922	13690	1310	1095	12.9	9.99

Tolerances
Length of size :
H, B < 100 : ± 1% with a minimum of ± 0.5 mm
100 ≤ H, B ≤ 200 : ± 0.8%
H, B > 200 ± 0.6%
Thickness :
t ≤ 5 mm ± 10%
t > 5 mm ± 0.5 mm
Weight : ± 6%



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HOLLOW SECTION OF NON-ALLOY AND FINE GRAIN STEELS

เหล็กงานโครงสร้าง

EN 10219

MATERIAL OF GRADE	CHEMICAL COMPOSITION (%)					YIELD STRENGTH (MIN) N/mm ²	TENSILE STRENGTH (MIN)		ELONGATION % (MIN)	IMPACT TEST Test temperature °C	Minimum average absorbed energy for standard test pieces J
	C Max	Si Max	Mn Max	P Max	S Max		N/mm ²				
	t < 3 mm		3 mm ≤ T ≤ 40 mm								
S235JRH	0.170	-	1.400	0.045	0.045	235	360 - 510	340 - 370	24	20	27
S275J0H	0.200	-	1.500	0.040	0.040	275	430 - 580	410 - 560	20	0	27
S275J2H	0.200	-	1.500	0.035	0.035	275	430 - 580	410 - 560	20	-20	27
S355J0H	0.220	0.550	1.600	0.040	0.040	355	510 - 680	490 - 630	20	0	27
S355J2H	0.220	0.550	1.600	0.035	0.035	355	510 - 680	490 - 630	20	-20	27

Length of size		Thickness	Mass/length	Cross Sectional Area	Geometrical moment of inertia (cm ⁴)	Modulus of section (cm ³)	Radius of gyration (cm)	Length of size		Thickness	Mass/length	Cross Sectional Area	Geometrical moment of inertia (cm ⁴)	Modulus of section (cm ³)	Radius of gyration (cm)
H	B	mm	kg/m	cm ²	I _x , I _y	Z _x , Z _y	i _x , i _y	H	B	mm	kg/m	cm ²	I _x , I _y	Z _x , Z _y	i _x , i _y
20	20	2.00	1.05	1.34	0.692	0.692	0.720	120	120	3.00	10.80	13.8	312	52.1	4.76
		2.50	1.36	1.74	1.48	1.19	0.924			4.00	14.20	18.1	402	67	4.71
		3.00	1.64	2.09	1.69	1.35	0.899			5.00	17.50	22.4	485	80.9	4.66
30	30	2.00	1.68	2.14	2.72	1.81	1.13	150	150	6.00	20.70	26.4	562	93.7	4.61
		2.50	2.03	2.59	3.16	2.1	1.1			6.30	21.40	27.3	572	95.3	4.58
		3.00	2.36	3.01	3.50	2.34	1.08			8.00	26.40	33.6	677	113	4.49
40	40	2.00	2.31	2.94	6.94	3.47	1.54	200	200	4.00	18.00	22.9	808	108	5.93
		2.50	2.82	3.59	8.22	4.11	1.51			5.00	22.30	28.4	982	131	5.89
		3.00	3.30	4.21	9.32	4.66	1.49			6.00	26.40	33.6	1146	153	5.84
		4.00	4.20	5.35	11.1	5.54	1.44			6.30	27.40	34.8	1174	156	5.80
50	50	4.00	4.20	5.35	11.1	5.54	1.44	250	250	8.00	33.90	43.2	1412	188	5.71
		2.00	2.93	3.74	14.1	5.66	1.95			4.00	24.30	30.9	1968	197	7.97
		2.50	3.60	4.59	16.9	6.78	1.92			5.00	30.10	38.4	2410	241	7.93
		3.00	4.25	5.41	19.5	7.79	1.90			6.00	35.80	45.6	2833	283	7.88
		4.00	5.45	6.95	23.7	9.49	1.85			6.30	37.20	47.4	2922	292	7.85
60	60	5.00	6.56	8.36	27	10.8	1.80	300	300	8.00	46.50	59.2	3566	357	7.76
		2.00	3.56	4.54	25.1	8.38	2.35			10.00	57.00	72.6	4251	425	7.65
		2.50	4.39	5.59	30.3	10.1	2.33			12.00	66.00	84.1	4730	473	7.50
		3.00	5.19	6.61	35.1	11.7	2.31			12.50	68.30	87	4859	486	7.47
		4.00	6.71	8.55	43.6	14.5	2.26			5.00	38.00	48.4	4805	384	9.97
80	80	5.00	8.13	10.4	50.5	16.8	2.21	300	300	6.00	45.20	57.6	5672	454	9.92
		3.00	7.07	9.01	87.8	22	3.12			6.30	47.10	60	5873	470	9.89
		4.00	9.22	11.7	111	27.8	3.07			8.00	59.10	75.2	7229	578	9.80
		5.00	11.30	14.4	131	32.9	3.03			10.00	72.70	92.6	8707	697	9.70
		6.00	13.20	16.8	149	37.3	2.98			12.00	84.80	108	9859	789	9.55
		6.30	13.50	17.2	149	37.1	2.94			12.50	88.00	112	10161	813	9.52
		8.00	16.40	20.8	168	42.1	2.84			6.00	54.70	69.6	9964	664	12
		6.00	15.10	19.2	220	49	3.39			6.30	57.00	72.6	10342	689	11.9
90	90	4.00	10.50	13.3	162	36	3.48	300	300	8.00	71.60	91.2	12801	853	11.8
		5.00	12.80	16.4	193	42.9	3.43			10.00	88.40	113	15519	1035	11.7
		6.00	15.10	19.2	220	49	3.39			12.00	104.00	132	17767	1184	11.6
		6.30	15.50	19.7	221	49.1	3.35			12.50	108.00	137	18348	1223	11.6
		8.00	18.90	24	255	56.6	3.25			3.00	8.96	11.4	177	35.4	3.94
		4.00	11.70	14.9	226	45.3	3.89			4.00	17.00	21.6	311	62.3	3.79
5.00	14.40	18.4	271	54.2	3.84	6.00	21.50	22.2	314	62.8	3.76				
8.00	21.40	27.2	366	73.2	3.67	8.00	27.20	27.2	366	73.2	3.67				

Dimension Tolerances
 Outside Diameter:
 Length of side :
 <100 : ± 1% with a minimum of
 ± 0.5 mm
 100-200 : ± 0.8%
 ≥200 : ± 0.6%
 Thickness : t ≤ 5 mm ± 10%
 t > 5 mm ± 0.5 mm
 Weight : ± 6%