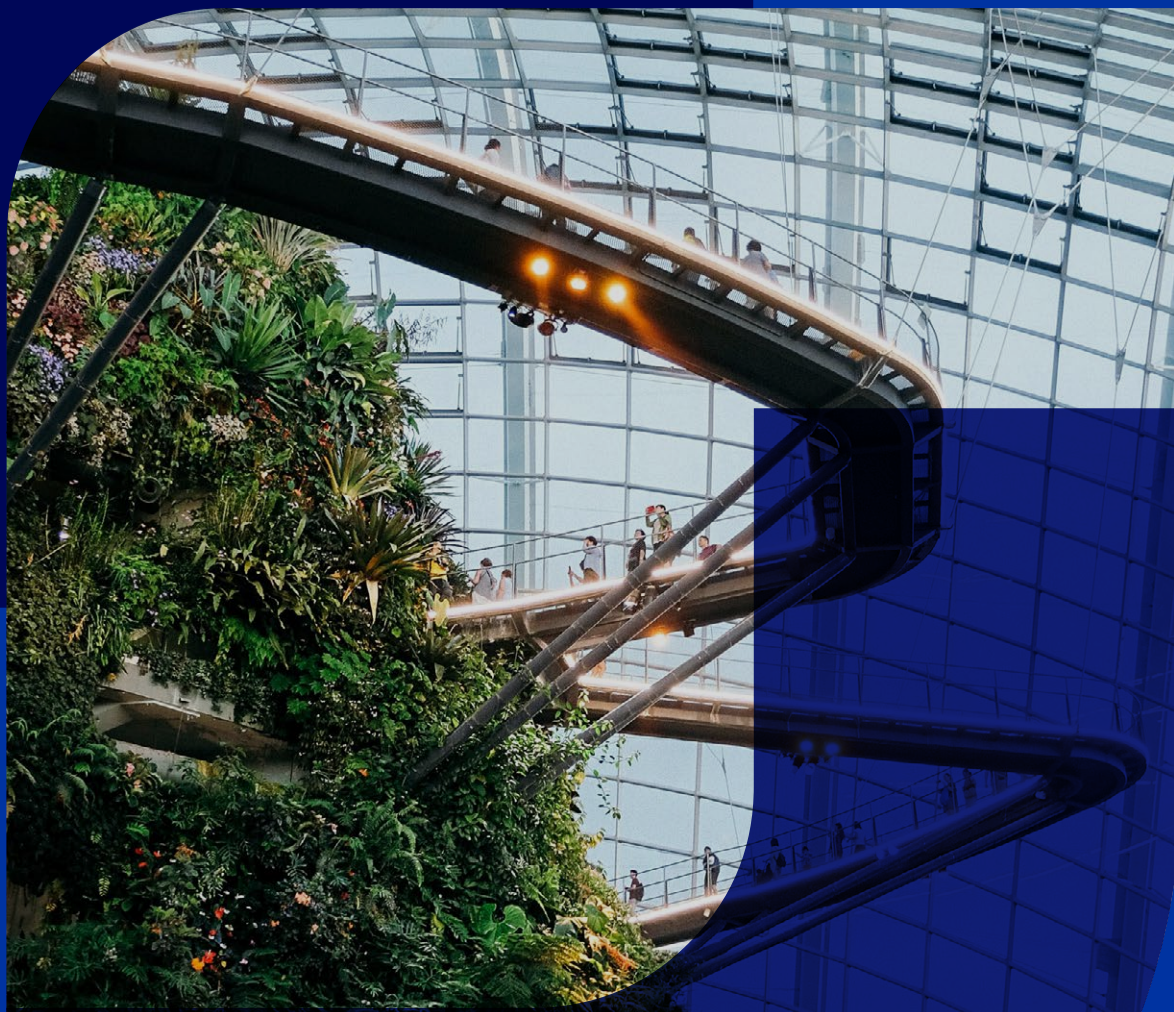
Structural Steel Product Catalogue

2022 EDITION



Continental Steel

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1. About

The Company

1.1 Continental Steel

To continuously engineer innovative steel solutions and value creation for the future

Company Profile

From our humble beginnings in 1982 with a 370 square-foot rental office with only 2 employees, we've since grown to become one of the largest premier steel suppliers in South East Asia.

We currently operate from our current 350,000 square-foot, fully covered, multi-storey warehouse and office complex with 100 loyal employees.

Beyond pure steel trading, we also stock a full range of structural steel that satisfies the exacting needs of the construction, oil and gas, marine and renewable industries.

Our strong working relationships with steel mills throughout the world built over the years, paired with strong support from our bankers gives us complete confidence to meet steel needs for any project, at any scale.

Our 350,000 square-foot fully covered multi-storey warehouse, Southeast Asia's first, comprises the following facilities:

- Stockholding capacity for 150,000 tons of material
- Rust protected storage
- 24 remote-controlled heavy-duty overhead cranes with magnetic capabilities

Why Continental Steel

We Solve Problems.

Our people are problem solvers

Every member of our highly experienced team brings product and technical expertise to every project, serving as a valuable resource for overcoming every challenge our clients encounter.

The provenance of our product is steel-clad

We build customer confidence by ensuring our supplies are fully certified, traceable, and meet applicable quality specifications

Relationship is our structure

Our long history has resulted in a network of strong relationships with established suppliers across multiple product lines globally. This places us well for multi-faceted projects, with complex requirements and deliveries.

Every job is unique

Nothing is one-size-fits-all with Continental Steel. We supply steel for construction of bus stops, airports and everything in between with exacting attention to detail, providing value-added engineering for every project.

Certification

Continental Steel is ISO accredited and awarded BizSafe Star, the highest safety award ranking in Singapore.

The Company

1.2 Services

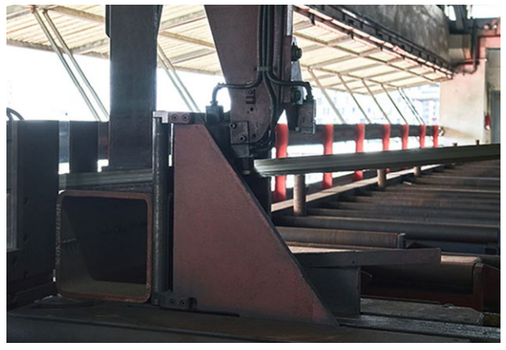
We’re a one-stop steel engineering solutions provider with an exhaustive range of value-added services for all your steel needs

01

Cutting & Drilling

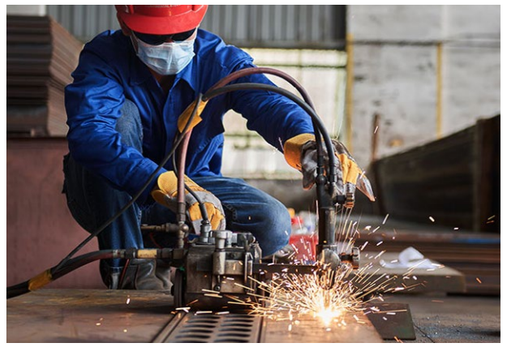
We provide cut to length steel material, resulting in minimal wastage. With our automatic drilling and sawing capabilities, we are able to offer flexibility, productivity and reliability of steel products to meet customer’s requirements and schedule.

Plasma Plate Cutting Machine
Cutting and drilling to desired shapes and sizes



Bandsaw Cutting Machine
Bandsaw cutting for clean, uniform cuts

CNC Machine
CNC Drilling to customer’s requirements



Semi-Auto Roller Gas Cut
Cutting of thicker plates

02

Auto Shot Blasting and Painting

For better steel finishes and protection, the fully-automatic shot blasting machines attend to steel treatment needs according to SA 2.5 specifications with the provision of in-house painting.

03

Engineering & Technical Support

Our team of highly qualified engineers can advise customers on optimal structural steel application. We provide technical assistance in the design, structural element, joint connection details, creating engineering solutions of the highest value.

04

Galvanising

Hot dip galvanising provides corrosion protection for long service life.

05

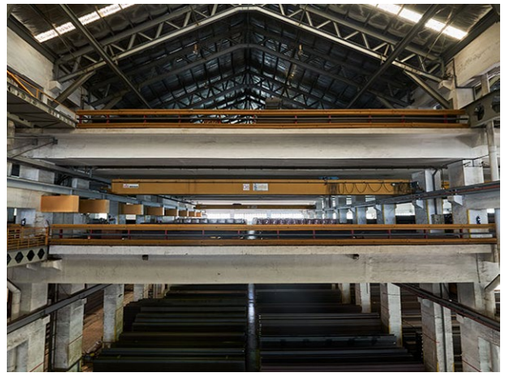
Delivery Services

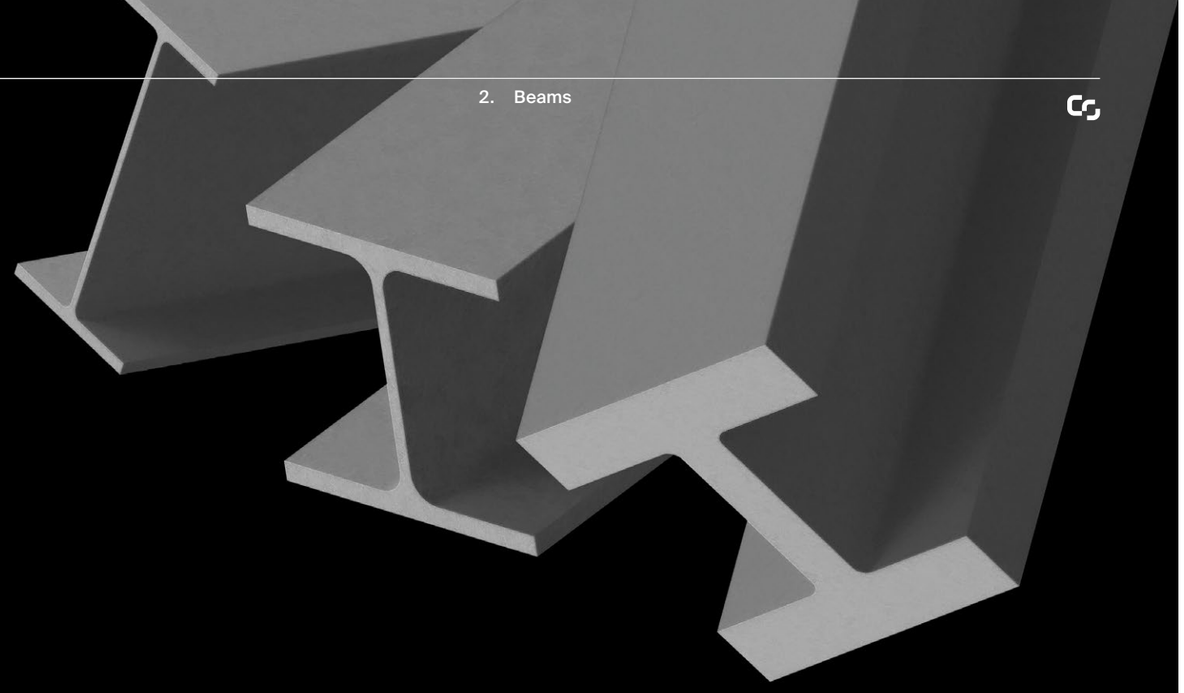
In-house transportation fleet to meet delivery needs of customers.

06

Storage Facilities

Multi-storey, fully covered warehouse spanning 350,000 square-foot, fully equipped with cranes for optimal logistical efficiency.





2. Beams

Structural steel product having a profile of a specific cross section, like a H or I, usually used in construction and is designed to support heavy loads.

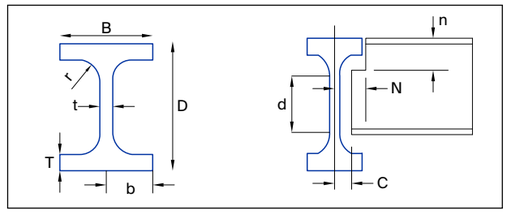
2.1 Parallel Flange I Sections (IPE)
2.2 Wide Flange Beams (HE)
2.3 Universal Beams (UB)
2.4 Universal Columns (UB)
2.5 Metric Beams (MB)
2.6 Metric Columns (MC)

Universal Beams and Columns
Standard specifications

The standard specifications used for production of universal beams and columns in this region are listed in this table.

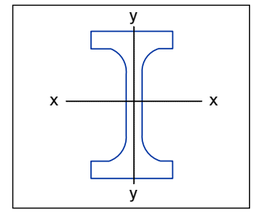
Material	Yield strength N/mm²			Tensile strength N/mm²	Min. Elongation $L_0=5.65\sqrt{S_0}$	Min. Charpy V-notch.	Dimensions & Tolerances
AS 3679.1	**≤11mm**	**>11 - <40mm**	**≥40mm**				***AS 3679.1***
Grade 300	320	300	280	min. 440	22%	27J @ 0°C	
Grade 350	360	340	330	min. 480	20%	27J @ 0°C	
ASTM A36 (1996)	min. 250			400-550	20-21 %	-	***ASTM A6***
ASTM A572							
Grade 42	min. 290			min. 415	20-24 %	-	
Grade 50	min. 345			min. 450	18-21 %	-	
Grade 60	min. 415			min. 520	16-18 %	-	
Grade 65	min. 450			min. 550	15-17 %	-	
ASTM A992	345 - 450			min. 450	18-21 %	-	
EN 10025	**≤16mm**	**>16 - ≤40mm**	**>40 - ≤150mm**	**3-100mm**			***EN 10034***
S275JR	275	265	255 - 225	410-560	18-23 %	27J @ 20°C	
S355JR	355	345	335 - 295	470-630	17-22 %	27J @ 20°C	
S355J0	355	345	335 - 295	470-630	17-22 %	27J @ 0°C	
S355J2	355	345	335 - 295	470-630	17-22 %	27J @ -20°C	
S460M	460	440	430 - 385	500-720	17%	40J @ -20°C	
ETA - 10/0156	**≤100mm**	**>100 - ≤140mm**					***EN 10034***
HISTAR460	460	450		540-720	17%	40J @ -20°C	
JIS 3101	**≤16mm**	**>16 - ≤40mm**	**>40 - ≤100mm**	**t<100mm**			***JIS 3192***
SS400	245	235	215	400-510	17-23 %	-	
SS490	285	275	255	490-610	15-21 %	-	
SS540	400	390	-	min. 540	13-17 %	-	
JIS 3106	**≤16mm**	**>16 - ≤40mm**	**>40mm**	**t<100mm**			
SM400A	245	235	215	400-510	18-24 %	-	
SM400B	245	235	215	400-510	18-24 %	27J @ 0°C	
SM400C	245	235	215	400-510	18-24 %	47J @ 0°C	
SM490A	325	315	295	490-610	17-23 %	-	
SM490B	325	315	295	490-610	17-23 %	27J @ 0°C	
SM490C	325	315	295	490-610	17-23 %	47J @ 0°C	
SM490YA	365	355	335	490-610	15-21 %	-	
SM490YB	365	355	335	490-610	15-21 %	27J @ 0°C	
SM520B	365	355	335	520-640	15-21%	27J @ 0°C	
SM520C	365	355	335	520-640	15-21 %	47J @ 0°C	

2.1
Parallel Flange I Sections (IPE)



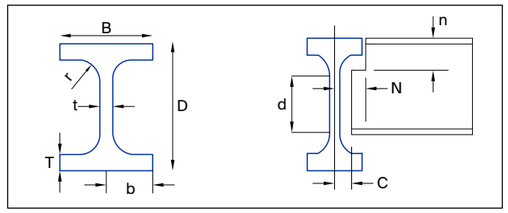
Section designation	Dimensions												
	Mass per Metre	Depth of Section	Width of Section	Thickness		Root Radius	Depth between Fillets	Area of Section	Ratios for Local Buckling		Dimensions for Detailing		
				Flange	Web				Flange	Web	End clearance	Notch	
		D	B	T	t	r	d	A	b/T	d/t	C	N	n
	kg/m	mm	mm	mm	mm	mm	mm	cm²			mm	mm	mm
IPE AA 80	4.9	78.0	46.0	4.2	3.2	5.0	59.6	6.3	3.90	18.6	4	32	10
IPE A 80	5.0	78.0	46.0	4.2	3.3	5.0	59.6	6.4	3.89	18.1	4	32	10
IPE 80	6.0	80.0	46.0	5.2	3.8	5.0	59.6	7.6	3.10	15.7	4	32	12
IPE AA 100	6.7	97.6	55.0	4.5	3.6	7.0	74.6	8.6	4.16	20.7	4	36	12
IPE A 100	6.9	98.0	55.0	4.7	3.6	7.0	74.6	8.8	3.98	20.7	4	36	12
IPE 100	8.1	100.0	55.0	5.7	4.1	7.0	74.6	10.3	3.24	18.2	4	36	14
IPE AA 120	8.4	117.0	64.0	4.8	3.8	7.0	93.4	10.7	4.81	24.6	4	42	12
IPE A 120	8.7	117.6	64.0	5.1	3.8	7.0	93.4	11.0	4.53	24.6	4	42	14
IPE 120	10.4	120.0	64.0	6.3	4.4	7.0	93.4	13.2	3.62	21.2	4	40	14
IPE AA 140	10.1	136.6	73.0	5.2	3.8	7.0	112.2	12.8	5.31	29.5	4	46	14
IPE A 140	10.5	137.4	73.0	5.6	3.8	7.0	112.2	13.4	4.93	29.5	4	46	14
IPE 140	12.9	140.0	73.0	6.9	4.7	7.0	112.2	16.4	3.93	23.9	4	46	14
IPE AA 160	12.3	156.4	82.0	5.6	4.0	9.0	131.2	15.7	5.36	32.8	4	50	14
IPE A 160	12.7	157.0	82.0	5.9	4.0	9.0	127.2	16.2	5.08	31.8	4	50	16
IPE 160	15.8	160.0	82.0	7.4	5.0	9.0	127.2	20.1	3.99	25.4	5	50	18
IPE AA 180	14.9	176.4	91.0	6.2	4.3	9.0	146.0	19.0	5.54	34.0	4	54	16
IPE A 180	15.4	177.0	91.0	6.5	4.3	9.0	146.0	19.6	5.28	34.0	4	54	16
IPE 180	18.8	180.0	91.0	8.0	5.3	9.0	146.0	23.9	4.23	27.5	5	54	18
IPE O 180	21.3	182.0	92.0	9.0	6.0	9.0	146.0	27.1	3.78	24.3	5	54	18
IPE AA 200	18.0	196.4	100.0	6.7	4.5	12.0	159.0	22.9	5.34	35.3	4	58	20
IPE A 200	18.4	197.0	100.0	7.0	4.5	12.0	159.0	23.5	5.11	35.3	4	58	20
IPE 200	22.4	200.0	100.0	8.5	5.6	12.0	159.0	28.5	4.14	28.4	5	58	22
IPE O 200	25.1	202.0	102.0	9.5	6.2	12.0	159.0	32.0	3.78	25.6	5	58	22
IPE AA 220	21.2	216.4	110.0	7.4	4.7	12.0	177.6	27.0	5.49	37.8	4	64	20
IPE A 220	22.2	217.0	110.0	7.7	5.0	12.0	177.6	28.3	5.26	35.5	5	64	20
IPE 220	26.2	220.0	110.0	9.2	5.9	12.0	177.6	33.4	4.35	30.1	5	64	22
IPE O 220	29.4	222.0	112.0	10.2	6.6	12.0	177.6	37.4	3.99	26.9	5	64	24
IPE AA 240	24.9	236.4	120.0	8.0	4.8	15.0	190.4	31.7	5.33	39.7	4	68	24

Dimensions	EN10365
Specification	EN10025
Size Range	IPE AA 80 to IPE 750 x 196

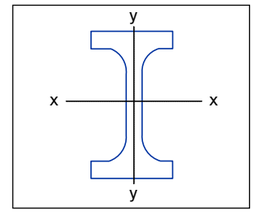


	Properties												
Surface Area	Second Moment of Area		Radius of Gyration		Elastic Modulus		Plastic Modulus		Buckling Parameter	Torsional Index	Warping Constant	Torsional Constant
Per metre	Axis x-x	Axis y-y	Axis x-x	Axis y-y	Axis x-x	Axis y-y	Axis x-x	Axis y-y				
m²	cm⁴	cm⁴	cm	cm	cm³	cm³	cm³	cm³	u	x	H dm⁶	J cm⁴
0.325	64.1	6.85	3.19	1.04	16.4	3	18.9	4.70	3.044	16.6	0.000090	0.38
0.325	64.4	6.85	3.18	1.04	16.5	3	19.0	4.70	3.025	16.5	0.000090	0.39
0.328	80.1	8.49	3.24	1.05	20.0	4	23.2	5.80	3.065	14.3	0.000120	0.67
0.396	136	12.6	3.98	1.21	27.9	5	31.9	7.20	3.279	18.7	0.000270	0.67
0.397	141	13.1	4.01	1.22	28.8	5	33.0	7.50	3.299	18.2	0.000280	0.73
0.400	171	15.9	4.07	1.24	34.2	6	39.4	9.20	3.333	15.8	0.000350	1.16
0.470	244	21.1	4.79	1.41	41.7	7	47.6	10.4	3.536	21.9	0.000660	0.89
0.472	257	22.4	4.83	1.42	43.8	7	49.9	11.0	3.577	21.2	0.000710	1.00
0.475	318	27.7	4.90	1.45	53.0	9	60.7	13.6	3.601	17.9	0.000890	1.69
0.546	407	33.8	5.64	1.63	59.7	9	67.6	14.5	3.818	24.8	0.00146	1.15
0.547	435	36.4	5.70	1.65	63.3	10	71.6	15.5	3.847	23.6	0.00158	1.34
0.551	541	44.9	5.74	1.65	77.3	12	88.3	19.3	3.854	19.6	0.00198	2.40
0.625	659	51.7	6.48	1.81	84.3	13	95.2	19.7	4.038	25.5	0.00293	1.75
0.619	689	54.4	6.53	1.83	87.8	13	99.1	20.7	4.062	24.7	0.00309	1.93
0.623	869	68.3	6.58	1.84	109	17	124	26.1	4.075	20.5	0.00396	3.54
0.693	1,020	78.1	7.32	2.03	116	17	131	26.7	4.282	26.9	0.00564	2.43
0.694	1,060	81.9	7.37	2.05	120	18	135	28.0	4.286	26.1	0.00593	2.67
0.698	1,320	101	7.42	2.05	146	22	166	34.6	4.299	21.8	0.00743	4.73
0.705	1,500	117	7.45	2.08	165	26	189	39.9	4.321	19.7	0.00874	6.65
0.763	1,530	112	8.19	2.21	156	22	176	35.0	4.472	26.3	0.0101	3.81
0.764	1,590	117	8.23	2.23	162	23	182	36.5	4.496	25.5	0.0105	4.14
0.768	1,940	142	8.26	2.24	194	29	221	44.6	4.492	22.0	0.0130	6.92
0.779	2,210	169	8.32	2.30	219	33	249	51.9	4.547	20.1	0.0156	9.36
0.843	2,220	165	9.07	2.47	205	30	230	46.5	4.727	27.2	0.0179	5.06
0.843	2,320	171	9.05	2.46	214	31	240	48.5	4.709	26.4	0.0187	5.68
0.848	2,770	205	9.11	2.48	252	37	285	58.1	4.725	22.9	0.0227	9.03
0.858	3,130	240	9.16	2.53	282	43	321	66.9	4.777	21.0	0.0268	12.2
0.917	3,150	231	9.97	2.70	267	39	298	60.0	4.949	26.4	0.0301	7.61

2.1
Parallel Flange I Sections (IPE)

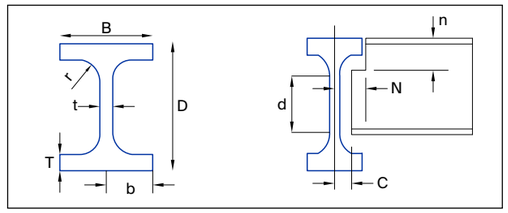


Dimensions	EN10365
Specification	EN10025
Size Range	IPE AA 80 to IPE 750 x 196

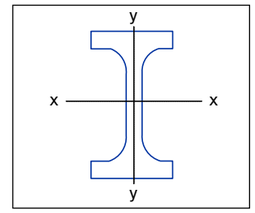


Section designation	Dimensions													Properties												
	Mass per Metre	Depth of Section	Width of Section	Thickness		Root Radius	Depth between Fillets	Area of Section	Ratios for Local Buckling		Dimensions for Detailing			Surface Area	Second Moment of Area		Radius of Gyration		Elastic Modulus		Plastic Modulus		Buckling Parameter	Torsional Index	Warping Constant	Torsional Constant
				Flange	Web				Flange	Web	End clearance	Notch														
		D	B	T	t	r	d	A	b/T	d/t	C	N	n	Per metre	Axis x-x	Axis y-y	Axis x-x	Axis y-y	Axis x-x	Axis y-y	Axis x-x	Axis y-y	u	x	H	J
	kg/m	mm	mm	mm	mm	mm	mm	cm²			mm	mm	mm	m²	cm⁴	cm⁴	cm	cm	cm³	cm³	cm³	cm³			dm⁶	cm⁴
IPE A 240	26.2	237.0	120.0	8.3	5.2	15.0	190.4	33.3	5.11	36.6	5	68	24	0.918	3,290	240	9.94	2.68	278	40	312	62.4	4.936	25.6	0.0313	8.50
IPE 240	30.7	240.0	120.0	9.8	6.2	15.0	190.4	39.1	4.28	30.7	5	68	26	0.922	3,890	284	9.97	2.69	324	47	367	73.9	4.941	22.6	0.0374	13.0
IPE O 240	34.3	242.0	122.0	10.8	7.0	15.0	190.4	43.7	3.94	27.2	6	68	26	0.932	4,370	329	10.0	2.74	361	54	410	84.4	4.976	20.8	0.0437	17.1
IPE A 270	30.7	267.0	135.0	8.7	5.5	15.0	219.6	39.2	5.72	39.9	5	76	24	1.04	4,920	358	11.2	3.02	368	53	413	82.3	5.232	28.3	0.0595	10.4
IPE 270	36.1	270.0	135.0	10.2	6.6	15.0	219.6	45.9	4.82	33.3	5	76	26	1.04	5,790	420	11.2	3.02	429	62	484	97.0	5.230	24.9	0.0706	15.9
IPE O 270	42.3	274.0	136.0	12.2	7.5	15.0	219.6	53.8	4.04	29.3	6	76	28	1.05	6,950	514	11.4	3.09	507	76	575	118	5.289	21.7	0.0876	25.0
IPE A 300	36.5	297.0	150.0	9.2	6.1	15.0	248.6	46.5	6.19	40.8	5	82	26	1.16	7,170	519	12.4	3.34	483	69	542	107	5.495	30.3	0.107	13.3
IPE 300	42.2	300.0	150.0	10.7	7.1	15.0	248.6	53.8	5.28	35.0	6	82	26	1.16	8,360	604	12.5	3.35	557	81	628	125	5.498	26.8	0.126	19.9
IPE O 300	49.3	304.0	152.0	12.7	8.0	15.0	248.6	62.8	4.49	31.1	6	82	28	1.17	9,990	746	12.6	3.45	658	98	744	153	5.580	23.4	0.158	31.0
IPE A 330	43.0	327.0	160.0	10.0	6.5	18.0	271.0	54.7	5.88	41.7	5	88	28	1.25	10,200	685	13.7	3.54	626	86	702	133	5.664	29.9	0.172	19.6
IPE 330	49.1	330.0	160.0	11.5	7.5	18.0	271.0	62.6	5.07	36.1	6	88	30	1.25	11,800	788	13.7	3.55	713	99	804	154	5.666	26.8	0.199	28.1
IPE O 330	57.0	334.0	162.0	13.5	8.5	18.0	271.0	72.6	4.35	31.9	6	88	32	1.27	13,900	960	13.8	3.64	833	119	943	185	5.738	23.7	0.246	42.2
IPE A 360	50.2	357.6	170.0	11.5	6.6	18.0	298.6	64.0	5.54	45.2	5	92	30	1.35	14,500	944	15.1	3.84	812	111	907	172	5.911	29.9	0.282	27.4
IPE 360	57.1	360.0	170.0	12.7	8.0	18.0	298.6	72.7	4.96	37.3	6	92	32	1.35	16,300	1,040	15.0	3.79	904	123	1,020	191	5.859	27.3	0.314	37.4
IPE O 360	66.0	364.0	172.0	14.7	9.2	18.0	298.6	84.1	4.31	32.5	7	92	34	1.37	19,000	1,250	15.1	3.86	1,050	146	1,190	227	5.910	24.2	0.380	55.7
IPE A 400	57.4	397.0	180.0	12.0	7.0	21.0	331.0	73.1	5.46	47.3	6	98	34	1.46	20,300	1,170	16.7	4.00	1,020	130	1,140	202	6.041	30.9	0.432	36.2
IPE 400	66.3	400.0	180.0	13.5	8.6	21.0	331.0	84.5	4.79	38.5	6	96	36	1.47	23,100	1,320	16.6	3.95	1,160	146	1,310	229	5.988	28.0	0.490	51.3
IPE O 400	75.7	404.0	182.0	15.5	9.7	21.0	331.0	96.4	4.20	34.1	7	98	38	1.48	26,800	1,560	16.7	4.03	1,320	172	1,500	269	6.046	25.1	0.588	73.3
IPE V 400	84.0	408.0	182.0	17.5	10.6	21.0	331.0	107	3.70	31.2	7	96	40	1.49	30,100	1,770	16.8	4.06	1,480	194	1,680	304	6.074	22.9	0.673	99.6
IPE A 450	67.2	447.0	190.0	13.1	7.6	21.0	378.8	85.6	5.36	49.8	6	102	36	1.60	29,800	1,500	18.7	4.19	1,330	158	1,490	246	6.181	33.0	0.705	47.1
IPE 450	77.6	450.0	190.0	14.6	9.4	21.0	378.8	98.8	4.75	40.3	7	102	36	1.61	33,700	1,680	18.5	4.12	1,500	176	1,700	276	6.118	29.9	0.791	66.7
IPE O 450	92.4	456.0	192.0	17.6	11.0	21.0	378.8	118	3.95	34.4	8	102	40	1.62	40,900	2,080	18.7	4.21	1,800	217	2,050	341	6.183	25.7	0.998	109
IPE V 450	107	460.0	194.0	19.6	12.4	21.0	378.8	132	3.56	30.5	8	102	42	1.64	46,200	2,400	18.7	4.26	2,010	247	2,300	389	6.218	23.5	1.16	149
IPE A 500	79.4	497.0	200.0	14.5	8.4	21.0	426.0	101	5.16	50.7	6	106	36	1.74	42,900	1,940	20.6	4.38	1,730	194	1,950	302	6.322	34.2	1.12	64.3
IPE 500	90.7	500.0	200.0	16.0	10.2	21.0	426.0	116	4.62	41.8	7	106	38	1.74	48,200	2,140	20.4	4.31	1,930	214	2,190	336	6.257	31.1	1.25	89.1
IPE O 500	107	506.0	202.0	19.0	12.0	21.0	426.0	137	3.89	35.5	8	106	40	1.76	57,800	2,620	20.6	4.38	2,280	260	2,610	409	6.307	26.9	1.55	143
IPE V 500	129	514.0	204.0	23.0	14.2	21.0	426.0	164	3.21	30.0	9	106	44	1.78	70,700	3,270	20.7	4.46	2,750	320	3,170	506	6.368	22.9	1.97	242
IPE A 550	92.1	547.0	210.0	15.7	9.0	24.0	467.6	117	4.87	52.0	7	112	40	1.87	60,000	2,430	22.6	4.55	2,190	232	2,480	362	6.451	34.4	1.71	89.3

2.1
Parallel Flange I Sections (IPE)

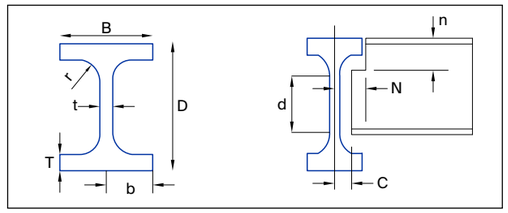


Dimensions	EN10365
Specification	EN10025
Size Range	IPE AA 80 to IPE 750 x 196



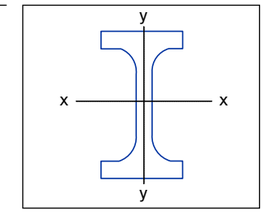
Section designation	Dimensions													Properties											
	Mass per Metre	Depth of Section	Width of Section	Thickness		Root Radius	Depth between Fillets	Area of Section	Ratios for Local Buckling		Dimensions for Detailing			Surface Area	Second Moment of Area		Radius of Gyration		Elastic Modulus		Plastic Modulus		Buckling Parameter	Torsional Index	Warping Constant	Torsional Constant
				Flange	Web				Flange	Web	End clearance	Notch														
		D	B	T	t	r	d	A	b/T	d/t	C	N	n	Per metre	Axis x-x	Axis y-y	Axis x-x	Axis y-y	Axis x-x	Axis y-y	Axis x-x	Axis y-y	u	x	H	J
	kg/m	mm	mm	mm	mm	mm	mm	cm²			mm	mm	mm	m²	cm⁴	cm⁴	cm	cm	cm³	cm³	cm³	cm³			dm⁶	cm⁴
IPE 550	106	550.0	210.0	17.2	11.1	24.0	467.6	134	4.39	42.1	8	110	42	1.88	67,100	2,670	22.4	4.45	2,440	254	2,790	401	6.365	31.4	1.88	123
IPE O 550	123	556.0	212.0	20.2	12.7	24.0	467.6	156	3.75	36.8	8	110	46	1.89	79,200	3,220	22.5	4.55	2,850	304	3,260	481	6.428	27.6	2.30	187
IPE V 550	159	566.0	216.0	25.2	17.1	24.0	467.6	202	2.99	27.3	11	110	50	1.92	102,000	4,260	22.5	4.59	3,620	395	4,200	632	6.449	22.5	3.12	372
IPE A 600	108	597.0	220.0	17.5	9.8	24.0	514.0	137	4.63	52.4	7	116	42	2.01	82,900	3,120	24.6	4.77	2,780	283	3,140	442	6.603	34.7	2.61	122
IPE 600	122	600.0	220.0	19.0	12.0	24.0	514.0	156	4.21	42.8	8	114	44	2.01	92,100	3,390	24.3	4.66	3,070	308	3,510	486	6.510	31.9	2.85	165
IPE O 600	154	610.0	224.0	24.0	15.0	24.0	514.0	197	3.35	34.3	10	116	48	2.04	118,000	4,520	24.5	4.79	3,880	404	4,470	640	6.600	26.1	3.86	316
IPE V 600	184	618.0	228.0	28.0	18.0	24.0	514.0	234	2.89	28.6	11	116	52	2.07	142,000	5,570	24.6	4.88	4,580	488	5,320	780	6.653	22.7	4.85	506
IPE 750 x 134	134	750.0	264.0	15.5	12.0	17.0	685.0	171	7.03	57.1	8	136	34	2.50	151,000	4,790	29.7	5.30	4,020	362	4,640	570	6.910	49.5	6.44	120
IPE 750 x 147	147	753.0	265.0	17.0	13.2	17.0	685.0	188	6.41	51.9	9	136	34	2.51	166,000	5,290	29.8	5.31	4,410	399	5,110	631	6.917	45.4	7.14	157
IPE 750 x 173	173	762.0	267.0	21.6	14.4	17.0	685.0	221	5.06	47.6	9	138	40	2.53	206,000	6,870	30.5	5.57	5,400	515	6,220	810	7.105	37.8	9.39	270
IPE 750 x 196	196	770.0	268.0	25.4	15.6	17.0	685.0	251	4.30	43.9	10	138	44	2.55	240,000	8,180	31.0	5.71	6,240	610	7,170	959	7.201	33.0	11.3	406
IPE 750 x 220	220	779.0	266.0	30.0	16.5	17.0	685.1	281	3.59	41.5	10	136	48	2.56	278,000	9,440	31.5	5.80	7,140	710	8,200	1,110	7.272	28.8	13.2	607

2.2
Wide Flange Beams (HE)



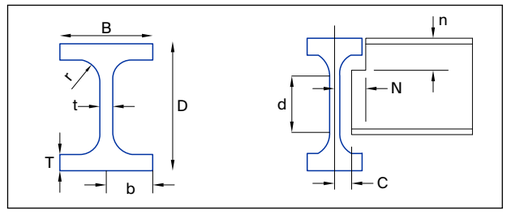
Section designation	Dimensions												
	Mass per Metre	Depth of Section	Width of Section	Thickness		Root	Depth between Fillets	Area of Section	Ratios for Local Buckling		Dimensions for Detailing		
				Flange	Web				Flange	Web	End clearance	Notch	
		D	B	T	t	r	d	A	b/T	d/t	C	N	n
	kg/m	mm	mm	mm	mm	mm	mm	cm²			mm	mm	mm
HE 100 AA	12.2	91.0	100.0	5.5	4.2	12.0	56.0	15.6	13.3	6.53	4	58	18
HE 100 A	16.7	96.0	100.0	8.0	5.0	12.0	56.0	21.2	11.2	4.44	5	58	20
HE 100 B	20.4	100.0	100.0	10.0	6.0	12.0	56.0	26.0	9.33	3.50	5	58	22
HE 100 C	30.9	110.0	103.0	15.0	9.0	12.0	56.0	39.3	6.22	2.33	7	58	28
HE 100 M	41.8	120.0	106.0	20.0	12.0	12.0	56.0	53.2	4.67	1.75	8	58	32
HE 120 AA	14.6	109.0	120.0	5.5	4.2	12.0	74.0	18.6	17.6	8.35	4	68	18
HE 120 A	19.9	114.0	120.0	8.0	5.0	12.0	74.0	25.3	14.8	5.69	5	68	20
HE 120 B	26.7	120.0	120.0	11.0	6.5	12.0	74.0	34.0	11.4	4.07	5	68	24
HE 120 C	39.2	130.0	123.0	16.0	9.5	12.0	74.0	49.9	7.79	2.80	7	68	28
HE 120 M	52.1	140.0	126.0	21.0	12.5	12.0	74.0	66.4	5.92	2.13	8	68	34
HE 140 AA	18.1	128.0	140.0	6.0	4.3	12.0	92.0	23.0	21.4	9.31	4	78	18
HE 140 A	24.7	133.0	140.0	8.5	5.5	12.0	92.0	31.4	16.7	6.50	5	78	22
HE 140 B	33.7	140.0	140.0	12.0	7.0	12.0	92.0	43.0	13.1	4.54	6	78	24
HE 140 C	48.2	150.0	143.0	17.0	10.0	12.0	92.0	61.5	9.20	3.21	7	78	30
HE 140 M	63.2	160.0	146.0	22.0	13.0	12.0	92.0	80.6	7.08	2.48	9	78	34
HE 160 AA	23.8	148.0	160.0	7.0	4.5	15.0	104.0	30.4	23.1	8.96	4	88	22
HE 160 A	30.4	152.0	160.0	9.0	6.0	15.0	104.0	38.8	17.3	6.89	5	88	24
HE 160 B	42.6	160.0	160.0	13.0	8.0	15.0	104.0	54.3	13.0	4.69	6	86	28
HE 160 C	59.2	170.0	163.0	18.0	11.0	15.0	104.0	75.4	9.45	3.39	8	86	34
HE 160 M	76.2	180.0	166.0	23.0	14.0	15.0	104.0	97.1	7.43	2.65	9	86	38
HE 180 AA	28.7	167.0	180.0	7.5	5.0	15.0	122.0	36.5	24.4	9.67	5	98	24
HE 180 A	35.5	171.0	180.0	9.5	6.0	15.0	122.0	45.3	20.3	7.58	5	98	26
HE 180 B	51.2	180.0	180.0	14.0	8.5	15.0	122.0	65.3	14.4	5.05	6	96	30
HE 180 C	69.8	190.0	183.0	19.0	11.5	15.0	122.0	89.0	10.6	3.72	8	96	34
HE 180 M	88.9	200.0	186.0	24.0	14.5	15.0	122.0	113	8.41	2.95	9	96	40
HE 200 AA	34.6	186.0	200.0	8.0	5.5	18.0	134.0	44.1	24.4	9.91	5	108	26

Dimensions	EN10365
Specification	EN10025
Size Range	HE 100 AA to HE 1000 x 584

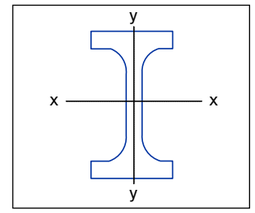


	Properties												
Surface Area	Second Moment of Area		Radius of Gyration		Elastic Modulus		Plastic Modulus		Buckling Parameter	Torsional Index	Warping Constant	Torsional Constant
	Axis x-x	Axis y-y	Axis x-x	Axis y-y	Axis x-x	Axis y-y	Axis x-x	Axis y-y				
Per metre									u	x	H	J
m²	cm⁴	cm⁴	cm	cm	cm³	cm³	cm³	cm³			dm⁶	cm⁴
0.553	236	92.1	3.89	2.43	52.0	18	58.4	28.4	4.271	12.5	0.00168	2.33
0.561	349	134	4.06	2.51	72.8	27	83.0	41.1	4.363	9.95	0.00258	5.28
0.567	450	167	4.16	2.53	89.9	33	104	51.4	4.401	8.49	0.00338	9.33
0.593	759	274	4.39	2.64	138	53	166	82.1	4.502	6.23	0.00616	29.1
0.619	1,140	399	4.63	2.74	190	75	236	116	4.597	5.02	0.00993	67.2
0.669	413	159	4.72	2.93	75.8	27	84.1	40.6	4.690	15.7	0.00424	2.59
0.677	606	231	4.89	3.02	106	39	120	58.8	4.789	12.3	0.00647	6.04
0.686	864	318	5.04	3.06	144	53	165	81.0	4.840	9.62	0.00941	13.9
0.712	1,390	498	5.27	3.16	214	81	253	124	4.930	7.13	0.0161	40.7
0.738	2,020	703	5.51	3.25	288	112	351	172	5.016	5.75	0.0248	90.5
0.787	720	275	5.59	3.45	112	39	124	59.9	5.114	17.8	0.0102	3.43
0.794	1,030	389	5.73	3.52	155	56	174	84.8	5.175	13.9	0.0151	8.10
0.805	1,510	550	5.93	3.58	216	79	245	120	5.241	10.6	0.0225	20.2
0.831	2,330	830	6.16	3.68	311	116	364	178	5.323	7.92	0.0366	55.4
0.857	3,290	1,140	6.39	3.77	411	157	494	240	5.401	6.42	0.0543	119
0.901	1,280	479	6.50	3.97	173	60	190	91.4	5.504	17.3	0.0238	6.43
0.906	1,670	616	6.57	3.98	220	77	245	118	5.519	14.5	0.0314	12.1
0.918	2,490	889	6.78	4.05	312	111	354	170	5.589	10.9	0.0479	31.3
0.944	3,700	1,300	7.01	4.16	436	160	508	245	5.669	8.41	0.0750	78.7
0.970	5,100	1,760	7.25	4.26	566	212	675	326	5.747	6.89	0.108	161
1.02	1,970	730	7.34	4.47	236	81	258	124	5.846	18.9	0.0464	8.31
1.02	2,510	925	7.45	4.52	294	103	325	156	5.882	15.9	0.0602	14.9
1.04	3,830	1,360	7.66	4.57	426	151	481	231	5.941	11.7	0.0938	42.2
1.06	5,540	1,940	7.89	4.68	584	212	675	325	6.016	9.05	0.142	101
1.09	7,480	2,580	8.13	4.77	748	277	883	425	6.088	7.46	0.199	201
1.13	2,940	1,070	8.17	4.92	317	107	347	163	6.152	18.9	0.0845	12.5

2.2
Wide Flange Beams (HE)

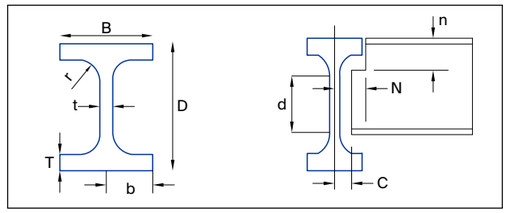


Dimensions	EN10365
Specification	EN10025
Size Range	HE 100 AA to HE 1000 x 584



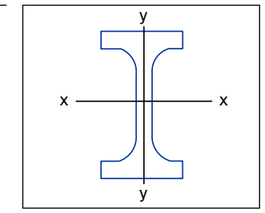
Section designation	Dimensions													Properties											
	Mass per Metre	Depth of Section	Width of Section	Thickness		Root	Depth between Fillets	Area of Section	Ratios for Local Buckling		Dimensions for Detailing			Surface Area	Second Moment of Area		Radius of Gyration		Elastic Modulus		Plastic Modulus		Buckling Parameter	Torsional Index	Warping Constant	Torsional Constant
				Flange	Web				Flange	Web	End clearance	Notch		Per metre	Axis x-x	Axis y-y	Axis x-x	Axis y-y	Axis x-x	Axis y-y	Axis x-x	Axis y-y				
	kg/m	D mm	B mm	T mm	t mm	r mm	d mm	A cm²	b/T	d/t	C mm	N mm	n mm	m²	cm⁴	cm⁴	cm	cm	cm³	cm³	cm³	cm³	u	x	H dm⁶	J cm⁴
HE 200 A	42.3	190.0	200.0	10.0	6.5	18.0	134.0	53.8	20.6	7.88	5	108	28	1.14	3,690	1,340	8.28	4.98	389	134	430	204	6.194	16.3	0.108	21.0
HE 200 B	61.3	200.0	200.0	15.0	9.0	18.0	134.0	78.1	14.9	5.17	7	106	34	1.15	5,700	2,000	8.54	5.07	570	200	642	306	6.267	12.0	0.171	59.7
HE 200 C	81.9	210.0	203.0	20.0	12.0	18.0	134.0	104	11.2	3.88	8	106	38	1.18	8,030	2,790	8.77	5.17	765	275	881	421	6.339	9.45	0.252	135
HE 200 M	103	220.0	206.0	25.0	15.0	18.0	134.0	131	8.93	3.10	10	106	44	1.20	10,600	3,650	9.00	5.27	967	354	1,140	543	6.406	7.87	0.346	258
HE 220 AA	40.4	205.0	220.0	8.5	6.0	18.0	152.0	51.5	25.3	10.47	5	118	28	1.25	4,170	1,510	9.00	5.42	407	137	446	209	6.448	20.2	0.146	15.5
HE 220 A	50.5	210.0	220.0	11.0	7.0	18.0	152.0	64.3	21.7	8.05	6	118	30	1.26	5,410	1,960	9.17	5.51	515	178	568	271	6.517	16.9	0.193	28.6
HE 220 B	71.5	220.0	220.0	16.0	9.5	18.0	152.0	91.0	16.0	5.45	7	116	34	1.27	8,090	2,840	9.43	5.59	736	258	827	394	6.587	12.5	0.295	77.0
HE 220 C	94.1	230.0	223.0	21.0	12.5	18.0	152.0	120	12.2	4.15	8	116	40	1.30	11,200	3,890	9.65	5.69	972	349	1,110	532	6.652	9.98	0.424	168
HE 220 M	117	240.0	226.0	26.0	15.5	18.0	152.0	149	9.81	3.36	10	116	44	1.32	14,600	5,010	9.89	5.79	1,220	444	1,420	679	6.715	8.35	0.573	313
HE 240 AA	47.4	224.0	240.0	9.0	6.5	21.0	164.0	60.4	25.2	10.64	5	128	30	1.36	5,840	2,080	9.83	5.87	521	173	571	264	6.726	20.1	0.240	22.1
HE 240 A	60.3	230.0	240.0	12.0	7.5	21.0	164.0	76.8	21.9	7.94	6	128	34	1.37	7,760	2,770	10.1	6.00	675	231	745	352	6.815	16.6	0.328	42.1
HE 240 B	83.2	240.0	240.0	17.0	10.0	21.0	164.0	106	16.4	5.53	7	126	38	1.38	11,300	3,920	10.3	6.08	938	327	1,050	498	6.880	12.7	0.487	104
HE 240 C	119	255.0	244.0	24.5	14.0	21.0	164.0	152	11.7	3.84	9	126	46	1.42	17,300	5,940	10.7	6.25	1,360	487	1,560	744	6.984	9.45	0.788	289
HE 240 M	157	270.0	248.0	32.0	18.0	21.0	164.0	200	9.11	2.94	11	126	54	1.46	24,300	8,150	11.0	6.39	1,800	658	2,120	1,010	7.077	7.59	1.15	626
HE 260 AA	54.1	244.0	260.0	9.5	6.5	24.0	177.0	69.0	27.2	10.82	5	138	34	1.47	7,980	2,790	10.8	6.36	654	214	714	328	7.026	20.1	0.383	30.1
HE 260 A	68.2	250.0	260.0	12.5	7.5	24.0	177.0	86.8	23.6	8.18	6	138	38	1.48	10,400	3,670	11.0	6.50	836	282	920	430	7.112	17.0	0.516	54.2
HE 260 B	93.0	260.0	260.0	17.5	10.0	24.0	177.0	118	17.7	5.77	7	136	42	1.50	14,900	5,140	11.2	6.58	1,150	395	1,280	602	7.175	13.2	0.754	127
HE 260 C	132	275.0	264.0	25.0	14.0	24.0	177.0	168	12.6	4.04	9	136	50	1.54	22,600	7,680	11.6	6.75	1,640	582	1,880	888	7.272	9.95	1.20	340
HE 260 M	172	290.0	268.0	32.5	18.0	24.0	177.0	220	9.83	3.11	11	136	58	1.57	31,300	10,400	11.9	6.90	2,160	780	2,520	1,190	7.362	8.03	1.73	720
HE 280 AA	61.2	264.0	280.0	10.0	7.0	24.0	196.0	78.0	28.0	11.25	6	148	34	1.59	10,600	3,660	11.6	6.85	800	262	873	399	7.299	21.3	0.590	35.5
HE 280 A	76.4	270.0	280.0	13.0	8.0	24.0	196.0	97.3	24.5	8.62	6	146	38	1.60	13,700	4,760	11.9	7.00	1,010	340	1,110	518	7.379	18.0	0.785	63.5
HE 280 B	103	280.0	280.0	18.0	10.5	24.0	196.0	131	18.7	6.15	7	146	42	1.62	19,300	6,600	12.1	7.09	1,380	471	1,530	718	7.442	14.0	1.13	146
HE 280 C	145	295.0	284.0	25.5	14.5	24.0	196.0	185	13.5	4.34	9	146	50	1.66	28,800	9,750	12.5	7.26	1,950	687	2,220	1,050	7.540	10.6	1.77	385
HE 280 M	189	310.0	288.0	33.0	18.5	24.0	196.0	240	10.6	3.36	11	146	58	1.69	39,600	13,200	12.8	7.40	2,550	914	2,970	1,400	7.628	8.54	2.52	807
HE 300 AA	69.8	283.0	300.0	10.5	7.5	27.0	208.0	88.9	27.7	11.36	6	158	38	1.70	13,800	4,730	12.5	7.30	976	316	1,060	482	7.541	21.0	0.877	47.8
HE 300 A	88.3	290.0	300.0	14.0	8.5	27.0	208.0	112	24.5	8.48	6	156	42	1.72	18,300	6,310	12.7	7.49	1,260	421	1,380	641	7.646	17.7	1.20	87.8

2.2
Wide Flange Beams (HE)



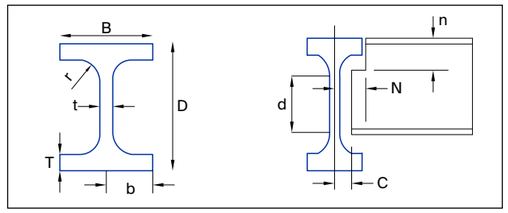
Section designation	Dimensions												
	Mass per Metre	Depth of Section	Width of Section	Thickness		Root	Depth between Fillets	Area of Section	Ratios for Local Buckling		Dimensions for Detailing		
				Flange	Web				Flange	Web	End clearance	Notch	
	kg/m	D mm	B mm	T mm	t mm	r mm	d mm	A cm²	b/T	d/t	C mm	N mm	n mm
HE 300 B	117	300.0	300.0	19.0	11.0	27.0	208.0	149	18.9	6.18	8	156	46
HE 300 C	177	320.0	305.0	29.0	16.0	27.0	208.0	225	13.0	4.05	10	156	56
HE 300 M	238	340.0	310.0	39.0	21.0	27.0	208.0	303	9.90	3.01	13	156	66
HE 320 AA	74.2	301.0	300.0	11.0	8.0	27.0	225.0	94.6	28.1	10.82	6	156	38
HE 320 A	97.6	310.0	300.0	15.5	9.0	27.0	225.0	124	25.0	7.65	7	156	44
HE 320 B	127	320.0	300.0	20.5	11.5	27.0	225.0	161	19.6	5.72	8	156	48
HE 320 C	186	340.0	305.0	30.5	16.0	27.0	225.0	237	14.1	3.85	10	156	58
HE 320 M	245	359.0	309.0	40.0	21.0	27.0	225.0	312	10.7	2.93	13	154	68
HE 340 AA	78.9	320.0	300.0	11.5	8.5	27.0	243.0	100	28.6	10.33	6	156	40
HE 340 A	105	330.0	300.0	16.5	9.5	27.0	243.0	134	25.6	7.17	7	156	44
HE 340 B	134	340.0	300.0	21.5	12.0	27.0	243.0	171	20.3	5.44	8	154	50
HE 340 M	248	377.0	309.0	40.0	21.0	27.0	243.0	316	11.6	2.93	13	154	68
HE 360 AA	83.7	339.0	300.0	12.0	9.0	27.0	261.0	107	29.0	9.88	7	156	40
HE 360 A	112	350.0	300.0	17.5	10.0	27.0	261.0	143	26.1	6.74	7	156	46
HE 360 B	142	360.0	300.0	22.5	12.5	27.0	261.0	181	20.9	5.19	8	154	50
HE 360 M	250	395.0	308.0	40.0	21.0	27.0	261.0	319	12.4	2.91	13	154	68
HE 400 AA	92.4	378.0	300.0	13.0	9.5	27.0	298.0	118	31.4	9.10	7	156	40
HE 400 A	125	390.0	300.0	19.0	11.0	27.0	298.0	159	27.1	6.18	8	156	46
HE 400 B	155	400.0	300.0	24.0	13.5	27.0	298.0	198	22.1	4.84	9	154	52
HE 400 M	256	432.0	307.0	40.0	21.0	27.0	298.0	326	14.2	2.90	13	154	68
HE 450 AA	99.7	425.0	300.0	13.5	10.0	27.0	344.0	127	34.4	8.74	7	156	42
HE 450 A	140	440.0	300.0	21.0	11.5	27.0	344.0	178	29.9	5.58	8	156	48
HE 450 B	171	450.0	300.0	26.0	14.0	27.0	344.0	218	24.6	4.46	9	154	54
HE 450 M	263	478.0	307.0	40.0	21.0	27.0	344.0	335	16.4	2.90	13	154	68
HE 500 AA	107	472.0	300.0	14.0	10.5	27.0	390.0	137	37.1	8.41	7	156	42
HE 500 A	155	490.0	300.0	23.0	12.0	27.0	390.0	198	32.5	5.09	8	154	50

Dimensions	EN10365
Specification	EN10025
Size Range	HE 100 AA to HE 1000 x 584

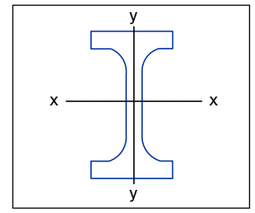


	Properties											
Surface Area	Second Moment of Area		Radius of Gyration		Elastic Modulus		Plastic Modulus		Buckling Parameter	Torsional Index	Warping Constant	Torsional Constant
Per metre	Axis x-x	Axis y-y	Axis x-x	Axis y-y	Axis x-x	Axis y-y	Axis x-x	Axis y-y	u	x	H	J
m²	cm⁴	cm⁴	cm	cm	cm³	cm³	cm³	cm³			dm⁶	cm⁴
1.73	25,200	8,560	13.0	7.58	1,680	571	1,870	870	7.706	14.1	1.69	189
1.78	41,000	13,700	13.5	7.81	2,560	901	2,930	1,370	7.835	10.0	2.90	604
1.83	59,200	19,400	14.0	8.00	3,480	1,250	4,080	1,910	7.947	7.88	4.39	1,410
1.74	16,400	4,960	13.2	7.24	1,090	331	1,200	506	7.617	21.8	1.04	53.6
1.76	22,900	6,980	13.6	7.49	1,480	466	1,630	710	7.761	17.5	1.51	112
1.77	30,800	9,240	13.8	7.57	1,930	616	2,150	939	7.813	14.2	2.07	230
1.82	48,700	14,400	14.3	7.81	2,860	947	3,270	1,440	7.945	10.3	3.45	688
1.87	68,100	19,700	14.8	7.95	3,800	1,280	4,440	1,950	8.028	8.20	5.00	1,510
1.78	19,600	5,180	14.0	7.18	1,220	346	1,340	529	7.675	22.6	1.23	60.0
1.79	27,700	7,440	14.4	7.46	1,680	496	1,850	756	7.837	17.9	1.82	131
1.81	36,700	9,690	14.7	7.53	2,160	646	2,410	986	7.882	14.5	2.45	263
1.90	76,400	19,700	15.6	7.90	4,050	1,280	4,720	1,950	8.085	8.70	5.58	1,510
1.81	23,000	5,410	14.7	7.12	1,360	361	1,500	553	7.710	23.3	1.44	67.1
1.83	33,100	7,890	15.2	7.43	1,890	526	2,090	802	7.893	18.1	2.18	153
1.85	43,200	10,100	15.5	7.49	2,400	676	2,680	1,030	7.935	14.8	2.88	298
1.93	84,900	19,500	16.3	7.83	4,300	1,270	4,990	1,940	8.115	9.21	6.14	1,510
1.89	31,200	5,860	16.3	7.06	1,650	391	1,820	600	7.778	24.8	1.95	81.3
1.91	45,100	8,560	16.8	7.34	2,310	571	2,560	873	7.951	19.0	2.94	193
1.93	57,700	10,800	17.1	7.40	2,880	721	3,230	1,100	7.987	15.7	3.82	361
2.00	104,000	19,300	17.9	7.70	4,820	1,260	5,570	1,930	8.155	10.3	7.41	1,520
1.98	41,900	6,090	18.2	6.92	1,970	406	2,180	624	7.780	27.4	2.57	91.4
2.01	63,700	9,460	18.9	7.29	2,900	631	3,220	966	8.016	20.0	4.15	250
2.03	79,900	11,700	19.1	7.33	3,550	781	3,980	1,200	8.039	16.7	5.26	448
2.10	132,000	19,300	19.8	7.59	5,500	1,260	6,330	1,940	8.176	11.6	9.25	1,530
2.08	54,600	6,310	20.0	6.79	2,320	421	2,580	649	7.756	29.9	3.30	103
2.11	87,000	10,400	21.0	7.24	3,550	691	3,950	1,060	8.050	20.8	5.64	318

2.2
Wide Flange Beams (HE)

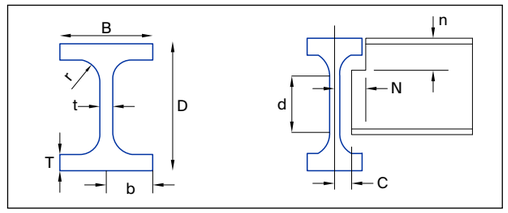


Dimensions	EN10365
Specification	EN10025
Size Range	HE 100 AA to HE 1000 x 584

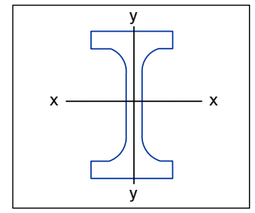


Section designation	Dimensions													Properties											
	Mass per Metre	Depth of Section	Width of Section	Thickness		Root	Depth between Fillets	Area of Section	Ratios for Local Buckling		Dimensions for Detailing			Surface Area	Second Moment of Area		Radius of Gyration		Elastic Modulus		Plastic Modulus		Buckling Parameter	Torsional Index	Warping Constant	Torsional Constant
				Flange	Web				Flange	Web	End clearance	Notch														
		D	B	T	t	r	d	A	b/T	d/t	C	N	n	Per metre	Axis x-x	Axis y-y	Axis x-x	Axis y-y	Axis x-x	Axis y-y	Axis x-x	Axis y-y	u	x	H	J
	kg/m	mm	mm	mm	mm	mm	mm	cm²			mm	mm	mm	m²	cm⁴	cm⁴	cm	cm	cm³	cm³	cm³	cm³			dm⁶	cm⁴
HE 500 B	187	500.0	300.0	28.0	14.5	27.0	390.0	239	26.9	4.13	9	154	56	2.12	107,000	12,600	21.2	7.27	4,290	842	4,820	1,290	8.065	17.6	7.02	548
HE 500 M	270	524.0	306.0	40.0	21.0	27.0	390.0	344	18.6	2.89	13	154	68	2.18	162,000	19,200	21.7	7.46	6,180	1,250	7,090	1,930	8.157	12.9	11.2	1,540
HE 550 AA	120	522.0	300.0	15.0	11.5	27.0	438.0	153	38.1	7.82	8	156	42	2.17	72,900	6,770	21.8	6.65	2,790	451	3,130	699	7.708	31.5	4.34	127
HE 550 A	166	540.0	300.0	24.0	12.5	27.0	438.0	212	35.0	4.86	8	154	52	2.21	112,000	10,800	23.0	7.15	4,150	721	4,620	1,110	8.031	22.4	7.19	360
HE 550 B	199	550.0	300.0	29.0	15.0	27.0	438.0	254	29.2	3.98	10	154	56	2.22	137,000	13,100	23.2	7.17	4,970	872	5,590	1,340	8.045	19.0	8.86	610
HE 550 M	278	572.0	306.0	40.0	21.0	27.0	438.0	354	20.9	2.89	13	154	68	2.28	198,000	19,200	23.6	7.35	6,920	1,250	7,930	1,940	8.135	14.3	13.5	1,560
HE 600 AA	129	571.0	300.0	15.5	12.0	27.0	486.0	164	40.5	7.55	8	154	44	2.27	91,900	6,990	23.7	6.53	3,220	466	3,620	724	7.651	33.8	5.38	142
HE 600 A	178	590.0	300.0	25.0	13.0	27.0	486.0	226	37.4	4.66	9	154	52	2.31	141,000	11,300	25.0	7.05	4,790	751	5,350	1,160	8.001	23.8	8.98	407
HE 600 B	212	600.0	300.0	30.0	15.5	27.0	486.0	270	31.4	3.84	10	154	58	2.32	171,000	13,500	25.2	7.08	5,700	902	6,420	1,390	8.015	20.3	11.0	677
HE 600 M	285	620.0	305.0	40.0	21.0	27.0	486.0	364	23.1	2.88	13	152	68	2.37	237,000	19,000	25.6	7.22	7,660	1,240	8,770	1,930	8.088	15.8	15.9	1,570
HE 600 x 337	337	632.0	310.0	46.0	25.5	27.0	486.0	429	19.1	2.51	15	154	74	2.41	283,000	22,900	25.7	7.31	8,960	1,480	10,400	2,310	8.123	13.9	19.6	2,440
HE 600 x 399	399	648.0	315.0	54.0	30.0	27.0	486.0	508	16.2	2.14	17	154	82	2.45	345,000	28,300	26.0	7.46	10,600	1,800	12,500	2,810	8.201	12.0	24.8	3,930
HE 650 AA	138	620.0	300.0	16.0	12.5	27.0	534.0	176	42.7	7.30	8	154	44	2.37	114,000	7,220	25.5	6.41	3,680	481	4,160	751	7.594	35.9	6.57	158
HE 650 A	190	640.0	300.0	26.0	13.5	27.0	534.0	242	39.6	4.47	9	154	54	2.41	175,000	11,700	26.9	6.97	5,470	782	6,140	1,200	7.966	25.2	11.0	458
HE 650 B	225	650.0	300.0	31.0	16.0	27.0	534.0	286	33.4	3.71	10	152	58	2.42	211,000	14,000	27.1	6.99	6,480	932	7,320	1,440	7.978	21.6	13.4	749
HE 650 M	293	668.0	305.0	40.0	21.0	27.0	534.0	374	25.4	2.88	13	152	68	2.47	282,000	19,000	27.5	7.13	8,430	1,240	9,660	1,940	8.048	17.2	18.6	1,580
HE 650 x 343	343	680.0	309.0	46.0	25.0	27.0	534.0	438	21.4	2.50	15	152	74	2.50	334,000	22,700	27.6	7.21	9,820	1,470	11,400	2,300	8.084	15.2	22.7	2,440
HE 650 x 407	407	696.0	314.0	54.0	29.5	27.0	534.0	519	18.1	2.13	17	154	82	2.54	405,000	28,000	28.0	7.35	11,600	1,780	13,600	2,800	8.160	13.2	28.7	3,930
HE 700 AA	150	670.0	300.0	17.0	13.0	27.0	582.0	191	44.8	6.85	9	154	44	2.47	143,000	7,670	27.3	6.34	4,260	512	4,840	800	7.562	37.3	8.16	186
HE 700 A	204	690.0	300.0	27.0	14.5	27.0	582.0	260	40.1	4.29	9	154	54	2.50	215,000	12,200	28.8	6.84	6,240	812	7,030	1,260	7.897	26.5	13.4	522
HE 700 B	241	700.0	300.0	32.0	17.0	27.0	582.0	306	34.2	3.58	11	152	60	2.52	257,000	14,400	29.0	6.87	7,340	963	8,330	1,500	7.912	22.8	16.1	839
HE 700 M	301	716.0	304.0	40.0	21.0	27.0	582.0	383	27.7	2.86	13	152	68	2.56	329,000	18,800	29.3	7.01	9,200	1,240	10,500	1,930	7.991	18.7	21.4	1,600
HE 700 x 352	352	728.0	308.0	46.0	25.0	27.0	582.0	449	23.3	2.49	15	152	74	2.59	390,000	22,500	29.5	7.08	10,700	1,460	12,400	2,290	8.027	16.5	26.0	2,450
HE 700 x 418	418	744.0	313.0	54.0	29.5	27.0	582.0	532	19.7	2.13	17	152	82	2.63	472,000	27,800	29.8	7.22	12,700	1,770	14,800	2,800	8.100	14.3	32.8	3,960
HE 800 AA	172	770.0	300.0	18.0	14.0	30.0	674.0	218	48.1	6.28	9	154	48	2.66	209,000	8,130	30.9	6.10	5,430	542	6,220	857	7.424	40.2	11.4	243

2.2
Wide Flange Beams (HE)

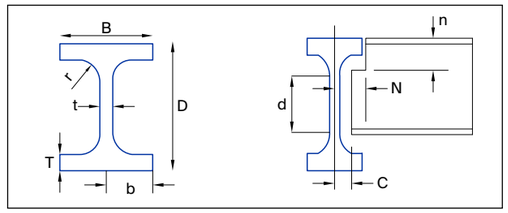


Dimensions	EN10365
Specification	EN10025
Size Range	HE 100 AA to HE 1000 x 584



Section designation	Dimensions													Properties												
	Mass per Metre	Depth of Section	Width of Section	Thickness		Root	Depth between Fillets	Area of Section	Ratios for Local Buckling		Dimensions for Detailing			Surface Area	Second Moment of Area		Radius of Gyration		Elastic Modulus		Plastic Modulus		Buckling Parameter	Torsional Index	Warping Constant	Torsional Constant
				Flange	Web				Flange	Web	End clearance	Notch														
		D	B	T	t	r	d	A	b/T	d/t	C	N	n	Per metre	Axis x-x	Axis y-y	Axis x-x	Axis y-y	Axis x-x	Axis y-y	Axis x-x	Axis y-y	u	x	H	J
	kg/m	mm	mm	mm	mm	mm	mm	cm²			mm	mm	mm	m²	cm⁴	cm⁴	cm	cm	cm³	cm³	cm³	cm³			dm⁶	cm⁴
HE 800 A	224	790.0	300.0	28.0	15.0	30.0	674.0	286	44.9	4.02	10	154	58	2.70	303,000	12,600	32.6	6.65	7,680	843	8,700	1,310	7.799	29.5	18.3	609
HE 800 B	262	800.0	300.0	33.0	17.5	30.0	674.0	334	38.5	3.37	11	152	64	2.71	359,000	14,900	32.8	6.68	8,980	994	10,200	1,550	7.813	25.6	21.8	959
HE 800 M	317	814.0	303.0	40.0	21.0	30.0	674.0	404	32.1	2.78	13	152	70	2.75	443,000	18,600	33.1	6.79	10,900	1,230	12,500	1,930	7.876	21.6	27.8	1,660
HE 800 x 373	373	826.0	308.0	46.0	25.0	30.0	674.0	475	27.0	2.42	15	152	76	2.78	524,000	22,500	33.2	6.89	12,700	1,460	14,700	2,310	7.927	19.0	34.1	2,550
HE 800 x 444	444	842.0	313.0	54.0	30.0	30.0	674.0	566	22.5	2.06	17	152	84	2.82	634,000	27,800	33.5	7.01	15,100	1,780	17,600	2,830	7.987	16.4	42.8	4,160
HE 900 AA	198	870.0	300.0	20.0	15.0	30.0	770.0	252	51.3	5.63	10	154	50	2.86	301,000	9,040	34.6	5.99	6,920	603	8,000	958	7.357	42.5	16.3	322
HE 900 A	252	890.0	300.0	30.0	16.0	30.0	770.0	320	48.1	3.73	10	152	60	2.90	422,000	13,600	36.3	6.50	9,480	903	10,800	1,410	7.711	31.8	25.0	749
HE 900 B	291	900.0	300.0	35.0	18.5	30.0	770.0	371	41.6	3.16	11	152	66	2.91	494,000	15,800	36.5	6.53	11,000	1,050	12,600	1,660	7.723	27.7	29.5	1,150
HE 900 M	333	910.0	302.0	40.0	21.0	30.0	770.0	424	36.7	2.76	13	152	70	2.93	570,000	18,400	36.7	6.60	12,500	1,220	14,400	1,930	7.766	24.6	34.8	1,680
HE 900 x 391	391	922.0	307.0	46.0	25.0	30.0	770.0	498	30.8	2.41	15	152	76	2.97	674,000	22,300	36.8	6.70	14,600	1,450	17,000	2,310	7.815	21.6	42.6	2,600
HE 900 x 466	466	938.0	312.0	54.0	30.0	30.0	770.0	594	25.7	2.06	17	152	84	3.01	815,000	27,600	37.1	6.81	17,400	1,770	20,400	2,830	7.877	18.7	53.4	4,230
HE 1000 AA	222	970.0	300.0	21.0	16.0	30.0	868.0	282	54.3	5.33	10	152	52	3.06	406,000	9,500	38.0	5.80	8,380	633	9,780	1,020	7.235	45.7	21.3	387
HE 1000 x 249	249	980.0	300.0	26.0	16.5	30.0	868.0	317	52.6	4.30	10	152	56	3.08	481,000	11,800	39.0	6.09	9,820	784	11,400	1,240	7.437	39.7	26.6	582
HE 1000 A	272	990.0	300.0	31.0	16.5	30.0	868.0	347	52.6	3.60	10	152	62	3.10	554,000	14,000	40.0	6.35	11,200	934	12,800	1,470	7.618	34.9	32.1	835
HE 1000 B	314	1,000.0	300.0	36.0	19.0	30.0	868.0	400	45.7	3.07	12	152	66	3.11	645,000	16,300	40.2	6.38	12,900	1,080	14,900	1,720	7.634	30.6	37.6	1,270
HE 1000 M	349	1,008.0	302.0	40.0	21.0	30.0	868.0	444	41.3	2.76	13	152	70	3.13	722,000	18,500	40.3	6.45	14,300	1,220	16,600	1,940	7.673	27.8	43.0	1,710
HE 1000 x 393	393	1,016.0	303.0	43.9	24.4	30.0	868.0	500	35.6	2.49	14	150	74	3.14	808,000	20,500	40.2	6.40	15,900	1,350	18,500	2,170	7.635	25.4	48.1	2,330
HE 1000 x 415	415	1,020.0	304.0	46.0	26.0	30.0	868.0	529	33.4	2.37	15	150	76	3.15	853,000	21,700	40.2	6.41	16,700	1,430	19,600	2,300	7.635	24.3	51.1	2,700
HE 1000 x 438	438	1,026.0	305.0	49.0	26.9	30.0	868.0	556	32.3	2.23	15	150	80	3.17	909,000	23,400	40.4	6.48	17,700	1,530	20,800	2,460	7.684	23.0	55.3	3,180
HE 1000 x 494	494	1,036.0	309.0	54.0	31.0	30.0	868.0	629	28.0	2.02	18	150	84	3.19	1,028,000	26,800	40.4	6.53	19,800	1,740	23,400	2,820	7.702	20.9	64.0	4,400
HE 1000 x 584	584	1,056.0	314.0	64.0	36.0	30.0	868.0	744	24.1	1.70	20	150	94	3.24	1,246,000	33,400	40.9	6.70	23,600	2,130	28,000	3,480	7.805	18.0	81.2	7,150

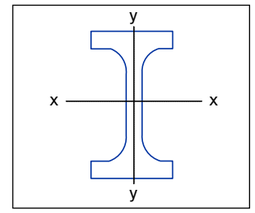
2.3 Universal Beams & Columns (UB & UC)



Imperial Units

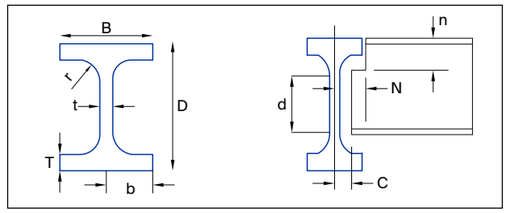
Designation			Depth of Section	Width of Section	Thickness		Root Radius	Depth between Fillets	Area of Section	Ratios for Local Buckling		Dimensions for Detailing		
Size	Mass per Metre				Flange	Web				Flange	Web	End clearance	Notch	
			D	B	T	t	r	d	A	b/T	d/t	C	N	n
in (mm)	lb/ft	kg/m	mm	mm	mm	mm	mm	mm	cm²			mm	mm	mm
W4-4x4 (102x102)	13	19.4	105.7	103.1	8.8	7.1	6.4	75.5	24.7	5.88	10.6	6	58	15
	13.8	21.0	102.0	102.0	9.4	8.0	6.0	71.2	26.1	5.43	8.90	6	57	15
	16.3	24.0	107.0	100.0	12.0	7.9	6.0	71.0	30.9	4.17	8.99	6	56	18
W5-5x3 (127x76)	9	13.0	127.0	76.0	7.6	4.0	7.6	96.6	16.5	5.00	24.2	4	46	15
W5-5x5 (127x127)	16	23.8	127.3	127.0	9.1	6.1	7.6	93.8	30.4	6.95	15.4	5	70	17
	19	28.3	130.8	127.8	10.9	6.9	7.6	93.8	35.8	5.86	13.7	5	70	19
W6-6x3 (152x76)	9	14.0	150.0	75.0	7.0	5.0	8.0	120.0	17.8	5.36	24.0	5	45	15
	12	18.0	155.0	75.0	8.5	6.0	8.0	122.0	21.6	4.41	20.3	5	45	17
W6-6x3 1/2 (152x89)	11	16.0	152.4	88.7	7.7	4.5	7.6	121.8	20.3	5.76	27.1	4	52	15
W6-6x4 (152x102)	9	13.4	149.9	100.1	5.5	4.3	6.4	126.3	17.3	9.17	29.2	4	58	12
	12	17.9	153.2	101.6	7.1	5.8	6.4	126.3	22.9	7.14	21.6	5	58	13
	16	23.8	159.5	102.4	10.2	6.6	6.4	126.4	30.4	5.02	19.2	5	58	17
W6-6x6 (152X152)	15	22.3	152.1	152.1	6.6	5.8	6.4	126.2	28.5	11.5	21.6	5	83	13
	15.7	23.0	152.4	152.2	6.8	5.8	7.6	123.6	29.2	11.2	21.3	5	83	14
	20	30.0	157.6	152.9	9.4	6.5	7.6	123.6	38.3	8.13	19.0	5	83	17
	25	37.0	161.8	154.4	11.5	8.0	7.6	123.6	47.1	6.71	15.5	6	83	19
W7-7x 3 1/2 (178x89)	11	16.1	173.0	90.0	7.0	4.5	8.9	141.2	20.4	6.43	31.4	4	53	16
	12	18.1	175.0	90.0	8.0	5.0	8.9	141.2	23.0	5.63	28.2	5	53	17
	15	22.2	179.0	90.0	10.0	6.0	8.9	141.2	28.2	4.50	23.5	5	52	19
W7-7x4 (178x102)	13	19.0	177.8	101.2	7.9	4.8	7.6	146.8	24.3	6.41	30.6	4	58	16
W8-8x4 (203x102)	10	14.9	200.4	100.1	5.2	4.3	7.6	174.7	19.1	9.61	40.4	4	58	13
	13	19.4	202.9	101.6	6.5	5.8	7.6	174.7	24.8	7.84	29.9	5	58	14
	15	22.3	206.0	102.0	8.0	6.2	7.6	174.8	28.6	6.38	28.1	5	58	16
	16	23.1	203.2	101.8	9.3	5.4	7.6	169.4	29.4	5.47	31.4	5	58	17
W8-8x5 1/4 (203x133)	15	22.3	202.0	133.0	7.0	5.0	8.9	170.2	28.7	9.50	34.0	5	74	16
	17	25.1	203.2	133.2	7.8	5.7	7.6	172.4	32.0	8.54	30.2	5	74	15
	18	26.8	206.8	133.3	8.4	5.8	7.6	174.8	33.9	7.95	29.9	5	74	16
	20	30.0	206.8	133.9	9.6	6.4	7.6	172.4	38.2	6.97	26.9	5	74	17
	21	31.3	210.3	133.9	10.1	6.4	7.6	174.9	39.6	6.63	27.5	5	74	18

Dimensions	EN10365 / ASTM A6
Specification	EN10025 / ASTM A36 / ASTM A572
Size Range	UB: 5”x3” (127mm x 76mm) to 44”x16” (1118mm x 406mm) UC: 4”x4” (102mm x 102mm) to 14”x16” (356mm x 406mm)

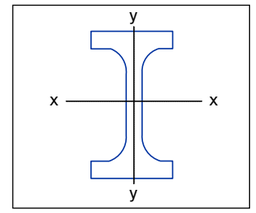


Surface Area	Second Moment of Area		Radius of Gyration		Elastic Modulus		Plastic Modulus		Buckling Parameter	Torsional Index	Warping Constant	Torsional Constant
Per metre	Axis x-x	Axis y-y	Axis x-x	Axis y-y	Axis x-x	Axis y-y	Axis x-x	Axis y-y				
									u	x	H	J
m²	cm⁴	cm⁴	cm	cm	cm³	cm³	cm³	cm³			dm⁶	cm⁴
0.599	472	160	4.38	2.55	89.4	31.1	103	47.8	0.836	10.9	0.004	6.29
0.586	456	167	4.18	2.53	89.4	32.7	104	50.4	0.827	9.61	0.004	7.78
0.588	587	200	4.36	2.55	110	40.1	129	61.5	0.844	8.13	0.005	13.5
0.537	473	55.8	5.35	1.84	74.6	14.7	84.2	22.6	0.895	16.3	0.002	2.85
0.737	892	312	5.42	3.21	140	49.2	158	75.0	0.842	13.0	0.011	8.00
0.746	1092	380	5.52	3.25	167	59.4	190	90.6	0.845	11.2	0.014	13.1
0.576	666	49.5	6.11	1.67	88.8	13.2	102	20.8	0.876	20.4	0.003	2.81
0.584	841	60.2	6.24	1.67	109	16.0	126	25.4	0.875	17.6	0.003	4.81
0.638	834	89.8	6.41	2.10	109	20.2	123	31.2	0.890	19.6	0.005	3.56
0.681	683	91.4	6.29	2.30	91.1	18.3	102	28.1	0.873	26.2	0.005	1.69
0.690	918	125	6.33	2.33	120	24.5	136	38.0	0.869	20.4	0.007	3.76
0.704	1330	183	6.61	2.45	167	35.7	190	55.2	0.882	15.4	0.010	9.12
0.890	1210	387	6.51	3.68	159	50.9	177	77.7	0.837	21.4	0.021	4.21
0.889	1250	400	6.54	3.70	164	52.6	182	80.2	0.840	20.7	0.021	4.63
0.901	1748	560	6.76	3.83	222	73.3	248	112	0.849	16.0	0.031	10.5
0.912	2210	706	6.85	3.87	273	91.5	309	140	0.848	13.3	0.040	19.2
0.682	1060	85.4	7.20	2.04	123	19.0	138	29.4	0.884	23.9	0.006	3.15
0.685	1213	97.6	7.26	2.06	139	21.7	157	33.7	0.885	21.4	0.007	4.48
0.691	1529	122	7.36	2.08	171	27.1	195	42.3	0.886	17.8	0.009	8.16
0.738	1356	137	7.48	2.37	153	27.0	171	41.6	0.888	22.6	0.010	4.41
0.779	1284	87.3	8.19	2.14	128	17.4	145	27.2	0.867	36.3	0.008	1.78
0.787	1647	114	8.16	2.14	162	22.4	187	35.3	0.861	29.0	0.011	3.63
0.794	1999	142	8.36	2.23	194	27.8	222	43.7	0.869	25.2	0.014	5.68
0.790	2105	164	8.46	2.36	207	32.2	234	49.8	0.888	22.5	0.015	7.02
0.911	2105	275	8.56	3.09	208	41.3	232	63.4	0.879	27.9	0.026	4.50
0.915	2340	308	8.56	3.10	230	46.2	258	70.9	0.877	25.6	0.029	5.96
0.922	2578	331	8.72	3.12	249	49.7	279	76.3	0.880	24.5	0.033	7.13
0.923	2896	385	8.71	3.17	280	57.5	314	88.2	0.881	21.5	0.037	10.3
0.930	3119	405	8.87	3.20	297	60.4	333	92.7	0.885	21.0	0.041	11.6

2.3
Universal Beams & Columns (UB & UC)



Dimensions	EN10365 / ASTM A6
Specification	EN10025 / ASTM A36 / ASTM A572
Size Range	UB: 5”x3” (127mm x 76mm) to 44”x16” (1118mm x 406mm) UC: 4”x4” (102mm x 102mm) to 14”x16” (356mm x 406mm)

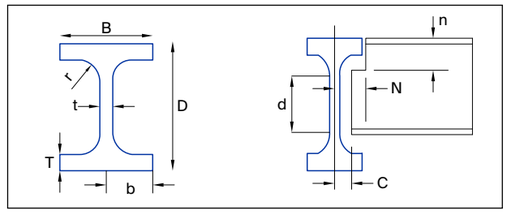


Imperial Units

Designation			Depth of Section	Width of Section	Thickness		Root Radius	Depth between Fillets	Area of Section	Ratios for Local Buckling		Dimensions for Detailing		
Size	Mass per Metre				Flange	Web				Flange	Web	End clearance	Notch	
			D	B	T	t	r	d	A	b/T	d/t	C	N	n
in (mm)	lb/ft	kg/m	mm	mm	mm	mm	mm	mm	cm²			mm	mm	mm
W8-8x6 1/2 (203x165)	24	35.7	201.4	165.0	10.1	6.2	10.2	160.8	45.5	8.17	25.9	5	89	20
	28	41.7	204.7	166.0	11.8	7.2	10.2	160.7	53.2	7.03	22.2	6	89	22
W8-8x8 (203x203)	31	46.1	203.2	203.6	11.0	7.2	10.2	160.8	58.7	9.25	22.3	6	108	21
	35	52.0	206.2	204.3	12.5	7.9	10.2	160.8	66.3	8.17	20.4	6	108	23
	40	60.0	209.6	205.8	14.2	9.4	10.2	160.8	76.4	7.25	17.1	7	108	24
	48	71.0	215.8	206.4	17.3	10.0	10.2	160.8	90.4	5.97	16.1	7	108	28
	58	86.1	222.2	209.1	20.5	12.7	10.2	160.8	110	5.10	12.7	8	108	31
	67	99.7	228.6	210.3	23.8	14.5	10.2	160.7	127	4.43	11.1	9	108	34
W10-10x4 (254x102)	12	17.9	250.7	100.6	5.3	4.8	7.6	224.8	22.8	9.44	46.5	4	58	13
	15	22.0	254.0	101.6	6.8	5.7	7.6	225.2	28.0	7.47	39.5	5	58	14
	17	25.2	257.2	101.9	8.4	6.0	7.6	225.2	32.0	6.07	37.5	5	58	16
	19	28.3	260.4	102.2	10.0	6.3	7.6	225.2	36.1	5.11	35.7	5	58	18
W10-10x5 3/4 (254x146)	21	31.1	251.4	146.1	8.6	6.0	7.6	219.0	39.7	8.49	36.5	5	80	16
	22	32.7	258.3	146.0	9.1	6.1	7.6	224.8	41.8	7.99	36.8	5	80	17
	25	37.0	256.0	146.4	10.9	6.3	7.6	219.0	47.2	6.72	34.8	5	80	19
	26	38.7	262.4	146.6	11.1	6.6	7.6	225.0	48.9	6.60	34.1	5	80	19
	29	43.0	259.6	147.3	12.7	7.2	7.6	219.0	54.8	5.80	30.4	6	80	20
	30	44.6	265.9	147.6	12.9	7.6	7.6	224.9	56.9	5.72	29.5	6	80	21
W10-10x8 (254x203)	33	49.1	247.1	202.2	11.0	7.4	12.7	199.7	62.5	9.19	27.1	6	107	24
	39	58.0	252.0	202.8	13.4	8.0	12.7	199.8	73.8	7.57	25.0	6	107	26
	42	62.5	249.4	207.0	12.2	12.2	12.7	199.6	79.3	8.49	16.4	8	107	25
	45	67.0	256.5	203.7	15.7	8.9	12.7	199.7	85.4	6.49	22.5	6	107	28
	57	84.8	258.1	211.3	16.5	16.5	12.7	199.7	108	6.40	12.1	10	107	29
W10-10x10 (254x254)	49	73.1	254.1	254.6	14.2	8.6	12.7	200.3	93.1	8.96	23.3	6	133	27
	54	80.4	256.3	254.8	15.6	9.4	12.7	199.7	102	8.17	21.2	7	133	28
	60	88.9	260.3	256.3	17.3	10.3	12.7	200.3	113	7.41	19.4	7	133	30
	68	101.2	264.2	257.3	19.6	11.9	12.7	199.7	129	6.58	16.7	8	133	32
	72	107.1	266.7	258.8	20.5	12.8	12.7	200.3	136	6.31	15.6	8	133	33
	77	114.6	269.2	258.8	22.1	13.5	12.7	199.6	146	5.86	14.8	9	133	35
	88	131	275.3	260.7	25.2	15.4	12.7	199.6	167	5.18	13.0	10	133	38
	89	132	276.3	261.3	25.3	15.3	12.7	200.3	168	5.16	13.1	10	133	38
	100	148.8	281.9	262.6	28.5	17.3	12.7	199.6	190	4.62	11.6	11	133	41
	112	167.1	289.1	265.2	31.7	19.2	12.7	200.3	213	4.18	10.4	12	133	44

Surface Area	Second Moment of Area		Radius of Gyration		Elastic Modulus		Plastic Modulus		Buckling Parameter	Torsional Index	Warping Constant	Torsional Constant
Per metre	Axis x-x	Axis y-y	Axis x-x	Axis y-y	Axis x-x	Axis y-y	Axis x-x	Axis y-y				
m²	cm⁴	cm⁴	cm	cm	cm³	cm³	cm³	cm³	u	x	H	J
1.03	3430	757	8.68	4.08	341	91.7	378	140	0.875	19.3	0.069	14.3
1.04	4077	901	8.76	4.12	398	109	445	165	0.875	16.8	0.084	22.4
1.19	4568	1548	8.82	5.13	450	152	497	231	0.847	17.7	0.143	22.2
1.20	5259	1778	8.91	5.18	510	174	567	264	0.848	15.8	0.167	31.8
1.21	6125	2065	8.96	5.20	584	201	656	305	0.846	14.1	0.197	47.2
1.22	7618	2537	9.18	5.30	706	246	799	374	0.853	11.9	0.250	80.2
1.24	9449	3128	9.28	5.34	850	299	977	456	0.850	10.2	0.318	137
1.25	11310	3687	9.44	5.39	990	351	1150	536	0.852	9.0	0.387	211
0.881	2241	90.8	9.91	1.99	179	18.0	207	28.6	0.851	44.0	0.014	2.28
0.890	2841	119	10.1	2.06	224	23.5	259	37.3	0.856	36.4	0.018	4.15
0.897	3415	149	10.3	2.15	266	29.2	306	46.0	0.866	31.5	0.023	6.42
0.904	4005	179	10.5	2.22	308	34.9	353	54.8	0.874	27.5	0.028	9.57
1.06	4413	448	10.5	3.36	351	61.3	393	94.1	0.880	29.6	0.066	8.55
1.08	4917	475	10.8	3.37	381	65.0	426	100	0.882	28.9	0.074	9.96
1.07	5537	571	10.8	3.48	433	78.0	483	119	0.890	24.3	0.086	15.3
1.08	5974	584	11.1	3.45	455	79.6	510	122	0.888	24.5	0.092	16.5
1.08	6544	677	10.9	3.52	504	92.0	566	141	0.891	21.2	0.103	23.9
1.09	7048	692	11.1	3.49	530	93.8	597	144	0.888	21.3	0.111	25.6
1.27	7071	1517	10.6	4.93	572	150	634	229	0.873	21.5	0.211	24.0
1.28	8672	1865	10.8	5.03	688	184	765	280	0.878	18.3	0.265	40.2
1.25	8430	1807	10.3	4.77	676	175	768	271	0.851	17.9	0.254	44.5
1.29	10300	2214	11.0	5.09	803	217	898	331	0.880	15.9	0.321	62.3
1.31	11930	2606	10.5	4.91	925	247	1067	385	0.849	13.6	0.380	109
1.49	11410	3908	11.1	6.48	898	307	992	465	0.849	17.3	0.562	57.6
1.49	12590	4304	11.1	6.49	983	338	1091	512	0.849	15.8	0.623	75.6
1.50	14270	4858	11.2	6.55	1096	379	1224	575	0.850	14.5	0.717	102
1.51	16390	5558	11.3	6.57	1241	432	1398	657	0.849	12.9	0.832	148
1.52	17510	5928	11.3	6.59	1313	458	1484	697	0.848	12.4	0.898	172
1.52	18950	6391	11.4	6.61	1408	494	1599	752	0.849	11.6	0.976	213
1.54	22210	7436	11.5	6.67	1613	570	1850	869	0.850	10.3	1.16	314
1.55	22530	7531	11.6	6.69	1631	576	1869	878	0.850	10.3	1.19	319
1.56	25900	8598	11.7	6.73	1838	655	2127	999	0.851	9.3	1.38	452
1.58	30000	9870	11.9	6.81	2075	744	2424	1137	0.851	8.5	1.63	626

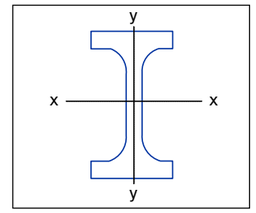
2.3
Universal Beams & Columns (UB & UC)



Imperial Units

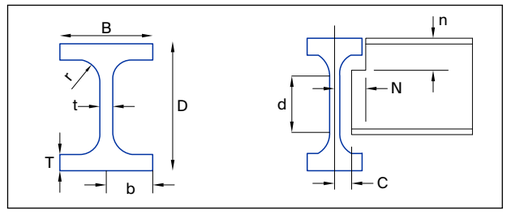
Designation			Depth of Section	Width of Section	Thickness		Root Radius	Depth between Fillets	Area of Section	Ratios for Local Buckling		Dimensions for Detailing		
Size	Mass per Metre				Flange	Web				Flange	Web	End clearance	Notch	
			D	B	T	t	r	d	A	b/T	d/t	C	N	n
in (mm)	lb/ft	kg/m	mm	mm	mm	mm	mm	mm	cm²			mm	mm	mm
W12-12x4 (305x102)	14	20.8	302.5	100.8	5.7	5.1	7.6	275.8	26.8	8.83	54.3	5	58	13
	16	23.8	304.5	101.3	6.7	5.6	7.6	275.8	30.4	7.53	49.3	5	58	14
	16.5	24.8	305.1	101.6	7.0	5.8	7.6	275.9	31.6	7.26	47.6	5	58	15
	19	28.2	308.7	101.8	8.8	6.0	7.6	275.9	35.9	5.78	46.0	5	58	16
	22	32.8	312.7	102.4	10.8	6.6	7.6	275.9	41.8	4.74	41.8	5	58	18
W12-12x5 (305x127)	25	37.0	304.4	123.3	10.7	7.1	8.9	265.2	47.2	5.76	37.4	6	68	20
	28	41.9	307.2	124.3	12.1	8.0	8.9	265.2	53.4	5.14	33.2	6	68	21
	32	48.1	311.0	125.3	14.0	9.0	8.9	265.2	61.2	4.48	29.5	7	68	23
W12-12x6 1/2 (305x165)	26	38.7	310.4	164.8	9.7	5.8	7.6	275.9	49.3	8.54	47.2	5	89	17
	27	40.3	303.4	165.0	10.2	6.0	8.9	265.2	51.3	8.09	44.2	5	90	19
	30	44.6	313.4	165.6	11.1	6.6	7.6	276.0	56.5	7.46	41.8	5	90	19
	31	46.1	306.6	165.7	11.8	6.7	8.9	265.2	58.7	7.02	39.6	5	90	21
	35	52.1	317.5	166.6	13.2	7.6	7.6	275.9	66.7	6.31	36.2	6	89	21
	36	54.0	310.4	166.9	13.7	7.9	8.9	265.2	68.8	6.09	33.6	6	90	23
W12-12x8 (305x203)	40	59.5	303.3	203.3	13.0	7.5	15.2	246.9	75.6	7.82	33.0	6	108	28
	45	67.0	306.3	204.3	14.6	8.5	15.2	246.7	85.2	7.00	29.0	6	108	30
	50	74.4	309.6	205.2	16.2	9.4	15.2	246.8	94.5	6.33	26.3	7	108	31
W12-12x10 (305x254)	53	78.9	306.3	253.9	14.6	8.8	15.2	246.7	100	8.70	28.2	6	133	30
	58	86.3	309.6	254.3	16.2	9.1	15.2	246.8	110	7.85	27.0	7	133	31
W12-12x12 (305x305)	65	96.9	307.9	305.3	15.4	9.9	15.2	246.7	123	9.91	24.9	7	158	31
	72	107.1	311.1	305.8	17.0	10.9	15.2	246.7	136	8.98	22.6	7	157	32
	79	117.9	314.5	307.4	18.7	12.0	15.2	246.7	150	8.22	20.6	8	158	34
	87	129.5	318.3	308.0	20.6	13.1	15.2	246.8	165	7.49	18.9	9	157	36
	92	136.9	320.5	309.2	21.7	13.8	15.2	246.7	174	7.12	17.9	9	158	37
	96	142.8	322.8	308.9	22.9	14.0	15.2	246.7	182	6.76	17.7	9	157	38
	106	158.1	327.1	311.2	25.0	15.8	15.2	246.7	201	6.22	15.6	10	158	40
	120	178.6	333.2	312.9	28.1	18.0	15.2	246.7	228	5.57	13.7	11	157	43
	133	198.1	339.9	314.5	31.4	19.1	15.2	246.7	252	5.01	12.9	12	158	47
	136	202.4	340.6	315.0	31.8	20.1	15.2	246.7	258	4.96	12.3	12	157	47
	152	226.2	348.2	317.0	35.6	22.1	15.2	246.7	289	4.46	11.2	13	157	51
	161	240	352.5	318.4	37.7	23.0	15.2	246.7	306	4.22	10.7	14	158	53
	170	253	356.4	319.3	39.6	24.4	15.2	246.8	323	4.03	10.1	14	157	55

Dimensions	EN10365 / ASTM A6
Specification	EN10025 / ASTM A36 / ASTM A572
Size Range	UB: 5”x3” (127mm x 76mm) to 44”x16” (1118mm x 406mm) UC: 4”x4” (102mm x 102mm) to 14”x16” (356mm x 406mm)



Surface Area	Second Moment of Area		Radius of Gyration		Elastic Modulus		Plastic Modulus		Buckling Parameter	Torsional Index	Warping Constant	Torsional Constant
Per metre	Axis x-x	Axis y-y	Axis x-x	Axis y-y	Axis x-x	Axis y-y	Axis x-x	Axis y-y				
									u	x	H	J
m²	cm⁴	cm⁴	cm	cm	cm³	cm³	cm³	cm³			dm⁶	cm⁴
0.985	3682	97.9	11.7	1.91	243	19.4	286	31.1	0.842	50.8	0.022	2.93
0.990	4274	117	11.9	1.96	281	23.1	329	37.0	0.846	45.0	0.026	4.27
0.992	4455	123	11.9	1.97	292	24.2	342	38.8	0.846	43.4	0.027	4.77
1.00	5366	155	12.2	2.08	348	30.5	403	48.5	0.859	37.4	0.035	7.40
1.01	6501	194	12.5	2.15	416	37.9	481	60.0	0.866	31.6	0.044	12.2
1.07	7166	335	12.3	2.67	471	54.4	539	85.3	0.872	29.7	0.072	14.8
1.08	8196	389	12.4	2.70	534	62.6	614	98.4	0.872	26.5	0.085	21.1
1.09	9575	461	12.5	2.74	616	73.6	711	116	0.873	23.3	0.102	31.8
1.26	8498	720	13.1	3.82	548	87.4	609	134	0.887	33.8	0.163	12.5
1.24	8503	764	12.9	3.86	560	92.7	623	142	0.889	31.0	0.164	14.7
1.26	9864	841	13.2	3.86	629	102	703	156	0.887	29.7	0.192	18.7
1.25	9899	896	13.0	3.90	646	108	720	166	0.891	27.1	0.195	22.2
1.27	11860	1019	13.3	3.91	747	122	838	188	0.889	25.3	0.236	30.8
1.26	11700	1063	13.0	3.93	754	127	846	196	0.889	23.6	0.234	34.8
1.38	12840	1823	13.0	4.91	847	179	938	274	0.890	22.9	0.384	39.1
1.39	14570	2078	13.1	4.94	952	203	1060	311	0.889	20.6	0.442	54.6
1.40	16350	2337	13.2	4.97	1056	228	1183	349	0.889	18.8	0.503	73.5
1.58	17700	3986	13.3	6.30	1156	314	1276	477	0.876	20.4	0.848	65.6
1.59	19740	4444	13.4	6.36	1275	349	1411	531	0.878	18.7	0.956	86.5
1.79	22250	7308	13.4	7.69	1445	479	1592	726	0.850	19.3	1.56	91.2
1.80	24830	8117	13.5	7.72	1596	531	1767	806	0.850	17.6	1.75	122
1.81	27670	9060	13.6	7.77	1760	589	1958	895	0.850	16.2	1.98	161
1.82	30810	10030	13.7	7.80	1936	651	2164	990	0.851	14.9	2.22	212
1.82	32820	10700	13.7	7.83	2048	692	2297	1053	0.851	14.2	2.39	249
1.83	34670	11240	13.8	7.86	2148	728	2413	1106	0.853	13.6	2.53	285
1.84	38750	12570	13.9	7.90	2369	808	2680	1230	0.851	12.5	2.87	378
1.86	44560	14350	14.0	7.94	2675	917	3053	1399	0.851	11.2	3.34	537
1.87	50900	16300	14.2	8.04	2995	1037	3440	1581	0.853	10.2	3.88	734
1.87	51790	16560	14.2	8.02	3041	1052	3501	1606	0.852	10.1	3.95	771
1.89	59610	18910	14.4	8.09	3424	1193	3975	1823	0.853	9.2	4.62	1074
1.91	64200	20320	14.5	8.15	3643	1276	4247	1951	0.854	8.7	5.03	1271
1.92	68490	21540	14.6	8.17	3844	1349	4502	2064	0.854	8.4	5.40	1480

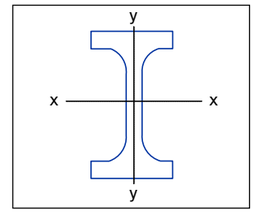
2.3
Universal Beams & Columns (UB & UC)



Imperial Units

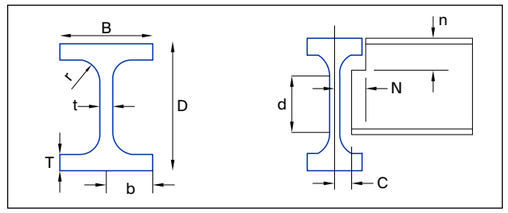
Designation			Depth of Section	Width of Section	Thickness		Root Radius	Depth between Fillets	Area of Section	Ratios for Local Buckling		Dimensions for Detailing		
Size	Mass per Metre				Flange	Web				Flange	Web	End clearance	Notch	
			D	B	T	t	r	d	A	b/T	d/t	C	N	n
in (mm)	lb/ft	kg/m	mm	mm	mm	mm	mm	mm	cm²			mm	mm	mm
W12-12x12 (305x305)	190	282.9	365.3	322.2	44.1	26.8	15.2	246.7	360	3.65	9.21	15	158	59
	210	312.5	373.6	324.9	48.3	30.0	15.2	246.7	399	3.37	8.23	17	157	63
	230	342	382.3	327.5	52.6	32.6	15.2	246.7	437	3.11	7.57	18	157	68
	252	375	391.4	330.3	57.2	35.4	15.2	246.6	478	2.89	6.97	20	157	72
	278	413.7	402.6	333.8	62.7	38.9	15.2	246.7	529	2.66	6.35	21	157	78
	279	415	402.6	333.8	62.7	38.9	15.2	246.8	528	2.66	6.34	21	157	78
	305	454	414.5	336.2	68.7	41.3	15.2	246.7	578	2.45	5.97	23	157	84
	336	500	427.2	340.0	75.1	45.1	15.2	246.6	638	2.26	5.47	25	157	90
W14-14x5 (356x127)	22	33.1	349.0	125.4	8.5	6.0	10.2	311.6	42.1	7.38	51.9	5	70	19
	26	39.1	353.4	126.0	10.7	6.6	10.2	311.6	49.8	5.89	47.2	5	70	21
W14-14x6 3/4 (356x171)	30	45.0	351.4	171.1	9.7	7.0	10.2	311.6	57.3	8.82	44.5	6	92	20
	34	51.0	355.0	171.5	11.5	7.4	10.2	311.6	64.9	7.46	42.1	6	92	22
	38	57.0	358.0	172.2	13.0	8.1	10.2	311.6	72.6	6.62	38.5	6	92	23
	45	67.1	363.4	173.2	15.7	9.1	10.2	311.6	85.5	5.52	34.2	7	92	26
W14-14x8 (356x203)	43	64.0	347.0	203.1	13.4	7.8	15.2	289.8	81.2	7.58	37.4	6	108	29
	48	71.4	350.3	204.0	15.1	8.6	15.2	289.7	91.2	6.75	33.5	6	108	30
	53	78.9	353.6	204.7	16.7	9.4	15.2	289.8	100	6.13	30.8	7	108	32
W14-14x10 (356x254)	61	90.8	352.8	253.9	16.3	9.5	15.2	289.8	115	7.79	30.4	7	132	32
	68	101.2	356.6	254.8	18.3	10.5	15.2	289.6	129	6.97	27.5	7	132	33
	74	110.1	359.9	255.8	19.9	11.4	15.2	289.6	141	6.41	25.3	8	132	35
	82	122	363.5	257.3	21.7	12.9	15.2	289.7	155	5.92	22.5	8	132	37
W14-14x14 1/2 (356x368)	87	129	355.6	368.6	17.5	10.4	15.2	290.2	164	10.5	27.9	7	189	33
	90	133.9	356.1	368.8	18.0	11.2	15.2	289.6	171	10.2	25.9	8	189	33
	99	147.3	359.7	370.0	19.8	12.3	15.2	289.7	188	9.34	23.5	8	189	35
	103	152.9	362.0	370.5	20.7	12.3	15.2	290.2	195	8.95	23.6	8	189	36
	109	162.2	363.7	371.0	21.8	13.3	15.2	289.6	207	8.49	21.7	9	189	37
	119	177	368.2	372.6	23.8	14.4	15.2	290.2	226	7.83	20.2	9	189	39
	120	178.6	367.8	372.6	23.9	15.0	15.2	289.6	228	7.80	19.3	9	189	39
	132	196.4	372.4	374.0	26.2	16.4	15.2	289.7	250	7.15	17.7	10	189	41
	136	201.9	374.6	374.7	27.0	16.5	15.2	290.2	257	6.94	17.6	10	189	42
W14-14x16 (356x406)	118	175.6	360.0	396.0	20.0	20.0	15.0	290.0	224	9.90	14.5	12	198	35
	145	215.8	375.4	393.7	27.7	17.3	15.2	289.6	275	7.11	16.8	11	198	43
	158	235.1	381.0	394.8	30.2	18.4	15.2	290.2	299	6.54	15.8	11	198	45
	159	236.6	380.5	395.4	30.2	18.9	15.2	289.6	302	6.54	15.3	11	198	45

Dimensions	EN10365 / ASTM A6
Specification	EN10025 / ASTM A36 / ASTM A572
Size Range	UB: 5”x3” (127mm x 76mm) to 44”x16” (1118mm x 406mm) UC: 4”x4” (102mm x 102mm) to 14”x16” (356mm x 406mm)



Surface Area	Second Moment of Area		Radius of Gyration		Elastic Modulus		Plastic Modulus		Buckling Parameter	Torsional Index	Warping Constant	Torsional Constant
Per metre	Axis x-x	Axis y-y	Axis x-x	Axis y-y	Axis x-x	Axis y-y	Axis x-x	Axis y-y				
									u	x	H	J
m²	cm⁴	cm⁴	cm	cm	cm³	cm³	cm³	cm³			dm⁶	cm⁴
1.94	78870	24640	14.8	8.27	4318	1529	5105	2342	0.855	7.7	6.35	2034
1.96	89270	27660	15.0	8.33	4779	1702	5703	2613	0.855	7.1	7.32	2693
1.98	100600	30880	15.2	8.41	5261	1886	6332	2898	0.856	6.6	8.39	3490
2.01	113200	34470	15.4	8.49	5783	2087	7020	3211	0.856	6.2	9.62	4495
2.04	129600	39040	15.7	8.59	6437	2339	7890	3604	0.857	5.7	11.3	5953
2.04	129500	39010	15.7	8.59	6435	2338	7888	3602	0.857	5.7	11.3	5946
2.07	147600	43690	16.0	8.69	7122	2599	8807	4006	0.860	5.4	13.1	7719
2.10	169000	49420	16.3	8.80	7913	2907	9882	4487	0.861	5.0	15.3	10110
1.17	8250	280	14.0	2.58	473	44.7	543	70.3	0.863	42.2	0.081	8.79
1.18	10170	358	14.3	2.68	576	56.8	659	89.1	0.871	35.2	0.105	15.1
1.36	12070	811	14.5	3.76	687	94.8	775	147	0.874	36.8	0.237	15.8
1.36	14140	968	14.8	3.86	796	113	896	174	0.881	32.1	0.286	23.8
1.37	16040	1108	14.9	3.91	896	129	1010	199	0.882	28.8	0.330	33.4
1.38	19460	1362	15.1	3.99	1071	157	1211	243	0.886	24.4	0.412	55.7
1.46	17760	1874	14.8	4.80	1024	185	1138	283	0.891	25.9	0.521	43.2
1.47	20170	2140	14.9	4.84	1151	210	1285	322	0.891	23.3	0.601	60.4
1.48	22480	2391	15.0	4.88	1271	234	1424	359	0.892	21.3	0.679	80.1
1.68	26540	4451	15.2	6.21	1505	351	1668	534	0.886	21.5	1.26	90.3
1.69	30060	5048	15.3	6.26	1686	396	1878	604	0.886	19.4	1.44	126
1.69	33120	5569	15.3	6.29	1840	435	2058	665	0.886	18.0	1.61	161
1.70	36680	6175	15.4	6.31	2018	480	2270	734	0.884	16.6	1.80	211
2.14	40250	14610	15.6	9.43	2264	793	2479	1199	0.844	19.9	4.18	153
2.14	41580	15080	15.6	9.40	2335	818	2565	1238	0.842	19.2	4.31	169
2.15	46240	16730	15.7	9.43	2571	904	2838	1370	0.842	17.7	4.83	223
2.16	48590	17550	15.8	9.49	2685	948	2965	1435	0.844	17.0	5.11	251
2.16	51540	18600	15.8	9.49	2834	1003	3142	1519	0.843	16.2	5.43	296
2.17	57120	20530	15.9	9.54	3103	1102	3455	1671	0.844	15.0	6.09	381
2.17	57290	20600	15.9	9.51	3115	1106	3475	1678	0.842	14.9	6.09	390
2.18	63720	22820	16.0	9.55	3422	1221	3838	1853	0.843	13.7	6.84	511
2.19	66260	23690	16.1	9.60	3538	1264	3972	1920	0.844	13.4	7.16	558
2.24	51770	20730	15.2	9.61	2876	1047	3235	1603	0.810	16.1	5.99	322
2.26	71240	28180	16.1	10.1	3796	1432	4264	2172	0.832	13.0	8.52	632
2.28	79090	30990	16.3	10.2	4151	1570	4687	2383	0.834	12.1	9.54	812
2.28	79160	31170	16.2	10.2	4161	1577	4702	2394	0.833	12.0	9.56	822

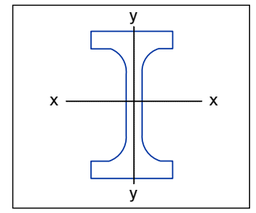
2.3
Universal Beams & Columns (UB & UC)



Imperial Units

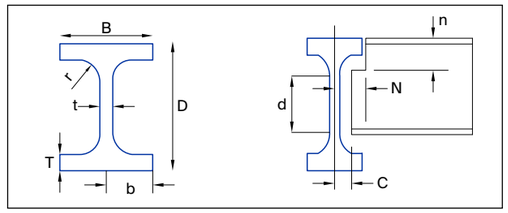
Designation			Depth of Section	Width of Section	Thickness		Root Radius	Depth between Fillets	Area of Section	Ratios for Local Buckling		Dimensions for Detailing		
Size	Mass per Metre				Flange	Web				Flange	Web	End clearance	Notch	
			D	B	T	t	r	d	A	b/T	d/t	C	N	n
in (mm)	lb/ft	kg/m	mm	mm	mm	mm	mm	mm	cm²			mm	mm	mm
W14-14x16 (356x406)	176	261.9	386.6	397.5	33.3	21.1	15.2	289.7	334	5.97	13.7	13	198	48
	193	287.1	393.6	399.0	36.5	22.6	15.2	290.2	366	5.47	12.8	13	198	52
	211	314	399.3	401.3	39.6	24.9	15.2	289.7	400	5.06	11.6	14	198	55
	219	326	403.1	402.0	41.2	25.5	15.2	290.3	415	4.88	11.4	15	198	56
	228	339.9	406.4	403.0	42.9	26.6	15.2	290.2	433	4.70	10.9	15	198	58
	233	346.7	407.4	403.6	43.7	27.2	15.2	289.6	442	4.62	10.7	16	198	59
	257	382.5	416.1	406.3	48.0	29.8	15.2	289.7	488	4.23	9.71	17	198	63
	264	393	419.0	407.0	49.2	30.6	15.2	290.2	501	4.14	9.48	17	198	64
	283	421.1	425.2	409.2	52.6	32.8	15.2	289.6	537	3.89	8.84	18	198	68
	311	462.8	434.8	412.2	57.4	35.8	15.2	289.6	590	3.59	8.09	20	198	73
	314	467	436.6	412.2	58.0	35.8	15.2	290.2	595	3.55	8.11	20	198	73
	342	509	445.5	415.5	62.7	39.1	15.2	289.6	649	3.31	7.40	22	198	78
	370	551	455.6	418.5	67.5	42.1	15.2	290.2	702	3.10	6.89	23	198	83
	398	592.3	464.6	421.4	72.3	45.0	15.2	289.7	755	2.92	6.44	24	198	87
	426	633.9	474.6	424.0	77.0	47.6	15.2	290.2	808	2.75	6.10	26	198	92
	455	677.1	483.1	427.6	81.5	51.2	15.2	289.6	863	2.62	5.66	28	198	97
	500	744.1	497.8	432.1	88.9	55.6	15.2	289.6	948	2.43	5.21	30	198	104
	550	818.5	514.1	436.9	97.0	60.5	15.2	289.6	1043	2.25	4.79	32	198	112
	605	900.3	531.4	442.3	105.6	65.9	15.2	289.8	1147	2.09	4.40	35	198	121
	665	989.6	549.7	448.3	114.8	71.9	15.2	289.7	1261	1.95	4.03	38	198	130
	730	1086	569.5	454.4	124.7	78.0	15.2	289.7	1385	1.82	3.72	41	198	140
W16-16x5 1/2 (406x140)	26	39.0	398.0	141.8	8.6	6.4	10.2	360.4	49.7	8.24	56.3	5	78	19
	31	46.0	403.2	142.2	11.2	6.8	10.2	360.4	58.6	6.35	53.0	5	78	21
W16-16x7 (406x178)	36	54.1	402.6	177.7	10.9	7.7	10.2	360.4	69.0	8.15	46.8	6	95	21
	40	60.1	406.4	177.9	12.8	7.9	10.2	360.4	76.5	6.95	45.6	6	95	23
	45	67.1	409.4	178.8	14.3	8.8	10.2	360.4	85.5	6.25	41.0	6	95	25
	50	74.2	412.8	179.5	16.0	9.5	10.2	360.4	94.5	5.61	37.9	7	95	26
	57	84.8	417.3	180.8	18.2	10.9	10.2	360.6	108	4.98	33.0	7	95	28
W16-16x10 1/4 (406x260)	67	99.7	414.8	260.0	16.9	10.0	10.2	360.6	127	7.70	36.0	7	135	27
	77	114.6	419.6	261.5	19.3	11.6	10.2	360.6	146	6.77	31.2	8	135	30
	89	132.4	425.4	263.3	22.2	13.3	10.2	360.6	169	5.92	27.0	9	135	32
	100	148.8	431.0	264.8	25.0	14.9	10.2	360.6	190	5.29	24.3	9	135	35
W18-18x6 (457x152)	35	52.3	449.8	152.4	10.9	7.6	10.2	407.6	66.6	6.99	53.6	6	82	21
	40	59.8	454.6	152.9	13.3	8.1	10.2	407.6	76.2	5.75	50.3	6	82	24
	45	67.2	458.0	153.8	15.0	9.0	10.2	407.6	85.6	5.13	45.3	7	82	25

Dimensions	EN10365 / ASTM A6
Specification	EN10025 / ASTM A36 / ASTM A572
Size Range	UB: 5”x3” (127mm x 76mm) to 44”x16” (1118mm x 406mm) UC: 4”x4” (102mm x 102mm) to 14”x16” (356mm x 406mm)

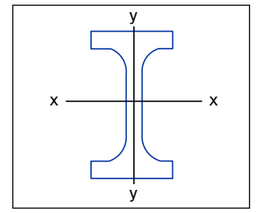


Surface Area	Second Moment of Area		Radius of Gyration		Elastic Modulus		Plastic Modulus		Buckling Parameter	Torsional Index	Warping Constant	Torsional Constant
Per metre	Axis x-x	Axis y-y	Axis x-x	Axis y-y	Axis x-x	Axis y-y	Axis x-x	Axis y-y				
									u	x	H	J
m²	cm⁴	cm⁴	cm	cm	cm³	cm³	cm³	cm³			dm⁶	cm⁴
2.29	89040	34860	16.3	10.2	4606	1754	5244	2667	0.833	11.0	10.9	1101
2.31	99880	38680	16.5	10.3	5075	1939	5812	2949	0.835	10.2	12.3	1441
2.33	110500	42720	16.6	10.3	5537	2129	6387	3243	0.834	9.5	13.8	1854
2.34	116400	44660	16.7	10.4	5777	2222	6681	3384	0.836	9.2	14.6	2073
2.35	122500	46850	16.8	10.4	6031	2325	6999	3544	0.836	8.8	15.5	2343
2.35	125100	47930	16.8	10.4	6141	2375	7140	3621	0.836	8.7	15.9	2478
2.37	141500	53750	17.0	10.5	6803	2646	7975	4038	0.837	8.0	18.2	3292
2.38	146600	55370	17.1	10.5	6998	2721	8222	4154	0.837	7.9	18.9	3545
2.40	159800	60150	17.2	10.6	7516	2940	8887	4492	0.837	7.4	20.9	4336
2.42	180100	67130	17.5	10.7	8283	3257	9877	4983	0.838	6.9	23.9	5655
2.42	183000	67830	17.5	10.7	8383	3291	10000	5034	0.839	6.9	24.3	5809
2.45	203800	75180	17.7	10.8	9151	3619	11010	5543	0.840	6.4	27.5	7401
2.47	226900	82670	18.0	10.9	9962	3951	12080	6058	0.841	6.1	31.1	9240
2.50	249800	90380	18.2	10.9	10750	4289	13130	6583	0.842	5.7	34.8	11350
2.52	274800	98130	18.4	11.0	11580	4629	14240	7108	0.843	5.5	38.8	13720
2.55	299400	106600	18.6	11.1	12400	4987	15340	7669	0.843	5.2	43.0	16460
2.59	341900	120000	19.0	11.3	13740	5555	17160	8553	0.844	4.9	50.2	21390
2.63	392400	135500	19.4	11.4	15260	6202	19260	9560	0.846	4.6	58.9	27870
2.67	450600	153100	19.8	11.6	16960	6922	21610	10680	0.848	4.3	69.4	36130
2.72	518100	173400	20.3	11.7	18850	7736	24250	11960	0.849	4.0	82.0	46760
2.77	597000	196300	20.8	11.9	20970	8640	27230	13370	0.851	3.8	97.1	60230
1.33	12510	410	15.9	2.87	629	57.8	724	90.8	0.858	47.5	0.155	10.7
1.34	15690	538	16.4	3.03	778	75.7	888	118	0.871	38.9	0.207	19.0
1.48	18720	1021	16.5	3.85	930	115	1055	178	0.871	38.3	0.392	23.1
1.49	21600	1203	16.8	3.97	1063	135	1199	209	0.880	33.8	0.466	33.3
1.50	24330	1365	16.9	3.99	1189	153	1346	237	0.880	30.5	0.533	46.1
1.51	27310	1546	17.0	4.04	1323	172	1501	267	0.882	27.6	0.608	62.8
1.52	31520	1794	17.1	4.07	1511	198	1724	309	0.881	24.5	0.714	92.2
1.83	39730	4951	17.7	6.25	1915	381	2128	581	0.888	25.4	1.96	99.4
1.84	46110	5758	17.8	6.28	2198	440	2457	673	0.887	22.4	2.31	149
1.86	54060	6768	17.9	6.33	2541	514	2859	788	0.887	19.7	2.75	227
1.87	61830	7754	18.0	6.39	2869	586	3246	899	0.887	17.7	3.20	322
1.48	21370	645	17.9	3.11	950	84.7	1096	133	0.859	43.9	0.311	21.4
1.49	25500	795	18.3	3.23	1122	104	1287	163	0.868	37.5	0.387	33.8
1.50	28930	913	18.4	3.27	1263	119	1453	187	0.869	33.6	0.448	47.7

2.3
Universal Beams & Columns (UB & UC)



Dimensions	EN10365 / ASTM A6
Specification	EN10025 / ASTM A36 / ASTM A572
Size Range	UB: 5”x3” (127mm x 76mm) to 44”x16” (1118mm x 406mm) UC: 4”x4” (102mm x 102mm) to 14”x16” (356mm x 406mm)

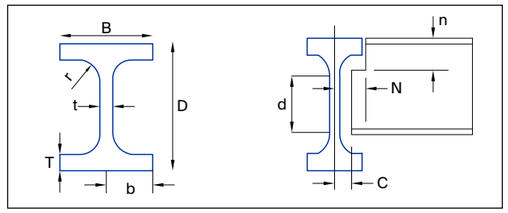


Imperial Units

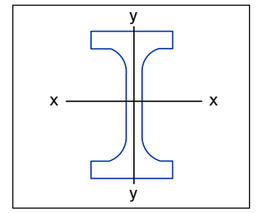
Designation			Depth of Section	Width of Section	Thickness		Root Radius	Depth between Fillets	Area of Section	Ratios for Local Buckling		Dimensions for Detailing		
Size	Mass per Metre				Flange	Web				Flange	Web	End clearance	Notch	
			D	B	T	t	r	d	A	b/T	d/t	C	N	n
in (mm)	lb/ft	kg/m	mm	mm	mm	mm	mm	mm	cm²			mm	mm	mm
W18-18x6 (457x152)	46	68.5	458.7	153.9	15.3	9.1	10.2	407.7	87.1	5.03	44.6	7	82	26
	50	74.2	462.0	154.4	17.0	9.6	10.2	407.6	94.5	4.54	42.5	7	82	27
	55	82.1	465.8	155.3	18.9	10.5	10.2	407.6	105	4.11	38.8	7	82	29
W18-18x7 1/2 (457x191)	45	67.1	453.4	189.9	12.7	8.5	10.2	407.6	85.5	7.48	48.0	6	101	23
	50	74.3	457.0	190.4	14.5	9.0	10.2	407.6	94.6	6.57	45.3	7	101	25
	55	82.0	460.0	191.3	16.0	9.9	10.2	407.6	104	5.98	41.2	7	101	26
	60	89.3	463.4	191.9	17.7	10.5	10.2	407.6	114	5.42	38.8	7	101	28
	65	96.7	466.1	192.8	19.1	11.4	10.2	407.6	123	5.06	35.7	8	101	29
	66	98.3	467.2	192.8	19.6	11.4	10.2	407.6	125	4.92	35.8	8	101	30
	71	105.7	469.1	193.9	20.6	12.6	10.2	407.6	134	4.71	32.4	8	101	31
W18-18x11 (457x279)	76	113.1	462.5	280.3	17.3	10.8	10.2	407.6	144	8.12	37.7	7	145	27
	86	128	467.1	281.7	19.6	12.1	10.2	407.6	163	7.20	33.7	8	145	30
	97	144.4	472.2	283.1	22.1	13.6	10.2	407.6	184	6.40	30.0	9	145	32
	106	157.7	475.7	284.5	23.9	15.0	10.2	407.5	201	5.96	27.2	9	145	34
	119	177.1	481.8	286.1	26.9	16.6	10.2	407.6	226	5.31	24.5	10	145	37
	130	193.5	489.0	283.5	30.5	17.0	10.2	407.6	247	4.65	24.0	11	143	41
	143	212.8	495.0	285.0	33.5	18.5	10.2	407.5	271	4.25	22.0	11	143	44
W21-21x6 1/2 (533x165)	44	65.5	524.8	165.1	11.4	8.9	12.7	476.6	84	7.24	53.6	6	88	24
	50	74.4	529.1	165.9	13.5	9.7	12.7	476.7	95	6.14	49.4	7	88	26
	57	84.8	534.9	166.5	16.5	10.3	12.7	476.5	108	5.04	46.3	7	88	29
W21-21x8 1/4 (533x210)	55	82.2	528.3	208.8	13.2	9.6	12.7	476.5	105	7.91	49.6	7	110	26
	62	92.1	533.1	209.3	15.6	10.1	12.7	476.5	117	6.71	47.2	7	110	28
	68	101	536.7	210.0	17.4	10.8	12.7	476.5	129	6.03	44.1	7	110	30
	73	109	539.5	210.8	18.8	11.6	12.7	476.5	139	5.61	41.1	8	110	32
	82	122	544.5	211.9	21.3	12.7	12.7	476.5	155	4.97	37.5	8	110	34
	83	123.5	544.3	212.2	21.2	13.1	12.7	476.5	157	5.00	36.4	9	110	34
	93	138.4	549.1	213.9	23.6	14.7	12.7	476.5	176	4.53	32.3	9	110	36
W21-21x12 1/4 (533x312)	101	150.3	542.5	312.2	20.3	12.7	12.7	476.5	192	7.68	37.5	8	160	33
	111	165.2	546.4	313.4	22.2	14.0	12.7	476.6	211	7.05	34.1	9	160	35
	122	181.6	550.7	314.7	24.4	15.2	12.7	476.5	231	6.45	31.3	10	160	37
	132	196.4	554.5	316.0	26.3	16.5	12.7	476.5	250	6.01	28.9	10	160	39
	147	218.8	560.3	317.8	29.2	18.3	12.7	476.5	279	5.44	26.1	11	160	42
	166	247	571.0	315.5	34.5	19.1	12.7	476.5	315	4.57	25.0	12	158	47
	182	270.8	577.1	317.8	37.6	21.1	12.7	476.5	346	4.23	22.6	13	158	50

Surface Area	Second Moment of Area		Radius of Gyration		Elastic Modulus		Plastic Modulus		Buckling Parameter	Torsional Index	Warping Constant	Torsional Constant
Per metre	Axis x-x	Axis y-y	Axis x-x	Axis y-y	Axis x-x	Axis y-y	Axis x-x	Axis y-y				
m²	cm⁴	cm⁴	cm	cm	cm³	cm³	cm³	cm³	u	x	H	J
1.50	29530	933	18.4	3.27	1288	121	1482	191	0.869	33.0	0.458	50.4
1.50	32670	1047	18.6	3.33	1414	136	1627	213	0.873	30.1	0.518	65.9
1.51	36590	1185	18.7	3.37	1571	153	1811	240	0.873	27.4	0.591	89.2
1.63	29380	1452	18.5	4.12	1296	153	1471	237	0.872	37.9	0.705	37.1
1.64	33320	1671	18.8	4.20	1458	176	1653	272	0.877	33.9	0.818	51.8
1.65	37050	1871	18.8	4.23	1611	196	1831	304	0.877	30.9	0.922	69.2
1.66	41020	2089	19.0	4.29	1770	218	2014	338	0.880	28.3	1.04	90.7
1.66	44590	2281	19.0	4.30	1913	237	2184	369	0.879	26.3	1.14	114
1.67	45730	2347	19.1	4.33	1957	243	2232	379	0.881	25.7	1.18	121
1.67	48760	2507	19.0	4.32	2079	259	2383	404	0.877	24.4	1.26	145
2.01	55460	6344	19.6	6.64	2398	453	2669	692	0.885	27.9	3.14	118
2.02	63520	7295	19.7	6.69	2720	518	3039	792	0.886	24.8	3.65	170
2.03	72710	8367	19.9	6.74	3079	591	3457	906	0.886	22.1	4.24	244
2.04	79600	9178	19.9	6.76	3347	645	3775	991	0.884	20.5	4.68	311
2.06	91040	10530	20.1	6.82	3779	736	4284	1132	0.885	18.4	5.44	442
2.06	102500	11590	20.4	6.86	4192	818	4761	1257	0.891	16.6	6.09	603
2.08	114400	12960	20.5	6.91	4624	910	5278	1400	0.891	15.2	6.90	800
1.67	35030	859	20.5	3.20	1335	104	1561	166	0.847	47.0	0.566	31.9
1.68	40810	1032	20.8	3.30	1543	124	1797	199	0.853	41.4	0.686	47.1
1.69	48640	1276	21.2	3.44	1819	153	2107	243	0.862	35.5	0.857	73.8
1.85	47540	2008	21.3	4.38	1800	192	2059	300	0.864	41.6	1.33	51.5
1.86	55230	2389	21.7	4.51	2072	228	2360	356	0.872	36.5	1.60	75.7
1.87	61520	2692	21.9	4.57	2292	256	2612	399	0.874	33.2	1.82	101
1.88	66820	2943	21.9	4.60	2477	279	2828	436	0.875	30.9	1.99	126
1.89	76040	3388	22.1	4.67	2793	320	3196	500	0.877	27.6	2.32	178
1.89	76240	3389	22.0	4.65	2801	319	3212	500	0.874	27.6	2.32	181
1.90	86170	3868	22.1	4.68	3139	362	3617	569	0.873	24.9	2.67	251
2.29	100800	10320	22.9	7.33	3715	661	4147	1012	0.885	27.8	7.03	217
2.30	111300	11410	23.0	7.36	4074	728	4565	1117	0.885	25.6	7.84	284
2.31	123300	12680	23.1	7.40	4476	806	5032	1238	0.885	23.4	8.78	373
2.32	134200	13850	23.2	7.44	4842	876	5462	1348	0.884	21.8	9.66	469
2.33	151200	15650	23.3	7.49	5396	985	6116	1519	0.884	19.8	11.0	643
2.34	178000	18110	23.8	7.58	6233	1148	7080	1766	0.891	17.2	13.0	983
2.36	197200	20150	23.9	7.63	6834	1268	7807	1956	0.890	15.9	14.7	1278

2.3
Universal Beams & Columns (UB & UC)



Dimensions	EN10365 / ASTM A6
Specification	EN10025 / ASTM A36 / ASTM A572
Size Range	UB: 5”x3” (127mm x 76mm) to 44”x16” (1118mm x 406mm) UC: 4”x4” (102mm x 102mm) to 14”x16” (356mm x 406mm)

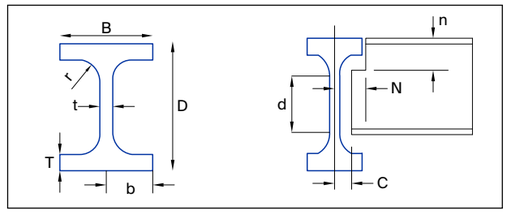


Imperial Units

Designation			Depth of Section	Width of Section	Thickness		Root Radius	Depth between Fillets	Area of Section	Ratios for Local Buckling		Dimensions for Detailing		
Size	Mass per Metre				Flange	Web				Flange	Web	End clearance	Notch	
			D	B	T	t	r	d	A	b/T	d/t	C	N	n
in (mm)	lb/ft	kg/m	mm	mm	mm	mm	mm	mm	cm²			mm	mm	mm
W21-21x12 1/4 (533x312)	201	300	585.0	319.0	41.4	23.1	12.7	476.8	382	3.85	20.6	14	158	54
	223	331	593.0	322.0	45.5	25.4	12.7	476.6	422	3.54	18.8	15	158	58
	248	370	603.0	324.0	50.5	26.2	12.7	476.6	460	3.21	18.2	15	159	63
	275	409	613.0	327.0	55.6	31.0	12.7	476.4	521	2.94	15.4	18	158	68
W24-24x7 (610x178)	55	81.9	598.7	177.9	12.8	10.0	12.7	547.6	105	6.93	54.6	7	94	26
	61	91.0	602.5	178.4	15.0	10.6	12.7	547.1	116	5.95	51.6	7	94	28
	62	92.3	603.0	178.8	15.0	10.9	12.7	547.6	118	5.96	50.1	7	94	28
W24-24x9 (610x229)	68	101.2	602.6	227.6	14.8	10.5	12.7	547.6	129	7.69	52.2	7	119	28
	76	113	607.6	228.2	17.3	11.1	12.7	547.6	144	6.60	49.3	8	119	30
	84	125.1	612.2	229.0	19.3	11.9	12.7	548.2	158	5.93	46.1	8	119	32
	94	139.9	617.2	230.2	22.1	13.1	12.7	547.6	178	5.21	41.8	9	119	35
	103	153	623.1	228.6	24.9	14.0	12.7	547.9	195	4.59	39.1	9	117	38
	114	171	628.9	229.9	27.9	15.5	12.7	547.7	218	4.12	35.3	10	117	41
	128	191	635.0	231.5	30.9	17.0	12.7	547.8	242	3.75	32.2	11	117	44
	146	217	643.1	234.1	35.1	19.6	12.7	547.5	278	3.33	27.9	12	117	48
	163	243	651.0	235.9	39.1	21.6	12.7	547.4	310	3.02	25.3	13	117	52
	181	270	658.6	238.5	42.9	23.9	12.7	547.4	343	2.78	22.9	14	117	56
	198	295	667.0	240.5	47.0	25.9	12.7	547.6	376	2.56	21.1	15	117	60
	218	325	675.1	243.1	51.0	28.4	12.7	547.7	412	2.38	19.3	16	117	64
	239	356	685.0	245.6	55.9	31.0	12.7	547.8	454	2.20	17.7	18	117	69
W24-24x12 (610x305)	100	149.1	612.4	304.8	19.7	11.8	16.5	540.0	190	7.74	45.8	8	157	36
	120	179	620.2	307.1	23.6	14.1	16.5	540.0	228	6.51	38.3	9	157	40
	160	238.1	635.8	311.4	31.4	18.4	16.5	540.0	303	4.96	29.3	11	157	48
W24-24x12 3/4 (610x324)	104	154.8	611.1	323.8	19.1	12.7	12.7	547.6	198	8.50	43.1	8	166	32
	117	174.1	616.2	325.1	21.6	14.0	12.7	547.6	222	7.53	39.2	9	166	34
	131	194.9	621.8	326.5	24.4	15.4	12.7	547.6	249	6.70	35.6	10	166	37
	146	217.3	628.4	327.7	27.7	16.5	12.7	547.6	277	5.92	33.2	10	166	40
	162	241.1	635.0	329.1	31.0	17.9	12.7	547.6	308	5.31	30.6	11	166	44
	176	261.9	641.1	327.4	34.0	19.1	12.7	547.6	333	4.81	28.7	12	164	47
	192	285.7	646.9	328.9	37.1	20.6	12.7	547.3	363	4.44	26.6	12	164	50
	207	308	653.0	330.5	39.9	22.1	12.7	547.8	392	4.14	24.8	13	164	53
	229	341	661.0	333.0	43.9	24.4	16.5	540.2	435	3.79	22.1	14	164	60
	250	372	669.0	335.0	48.0	26.4	16.5	540.0	475	3.49	20.5	15	164	65
	279	415	679.0	338.0	53.1	29.5	16.5	539.8	530	3.18	18.3	17	164	70
	306	455	689.0	340.0	57.9	32.0	16.5	540.2	579	2.94	16.9	18	164	74

Surface Area	Second Moment of Area		Radius of Gyration		Elastic Modulus		Plastic Modulus		Buckling Parameter	Torsional Index	Warping Constant	Torsional Constant
Per metre	Axis x-x	Axis y-y	Axis x-x	Axis y-y	Axis x-x	Axis y-y	Axis x-x	Axis y-y				
m²	cm⁴	cm⁴	cm	cm	cm³	cm³	cm³	cm³	u	x	H	J
2.38	220700	22450	24.1	7.67	7547	1408	8670	2175	0.890	14.6	16.6	1700
2.40	247700	25390	24.2	7.76	8355	1577	9656	2442	0.890	13.4	19.0	2263
2.43	278900	28710	24.6	7.90	9250	1772	10730	2739	0.894	12.3	21.9	2996
2.45	316900	32530	24.7	7.91	10340	1990	12120	3096	0.890	11.2	25.3	4131
1.87	56020	1210	23.2	3.40	1871	136	2200	219	0.843	48.3	1.04	49.2
1.88	63880	1426	23.5	3.51	2120	160	2480	256	0.850	43.2	1.23	68.6
1.88	64580	1436	23.4	3.49	2142	161	2512	258	0.848	42.8	1.24	71.0
2.07	75780	2915	24.2	4.76	2515	256	2881	400	0.864	43.1	2.52	77.0
2.08	87320	3434	24.6	4.88	2874	301	3281	469	0.870	38.0	2.99	111
2.09	97540	3872	24.8	4.95	3187	338	3639	528	0.872	34.5	3.40	149
2.11	111800	4505	25.0	5.03	3622	391	4142	611	0.875	30.6	3.99	216
2.11	125000	4972	25.3	5.04	4012	435	4595	680	0.878	27.6	4.45	295
2.12	141400	5670	25.4	5.09	4495	493	5167	773	0.878	24.8	5.12	411
2.14	158400	6415	25.6	5.15	4990	554	5757	871	0.879	22.6	5.85	554
2.16	183900	7544	25.7	5.21	5718	644	6643	1019	0.877	20.0	6.97	819
2.18	207900	8606	25.9	5.27	6386	730	7455	1157	0.878	18.2	8.06	1123
2.20	232800	9768	26.1	5.34	7069	819	8299	1304	0.877	16.7	9.26	1495
2.22	259400	10980	26.3	5.41	7778	913	9173	1458	0.878	15.4	10.6	1952
2.24	287700	12330	26.4	5.47	8522	1014	10110	1625	0.877	14.3	12.0	2517
2.27	322200	13950	26.6	5.55	9406	1136	11220	1826	0.877	13.2	13.8	3309
2.39	125900	9308	25.7	7.00	4111	611	4594	937	0.886	32.7	8.17	200
2.41	153000	11410	25.9	7.07	4935	743	5547	1144	0.886	27.7	10.2	340
2.45	209500	15840	26.3	7.23	6589	1017	7486	1574	0.886	21.3	14.5	785
2.47	129200	10790	25.6	7.39	4227	666	4734	1023	0.880	33.6	9.46	196
2.48	147200	12380	25.8	7.47	4776	762	5360	1170	0.882	30.0	10.9	280
2.50	167300	14160	25.9	7.55	5383	867	6057	1335	0.883	26.8	12.6	395
2.51	190800	16260	26.2	7.66	6074	993	6845	1527	0.886	23.9	14.7	559
2.53	215400	18440	26.4	7.74	6784	1121	7670	1726	0.888	21.6	16.8	770
2.53	236600	19950	26.6	7.73	7380	1218	8369	1878	0.890	19.9	18.4	995
2.55	260400	22030	26.8	7.79	8050	1340	9163	2068	0.890	18.4	20.5	1280
2.56	283900	24050	26.9	7.84	8695	1455	9936	2250	0.890	17.2	22.6	1593
2.58	319000	27090	27.1	7.90	9652	1627	11090	2523	0.890	15.7	25.8	2162
2.60	353900	30170	27.3	7.97	10580	1801	12220	2797	0.890	14.5	29.1	2809
2.62	400500	34310	27.5	8.04	11800	2030	13720	3162	0.889	13.2	33.6	3824
2.65	445200	38100	27.7	8.11	12920	2241	15120	3498	0.889	12.2	37.9	4940

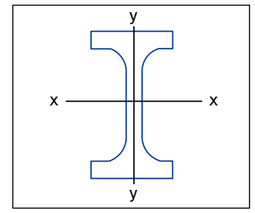
2.3
Universal Beams & Columns (UB & UC)



Imperial Units

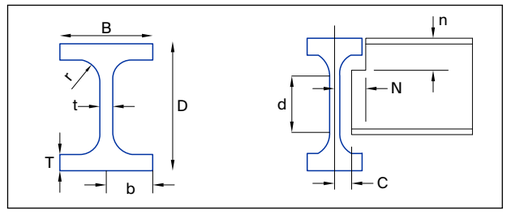
Designation			Depth of Section	Width of Section	Thickness		Root Radius	Depth between Fillets	Area of Section	Ratios for Local Buckling		Dimensions for Detailing		
Size	Mass per Metre				Flange	Web				Flange	Web	End clearance	Notch	
			D	B	T	t	r	d	A	b/T	d/t	C	N	n
in (mm)	lb/ft	kg/m	mm	mm	mm	mm	mm	mm	cm²			mm	mm	mm
W27-27x10 (686x254)	84	125.2	677.9	253.0	16.2	11.7	15.2	615.1	159	7.81	52.6	8	131	31
	94	140.1	683.5	253.7	19.0	12.4	15.2	615.1	178	6.68	49.6	8	131	34
	102	152.4	687.5	254.5	21.0	13.2	15.2	615.1	194	6.06	46.6	9	131	36
	114	170.2	692.9	255.8	23.7	14.5	15.2	615.1	217	5.40	42.4	9	131	39
	129	192	701.8	254.3	27.9	15.5	15.2	615.6	244	4.56	39.7	10	129	43
	143	213	707.9	255.8	31.0	17.0	15.2	615.5	270	4.13	36.2	11	129	46
	159	237	714.0	257.8	34.0	19.1	15.2	615.6	301	3.79	32.2	12	129	49
	182	271	723.9	260.2	39.1	21.6	15.2	615.3	345	3.33	28.5	13	129	54
	201	299	732.0	262.8	42.9	23.9	15.2	615.8	382	3.06	25.8	14	129	58
	221	329	739.9	264.8	47.0	25.9	15.2	615.5	418	2.82	23.8	15	129	62
	247	368	749.8	267.7	52.1	28.9	15.2	615.2	468	2.57	21.3	16	129	67
	271	404	760.0	270.3	56.9	31.5	15.2	615.8	513	2.38	19.5	18	129	72
	302	449	771.9	273.8	63.0	35.1	15.2	615.5	574	2.17	17.5	20	129	78
W27-27x14 (686x356)	146	217.3	695.5	354.7	24.8	15.4	15.2	615.6	277	7.16	40.1	10	180	40
	161	239.6	700.8	356.1	27.4	16.8	15.2	615.5	306	6.49	36.7	10	180	43
	178	264.9	706.4	357.8	30.2	18.4	15.2	615.5	337	5.92	33.4	11	180	45
	194	288.7	714.0	356.4	34.0	19.1	15.2	615.5	368	5.24	32.3	12	179	49
	217	322.9	722.1	358.5	38.1	21.1	15.2	615.5	411	4.70	29.2	13	179	53
	235	349.7	728.0	360.4	40.9	23.1	15.2	615.8	446	4.41	26.6	14	179	56
	258	383.9	736.1	362.5	45.0	24.9	15.2	615.8	489	4.03	24.7	14	179	60
	281	418.2	744.0	364.5	49.0	26.9	15.2	615.6	533	3.72	22.9	15	179	64
	307	456.9	752.1	366.9	53.1	29.5	15.2	615.5	582	3.46	20.9	17	179	68
	336	500	762.0	369.0	57.9	32.0	15.2	615.8	636	3.19	19.2	18	179	73
W30-30x10 1/2 (762x267)	90	133.9	750.0	264.4	15.5	12.0	16.5	686.0	171	8.53	57.2	8	136	32
	99	146.9	754.0	265.2	17.5	12.8	16.5	686.0	187	7.58	53.6	8	136	34
	108	160.7	757.7	266.1	19.3	13.8	16.5	686.1	205	6.89	49.6	9	136	36
	116	173	762.2	266.7	21.6	14.3	16.5	686.0	220	6.17	48.0	9	136	38
	124	184.5	766.3	267.1	23.6	14.9	16.5	686.1	235	5.65	46.2	9	136	40
	132	196.8	769.8	268.0	25.4	15.6	16.5	686.0	251	5.28	44.0	10	136	42
	148	220	779.0	266.2	30.0	16.5	16.5	686.0	281	4.44	41.6	10	135	47
	165	246	785.1	268.1	33.0	18.5	16.5	686.1	312	4.06	37.1	11	135	50
	185	275	793.0	270.1	37.1	20.6	16.5	685.8	351	3.64	33.3	12	135	54
	207	308	801.1	272.7	40.9	23.1	16.5	686.3	392	3.33	29.7	14	135	57
	226	337	809.0	274.6	44.9	24.9	16.5	686.2	428	3.06	27.6	14	135	61
	246	366	817.1	276.6	48.0	26.9	16.5	688.1	462	2.88	25.6	15	135	65

Dimensions	EN10365 / ASTM A6
Specification	EN10025 / ASTM A36 / ASTM A572
Size Range	UB: 5”x3” (127mm x 76mm) to 44”x16” (1118mm x 406mm) UC: 4”x4” (102mm x 102mm) to 14”x16” (356mm x 406mm)



Surface Area	Second Moment of Area		Radius of Gyration		Elastic Modulus		Plastic Modulus		Buckling Parameter	Torsional Index	Warping Constant	Torsional Constant
Per metre	Axis x-x	Axis y-y	Axis x-x	Axis y-y	Axis x-x	Axis y-y	Axis x-x	Axis y-y				
									u	x	H	J
m²	cm⁴	cm⁴	cm	cm	cm³	cm³	cm³	cm³			dm⁶	cm⁴
2.32	118000	4383	27.2	5.24	3481	347	3994	542	0.862	43.9	4.80	116
2.33	136300	5184	27.6	5.39	3987	409	4558	638	0.868	38.7	5.72	169
2.34	150400	5784	27.8	5.46	4374	455	5000	710	0.871	35.5	6.42	220
2.35	170300	6631	28.0	5.53	4916	518	5631	811	0.872	31.8	7.42	308
2.36	198000	7670	28.5	5.61	5644	603	6462	943	0.878	27.7	8.71	462
2.38	222000	8678	28.7	5.67	6272	678	7204	1063	0.878	25.2	9.94	627
2.39	247800	9750	28.7	5.69	6940	756	8016	1191	0.877	23.0	11.3	840
2.42	289300	11540	29.0	5.78	7993	887	9282	1402	0.878	20.3	13.5	1260
2.44	323800	13060	29.1	5.85	8847	994	10330	1577	0.877	18.6	15.5	1675
2.46	359400	14640	29.3	5.92	9715	1106	11390	1759	0.877	17.2	17.6	2186
2.49	406900	16800	29.5	5.99	10850	1255	12810	2005	0.877	15.6	20.4	2993
2.51	453800	18910	29.7	6.07	11940	1399	14170	2243	0.877	14.4	23.4	3897
2.54	515400	21790	30.0	6.16	13350	1592	15950	2565	0.876	13.2	27.4	5322
2.75	234200	18440	29.1	8.16	6735	1040	7558	1598	0.884	29.7	20.7	454
2.77	261200	20670	29.2	8.22	7455	1161	8389	1787	0.885	27.0	23.4	610
2.78	290800	23120	29.4	8.28	8233	1292	9297	1992	0.885	24.6	26.4	813
2.79	325500	25720	29.8	8.36	9118	1444	10300	2223	0.889	22.3	29.7	1100
2.81	369200	29310	30.0	8.44	10230	1635	11610	2523	0.890	20.1	34.3	1532
2.83	402300	31970	30.0	8.47	11050	1774	12600	2745	0.888	18.8	37.7	1914
2.85	447800	35780	30.3	8.56	12170	1974	13930	3057	0.889	17.2	42.7	2518
2.87	494700	39680	30.5	8.63	13300	2177	15290	3377	0.890	15.9	47.9	3250
2.89	545000	43850	30.6	8.68	14990	2390	16750	3717	0.889	14.8	53.6	4152
2.91	604800	48670	30.8	8.75	15870	2638	18450	4111	0.889	13.7	60.3	5373
2.51	150700	4788	29.7	5.30	4018	362	4644	570	0.854	49.8	6.46	119
2.51	168500	5456	30.0	5.40	4470	411	5156	647	0.858	45.2	7.40	159
2.52	185900	6080	30.1	5.45	4907	457	5665	720	0.859	41.5	8.29	208
2.53	205300	6850	30.5	5.58	5387	514	6198	807	0.864	38.1	9.39	267
2.54	223100	7525	30.8	5.65	5821	563	6689	885	0.867	35.4	10.4	333
2.55	240000	8175	30.9	5.71	6234	610	7167	959	0.869	33.2	11.3	404
2.56	278200	9463	31.5	5.81	7142	711	8197	1115	0.875	28.9	13.3	605
2.58	310700	10640	31.5	5.84	7914	794	9129	1251	0.874	26.4	15.0	815
2.60	353200	12240	31.7	5.91	8909	906	10320	1433	0.874	23.7	17.5	1147
2.62	397200	13900	31.8	5.96	9916	1020	11550	1620	0.873	21.6	20.1	1555
2.64	440500	15600	32.1	6.04	10890	1136	12720	1808	0.874	19.9	22.8	2029
2.66	480200	17050	32.2	6.08	11750	1233	13790	1971	0.873	18.7	25.2	2500

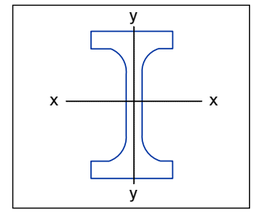
2.3
Universal Beams & Columns (UB & UC)



Imperial Units

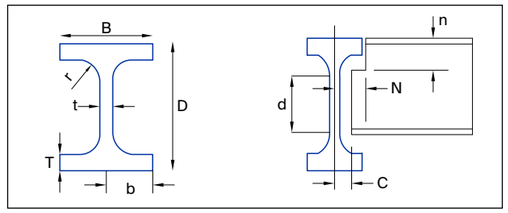
Designation			Depth of Section	Width of Section	Thickness		Root Radius	Depth between Fillets	Area of Section	Ratios for Local Buckling		Dimensions for Detailing		
Size	Mass per Metre				Flange	Web				Flange	Web	End clearance	Notch	
			D	B	T	t	r	d	A	b/T	d/t	C	N	n
in (mm)	lb/ft	kg/m	mm	mm	mm	mm	mm	mm	cm²			mm	mm	mm
W30-30x10 1/2 (762x267)	269	401	825.0	279.1	53.1	29.5	16.5	685.8	511	2.63	23.2	17	135	70
	295	439	835.2	281.7	57.9	32.0	16.5	686.4	559	2.43	21.5	18	135	74
W30-30x15 (762x381)	173	257.5	773.2	380.6	27.1	16.6	16.5	686.1	328	7.04	41.2	10	192	44
	191	284.2	779.3	382.0	30.1	18.0	16.5	686.1	362	6.35	38.1	11	192	47
	211	314	785.9	383.7	33.4	19.7	16.5	686.1	400	5.74	34.9	12	192	50
	235	349.7	795.0	382.4	38.1	21.1	16.5	685.8	445	5.02	32.5	13	191	55
	261	388.4	802.9	384.9	41.9	23.6	16.5	686.1	495	4.59	29.0	14	191	58
	292	434.5	813.1	387.5	47.0	25.9	16.5	686.1	553	4.12	26.5	15	191	63
	326	485.1	823.0	390.4	52.1	29.0	16.5	685.9	617	3.75	23.7	16	191	69
	357	531	833.0	393.0	56.9	31.5	20.0	679.2	677	3.45	21.6	18	191	77
W33-33x11 1/2 (838x292)	118	175.9	834.9	291.7	18.8	14.0	17.8	761.7	224	7.76	54.4	9	149	37
	130	193.8	840.7	292.4	21.7	14.7	17.8	761.7	247	6.74	51.8	9	149	40
	141	209.8	845.8	293.0	24.4	15.4	17.8	761.4	268	6.01	49.5	10	149	42
	152	226.5	850.9	293.8	26.8	16.1	17.8	761.7	289	5.48	47.3	10	149	45
	169	252	859.0	292.1	31.0	17.0	17.8	761.4	319	4.71	44.8	11	148	49
	187	278	865.1	294.1	34.0	19.1	17.8	761.5	355	4.33	39.9	12	148	52
	204	304	871.2	295.7	37.1	20.6	17.8	761.4	386	3.99	37.0	12	148	55
	219	326	877.1	297.2	39.9	22.1	17.8	761.7	416	3.72	34.5	13	148	58
	243	362	885.2	299.7	43.9	24.4	17.8	761.8	460	3.41	31.2	14	148	62
	271	404	895.1	302.1	49.0	26.9	17.8	761.5	513	3.08	28.3	15	148	67
	301	449	905.0	305.2	54.1	30.0	17.8	761.2	572	2.82	25.4	17	148	72
	332	494	915.2	308.1	58.9	33.0	17.8	761.8	629	2.62	23.1	19	148	77
	361	537	925.1	310.6	64.0	35.6	17.8	761.5	684	2.43	21.4	20	148	82
W33-33x15 3/4 (838x400)	201	299.1	855.5	399.9	29.2	18.2	17.8	761.5	381	6.85	41.9	11	201	47
	221	328.9	861.8	401.4	32.4	19.7	17.8	761.4	420	6.20	38.7	12	201	50
	241	358.6	868.2	402.8	35.6	21.1	17.8	761.5	457	5.66	36.1	13	201	53
	263	391.4	877.1	401.4	39.9	22.1	17.8	761.7	499	5.03	34.5	13	200	58
	291	433.1	884.9	404.0	43.9	24.4	17.8	761.4	552	4.60	31.2	14	200	62
	318	473.2	893.1	406.0	48.0	26.4	17.8	761.5	603	4.23	28.8	15	200	66
	354	526.8	903.0	408.9	53.1	29.5	17.8	761.2	672	3.85	25.8	17	200	71
	387	575.9	913.1	411.5	57.9	32.0	17.8	761.7	734	3.55	23.8	18	200	76
	424	631	923.0	414.0	63.0	35.1	20.0	757.0	805	3.29	21.6	20	199	83
	468	697	935.0	418.0	69.1	38.6	20.0	756.8	889	3.02	19.6	21	200	89

Dimensions	EN10365 / ASTM A6
Specification	EN10025 / ASTM A36 / ASTM A572
Size Range	UB: 5”x3” (127mm x 76mm) to 44”x16” (1118mm x 406mm) UC: 4”x4” (102mm x 102mm) to 14”x16” (356mm x 406mm)

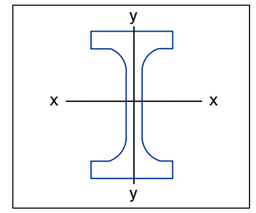


Surface Area	Second Moment of Area		Radius of Gyration		Elastic Modulus		Plastic Modulus		Buckling Parameter	Torsional Index	Warping Constant	Torsional Constant
Per metre	Axis x-x	Axis y-y	Axis x-x	Axis y-y	Axis x-x	Axis y-y	Axis x-x	Axis y-y				
									u	x	H	J
m²	cm⁴	cm⁴	cm	cm	cm³	cm³	cm³	cm³			dm⁶	cm⁴
2.68	536500	19400	32.4	6.16	13010	1390	15330	2229	0.874	17.0	28.9	3361
2.70	595900	21780	32.7	6.24	14270	1546	16900	2486	0.874	15.8	32.9	4345
3.01	341200	24890	32.3	8.71	8827	1308	9916	2012	0.883	30.3	34.6	635
3.02	381700	28000	32.5	8.80	9796	1466	11030	2258	0.885	27.5	39.3	859
3.04	427000	31500	32.7	8.87	10870	1642	12270	2531	0.886	25.0	44.6	1161
3.05	485900	35570	33.0	8.94	12220	1860	13830	2869	0.889	22.2	50.9	1651
3.07	543700	39920	33.1	8.98	13540	2074	15410	3208	0.888	20.3	57.8	2218
3.10	618300	45680	33.4	9.09	15210	2358	17380	3653	0.889	18.3	67.0	3090
3.12	697600	51790	33.6	9.16	16950	2653	19500	4123	0.888	16.7	77.0	4224
3.14	776600	57770	33.9	9.24	18650	2940	21550	4579	0.888	15.3	87.0	5563
2.78	246000	7800	33.1	5.90	5893	535	6808	842	0.856	46.5	13.0	221
2.79	279200	9067	33.6	6.06	6642	620	7640	974	0.862	41.6	15.2	306
2.80	310200	10250	34.0	6.18	7334	700	8416	1097	0.867	37.9	17.3	404
2.81	339700	11360	34.3	6.27	7985	773	9155	1212	0.870	35.0	19.3	514
2.82	386500	12920	34.8	6.36	8999	884	10310	1383	0.875	30.9	22.1	735
2.84	430400	14470	34.8	6.38	9950	984	11450	1547	0.874	28.3	25.0	983
2.85	473000	16050	35.0	6.45	10860	1086	12530	1710	0.874	26.1	27.9	1265
2.87	513500	17540	35.1	6.49	11710	1180	13550	1864	0.874	24.4	30.7	1569
2.89	573400	19800	35.3	6.56	12960	1321	15060	2095	0.874	22.3	35.0	2095
2.91	648200	22660	35.5	6.64	14480	1500	16910	2385	0.875	20.2	40.5	2884
2.94	729200	25820	35.7	6.72	16120	1692	18920	2704	0.874	18.4	46.7	3910
2.97	810000	28960	35.9	6.79	17700	1880	20890	3018	0.873	17.0	53.1	5088
2.99	892800	32280	36.1	6.87	19300	2078	22880	3346	0.873	15.8	59.8	6494
3.24	479800	31180	35.5	9.05	11220	1559	12640	2405	0.881	31.2	53.2	855
3.26	534700	34970	35.7	9.13	12410	1742	14020	2690	0.882	28.4	60.1	1146
3.27	590000	38800	35.9	9.21	13590	1927	15380	2977	0.884	26.1	67.3	1491
3.29	659000	43070	36.3	9.29	15030	2146	17020	3314	0.888	23.6	75.5	2008
3.31	735400	48390	36.5	9.36	16620	2396	18910	3709	0.887	21.6	85.6	2687
3.33	812500	53680	36.7	9.43	18200	2644	20780	4101	0.888	19.9	95.8	3488
3.35	913500	60680	36.9	9.50	20330	2968	23230	4616	0.887	18.1	110	4737
3.38	1012000	67480	37.1	9.59	22170	3280	25570	5113	0.887	16.7	123	6135
3.40	1120000	74810	37.3	9.64	24260	3614	28140	5652	0.886	15.5	138	7983
3.43	1253000	84520	37.6	9.75	26810	4044	31270	6342	0.886	14.2	158	10569

2.3
Universal Beams & Columns (UB & UC)



Dimensions	EN10365 / ASTM A6
Specification	EN10025 / ASTM A36 / ASTM A572
Size Range	UB: 5”x3” (127mm x 76mm) to 44”x16” (1118mm x 406mm) UC: 4”x4” (102mm x 102mm) to 14”x16” (356mm x 406mm)

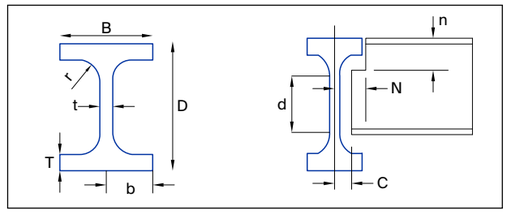


Imperial Units

Designation			Depth of section	Width of section	Thickness		Root radius	Depth between fillets	Area of section	Ratios for local buckling		Dimensions for detailing		
					Flange	Web				Flange	Web	End clearance	Notch	
Size	Mass per metre		D	B	T	t	r	d	A	b/T	d/t	C	N	n
in (mm)	lb/ft	kg/m	mm	mm	mm	mm	mm	mm	cm²			mm	mm	mm
W36-36x12 (914x305)	135	200.9	903.0	303.3	20.2	15.1	19.1	824.4	256	7.51	54.6	10	154	39
	150	224.2	910.4	304.1	23.9	15.9	19.1	824.4	286	6.36	51.8	10	154	43
	160	238.1	914.7	304.8	25.9	16.5	19.0	824.9	304	5.88	50.0	10	154	45
	170	253.4	918.4	305.5	27.9	17.3	19.1	824.4	323	5.47	47.7	11	154	47
	182	270.8	922.8	306.7	30.0	18.4	19.0	824.9	346	5.12	44.8	11	154	49
	194	289.1	926.6	307.7	32.0	19.5	19.1	824.4	368	4.81	42.3	12	154	51
	210	312.5	931.9	309.4	34.5	21.1	19.0	824.8	399	4.48	39.1	13	154	54
	232	345	942.9	307.8	39.9	22.1	19.1	824.9	440	3.86	37.3	13	153	59
	256	381	950.7	310.3	43.9	24.4	19.1	824.7	486	3.53	33.8	14	153	63
	286	426	960.9	312.8	48.0	26.9	19.1	826.7	536	3.26	30.7	15	153	67
	318	474	970.8	315.7	54.1	29.9	19.1	824.4	603	2.92	27.6	17	153	73
	350	521	980.7	318.8	58.9	33.0	19.1	824.7	663	2.71	25.0	19	153	78
	387	576	992.9	321.8	65.0	36.1	19.1	824.7	733	2.48	22.8	20	153	84
W36-36x16 1/2 (914x419)	230	343.3	911.8	418.5	32.0	19.4	24.1	799.6	437	6.54	41.2	12	210	56
	245	364.6	916.4	419.4	34.3	20.3	24.1	799.6	465	6.12	39.4	12	210	58
	260	388	921.0	420.5	36.6	21.4	24.1	799.6	494	5.74	37.4	13	210	61
	280	416.7	927.6	421.5	39.9	22.5	24.1	799.6	532	5.28	35.6	13	210	64
	300	446.4	933.2	423.0	42.7	24.0	24.1	799.7	569	4.96	33.3	14	210	67
	328	488.1	942.1	422.4	47.0	25.9	24.1	799.9	622	4.49	30.9	15	208	71
	359	534.2	950.0	424.9	51.1	28.5	24.1	799.7	680	4.16	28.1	16	208	75
	393	584.8	960.1	427.5	55.9	31.0	24.1	800.1	746	3.83	25.8	17	208	80
W40-40x12 (1016x305)	149	222	970.3	300.0	21.1	16.0	30.0	868.1	283	7.11	54.3	10	152	51
	167	249	980.2	300.0	26.0	16.5	30.0	868.2	317	5.77	52.6	10	152	56
	183	272	990.1	300.0	31.0	16.5	30.0	868.1	347	4.84	52.6	10	152	61
	211	314	1000.0	300.0	35.9	19.1	30.0	868.2	400	4.18	45.5	12	150	66
	235	349	1008.1	302.0	40.0	21.1	30.0	868.1	445	3.78	41.1	13	150	70
	264	393	1016.0	303.0	43.9	24.4	30.0	868.2	500	3.45	35.6	14	149	74
	294	438	1025.9	305.4	49.0	26.9	30.0	867.9	557	3.12	32.3	15	149	79
	327	487	1036.1	308.5	54.1	30.0	30.0	867.9	620	2.85	28.9	17	149	84
	359	535	1046.0	311.4	58.9	33.0	30.0	868.2	681	2.64	26.3	19	149	89

Surface area	Second moment of area		Radius of gyration		Elastic modulus		Plastic modulus		Buckling parameter	Torsional index	Warping constant	Torsional constant
Per metre	Axis x-x	Axis y-y	Axis x-x	Axis y-y	Axis x-x	Axis y-y	Axis x-x	Axis y-y				
m²	cm⁴	cm⁴	cm	cm	cm³	cm³	cm³	cm³	u	x	H	J
2.96	325300	9424	35.7	6.07	7204	621	8351	982	0.854	46.8	18.4	291
2.97	376400	11240	36.3	6.27	8269	739	9535	1163	0.861	41.3	22.1	422
2.98	406100	12270	36.6	6.36	8879	805	10230	1266	0.864	38.6	24.2	515
2.99	436300	13300	36.8	6.42	9501	871	10940	1371	0.866	36.2	26.4	626
3.00	470700	14460	36.9	6.47	10200	943	11770	1487	0.866	33.9	28.8	767
3.01	504200	15600	37.0	6.51	10880	1014	12570	1601	0.867	31.9	31.2	926
3.03	549000	17130	37.1	6.55	11780	1107	13650	1754	0.866	29.7	34.5	1164
3.04	625200	19480	37.7	6.66	13260	1266	15340	2000	0.872	26.4	39.7	1648
3.06	696900	21980	37.9	6.72	14660	1416	17030	2247	0.872	24.1	45.2	2199
3.09	777000	24640	38.1	6.78	16170	1575	18870	2510	0.871	22.2	51.3	2891
3.11	884100	28580	38.3	6.89	18210	1810	21350	2895	0.872	19.9	60.0	4091
3.14	981300	32080	38.5	6.95	20010	2013	23590	3235	0.871	18.4	68.1	5337
3.17	110100	36460	38.8	7.05	22180	2266	26260	3654	0.871	16.8	78.5	7127
3.42	625800	39160	37.8	9.46	13730	1871	15480	2890	0.883	30.1	75.8	1193
3.43	671700	42240	38.0	9.53	14660	2014	16550	3111	0.884	28.3	82.2	1442
3.44	719600	45440	38.2	9.59	15630	2161	17670	3341	0.885	26.7	88.9	1734
3.45	785700	49870	38.4	9.68	16940	2366	19170	3658	0.887	24.8	98.3	2188
3.47	846900	53940	38.6	9.73	18150	2550	20600	3948	0.887	23.3	107	2671
3.48	936400	59170	38.8	9.76	19880	2801	22640	4344	0.887	21.4	119	3500
3.50	1031000	65450	38.9	9.81	21700	3081	24820	4790	0.886	19.8	132	4508
3.53	1144000	73000	39.2	9.89	23840	3415	27390	5320	0.887	18.2	149	5890
3.06	408000	9553	38.0	5.81	8409	637	9807	1020	0.850	45.7	21.5	390
3.08	481300	11760	39.0	6.09	9821	784	11350	1245	0.861	39.9	26.8	582
3.10	554000	14010	40.0	6.36	11190	934	12830	1470	0.873	35.0	32.2	835
3.11	644200	16240	40.1	6.37	12880	1083	14850	1713	0.872	30.7	37.7	1264
3.13	723100	18470	40.3	6.44	14350	1223	16590	1941	0.872	27.9	43.3	1718
3.14	807700	20500	40.2	6.40	15900	1353	18540	2168	0.868	25.5	48.4	2330
3.17	909900	23450	40.4	6.49	17740	1536	20760	2469	0.868	23.1	56.0	3185
3.19	1021000	26730	40.6	6.57	19720	1733	23200	2800	0.867	21.1	64.4	4299
3.22	1131000	29970	40.8	6.63	21620	1925	25570	3126	0.866	19.5	73.0	5576

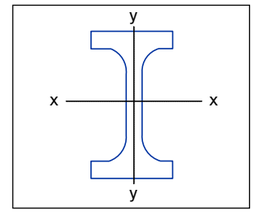
2.4 Metric Beams & Columns (MB & MC)



Metric Units

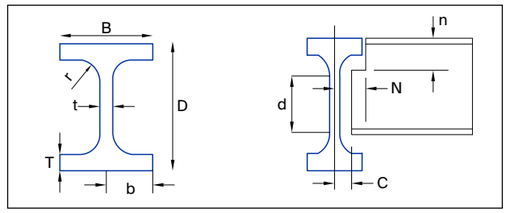
Designation		Depth of Section	Width of Section	Thickness		Root Radius	Depth between Fillets	Area of Section	Ratios for Local Buckling		Dimensions for Detailing		
Size	Mass per Metre			Flange	Web				Flange	Web	End clearance	Notch	
		D	B	T	t	r	d	A	b/T	d/t	C	N	n
in (mm)	kg/m	mm	mm	mm	mm	mm	mm	cm²			mm	mm	mm
100x50	9.30	100	50	7	5	8	70	11.8	3.57	14.0	5	33	15
100x100	14.8	100	100	7	5	10	66	19.2	7.14	13.2	5	58	17
	16.9	100	100	8	6	8	68	21.6	6.25	11.3	5	57	16
	17.2	100	100	8	6	10	64	21.9	6.25	10.7	5	57	18
125x60	13.2	125	60	8	6	9	91	16.8	3.75	15.2	5	37	17
125x125	23.6	125	125	9	6.5	8	91	30.0	6.94	14.0	5	69	17
	23.8	125	125	9	6.5	10	87	30.3	6.94	13.4	5	69	19
150x75	14.0	150	75	7	5	8	120	17.8	5.36	24.0	5	45	15
150x100	20.7	148	100	9	6	8	114	26.3	5.56	19.0	5	57	17
	21.1	148	100	9	6	11	108	26.8	5.56	18.0	5	57	20
150x150	31.1	150	150	10	7	8	114	39.6	7.50	16.3	6	82	18
	31.5	150	150	10	7	11	108	40.1	7.50	15.4	6	82	21
	37.4	154	151	12	8	11	108	47.7	6.29	13.5	6	82	23
175x90	18.0	175	90	8	5	8	143	22.9	5.63	28.6	5	53	16
	18.1	175	90	8	5	9	141	23.0	5.63	28.2	5	53	17
175x125	23.3	169	125	8	5.5	12	129	29.7	7.81	23.5	5	70	20
175x175	32.8	171	174	9	6	12	129	41.7	9.67	21.5	5	94	21
	40.2	175	175	11	7.5	12	129	51.2	7.95	17.2	6	94	23
	40.4	175	175	11	7.5	13	127	51.4	7.95	16.9	6	94	24
200x100	17.8	198	99	7	4.5	8	168	22.7	7.07	37.3	4	57	15
	18.2	198	99	7	4.5	11	162	23.2	7.07	36.0	4	57	18
	20.9	200	100	8	5.5	8	168	26.7	6.25	30.5	5	57	16
	21.3	200	100	8	5.5	11	162	27.2	6.25	29.5	5	57	19
200x150	29.9	194	150	9	6	8	160	38.1	8.33	26.7	5	82	17
	30.6	194	150	9	6	13	150	39.0	8.33	25.0	5	82	22
	36.9	198	151	11	7	13	150	47.0	6.86	21.4	6	82	24
200x200	41.4	196	199	10	6.5	13	150	52.7	9.95	23.1	5	106	23
	49.9	200	200	12	8	13	150	63.5	8.33	18.8	6	106	25
	57.8	204	201	14	9	13	150	73.6	7.18	16.7	7	106	27
	65.7	208	202	16	10	13	150	83.7	6.31	15.0	7	106	29

Dimensions	JIS G 3192
Specification	EN10025/ ASTM A36/ ASTM A572/ JIS G 3101
Size Range	MB: 100mm x 50mm to 900mm x 300mm MC: 100mm x 100mm to 400mm x 400mm

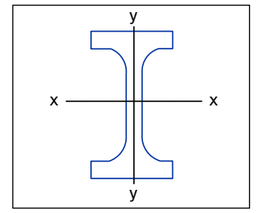


Surface Area per Metre	Second Moment of Area		Radius of Gyration		Elastic Modulus		Plastic Modulus		Buckling Parameter	Torsional Index	Warping Constant	Torsional Constant
Per metre	Axis x-x	Axis y-y	Axis x-x	Axis y-y	Axis x-x	Axis y-y	Axis x-x	Axis y-y				
m²	cm⁴	cm⁴	cm	cm	cm³	cm³	cm³	cm³	u	x	H	J
0.376	188	14.8	3.98	1.12	37.5	5.93	44.1	9.5	0.876	12.7	0.000	2.03
0.570	344	117.0	4.20	2.47	69.0	23.0	78.0	36.0	0.843	12.3	0.003	3.53
0.574	378	134	4.18	2.49	75.6	26.7	86.4	41.0	0.836	11.1	0.003	4.73
0.571	383	134	4.18	2.47	76.5	26.8	87.6	41.2	0.837	10.7	0.003	5.17
0.463	413	29.2	4.95	1.32	66.1	9.75	77.6	15.7	0.872	14.0	0.001	3.75
0.723	840	293	5.29	3.13	134	46.9	152	71.7	0.839	12.8	0.010	7.91
0.720	847	294	5.29	3.11	136	47.0	154	71.9	0.840	12.5	0.010	8.43
0.576	666	49.5	6.11	1.67	88.8	13.2	102	20.8	0.876	20.4	0.003	2.81
0.670	1003	150	6.17	2.39	135	30.1	154	46.4	0.880	15.8	0.007	6.56
0.665	1021	151	6.17	2.37	138	30.1	157	46.7	0.881	15.0	0.007	7.37
0.872	1623	563	6.40	3.77	216	75.1	243	114	0.841	14.1	0.028	12.5
0.867	1641	563	6.39	3.75	219	75.1	246	115	0.842	13.7	0.028	13.5
0.877	2018	690	6.51	3.80	262	91.4	298	140	0.845	11.8	0.035	22.2
0.686	1205	97.5	7.26	2.06	138	21.7	156	33.6	0.885	21.8	0.007	4.31
0.685	1214	97.6	7.26	2.06	139	21.7	157	33.7	0.885	21.4	0.007	4.50
0.806	1529	261	7.18	2.97	181	41.8	202	64.3	0.879	19.1	0.017	6.76
1.01	2304	791	7.43	4.35	269	90.9	298	138	0.845	17.5	0.052	11.5
1.01	2884	984	7.50	4.38	330	112	369	171	0.844	14.7	0.066	20.4
1.01	2895	984	7.50	4.37	331	112	370	172	0.845	14.5	0.066	21.0
0.769	1543	113	8.25	2.24	156	22.9	175	35.5	0.883	28.4	0.010	3.30
0.764	1582	114	8.26	2.22	160	23.0	180	35.7	0.884	26.5	0.010	3.86
0.775	1806	134	8.23	2.24	181	26.7	205	41.6	0.878	24.9	0.012	5.08
0.770	1844	134	8.24	2.22	184	26.8	209	41.9	0.880	23.6	0.012	5.77
0.962	2625	507	8.30	3.65	271	67.6	301	103	0.876	21.2	0.043	9.32
0.954	2690	507	8.30	3.61	277	67.7	309	104	0.878	19.8	0.043	10.9
0.964	3331	633	8.42	3.67	336	83.8	377	128	0.879	16.9	0.055	18.5
1.15	3846	1315	8.54	5.00	392	132	433	201	0.847	18.2	0.114	17.6
1.16	4716	1602	8.62	5.02	472	160	525	244	0.846	15.5	0.142	29.8
1.17	5603	1897	8.73	5.08	549	189	617	287	0.847	13.6	0.171	45.8
1.18	6531	2201	8.83	5.13	628	218	710	332	0.848	12.2	0.203	66.7

2.4
Metric Beams & Columns (MB & MC)



Dimensions	JIS G 3192
Specification	EN10025/ ASTM A36/ ASTM A572/ JIS G 3101
Size Range	MB: 100mm x 50mm to 900mm x 300mm MC: 100mm x 100mm to 400mm x 400mm

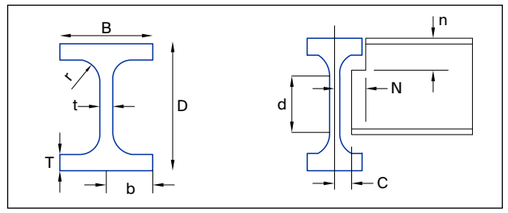


Metric Units

Designation		Depth of Section	Width of Section	Thickness		Root Radius	Depth between Fillets	Area of Section	Ratios for Local Buckling		Dimensions for Detailing		
Size	Mass per Metre			Flange	Web				Flange	Web	End clearance	Notch	
		D	B	T	t	r	d	A	b/T	d/t	C	N	n
in (mm)	kg/m	mm	mm	mm	mm	mm	mm	cm²			mm	mm	mm
250x125	25.1	248	124	8	5	8	216	32.0	7.75	43.2	5	70	16
	25.7	248	124	8	5	12	208	32.7	7.75	41.6	5	70	20
	29.0	250	125	9	6	8	216	37.0	6.94	36.0	5	70	17
	29.6	250	125	9	6	12	208	37.7	6.94	34.7	5	70	21
250x175	43.6	244	175	11	7	13	196	55.5	7.95	28.0	6	94	24
	44.1	244	175	11	7	16	190	56.2	7.95	27.1	6	94	27
	51.6	248	176	13	8	16	190	65.7	6.77	23.8	6	94	29
	59.1	252	177	15	9	16	190	75.3	5.90	21.1	7	94	31
250x250	66.5	248	249	13	8	16	190	84.7	9.58	23.8	6	131	29
	71.8	250	250	14	9	13	196	91.4	8.93	21.8	7	131	27
	72.4	250	250	14	9	16	190	92.2	8.93	21.1	7	131	30
	81.6	250	255	14	14	13	196	104	9.11	14.0	9	131	27
	98.1	260	253	19	12	16	190	125	6.66	15.8	8	131	35
300x150	25.0	294	148	6	4.5	16	250	32.6	12.3	55.6	4	82	22
	32.0	298	149	8	5.5	13	256	40.8	9.31	46.5	5	82	21
	36.7	300	150	9	6.5	13	256	46.8	8.33	39.4	5	82	22
	41.4	304	150	11	6.5	13	256	52.8	6.82	39.4	5	82	24
	46.2	306	151	12	7.5	13	256	58.8	6.29	34.1	6	82	25
	69.0	318	154	18	11	13	256	87.9	4.28	23.3	8	82	31
300x200	48.3	290	199	10	7	18	234	61.5	9.95	33.4	6	106	28
	55.8	294	200	12	8	13	244	71.1	8.33	30.5	6	106	25
	56.8	294	200	12	8	18	234	72.4	8.33	29.3	6	106	30
	65.4	298	201	14	9	18	234	83.4	7.18	26.0	7	106	32
	77.3	304	202	17	10	18	234	98.5	5.94	23.4	7	106	35
300x300	87.0	298	299	14	9	18	234	111	10.7	26.0	7	155	32
	93.0	300	300	15	10	13	244	118	10.0	24.4	7	155	28
	94.0	300	300	15	10	18	234	120	10.0	23.4	7	155	33
	105	300	305	15	15	13	244	133	10.2	16.3	10	155	28
	106	304	301	17	11	18	234	135	8.85	21.3	8	155	35
	125	310	303	20	13	18	234	159	7.58	18.0	9	155	38
	130	310	305	20	15	18	234	165	7.63	15.6	10	155	38
	147	312	310	21	20	18	234	187	7.38	11.7	12	155	39

Surface Area per Metre	Second Moment of Area		Radius of Gyration		Elastic Modulus		Plastic Modulus		Buckling Parameter	Torsional Index	Warping Constant	Torsional Constant
Per metre	Axis x-x	Axis y-y	Axis x-x	Axis y-y	Axis x-x	Axis y-y	Axis x-x	Axis y-y				
									u	x	H	J
m²	cm⁴	cm⁴	cm	cm	cm³	cm³	cm³	cm³			dm⁶	cm⁴
0.968	3450	255	10.4	2.82	278	41.1	312	63.2	0.884	32.0	0.037	5.78
0.961	3537	255	10.4	2.79	285	41.1	319	63.6	0.886	29.9	0.037	6.74
0.974	3965	294	10.4	2.82	317	47.0	358	72.7	0.880	28.4	0.043	8.51
0.967	4052	294	10.4	2.79	324	47.0	366	73.1	0.881	26.9	0.043	9.68
1.15	6037	984	10.4	4.21	495	112	550	172	0.883	21.3	0.134	21.2
1.15	6122	985	10.4	4.19	502	113	558	173	0.884	20.5	0.134	23.2
1.16	7308	1184	10.5	4.24	589	135	660	207	0.884	18.0	0.163	36.1
1.17	8541	1390	10.7	4.30	678	157	764	241	0.885	16.0	0.195	53.2
1.45	9931	3348	10.8	6.29	801	269	883	408	0.850	17.9	0.462	46.7
1.46	10750	3648	10.8	6.32	860	292	953	443	0.847	17.1	0.508	55.8
1.45	10830	3649	10.8	6.29	867	292	960	444	0.848	16.7	0.508	58.7
1.47	11400	3876	10.5	6.11	912	304	1031	467	0.826	15.7	0.540	75.4
1.48	15340	5134	11.1	6.41	1180	406	1330	618	0.849	12.8	0.745	141
1.14	4940	326	12.3	3.16	336	44.0	375	68.4	0.878	39.7	0.068	5.51
1.16	6318	442	12.4	3.29	424	59.4	475	91.8	0.880	35.6	0.093	8.65
1.16	7210	508	12.4	3.29	481	67.7	542	105	0.876	32.0	0.107	12.4
1.17	8578	620	12.7	3.43	564	82.7	633	128	0.888	27.8	0.133	18.8
1.18	9514	691	12.7	3.43	622	91.5	702	142	0.884	25.6	0.149	24.9
1.21	14820	1100	13.0	3.54	932	143	1070	223	0.884	17.9	0.248	79.0
1.33	9431	1317	12.4	4.63	650	132	721	203	0.882	26.0	0.258	22.8
1.35	11110	1602	12.5	4.75	756	160	842	245	0.882	24.0	0.319	31.4
1.34	11340	1604	12.5	4.71	771	160	859	247	0.883	22.7	0.319	35.8
1.35	13310	1900	12.6	4.77	893	189	1000	291	0.884	20.1	0.383	53.4
1.37	16280	2341	12.9	4.88	1071	232	1204	356	0.888	17.2	0.482	87.8
1.74	18850	6242	13.0	7.51	1265	418	1389	634	0.850	20.0	1.26	71.3
1.76	20190	6753	13.1	7.55	1346	450	1484	683	0.847	19.4	1.37	82.1
1.75	20410	6756	13.1	7.51	1361	450	1501	684	0.848	18.8	1.37	88.1
1.77	21310	7103	12.6	7.30	1421	466	1596	714	0.828	17.9	1.44	109
1.76	23380	7733	13.2	7.57	1538	514	1705	781	0.849	16.9	1.59	125
1.78	28130	9282	13.3	7.64	1815	613	2031	932	0.849	14.6	1.95	200
1.78	28630	9470	13.2	7.57	1847	621	2079	949	0.842	14.4	1.99	215
1.79	31370	10450	13.0	7.48	2011	674	2295	1040	0.830	13.0	2.21	298

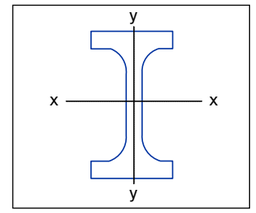
2.4
Metric Beams & Columns (MB & MC)



Metric Units

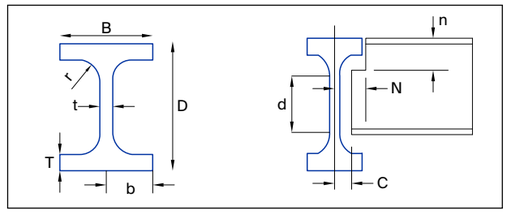
Designation		Depth of Section	Width of Section	Thickness		Root Radius	Depth between Fillets	Area of Section	Ratios for Local Buckling		Dimensions for Detailing		
				Flange	Web				Flange	Web	End clearance	Notch	
Size	Mass per Metre	D	B	T	t	r	d	A	b/T	d/t	C	N	n
in (mm)	kg/m	mm	mm	mm	mm	mm	mm	cm²			mm	mm	mm
350x175	41.2	346	174	9	6	13	302	52.5	9.67	50.3	5	94	22
	41.4	346	174	9	6	14	300	52.7	9.67	50.0	5	94	23
	49.4	350	175	11	7	13	302	62.9	7.95	43.1	6	94	24
	49.6	350	175	11	7	14	300	63.1	7.95	42.9	6	94	25
	57.8	354	176	13	8	14	300	73.7	6.77	37.5	6	94	27
	66.2	358	177	15	9	14	300	84.3	5.90	33.3	7	94	29
	71.8	360	178	16	10	14	300	91.4	5.56	30.0	7	94	30
	79.7	364	177	18	11	14	300	101	4.92	27.3	8	93	32
350x250	69.2	336	249	12	8	20	272	88.2	10.4	34.0	6	131	32
	78.1	340	250	14	9	13	286	100	8.93	31.8	7	131	27
	79.7	340	250	14	9	20	272	102	8.93	30.2	7	131	34
	94.2	346	251	17	10	20	272	120	7.38	27.2	7	131	37
	108	350	253	19	12	20	272	137	6.66	22.7	8	131	39
350x350	113	344	348	16	10	13	286	144	10.9	28.6	7	179	29
	115	344	354	16	10	20	272	148	11.1	27.2	7	182	36
	135	350	350	19	12	13	286	172	9.21	23.8	8	179	32
	137	350	350	19	12	20	272	174	9.21	22.7	8	179	39
	159	356	352	22	14	20	272	202	8.00	19.4	9	179	42
	181	362	354	25	16	20	272	230	7.08	17.0	10	179	45
400x200	56.1	396	199	11	7	13	348	71.4	9.05	49.7	6	106	24
	56.6	396	199	11	7	16	342	72.2	9.05	48.9	6	106	27
	65.4	400	200	13	8	13	348	83.4	7.69	43.5	6	106	26
	66.0	400	200	13	8	16	342	84.1	7.69	42.8	6	106	29
	75.5	404	201	15	9	16	342	96.2	6.70	38.0	7	106	31
	88.2	410	202	18	10	16	342	112	5.61	34.2	7	106	34
	140	430	208	28	16	16	342	179	3.71	21.4	10	106	44
	187	446	214	36	22	16	342	239	2.97	15.5	13	106	52
400x300	94.3	386	299	14	9	22	314	120	10.7	34.9	7	155	36
	105	390	300	16	10	13	332	133	9.38	33.2	7	155	29
	107	390	300	16	10	22	314	136	9.38	31.4	7	155	38
	127	396	302	19	12	22	314	162	7.95	26.2	8	155	41
	144	402	303	22	13	22	314	184	6.89	24.2	9	155	44

Dimensions	JIS G 3192
Specification	EN10025/ ASTM A36/ ASTM A572/ JIS G 3101
Size Range	MB: 100mm x 50mm to 900mm x 300mm MC: 100mm x 100mm to 400mm x 400mm

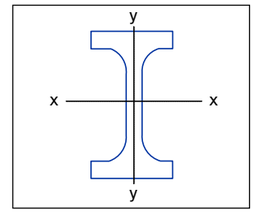


Surface Area per Metre	Second Moment of Area		Radius of Gyration		Elastic Modulus		Plastic Modulus		Buckling Parameter	Torsional Index	Warping Constant	Torsional Constant
Per metre	Axis x-x	Axis y-y	Axis x-x	Axis y-y	Axis x-x	Axis y-y	Axis x-x	Axis y-y	u	x	H	J
m²	cm⁴	cm⁴	cm	cm	cm³	cm³	cm³	cm³			dm⁶	cm⁴
1.35	11040	792	14.5	3.88	638	91.0	712	140	0.881	38.1	0.225	13.2
1.35	11100	792	14.5	3.88	641	91.0	716	140	0.882	37.5	0.225	13.6
1.36	13500	984	14.6	3.96	771	113	864	173	0.883	32.2	0.283	22.4
1.36	13560	985	14.7	3.95	775	113	868	174	0.884	31.8	0.283	23.0
1.37	16100	1184	14.8	4.01	909	135	1022	208	0.885	27.6	0.344	36.1
1.38	18710	1390	14.9	4.06	1045	157	1180	243	0.886	24.4	0.409	53.6
1.39	20240	1508	14.9	4.06	1124	169	1276	263	0.883	22.9	0.446	66.3
1.39	22760	1669	15.0	4.06	1250	189	1425	293	0.884	20.6	0.499	91.3
1.62	18510	3093	14.5	5.92	1102	248	1215	380	0.881	25.8	0.812	44.6
1.64	21230	3649	14.6	6.05	1249	292	1382	445	0.881	24.2	0.969	58.0
1.63	21680	3652	14.6	6.00	1275	292	1412	447	0.882	22.8	0.970	66.3
1.64	26440	4488	14.8	6.12	1528	358	1699	547	0.886	19.5	1.21	109
1.65	30190	5138	14.8	6.12	1725	406	1935	623	0.882	17.6	1.41	155
2.04	32850	11240	15.1	8.84	1910	646	2092	978	0.848	21.1	3.02	111
2.05	33810	11840	15.1	8.95	1966	669	2153	1014	0.846	20.4	3.18	123
2.05	39847	13583	15.2	8.89	2277	776	2515	1176	0.847	18.0	3.72	186
2.04	40300	13590	15.2	8.84	2303	776	2545	1179	0.849	17.5	3.72	199
2.06	47590	16000	15.3	8.90	2674	909	2979	1382	0.848	15.4	4.46	305
2.07	55190	18500	15.5	8.96	3049	1045	3424	1591	0.848	13.7	5.25	445
1.55	19770	1447	16.6	4.50	999	145	1114	223	0.883	36.8	0.536	25.0
1.55	20020	1448	16.7	4.48	1011	145	1128	224	0.884	35.6	0.536	27.1
1.56	23460	1736	16.8	4.56	1173	174	1313	267	0.885	31.8	0.650	39.6
1.56	23710	1737	16.8	4.54	1185	174	1326	268	0.886	30.9	0.650	42.2
1.57	27490	2035	16.9	4.60	1361	202	1528	312	0.887	27.4	0.770	62.3
1.58	33060	2478	17.2	4.70	1612	245	1815	378	0.891	23.4	0.952	101
1.63	54850	4216	17.5	4.86	2551	405	2941	632	0.887	15.7	1.70	373
1.68	75250	5919	17.8	4.98	3374	553	3968	873	0.883	12.5	2.49	825
1.91	33680	6246	16.7	7.21	1745	418	1918	637	0.880	25.8	2.16	79.9
1.94	37860	7204	16.9	7.35	1942	480	2141	730	0.879	24.5	2.52	100
1.92	38680	7210	16.9	7.28	1983	481	2188	733	0.881	23.2	2.52	114
1.94	46660	8735	17.0	7.35	2357	578	2620	884	0.880	20.0	3.10	185
1.95	54420	10220	17.2	7.45	2707	674	3022	1030	0.883	17.7	3.69	272

2.4
Metric Beams & Columns (MB & MC)



Dimensions	JIS G 3192
Specification	EN10025/ ASTM A36/ ASTM A572/ JIS G 3101
Size Range	MB: 100mm x 50mm to 900mm x 300mm MC: 100mm x 100mm to 400mm x 400mm

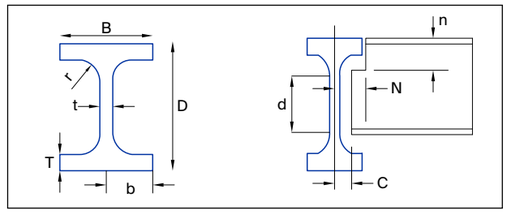


Metric Units

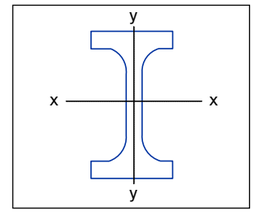
Designation		Depth of Section	Width of Section	Thickness		Root Radius	Depth between Fillets	Area of Section	Ratios for Local Buckling		Dimensions for Detailing		
Size	Mass per Metre			Flange	Web				Flange	Web	End clearance	Notch	
		D	B	T	t	r	d	A	b/T	d/t	C	N	n
in (mm)	kg/m	mm	mm	mm	mm	mm	mm	cm²			mm	mm	mm
400x400	140	388	402	15	15	22	314	178	13.4	20.9	10	204	37
	147	394	398	18	11	22	314	187	11.1	28.5	8	204	40
	172	400	400	21	13	22	314	219	9.52	24.2	9	204	43
	197	400	408	21	21	22	314	251	9.71	15.0	13	204	43
	200	406	403	24	16	22	314	255	8.40	19.6	10	204	46
	232	414	405	28	18	22	314	295	7.23	17.4	11	204	50
	235	408	412	25	25	22	314	300	8.24	12.6	15	204	47
	283	428	407	35	20	22	314	361	5.81	15.7	12	204	57
	415	458	417	50	30	22	314	529	4.17	10.5	17	204	72
	605	498	432	70	45	22	314	770	3.09	7.0	25	204	92
450x200	65.1	446	199	12	8	13	396	83.0	8.29	49.5	6	106	25
	66.2	446	199	12	8	18	386	84.3	8.29	48.3	6	106	30
	74.9	450	200	14	9	13	396	95.4	7.14	44.0	7	106	27
	76.0	450	200	14	9	18	386	96.8	7.14	42.9	7	106	32
	88.9	456	201	17	10	18	386	113	5.91	38.6	7	106	35
	98.9	460	202	19	11	18	386	126	5.32	35.1	8	106	37
	110	460	205	19	14	18	386	140	5.39	27.6	9	106	37
450x300	106	434	299	15	10	24	356	135	9.97	35.6	7	155	39
	121	440	300	18	11	13	378	154	8.33	34.4	8	155	31
	124	440	300	18	11	24	356	157	8.33	32.4	8	155	42
	145	446	302	21	13	24	356	184	7.19	27.4	9	155	45
500x200	77.9	496	199	14	9	13	442	99	7.11	49.1	7	105	27
	79.5	496	199	14	9	20	428	101	7.11	47.6	7	105	34
	88.2	500	200	16	10	13	442	112	6.25	44.2	7	105	29
	89.6	500	200	16	10	20	428	114	6.25	42.8	7	105	36
	102	506	201	19	11	13	442	129	5.29	40.2	8	105	32
	103	506	201	19	11	20	428	131	5.29	38.9	8	105	39
	117	512	202	22	12	20	428	148	4.59	35.7	8	105	42
500x300	111	482	300	15	11	13	426	141	10.0	38.7	8	155	28
	114	482	300	15	11	26	400	146	10.0	36.4	8	155	41
	125	488	300	18	11	13	426	159	8.33	38.7	8	155	31
	128	488	300	18	11	26	400	164	8.33	36.4	8	155	44
	150	494	302	21	13	26	400	191	7.19	30.8	9	155	47

Surface Area per Metre	Second Moment of Area		Radius of Gyration		Elastic Modulus		Plastic Modulus		Buckling Parameter	Torsional Index	Warping Constant	Torsional Constant
Per metre	Axis x-x	Axis y-y	Axis x-x	Axis y-y	Axis x-x	Axis y-y	Axis x-x	Axis y-y				
									u	x	H	J
m²	cm⁴	cm⁴	cm	cm	cm³	cm³	cm³	cm³			dm⁶	cm⁴
2.32	48970	16260	16.6	9.55	2524	809	2802	1237	0.830	22.5	5.66	156
2.32	56150	18930	17.3	10.1	2850	951	3118	1441	0.850	20.9	6.69	194
2.34	66620	22420	17.5	10.1	3331	1121	3672	1700	0.850	18.2	8.05	303
2.35	70890	23810	16.8	9.75	3545	1167	3992	1794	0.828	16.7	8.55	415
2.35	78040	26200	17.5	10.1	3844	1300	4280	1977	0.846	16.1	9.56	462
2.37	92770	31030	17.7	10.2	4482	1532	5026	2331	0.848	14.1	11.6	714
2.38	86470	29200	17.0	9.87	4239	1418	4818	2185	0.827	14.2	10.7	694
2.41	119200	39360	18.2	10.4	5570	1934	6311	2941	0.854	11.6	15.2	1317
2.49	187100	60530	18.8	10.7	8172	2903	9540	4436	0.853	8.5	25.2	3885
2.60	297900	94360	19.7	11.1	11960	4369	14460	6724	0.852	6.4	43.2	11060
1.65	28130	1579	18.4	4.36	1262	159	1423	245	0.876	38.4	0.744	33.9
1.64	28700	1581	18.5	4.33	1287	159	1450	247	0.878	36.5	0.744	38.3
1.66	32890	1870	18.6	4.43	1462	187	1652	290	0.878	33.6	0.889	51.6
1.65	33450	1872	18.6	4.40	1487	187	1679	291	0.879	32.2	0.890	56.9
1.67	40400	2308	18.9	4.51	1772	230	2003	356	0.884	27.5	1.11	92.5
1.68	45430	2619	19.0	4.56	1975	259	2240	403	0.885	25.0	1.27	126
1.68	47860	2742	18.5	4.43	2081	268	2399	423	0.869	23.9	1.33	152
2.00	46800	6695	18.6	7.04	2157	448	2384	686	0.883	27.0	2.94	104
2.04	54730	8106	18.9	7.26	2488	540	2757	823	0.885	24.9	3.61	141
2.02	56070	8114	18.9	7.18	2549	541	2825	828	0.887	23.4	3.61	163
2.03	66380	9658	19.0	7.24	2977	640	3323	981	0.886	20.5	4.36	253
1.75	40840	1843	20.3	4.31	1647	185	1869	288	0.874	37.5	1.07	52.5
1.74	41870	1846	20.3	4.27	1688	186	1914	290	0.876	35.2	1.07	60.8
1.76	46810	2138	20.4	4.36	1872	214	2130	333	0.875	33.3	1.25	75.9
1.75	47850	2142	20.5	4.33	1914	214	2175	335	0.877	31.6	1.25	85.9
1.77	55480	2578	20.7	4.47	2193	257	2496	399	0.880	28.7	1.53	119
1.76	56520	2582	20.7	4.43	2234	257	2541	401	0.881	27.5	1.53	132
1.77	65450	3035	21.0	4.52	2557	300	2913	469	0.884	24.3	1.82	193
2.12	58270	6756	20.3	6.92	2418	450	2696	690	0.877	32.4	3.68	93.9
2.10	60370	6768	20.4	6.82	2505	451	2791	695	0.880	29.4	3.69	118
2.13	68860	8106	20.8	7.14	2822	540	3132	825	0.887	28.0	4.48	143
2.11	70960	8118	20.8	7.05	2908	541	3228	830	0.889	25.9	4.48	172
2.13	83810	9663	20.9	7.11	3393	640	3792	984	0.888	22.8	5.40	265

2.4
Metric Beams & Columns (MB & MC)



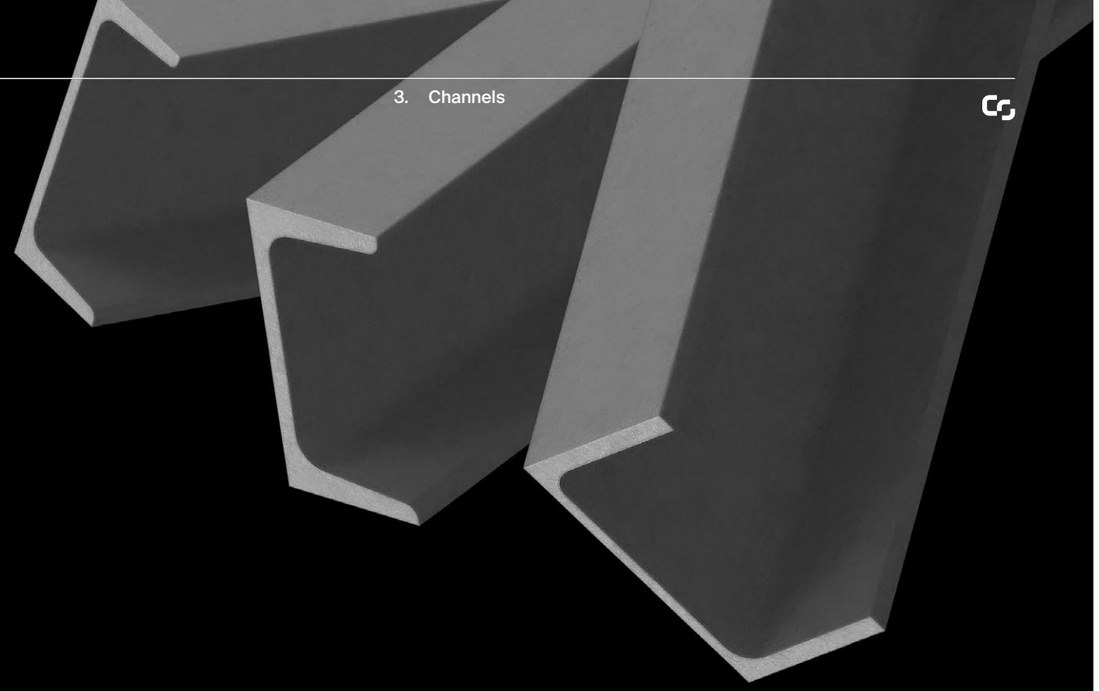
Dimensions	JIS G 3192
Specification	EN10025/ ASTM A36/ ASTM A572/ JIS G 3101
Size Range	MB: 100mm x 50mm to 900mm x 300mm MC: 100mm x 100mm to 400mm x 400mm



Metric Units

Designation		Depth of Section	Width of Section	Thickness		Root Radius	Depth between Fillets	Area of Section	Ratios for Local Buckling		Dimensions for Detailing		
Size	Mass per Metre			Flange	Web				Flange	Web	End clearance	Notch	
		D	B	T	t	r	d	A	b/T	d/t	C	N	n
in (mm)	kg/m	mm	mm	mm	mm	mm	mm	cm²			mm	mm	mm
600x200	79.0	592	197	13	8	22	522	101	7.58	65.3	6	105	35
	92.5	596	199	15	10	13	540	118	6.63	54.0	7	105	28
	94.6	596	199	15	10	22	522	120	6.63	52.2	7	105	37
	103	600	200	17	11	13	540	132	5.88	49.1	8	105	30
	106	600	200	17	11	22	522	134	5.88	47.5	8	105	39
	118	606	201	20	12	13	540	150	5.03	45.0	8	105	33
	120	606	201	20	12	22	522	152	5.03	43.5	8	105	42
	134	612	202	23	13	22	522	171	4.39	40.2	9	105	45
600x300	133	582	300	17	12	13	522	169	8.82	43.5	8	154	30
	137	582	300	17	12	28	492	174	8.82	41.0	8	154	45
	147	588	300	20	12	13	522	187	7.50	43.5	8	154	33
	151	588	300	20	12	28	492	192	7.50	41.0	8	154	48
	170	594	302	23	14	13	522	217	6.57	37.3	9	154	36
	175	594	302	23	14	28	492	222	6.57	35.1	9	154	51
	203	602	304	27	16	28	492	259	5.63	30.8	10	154	55
	217	608	304	30	16	28	492	277	5.07	30.8	10	154	58
700x300	166	692	300	20	13	28	596	211	7.50	45.8	9	154	48
	182	700	300	24	13	18	616	232	6.25	47.4	9	154	42
	185	700	300	24	13	28	596	235	6.25	45.8	9	154	52
	215	708	302	28	15	28	596	274	5.39	39.7	10	154	56
800x300	191	792	300	22	14	28	692	243	6.82	49.4	9	153	50
	207	800	300	26	14	18	712	264	5.77	50.9	9	153	44
	210	800	300	26	14	28	692	267	5.77	49.4	9	153	54
	241	808	302	30	16	28	692	308	5.03	43.3	10	153	58
	267	816	303	34	17	28	692	340	4.46	40.7	11	153	62
900x300	210	890	299	23	15	18	808	267	6.50	53.9	10	152	41
	213	890	299	23	15	28	788	271	6.50	52.5	10	152	51
	240	900	300	28	16	18	808	306	5.36	50.5	10	152	46
	243	900	300	28	16	28	788	310	5.36	49.3	10	152	56
	283	912	302	34	18	18	808	360	4.44	44.9	11	152	52
	286	912	302	34	18	28	788	364	4.44	43.8	11	152	62
	304	918	303	37	19	18	808	387	4.09	42.5	12	152	55
	307	918	303	37	19	28	788	391	4.09	41.5	12	152	65

Surface Area per Metre	Second Moment of Area		Radius of Gyration		Elastic Modulus		Plastic Modulus		Buckling Parameter	Torsional Index	Warping Constant	Torsional Constant
Per metre	Axis x-x	Axis y-y	Axis x-x	Axis y-y	Axis x-x	Axis y-y	Axis x-x	Axis y-y				
									u	x	H	J
m²	cm⁴	cm⁴	cm	cm	cm³	cm³	cm³	cm³			dm⁶	cm⁴
1.92	58240	1665	24.1	4.07	1968	169	2239	265	0.870	45.2	1.40	53.0
1.95	66640	1976	23.8	4.10	2236	199	2576	312	0.861	42.9	1.67	69.2
1.93	68720	1982	23.9	4.06	2306	199	2651	315	0.864	39.7	1.67	82.4
1.96	75560	2274	24.0	4.16	2519	227	2904	358	0.863	38.4	1.93	97.3
1.94	77630	2280	24.0	4.12	2588	228	2979	361	0.865	36.0	1.94	113
1.97	88320	2716	24.3	4.26	2915	270	3357	426	0.868	33.4	2.33	147
1.95	90400	2723	24.3	4.23	2983	271	3432	429	0.870	31.7	2.34	167
1.97	103500	3178	24.6	4.32	3382	315	3893	498	0.873	28.3	2.76	237
2.32	98950	7659	24.2	6.73	3400	511	3822	786	0.876	35.5	6.11	137
2.29	102700	7675	24.3	6.63	3530	512	3963	793	0.879	32.1	6.13	173
2.33	114400	9009	24.7	6.94	3889	601	4348	921	0.886	31.2	7.27	199
2.30	118100	9025	24.8	6.85	4018	602	4489	928	0.888	28.8	7.28	241
2.35	133600	10570	24.8	6.98	4497	700	5057	1077	0.885	27.3	8.62	304
2.32	137300	10590	24.9	6.90	4624	701	5197	1085	0.887	25.5	8.63	356
2.34	162600	12680	25.1	7.00	5401	834	6101	1292	0.888	22.3	10.5	551
2.35	179300	14090	25.4	7.13	5896	927	6653	1431	0.893	20.5	11.8	702
2.51	172400	9030	28.6	6.53	4984	602	5629	936	0.878	34.3	10.2	260
2.54	197500	10820	29.2	6.83	5643	721	6338	1110	0.887	31.4	12.4	343
2.53	201500	10830	29.3	6.78	5757	722	6464	1116	0.889	30.0	12.4	383
2.55	237100	12890	29.4	6.86	6699	854	7559	1323	0.889	26.3	14.9	588
2.71	253600	9936	32.3	6.39	6405	662	7288	1036	0.873	36.8	14.7	341
2.74	286400	11720	33.0	6.67	7159	781	8098	1210	0.882	33.9	17.6	440
2.72	291700	11740	33.0	6.62	7292	782	8243	1216	0.883	32.5	17.6	486
2.74	339200	13820	33.2	6.70	8397	915	9534	1426	0.883	28.7	20.9	726
2.76	383600	15820	33.6	6.82	9402	1044	10680	1625	0.887	25.8	24.2	1003
2.92	338500	10280	35.6	6.20	7608	687	8750	1079	0.863	42.2	19.3	361
2.90	345300	10290	35.7	6.16	7760	688	8913	1085	0.865	40.2	19.3	403
2.94	404500	12630	36.4	6.43	8989	842	10290	1317	0.872	35.9	24.0	580
2.92	411300	12650	36.4	6.39	9139	843	10450	1324	0.873	34.5	24.0	633
2.97	491000	15660	36.9	6.59	10770	1037	12340	1622	0.876	30.1	30.2	979
2.95	497800	15670	37.0	6.56	10920	1038	12500	1629	0.877	29.3	30.2	1050
2.98	535400	17210	37.2	6.67	11660	1136	13380	1778	0.878	27.9	33.4	1234
2.96	542200	17230	37.2	6.63	11810	1137	13540	1785	0.879	27.2	33.4	1316



3. Channels

Structural steel product having a profile of a specific cross section, like a squarish C, commonly used in construction and manufacturing.

3.1 Parallel Flange Channels (PFC)

3.2 Tapered Flange Channels

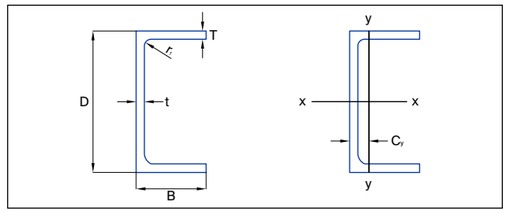
3.3 UPN

Channels
Standard specifications

This European standard specifies requirements for the tolerances on dimensions, shape and mass on hot rolled steel channels with parallel flanges.

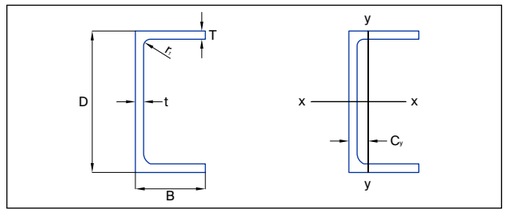
Material	Yield strength N/mm²			Tensile strength N/mm²	Min. Elongation $L_0=5.65\sqrt{S_0}$	Min. Charpy V-notch.	Dimensions & Tolerances
AS 3679.1	**≤11mm**	**>11 - <40mm**	**≥40mm**				***AS 3679.1***
Grade 300	320	300	280	min. 440	22%	27J @ 0°C	
Grade 350	360	340	330	min. 480	20%	27J @ 0°C	
ASTM A36 (1996)	min. 250			400-550	20-21 %	-	***ASTM A6***
ASTM A572							
Grade 42	min. 290			min. 415	20-24 %	-	
Grade 50	min. 345			min. 450	18-21 %	-	
Grade 60	min. 415			min. 520	16-18 %	-	
Grade 65	min. 450			min. 550	15-17 %	-	
ASTM A992	345 - 450			min. 450	18-21 %	-	
EN 10025	**≤16mm**	**>16 - ≤40mm**	**>40 - ≤150mm**	**3-100mm**			***EN 10279***
S275JR	275	265	255 - 225	410-560	18-23 %	27J @ 20°C	
S355JR	355	345	335 - 295	470-630	17-22 %	27J @ 20°C	
S355J0	355	345	335 - 295	470-630	17-22 %	27J @ 0°C	
S355J2	355	345	335 - 295	470-630	17-22 %	27J @ -20°C	
JIS 3101	**≤16mm**	**>16 - ≤40mm**	**>40 - ≤100mm**	**t<100mm**			***JIS 3192***
SS400	245	235	215	400-510	17-23 %	-	
SS490	285	275	255	490-610	15-21 %	-	
SS540	400	390	-	min. 540	13-17 %	-	
JIS 3106	**≤16mm**	**>16 - ≤40mm**	**>40mm**	**t<100mm**			
SM400A	245	235	215	400-510	18-24 %	-	
SM400B	245	235	215	400-510	18-24 %	27J @ 0°C	
SM400C	245	235	215	400-510	18-24 %	47J @ 0°C	
SM490A	325	315	295	490-610	17-23 %	-	
SM490B	325	315	295	490-610	17-23 %	27J @ 0°C	
SM490C	325	315	295	490-610	17-23 %	47J @ 0°C	
SM490YA	365	355	335	490-610	15-21 %	-	
SM490YB	365	355	335	490-610	15-21 %	27J @ 0°C	
SM520B	365	355	335	520-640	15-21%	27J @ 0°C	
SM520C	365	355	335	520-640	15-21 %	47J @ 0°C	

3.1 Parallel Flange Channels (PFC)



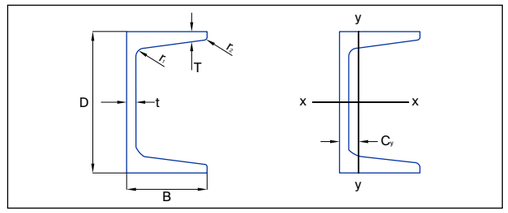
Designation		Thickness		Root Radius	Depth between Fillets	Area of Section	Centre of Gravity	Ratios for Local Buckling	
Size	Mass per Metre	Web t	Flange T	r1	d	A	Cy	Flange	Web
DxB	kg/m	mm	mm	mm	mm	cm²	cm	B/T	d/t
100x50	10.2	5.0	8.5	9	65.0	13.0	1.73	5.88	13.0
125x65	14.8	5.5	9.5	12	82.0	18.8	2.25	6.84	14.9
150x75	17.9	5.5	10.0	12	106	22.8	2.58	7.50	19.3
150x90	23.9	6.5	12.0	12	102	30.4	3.30	7.50	15.7
180x75	20.3	6.0	10.5	12	135	25.9	2.41	7.14	22.5
180x90	26.1	6.5	12.5	12	131	33.2	3.17	7.20	20.2
200x75	23.4	6.0	12.5	12	151	29.9	2.48	6.00	25.2
200x90	29.7	7.0	14.0	12	148	37.9	3.12	6.43	21.1
230x75	25.7	6.5	12.5	12	181	32.7	2.30	6.00	27.8
230x90	32.2	7.5	14.0	12	178	41.0	2.92	6.43	23.7
250x90	35.5	8.0	15.0	12	220	45.2	2.86	6.00	27.5
260x75	27.6	7.0	12.0	12	212	35.1	2.10	6.25	30.3
260x90	34.8	8.0	14.0	12	208	44.4	2.74	6.43	26.0
300x90	41.4	9.0	15.5	12	245	52.7	2.60	5.81	27.2
300x100	45.5	9.0	16.5	15	237	58.0	3.05	6.06	26.3
380x100	54.0	9.5	17.5	15	315	68.7	2.79	5.71	33.2
430x100	64.4	11.0	19.0	15	362	82.1	2.62	5.26	32.9

Dimensions	EN10365
Specification	EN10025
Size Range	100mm x 50mm to 430mm x 100mm



Second Moment of Area		Radius of Gyration		Elastic Modulus		Plastic Modulus		Buckling Parameter	Torsional Index	Warping Constant	Torsional Constant
Axis x-x	Axis y-y	Axis x-x	Axis y-y	Axis x-x	Axis y-y	Axis x-x	Axis y-y	u	x	H	J
cm⁴	cm⁴	cm	cm	cm³	cm³	cm³	cm³			dm6	cm4
208	32.3	4.00	1.58	41.5	9.89	48.9	17.5	0.942	10.0	0.000	2.53
483	80.0	5.07	2.06	77.3	18.8	89.9	33.2	0.942	11.1	0.002	4.72
861	131	6.15	2.40	115	26.6	132	47.2	0.946	13.1	0.005	6.10
1162	253	6.18	2.89	155	44.4	179	76.9	0.936	10.8	0.009	11.8
1370	146	7.27	2.38	152	28.8	176	51.8	0.946	15.3	0.008	7.34
1817	277	7.40	2.89	202	47.4	232	83.5	0.949	12.8	0.014	13.3
1963	170	8.11	2.39	196	33.8	227	60.6	0.956	14.8	0.011	11.1
2523	314	8.16	2.89	252	53.4	291	94.5	0.954	12.9	0.020	18.3
2748	181	9.17	2.35	239	34.8	278	63.2	0.947	17.3	0.015	11.8
3518	334	9.27	2.86	306	55.0	355	98.9	0.950	15.1	0.028	19.3
4510	364	9.99	2.84	361	59.3	421	107	0.948	15.5	0.036	23.8
3619	185	10.1	2.30	278	34.4	328	62.0	0.932	20.5	0.020	11.7
4728	353	10.3	2.82	364	56.3	425	102	0.942	17.2	0.038	20.6
7218	404	11.7	2.77	481	63.1	568	114	0.934	18.4	0.058	28.8
8229	568	11.9	3.13	549	81.7	641	148	0.944	17.0	0.081	36.8
15030	643	14.8	3.06	791	89.2	933	161	0.932	21.2	0.150	45.7
21940	722	16.3	2.97	1020	97.9	1222	176	0.917	22.5	0.219	63.0

3.2
Tapered Flange Channels



Dimensions JIS G 3192

Specification EN10025/ ASTM A36/ ASTM A572/ JIS G 3101

Size Range 75mm x 40mm to 380mm x 100mm

Metric

Designation		Thickness		Root	Toe	Area of Section	Centre of Gravity	Second Moment of Area		Radius of Gyration		Elastic Modulus	
Size	Mass per Metre	Web	Flange	Radius									
DxBxt		t	T	r_1	r_2	A	C_y	I_x	I_y	r_x	r_y	Z_x	Z_y
mm	kg/m	mm	mm	mm	mm	cm^2	cm	cm^4	cm^4	cm	cm	cm^3	cm^4
50x25x5	3.86	5.0	6.0	6	3	4.92	0.81	16.8	2.49	1.85	0.71	6.73	1.48
75x40x5	6.92	5.0	7.0	8	4	8.82	1.27	75.9	12.4	2.93	1.19	20.2	4.54
100x50x5	9.36	5.0	7.5	8	4	11.9	1.55	189	26.9	3.99	1.50	37.8	7.82
125x65x6	13.40	6.0	8.0	8	4	17.1	1.94	425	65.512	4.99	1.96	68.0	14.4
150x75x6.5	18.60	6.5	10.0	10	5	23.7	2.31	864	122	6.04	2.27	115	23.6
150x75x9	24.00	9.0	12.5	15	7.5	30.5	2.31	1060	151	5.90	2.22	141	29.1
180x75x7	21.40	7.0	10.5	11	5.5	27.2	2.15	1380	137	7.12	2.24	154	25.5
180x90x7.5	27.10	7.5	12.5	13	6.5	34.6	2.85	1840	258	7.29	2.73	204	42.0
200x80x7.5	24.60	7.5	11.0	12	6	31.3	2.24	1950	177	7.89	2.38	195	30.8
200x90x8	30.30	8.0	13.5	14	7	38.7	2.77	2490	286	8.02	2.72	249	45.9
230x80x8	28.40	8.0	12.0	13	6.5	36.1	2.15	2900	200	8.96	2.35	252	34.2
230x90x8.5	33.10	8.5	13.5	15	7.5	42.1	2.58	3490	303	9.10	2.68	304	47.3
250x80x8	30.20	8.0	12.5	14	7	38.5	2.11	3630	210	9.71	2.34	291	35.7
250x90x9	34.60	9.0	13.0	14	7	44.1	2.42	4180	306	9.74	2.63	335	46.5
250x90x11	40.20	11.0	14.5	17	8.5	51.2	2.39	4690	342	9.47	2.58	375	51.7
280x100x9	38.80	9.0	13.0	14	7	49.4	2.64	5930	428	11.0	2.94	423	58.2
280x100x11.5	48.20	11.5	16.0	18	9	61.4	2.68	7150	515	10.8	2.90	510	70.4
300x90x9	38.10	9.0	12.0	14	7	48.6	2.23	6440	325	11.5	2.59	429	48.0
300x90x10	43.80	10.0	15.5	19	9.5	55.7	2.33	7400	373	11.5	2.59	494	56.0
300x90x12	48.60	12.0	16.0	19	9.5	61.9	2.28	7870	379	11.3	2.48	525	56.4

Note : The flange thickness is measured at the centre of the flange

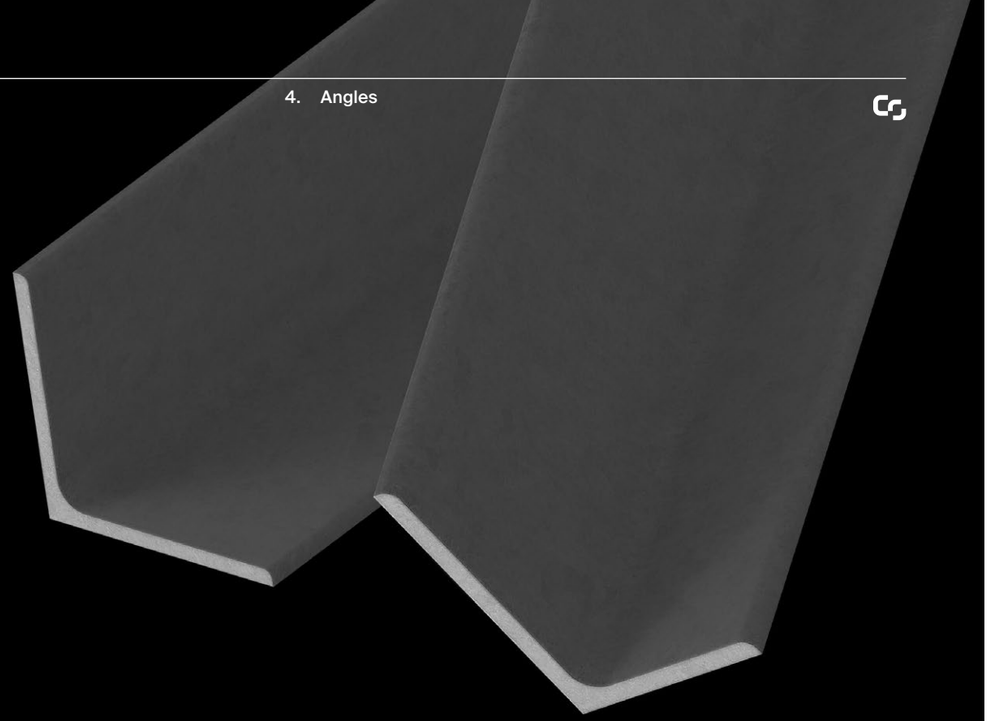
3.3
UPN

Dimensions EN10365

Specification EN10025

Size Range UPN 50 to UPN 400

Section Designation	Dimensions									Properties					
	Mass per Metre	Depth of Section	Width of Section	Thickness		Root Radius		Area of Section	Centre of Gravity	Second Moment of Area		Radius of Gyration		Elastic Modulus	
				Web	Flange										
	kg/m	D mm	B mm	t mm	T mm	r_1 mm	r_2 mm	A cm^2	C_y cm	I_x cm^4	I_y cm^4	r_x cm	r_y cm	Z_x cm^3	Z_y cm^3
UPN 50	5.6	50	38	5.0	7.0	7.0	3.5	7.1	1.35	26.4	9.12	1.92	1.13	10.6	4
UPN 65	7.1	65	42	5.5	7.5	7.5	4.0	9.0	1.46	57.5	14.1	2.52	1.25	17.7	5
UPN 80	8.6	80	45	6.0	8.0	8.0	4.0	11.0	1.52	106	19.4	3.10	1.33	26.5	6
UPN 100	10.6	100	50	6.0	8.5	8.5	4.5	13.5	1.68	206	29.3	3.91	1.47	41.2	8
UPN 120	13.4	120	55	7.0	9.0	9.0	4.5	17.0	1.78	364	43.2	4.62	1.59	60.7	11
UPN 140	16.0	140	60	7.0	10.0	10.0	5.0	20.4	1.97	605	62.7	5.45	1.75	86.4	15
UPN 160	18.8	160	65	7.5	10.5	10.5	5.5	24.0	2.10	925	85.3	6.21	1.89	116	18
UPN 180	22.0	180	70	8.0	11.0	11.0	5.5	28.0	2.23	1,350	114	6.95	2.02	150	22
UPN 200	25.3	200	75	8.5	11.5	11.5	6.0	32.2	2.36	1,910	148	7.70	2.14	191	27
UPN 220	29.4	220	80	9.0	12.5	12.5	6.5	37.4	2.51	2,690	197	8.48	2.30	245	34
UPN 240	33.2	240	85	9.5	13.0	13.0	6.5	42.3	2.64	3,600	248	9.22	2.42	300	40
UPN 260	37.9	260	90	10.0	14.0	14.0	7.0	48.3	2.80	4,820	317	9.99	2.56	371	48
UPN 280	41.8	280	95	10.0	15.0	15.0	7.5	53.3	2.99	6,280	399	10.9	2.74	448	57
UPN 300	46.2	300	100	10.0	16.0	16.0	8.0	58.8	3.21	8,030	495	11.7	2.90	535	68
UPN 320	59.5	320	100	14.0	17.5	17.5	9.0	75.8	2.92	10,900	597	12.1	2.81	679	81
UPN 350	60.6	350	100	14.0	16.0	16.0	8.0	77.3	2.75	12,800	570	12.9	2.72	734	75
UPN 380	63.1	380	102	13.5	16.0	16.0	8.0	80.4	2.88	15,800	615	14.0	2.77	829	79
UPN 400	71.8	400	110	14.0	18.0	18.0	9.0	91.5	3.16	20,400	846	14.9	3.04	1,020	102



4. Angles

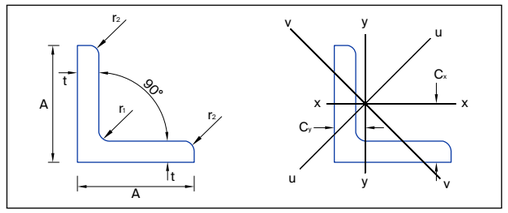
L-shape steel angles that can have equal or unequal legs, commonly used in construction where structural stability is required by joining with other steel members.

4.1 Equal Angles
4.2 Unequal Angles

Equal and Unequal Angles
Standard specifications

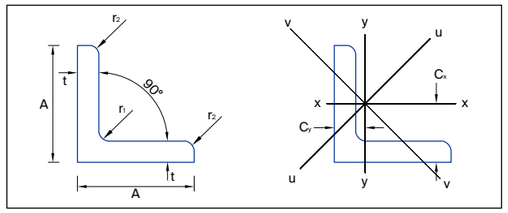
Material	Yield strength N/mm²			Tensile strength N/mm²	Min. Elongation $L_0=5.65\sqrt{S_0}$	Min. Charpy V-notch.	Dimensions & Tolerances
AS 3679.1	**≤11mm**	**>11 - <40mm**	**≥40mm**				***AS 3679.1***
Grade 300	320	300	280	min. 440	22%	27J @ 0°C	
Grade 350	360	340	330	min. 480	20%	27J @ 0°C	
ASTM A36 (1996)	min. 250			400-550	20-21 %	-	***ASTM A6***
ASTM A572							
Grade 42	min. 290			min. 415	20-24 %	-	
Grade 50	min. 345			min. 450	18-21 %	-	
Grade 60	min. 415			min. 520	16-18 %	-	
Grade 65	min. 450			min. 550	15-17 %	-	
ASTM A992	345 - 450			min. 450	18-21 %	-	
EN 10025	**≤16mm**	**>16 - ≤40mm**	**>40 - ≤150mm**	**3-100mm**			***EN 10279***
S275JR	275	265	255 - 225	410-560	18-23 %	27J @ 20°C	
S355JR	355	345	335 - 295	470-630	17-22 %	27J @ 20°C	
S355J0	355	345	335 - 295	470-630	17-22 %	27J @ 0°C	
S355J2	355	345	335 - 295	470-630	17-22 %	27J @ -20°C	
JIS 3101	**≤16mm**	**>16 - ≤40mm**	**>40 - ≤100mm**	**t<100mm**			***JIS 3192***
SS400	245	235	215	400-510	17-23 %	-	
SS490	285	275	255	490-610	15-21 %	-	
SS540	400	390	-	min. 540	13-17 %	-	
JIS 3106	**≤16mm**	**>16 - ≤40mm**	**>40mm**	**t<100mm**			
SM400A	245	235	215	400-510	18-24 %	-	
SM400B	245	235	215	400-510	18-24 %	27J @ 0°C	
SM400C	245	235	215	400-510	18-24 %	47J @ 0°C	
SM490A	325	315	295	490-610	17-23 %	-	
SM490B	325	315	295	490-610	17-23 %	27J @ 0°C	
SM490C	325	315	295	490-610	17-23 %	47J @ 0°C	
SM490YA	365	355	335	490-610	15-21 %	-	
SM490YB	365	355	335	490-610	15-21 %	27J @ 0°C	
SM520B	365	355	335	520-640	15-21%	27J @ 0°C	
SM520C	365	355	335	520-640	15-21 %	47J @ 0°C	

4.1 Equal Angles



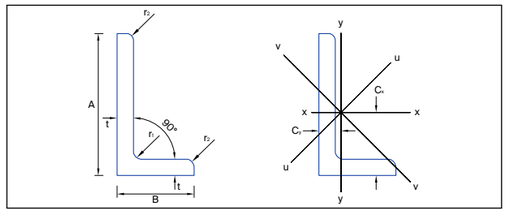
Designation		Mass per Metre	Radius		Area of Section	Distance Centre of Gravity	Second Moment of Area			Radius of Gyration			Elastic Modulus
Size	Thickness		Root	Toe			Axis x-x, y-y	Axis u-u	Axis v-v	Axis x-x, y-y	Axis u-u	Axis v-v	Axis x-x, y-y
AxA	t		r_1	r_2		C_x and C_y							
mm	mm	kg/m	mm	mm	cm^2	cm	cm^4	cm^4	cm^4	cm	cm	cm	cm^3
20x20	3	0.885	3.5	2.4	1.11	0.593	0.381	0.601	0.160	0.585	0.735	0.380	0.271
25x25	3	1.12	3.5	2.4	1.41	0.718	0.784	1.24	0.326	0.745	0.938	0.481	0.440
	4	1.45	3.5	2.4	1.84	0.758	1.00	1.58	0.422	0.737	0.926	0.479	0.574
	5	1.70	3.5	2.4	2.25	0.796	1.19	1.87	0.516	0.728	0.912	0.479	0.701
30x30	3	1.36	5	2.4	1.74	0.836	1.41	2.23	0.590	0.901	1.13	0.582	0.652
	4	1.76	5	2.4	2.27	0.879	1.81	2.86	0.758	0.893	1.12	0.578	0.853
	5	2.16	5	2.4	2.78	0.919	2.17	3.42	0.921	0.884	1.11	0.576	1.04
35X35	6	1.65	5	2.4	3.87	1.08	4.13	6.51	1.76	1.03	1.30	0.674	1.71
38x38	3	1.72	6	2.4	2.24	1.03	2.99	4.72	1.25	1.15	1.45	0.748	1.08
	4	2.36	6	2.4	2.93	1.07	3.85	6.10	1.61	1.15	1.44	0.741	1.41
40x40	3	1.83	6	2.4	2.36	1.08	3.51	5.55	1.47	1.22	1.53	0.789	1.20
	4	2.42	6	2.4	3.09	1.12	4.53	7.18	1.89	1.21	1.52	0.782	1.58
	5	2.95	6	2.4	3.80	1.17	5.48	8.68	2.29	1.20	1.51	0.776	1.94
	6	3.52	6	2.4	4.49	1.20	6.37	10.1	2.69	1.19	1.50	0.773	2.28
45x45	4	2.74	7	2.4	3.52	1.24	6.59	10.4	2.75	1.37	1.72	0.884	2.02
	5	3.38	7	2.4	4.33	1.29	7.99	12.6	3.34	1.36	1.71	0.878	2.49
50x50	3	2.33	7	2.4	2.99	1.32	7.06	11.1	2.97	1.54	1.93	0.997	1.92
	4	3.06	7	2.4	3.92	1.37	9.17	14.5	3.82	1.53	1.92	0.987	2.52
	4.5	3.40	7	2.4	4.38	1.39	10.2	16.1	4.23	1.52	1.92	0.984	2.82
	5	3.77	7	2.4	4.83	1.41	11.2	17.7	4.64	1.52	1.91	0.980	3.11
	6	4.43	7	2.4	5.72	1.45	13.0	20.6	5.43	1.51	1.90	0.974	3.67
	8	5.78	7	2.4	7.44	1.53	16.5	25.9	6.97	1.49	1.87	0.968	4.74
60x60	5	4.55	8	2.4	5.86	1.65	19.8	31.4	8.24	1.84	2.31	1.19	4.56
	6	5.42	8	2.4	6.95	1.70	23.2	36.8	9.65	1.83	2.30	1.18	5.40
63X63	5	4.75	8	2.4	6.16	1.73	23.1	36.6	9.58	1.93	2.44	1.25	5.05
	6	5.71	8	2.4	7.31	1.77	27.1	42.9	11.2	1.92	2.42	1.24	5.98
	8	7.42	8	2.4	9.55	1.85	34.5	54.6	14.4	1.90	2.39	1.23	7.76
65x65	5	5.00	9	2.4	6.40	1.77	25.5	40.3	10.6	2.00	2.51	1.29	5.39
	6	5.91	9	2.4	7.59	1.82	29.9	47.4	12.4	1.98	2.50	1.28	6.38
	8	7.66	9	2.4	9.91	1.90	38.2	60.4	15.9	1.96	2.47	1.27	8.29
	9	8.55	9	2.4	11.0	1.94	42.0	66.4	17.6	1.95	2.45	1.26	9.21
70x70	6	6.38	9	2.4	8.19	1.94	37.7	59.8	15.7	2.15	2.70	1.38	7.46
	7	7.38	9	2.4	9.46	1.98	43.1	68.3	17.9	2.13	2.69	1.38	8.59
75x75	5.5	6.30	10	4.8	8.06	2.02	42.2	66.8	17.6	2.29	2.88	1.48	7.71
	6	6.85	10	4.8	8.76	2.04	45.7	72.4	19.0	2.28	2.88	1.47	8.38
	8	9.03	10	4.8	11.5	2.13	59.0	93.5	24.5	2.27	2.85	1.46	11.0
	9	9.96	10	4.8	12.8	2.17	65.3	103	27.2	2.26	2.84	1.46	12.3
	10	10.99	10	4.8	14.1	2.21	71.3	113	29.8	2.25	2.83	1.45	13.5
	12	13.00	10	4.8	16.7	2.29	82.7	130	35.0	2.23	2.80	1.45	15.9
80x80	6	7.34	10	4.8	9.36	2.17	56.0	88.7	23.2	2.45	3.08	1.58	9.6
	8	9.66	10	4.8	12.3	2.26	72.4	115	30.0	2.43	3.06	1.56	12.6
	10	11.8	10	4.8	15.1	2.34	87.7	139	36.5	2.41	3.03	1.55	15.5

Dimensions	EN 10056/ JIS G 3192
Specification	EN10025/ ASTM A36/ ASTM A572/ JIS G 3101
Size Range	25mm x 25mm to 250mm x 250mm



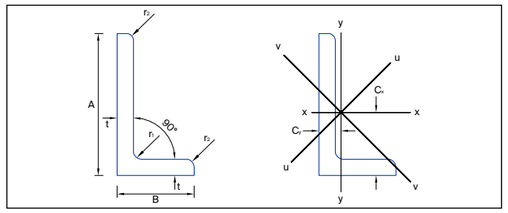
Designation		Mass per Metre	Radius		Area of Section	Distance Centre of Gravity	Second Moment of Area			Radius of Gyration			Elastic Modulus
Size	Thickness		Root	Toe			Axis x-x, y-y	Axis u-u	Axis v-v	Axis x-x, y-y	Axis u-u	Axis v-v	Axis x-x, y-y
AxA	t		r_1	r_2		C_x and C_y							
mm	mm	kg/m	mm	mm	cm^2	cm	cm^4	cm^4	cm^4	cm	cm	cm	cm^3
90x90	6	8.30	11	4.8	10.6	2.41	81.0	128	33.7	2.76	3.48	1.78	12.3
	7	9.61	11	4.8	12.3	2.46	93.2	148	38.7	2.76	3.47	1.77	14.3
	8	10.90	11	4.8	13.9	2.50	105	167	43.5	2.75	3.46	1.77	16.2
	9	12.20	11	4.8	15.6	2.54	117	185	48.2	2.74	3.45	1.76	18.0
	10	13.40	11	4.8	17.2	2.58	128	202	52.9	2.73	3.43	1.76	19.9
	12	15.90	11	4.8	20.3	2.66	149	235	62.1	2.70	3.40	1.75	23.5
	13	17.00	11	4.8	21.9	2.70	159	251	66.6	2.69	3.39	1.74	25.2
100x100	6	9.20	12	4.8	11.9	2.65	113	178	47.0	3.08	3.88	1.99	15.3
	7	10.70	12	4.8	13.7	2.70	130	206	53.9	3.08	3.87	1.98	17.8
	8	12.20	12	4.8	15.6	2.75	146	232	60.6	3.07	3.86	1.97	20.2
	10	15.00	12	4.8	19.2	2.83	178	283	73.8	3.05	3.84	1.96	24.8
	12	17.80	12	4.8	22.8	2.91	208	330	86.5	3.02	3.81	1.95	29.4
	13	19.10	12	4.8	24.5	2.95	222	352	92.8	3.01	3.79	1.95	31.5
	15	21.90	12	4.8	28.0	3.02	250	395	105	2.99	3.76	1.94	35.8
120x120	8	14.70	13	4.8	18.8	3.24	259	411	107	3.71	4.67	2.38	29.5
	10	18.20	13	4.8	23.3	3.32	316	502	130	3.69	4.64	2.37	36.4
	12	21.60	13	4.8	27.6	3.41	371	588	153	3.66	4.62	2.36	43.1
	15	26.60	13	4.8	34.0	3.52	448	710	186	3.63	4.57	2.34	52.8
125x125	8	14.90	14	4.8	19.7	3.36	294	466	122	3.87	4.87	2.49	32.2
	10	19.09	14	4.8	24.3	3.44	360	570	149	3.84	4.84	2.47	39.7
	12	22.67	14	4.8	28.9	3.53	422	669	174	3.82	4.81	2.46	47.0
130x130	8	15.90	14	4.8	20.5	3.48	332	527	138	4.03	5.07	2.59	34.9
	9	17.90	14	4.8	22.9	3.53	370	586	153	4.02	5.06	2.58	39.0
	10	19.70	14	4.8	25.3	3.57	406	645	168	4.01	5.05	2.57	43.1
	12	23.50	14	4.8	30.1	3.65	477	758	197	3.98	5.02	2.56	51.1
	15	28.80	14	4.8	37.1	3.77	578	916	240	3.95	4.97	2.54	62.6
	16	30.70	14	4.8	39.4	3.81	610	966	253	3.94	4.95	2.54	66.3
150x150	8	18.00	16	4.8	23.8	3.97	518	820	215	4.66	5.87	3.01	46.9
	10	23.00	16	4.8	29.5	4.06	635	1008	263	4.64	5.85	2.99	58.0
	12	27.30	16	4.8	35.0	4.14	748	1187	309	4.62	5.82	2.97	68.9
	15	33.80	16	4.8	43.2	4.26	909	1442	375	4.59	5.78	2.95	84.6
	16	35.70	16	4.8	45.9	4.30	960	1523	397	4.57	5.76	2.94	89.8
	18	40.10	16	4.8	51.2	4.38	1060	1680	440	4.55	5.73	2.93	99.8
	19	41.90	16	4.8	53.8	4.42	1109	1756	462	4.54	5.71	2.93	105
175x175	12	31.80	16	4.8	41.0	4.77	1208	1920	497	5.43	6.84	3.48	94.9
	15	39.40	16	4.8	50.7	4.89	1474	2342	606	5.39	6.80	3.46	117
200x200	12	36.55	18	4.8	47.2	5.38	1829	2906	753	6.23	7.85	4.00	125
	13	39.49	18	4.8	50.9	5.42	1967	3126	809	6.22	7.84	3.99	135
	15	45.30	18	4.8	58.3	5.50	2237	3555	919	6.19	7.81	3.97	154
	16	48.50	18	4.8	62.0	5.54	2369	3765	973	6.18	7.79	3.96	164
	18	54.20	18	4.8	69.4	5.62	2627	4174	1080	6.15	7.76	3.95	183
	20	59.90	18	4.8	76.6	5.70	2877	4569	1185	6.13	7.72	3.93	201
	24	71.10	18	4.8	90.8	5.85	3357	5322	1391	6.08	7.65	3.91	237
	25	73.60	18	4.8	94.3	5.89	3472	5502	1442	6.07	7.64	3.91	246
	26	76.80	18	4.8	97.8	5.93	3586	5680	1492	6.05	7.62	3.91	255
250x250	25	93.70	20	4.8	120	7.14	7030	11170	2891	7.67	9.67	4.92	394
	28	104.00	20	4.8	133	7.25	7741	12290	3195	7.63	9.61	4.90	436
	32	118.00	20	4.8	151	7.40	8650	13710	3593	7.58	9.54	4.89	491
	35	128.00	20	4.8	164	7.51	9305	14720	3887	7.54	9.49	4.88	532

4.2 Unequal Angles

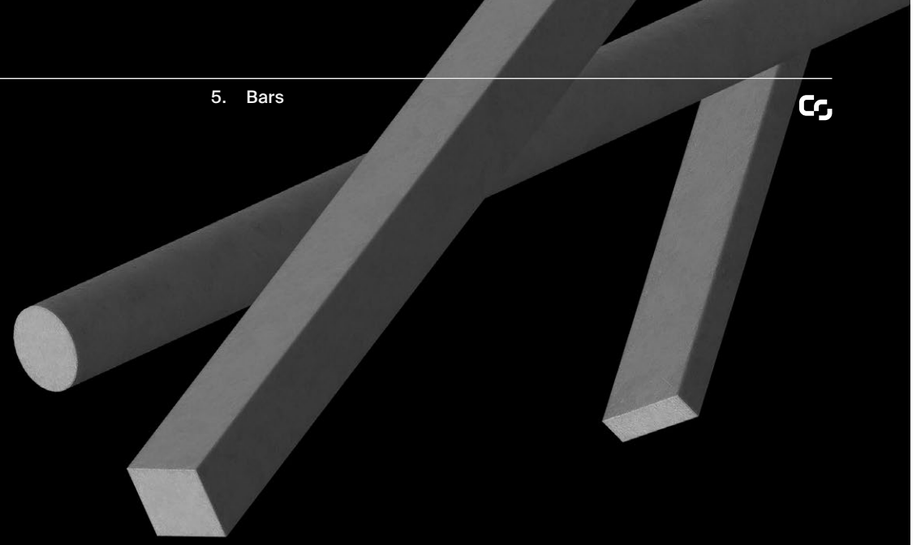


Designation		Mass per Metre	Radius		Area of Section	Distance Centre of Gravity		Second Moment of Area				Radius of Gyration				Elastic Modulus		Angle
Size	Thick-ness		Root	Toe				Axis x-x	Axis y-y	Axis u-u	Axis v-v	Axis x-x	Axis y-y	Axis u-u	Axis v-v	Axis x-x	Axis y-y	x-x Axis to u-u Axis
AxB	t		r1	r2		Cx	Cy											
mm	mm	kg/m	mm	mm	cm²	cm	cm	cm⁴	cm⁴	cm⁴	cm⁴	cm	cm	cm	cm	cm³	cm³	
63x38	4.5	3.45	6	2.4	4.4	2.10	0.870	18.0	4.90	20.0	3.00	2.01	1.06	2.12	0.820	4.20	1.68	0.362
	6	4.43	6	2.4	5.75	2.17	0.930	23.0	6.30	25.0	3.80	1.99	1.04	2.10	0.820	5.50	2.18	0.358
75x50	6	5.65	7	2.4	7.22	2.45	1.21	40.9	14.6	47.1	8.48	2.38	1.42	2.55	1.08	8.10	3.87	0.436
	8	7.39	7	2.4	9.44	2.53	1.29	52.4	18.6	60.1	10.9	2.36	1.40	2.52	1.07	10.5	5.01	0.430
100x65	7	8.8	10	4.8	11.2	3.23	1.52	113	37.7	128	22.1	3.18	1.84	3.39	1.41	16.7	7.56	0.415
	8	9.4	10	4.8	12.7	3.28	1.56	127	42.3	144	24.9	3.17	1.83	3.38	1.40	18.9	8.57	0.414
	9	11.0	10	7.0	14.0	3.31	1.58	138	45.5	157	26.8	3.14	1.80	3.34	1.38	20.6	9.26	0.410
	10	12.3	10	4.8	15.6	3.36	1.64	154	51.1	175	30.2	3.14	1.81	3.35	1.39	23.2	10.5	0.410
	12	14.4	10	7.0	18.4	3.43	1.70	177	58.0	201	34.7	3.11	1.78	3.30	1.37	27.0	12.1	0.404
100x75	7	9.3	10	5.0	11.9	3.06	1.84	118	56.9	144	30.7	3.15	2.19	3.49	1.61	17.0	10.1	0.548
	8	10.6	10	4.8	13.5	3.11	1.88	133	64.2	163	34.6	3.14	2.18	3.48	1.60	19.3	11.4	0.548
	9	11.8	10	4.8	15.1	3.15	1.92	148	71.1	181	38.4	3.13	2.17	3.46	1.60	21.6	12.7	0.546
	10	13.0	10	4.8	16.6	3.19	1.96	162	77.7	198	42.2	3.12	2.16	3.45	1.59	23.8	14.0	0.545
	12	15.4	10	4.8	19.7	3.27	2.03	189	90.3	230	49.5	3.10	2.14	3.42	1.59	28.1	16.5	0.541
	13	16.5	10	4.8	21.2	3.31	2.07	202	96.3	245	53.1	3.09	2.13	3.40	1.58	30.2	17.7	0.539
125x75	6.5	10.0	11	4.8	12.7	4.07	1.62	206	56.6	228	34.4	4.02	2.11	4.23	1.64	24.4	9.63	0.360
	7	10.7	11	4.8	13.7	4.10	1.64	220	60.5	244	36.7	4.01	2.10	4.22	1.64	26.2	10.3	0.360
	8	12.2	11	4.8	15.5	4.14	1.69	249	68.1	275	41.3	4.00	2.10	4.21	1.63	29.7	11.7	0.360
	9	13.5	11	4.8	17.4	4.19	1.73	276	75.5	306	45.8	3.99	2.09	4.20	1.62	33.2	13.1	0.359
	10	15.0	11	4.8	19.2	4.23	1.77	303	82.6	336	50.2	3.98	2.08	4.18	1.62	36.7	14.4	0.358
	12	17.8	11	4.8	22.7	4.32	1.84	355	96.0	392	58.8	3.95	2.06	4.16	1.61	43.4	17.0	0.354
	13	19.1	10	7.0	24.3	4.35	1.87	376	101	414	61.9	3.93	2.04	4.13	1.60	46.1	17.9	0.352

Dimensions	EN 10056/ JIS G 3192
Specification	EN10025/ ASTM A36/ ASTM A572/ JIS G 3101
Size Range	30mm x 20mm to 200mm x 150mm



Designation		Mass per Metre	Radius		Area of Section	Distance Centre of Gravity		Second Moment of Area				Radius of Gyration				Elastic Modulus		Angle
Size	Thick-ness		Root	Toe				Axis x-x	Axis y-y	Axis u-u	Axis v-v	Axis x-x	Axis y-y	Axis u-u	Axis v-v	Axis x-x	Axis y-y	x-x Axis to u-u Axis
AxB	t		r1	r2		Cx	Cy											
mm	mm	kg/m	mm	mm	cm²	cm	cm	cm⁴	cm⁴	cm⁴	cm⁴	cm	cm	cm	cm	cm³	cm³	
150x75	7	12.1	12	5.0	15.5	5.17	1.50	364	63.1	386	40.8	4.85	2.02	5.00	1.62	37.0	10.5	0.263
	8	13.8	11	4.8	17.5	5.23	1.54	411	71.2	436	45.8	4.84	2.02	4.99	1.62	42.1	11.9	0.263
	9	15.3	12	8.5	19.4	5.25	1.55	447	75.3	473	48.7	4.79	1.97	4.93	1.58	45.8	12.7	0.259
	10	17.0	11	4.8	21.7	5.32	1.62	503	86.3	533	55.8	4.82	2.00	4.96	1.60	52.0	14.7	0.261
	12	20.2	11	4.8	25.7	5.41	1.70	591	100	626	65.3	4.79	1.98	4.93	1.59	61.6	17.3	0.259
	15	24.8	11	4.8	31.7	5.53	1.81	715	120	756	79.2	4.75	1.95	4.89	1.58	75.5	21.1	0.254
150x90	8	14.3	10	5.0	18.7	4.93	1.97	436	121	484	72.7	4.83	2.54	5.09	1.97	43.3	17.2	0.364
	9	16.4	12	6.0	20.9	4.95	2.00	485	133	537	80.5	4.81	2.52	5.06	1.96	48.2	19.0	0.361
	10	18.2	12	4.8	23.2	5.00	2.04	536	147	595	89.2	4.81	2.52	5.06	1.96	53.7	21.2	0.361
	12	21.6	12	4.8	27.6	5.09	2.12	630	172	698	105	4.78	2.50	5.03	1.95	63.6	25.0	0.359
	15	26.6	12	4.8	34.0	5.21	2.24	764	207	844	127	4.74	2.47	4.99	1.93	78.1	30.6	0.354
150x100	8	15.2	12	8.5	19.4	4.70	2.24	441	158	508	90.9	4.77	2.86	5.12	2.17	42.8	20.3	0.437
	9	17.1	12	6.0	21.8	4.77	2.30	502	181	579	104	4.79	2.88	5.15	2.18	49.1	23.5	0.439
	10	19.0	13	6.5	24.2	4.80	2.34	552	198	635	114	4.78	2.86	5.13	2.17	54.1	25.8	0.437
	12	22.4	12	8.5	28.6	4.88	2.41	642	228	738	132	4.74	2.83	5.08	2.15	63.4	30.1	0.435
	15	27.7	12	8.5	35.2	5.01	2.53	781	276	897	161	4.71	2.80	5.04	2.14	78.2	37.0	0.431
200x100	10	23.0	15	4.8	29.4	6.95	2.03	1233	215	1309	138	6.48	2.70	6.68	2.17	94.5	27.0	0.264
	12	27.3	15	4.8	34.9	7.04	2.11	1454	252	1544	162	6.45	2.68	6.65	2.16	112	31.9	0.263
	15	33.7	15	4.8	43.1	7.17	2.23	1772	303	1879	197	6.41	2.65	6.60	2.14	138	39.0	0.260
200x150	12	32.0	15	4.8	40.9	6.10	3.63	1667	813	2046	434	6.38	4.45	7.07	3.26	120	71.5	0.554
	15	39.6	15	4.8	50.6	6.22	3.75	2037	989	2496	530	6.34	4.42	7.02	3.23	148	87.9	0.552
	18	47.4	15	4.8	60.1	6.34	3.86	2390	1155	2923	622	6.30	4.38	6.97	3.22	175	104	0.549



5. Bars

Steel bars are long steel products commonly used in construction and manufacturing, having a round, square or rectangular cross section.

5.1 Flat Bars

5.2 Round Bars

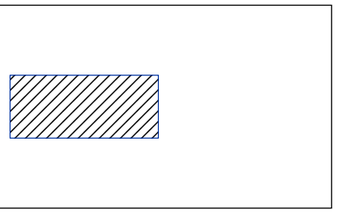
5.3 Square Bars

Bars
Standard specifications

The standard specifications used for production of universal beams and columns in this region are listed in this table.

Material	Yield strength N/mm²			Tensile strength N/mm²	Min. Elongation $L_0=5.65\sqrt{S_0}$	Min. Charpy V-notch.	Dimensions & Tolerances
AS 3679.1	**≤11mm**	**>11 - <40mm**	**≥40mm**				***AS 3679.1***
Grade 300	320	300	280	min. 440	22%	27J @ 0°C	
Grade 350	360	340	330	min. 480	20%	27J @ 0°C	
ASTM A36 (1996)	min. 250			400-550	20-21 %	-	***ASTM A6***
ASTM A572							
Grade 42	min. 290			min. 415	20-24 %	-	
Grade 50	min. 345			min. 450	18-21 %	-	
Grade 60	min. 415			min. 520	16-18 %	-	
Grade 65	min. 450			min. 550	15-17 %	-	
ASTM A992	345 - 450			min. 450	18-21 %	-	
EN 10025	**≤16mm**	**>16 - ≤40mm**	**>40 - ≤150mm**	**3-100mm**			***EN 10058 - Flat EN10059 - Square EN10060 - Round***
S275JR	275	265	255 - 225	410-560	18-23 %	27J @ 20°C	
S355JR	355	345	335 - 295	470-630	17-22 %	27J @ 20°C	
S355J0	355	345	335 - 295	470-630	17-22 %	27J @ 0°C	
S355J2	355	345	335 - 295	470-630	17-22 %	27J @ -20°C	
JIS 3101	**≤16mm**	**>16 - ≤40mm**	**>40 - ≤100mm**	**t<100mm**			***JIS 3192***
SS400	245	235	215	400-510	17-23 %	-	
SS490	285	275	255	490-610	15-21 %	-	
SS540	400	390	-	min. 540	13-17 %	-	
JIS 3106	**≤16mm**	**>16 - ≤40mm**	**>40mm**	**t<100mm**			
SM400A	245	235	215	400-510	18-24 %	-	
SM400B	245	235	215	400-510	18-24 %	27J @ 0°C	
SM400C	245	235	215	400-510	18-24 %	47J @ 0°C	
SM490A	325	315	295	490-610	17-23 %	-	
SM490B	325	315	295	490-610	17-23 %	27J @ 0°C	
SM490C	325	315	295	490-610	17-23 %	47J @ 0°C	
SM490YA	365	355	335	490-610	15-21 %	-	
SM490YB	365	355	335	490-610	15-21 %	27J @ 0°C	
SM520B	365	355	335	520-640	15-21%	27J @ 0°C	
SM520C	365	355	335	520-640	15-21 %	47J @ 0°C	

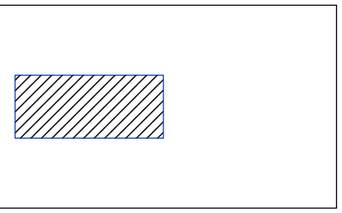
5.1 Flat Bars



Section Size		Unit Weight	Section Area
Thickness	Width	M	A
mm	mm	kg/m	cm²
3	12	0.283	0.360
	16	0.377	0.480
	19	0.447	0.570
	25	0.589	0.750
	32	0.754	0.960
	38	0.895	1.14
	50	1.18	1.50
	65	1.53	1.95
	75	1.77	2.25
	100	2.36	3.00
4.5	25	0.883	1.13
	32	1.13	1.44
	35	1.24	1.58
	38	1.34	1.71
	44	1.55	1.98
	50	1.77	2.25
	65	2.30	2.93
	75	2.65	3.38
	100	3.53	4.50
6	25	1.18	1.50
	32	1.51	1.92
	35	1.65	2.10
	38	1.79	2.28
	40	1.88	2.40
	44	2.07	2.64
	50	2.36	3.00
	65	3.06	3.90
	75	3.53	4.50
	90	4.24	5.40
	100	4.71	6.00
	125	5.89	7.50
	150	7.07	9.00
	175	8.24	10.5
	200	9.42	12.0

Section Size		Unit Weight	Section Area
Thickness	Width	M	A
mm	mm	kg/m	cm²
8	25	1.57	2.00
	32	2.01	2.56
	38	2.39	3.04
	44	2.76	3.52
	50	3.14	4.00
	65	4.08	5.20
	75	4.71	6.00
	90	5.65	7.20
	100	6.28	8.00
	125	7.85	10.0
	150	9.42	12.0
	200	12.56	16.0
9	19	1.34	1.71
	25	1.77	2.25
	32	2.26	2.88
	38	2.68	3.42
	44	3.11	3.96
	50	3.53	4.50
	65	4.59	5.85
	75	5.30	6.75
	90	6.36	8.10
	100	7.07	9.00
	125	8.83	11.3
	150	10.60	13.5
	180	12.72	16.2
	200	14.13	18.0
	250	17.66	22.5
	300	21.20	27.0
12	25	2.36	3.00
	32	3.01	3.84

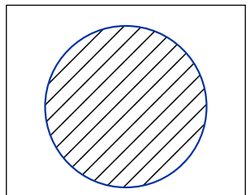
Dimensions	EN10058/ ASTM A6
Specification	EN10025/ ASTM A36/ ASTM A572
Size Range	3mm x 25mm to 25mm x 200mm



Section Size		Unit Weight	Section Area
Thickness	Width	M	A
mm	mm	kg/m	cm²
12	38	3.58	4.56
	40	3.77	4.80
	44	4.14	5.28
	50	4.71	6.00
	65	6.12	7.80
	75	7.07	9.00
	90	8.48	10.8
	100	9.42	12.0
	125	11.78	15.0
	150	14.13	18.0
	180	16.96	21.6
	200	18.84	24.0
	250	23.55	30.0
	300	28.26	36.0
16	25	3.14	4.00
	32	4.02	5.12
	38	4.77	6.08
	50	6.28	8.00
	65	8.16	10.4
	75	9.42	12.0
	90	11.30	14.4
	100	12.56	16.0
	125	15.70	20.0
	150	18.84	24.0
	200	25.12	32.0
19	38	5.67	7.2
	50	7.46	9.5
	65	9.69	12.4
	75	11.19	14.3
	90	13.42	17.1

Section Size		Unit Weight	Section Area
Thickness	Width	M	A
mm	mm	kg/m	cm²
19	100	14.92	19.0
	125	18.64	23.8
	150	22.37	28.5
	200	29.83	38.0
	250	37.29	47.5
	300	44.75	57.0
25	50	9.81	12.5
	65	12.76	16.3
	75	14.72	18.8
	90	17.66	22.5
	100	19.63	25.0
	125	24.53	31.3
	150	29.44	37.5
32	100	25.12	32.0
	125	31.40	40.0
	150	37.68	48.0
	180	45.22	57.6
	200	50.24	64.0
	230	57.78	73.6
	250	62.80	80.0
	280	70.34	89.6
	300	75.36	96.0
36	100	28.26	36.0
	125	35.33	45.0
	150	42.39	54.0
	180	50.87	64.8
	200	56.52	72.0

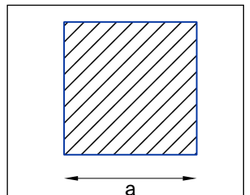
5.2
Round Bars



Dimensions	EN10058/ ASTM A6
Specification	EN10025/ ASTM A36/ ASTM A572
Size Range	3mm x 25mm to 25mm x 200mm

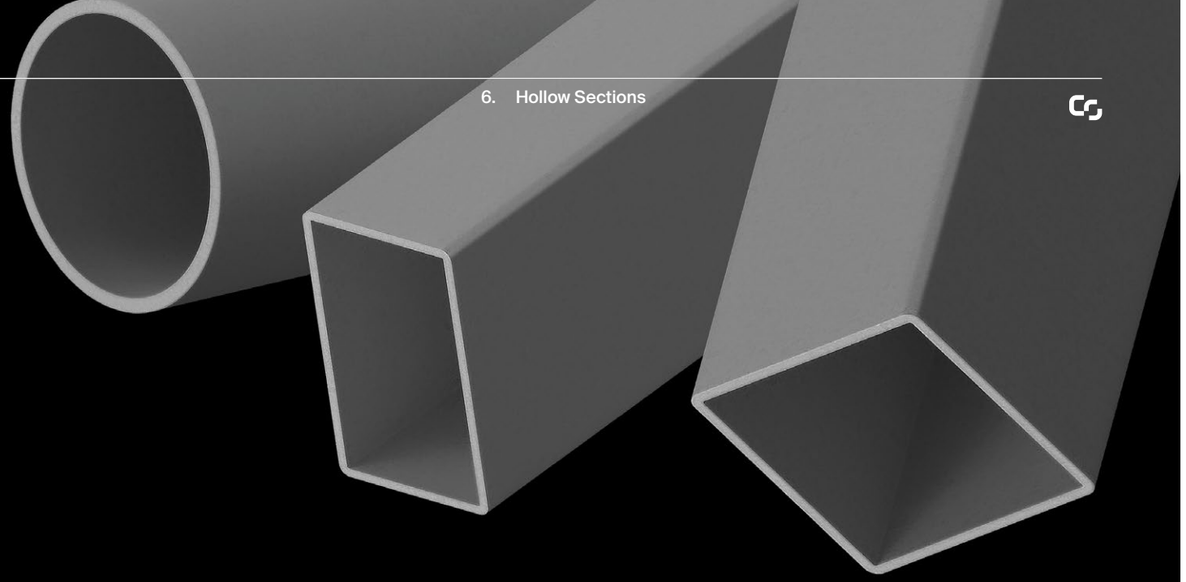
Section Size	Unit Weight	Section Area
	M	A
mm	kg/m	cm2
6	0.222	0.283
10	0.617	0.785
12	0.888	1.13
13	1.04	1.33
14	1.21	1.54
16	1.58	2.01
18	2.00	2.54
19	2.23	2.84
20	2.47	3.14
22	2.98	3.80
24	3.55	4.52
25	3.85	4.91
26	4.17	5.31
28	4.83	6.16
29	5.19	6.61
30	5.55	7.07
32	6.31	8.04
35	7.55	9.62
38	8.90	11.3
40	9.86	12.6
44	11.9	15.2
45	12.5	15.9
50	15.4	19.6
60	22.2	28.3
65	26.0	33.2
75	34.7	44.2
90	49.9	63.6
100	61.7	78.5
125	96.3	123
150	139	177
200	247	314

5.3
Square Bars



Dimensions	EN10059/ ASTM A6
Specification	EN10025/ ASTM A36/ ASTM A572
Size Range	8mm to 260mm

Designation			Area of Section	Second Moment of Inertia	Radius of Gyration	Elastic Modulus	Plastic Modulus
Size a	Mass per Metre						
mm	kg/m	lb/ft	mm^2	mm^4	mm	mm^3	mm^3
9	0.64	0.43	81.0	547	2.60	121	182
10	0.79	0.53	100	833	2.89	167	250
12	1.13	0.76	144	1728	3.46	288	432
13	1.33	0.89	169	2380	3.75	366	549
16	2.01	1.35	256	5461	4.62	683	1024
18	2.54	1.71	324	8748	5.20	972	1458
19	2.83	1.90	361	10860	5.48	1143	1715
22	3.80	2.55	484	19520	6.35	1775	2662
25	4.91	3.30	625	32550	7.22	2604	3906
28	6.15	4.14	784	51220	8.08	3659	5488
30	7.07	4.75	900	67500	8.66	4500	6750
32	8.04	5.40	1024	87380	9.24	5461	8192
36	10.17	6.84	1296	140000	10.4	7776	11660
38	11.34	7.62	1444	173800	11.0	9145	13720
40	12.56	8.44	1600	213300	11.5	10670	16000
44	15.20	10.21	1936	312300	12.7	14200	21300
45	15.90	10.68	2025	341700	13.0	15190	22780
50	19.63	13.19	2500	520800	14.4	20830	31250
55	23.75	15.96	3025	762600	15.9	27730	41590
60	28.26	18.99	3600	1080000	17.3	36000	54000
65	33.17	22.29	4225	1488000	18.8	45770	68660
75	44.16	29.67	5625	2637000	21.7	70310	105500
80	50.24	33.76	6400	3413000	23.1	85330	128000
85	56.72	38.11	7225	4350000	24.5	102400	153500
90	63.59	42.73	8100	5468000	26.0	121500	182300
95	70.85	47.61	9025	6788000	27.4	142900	214300
100	78.50	52.75	10000	8333000	28.9	166700	250000



6. Hollow Sections

Structural steel tubes that can be circular, hollow or rectangular, each with its own attributes, used for a wide range of construction and industrial applications.

6.1 Hot Finished

6.1.1 Circular Hollow Section (CHS)

6.1.2 Rectangular Hollow Section (RHS)

6.1.3 Square Hollow Section (SHS)

6.2 Cold Formed

6.2.1 Circular Hollow Section (CHS)

6.2.2 Rectangular Hollow Section (RHS)

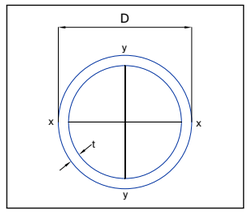
6.2.3 Square Hollow Section (SHS)

6.1 Hot Finished Hollow Sections
Standard specifications

Material	Yield strength N/mm²						Tensile strength N/mm²	Min. Elongation $L_0=5.65\sqrt{S_0}$	Min. Charpy V-notch.	Dimensions & Tolerances
EN 10210	≤16mm	>16 - ≤40mm	>40 - ≤63mm	>63 - ≤80mm	>80 - ≤100mm	>100 - ≤120mm	3-100mm			*EN10210*
S275J0H	275	265	255	245	235	225	410-560	19-23 %	27J @ 0°C	
S275J2H	275	265	255	245	235	225	410-560	19-23 %	27J @ -20°C	
S355J0H	355	345	335	325	315	295	470-630	18-22 %	27J @ 0°C	
S355J2H	355	345	335	325	315	295	470-630	18-22 %	27J @ -20°C	
S355NH	355	345	335	-	-	-	470-630	22%	40J @ -20°C	
S420NH	420	400	390	-	-	-	520-680	19%	40J @ -20°C	
S460NH	460	440	430	-	-	-	540-720	17%	40J @ -20°C	

* S460NH only available up to 16mm thickness

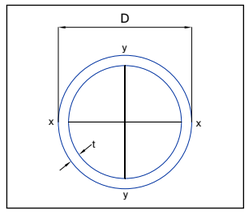
6.1.1 Hot Finished Circular Hollow Section (CHS)



Designation			Mass per Metre	Area of Section	Second Moment of Inertia	Radius of Gyration	Elastic Modulus	Plastic Modulus	Torsional Constants		Surface Area per Metre
Outside Diameter	Thickness										
D	t			A	I	r	Z	S	J	C	
mm	mm		kg/m	cm²	cm⁴	cm	cm³	cm³	cm⁴	cm³	m²/m
21.3	2.3		1.08	1.37	0.629	0.677	0.590	0.834	1.26	1.18	0.067
	3.2		1.43	1.82	0.768	0.650	0.722	1.06	1.54	1.44	0.067
26.9	2.3		1.40	1.78	1.36	0.874	1.01	1.40	2.71	2.02	0.085
	3.2		1.87	2.38	1.70	0.846	1.27	1.81	3.41	2.53	0.085
33.7	2.6		1.99	2.54	3.09	1.10	1.84	2.52	6.19	3.67	0.106
	2.9	*	2.20	2.81	3.36	1.09	1.99	2.76	6.71	3.98	0.106
	3.0	*	2.27	2.89	3.44	1.09	2.04	2.84	6.88	4.08	0.106
	3.2		2.41	3.07	3.60	1.08	2.14	2.99	7.21	4.28	0.106
	4.0		2.93	3.73	4.19	1.06	2.49	3.55	8.38	4.97	0.106
	5.0	*	3.54	4.51	4.78	1.03	2.84	4.16	9.57	5.68	0.106
42.4	2.6		2.55	3.25	6.46	1.41	3.05	4.12	12.9	6.10	0.133
	2.9	*	2.82	3.60	7.06	1.40	3.33	4.53	14.1	6.66	0.133
	3.0	*	2.91	3.71	7.25	1.40	3.42	4.67	14.5	6.84	0.133
	3.2		3.09	3.94	7.62	1.39	3.59	4.93	15.2	7.19	0.133
	3.6	*	3.44	4.39	8.33	1.38	3.93	5.44	16.7	7.86	0.133
	4.0		3.79	4.83	8.99	1.36	4.24	5.92	18.0	8.48	0.133
	5.0	*	4.61	5.87	10.5	1.33	4.93	7.04	20.9	9.86	0.133
	6.3	*	5.61	7.14	12.0	1.30	5.66	8.29	24.0	11.3	0.133
	8.0	*	6.79	8.65	13.5	1.25	6.36	9.64	27.0	12.7	0.133
48.3	2.5	*	2.82	3.60	9.46	1.62	3.92	5.25	18.9	7.83	0.152
	2.6		2.93	3.73	9.78	1.62	4.05	5.44	19.6	8.10	0.152
	2.9	*	3.25	4.14	10.7	1.61	4.43	5.99	21.4	8.86	0.152
	3.0	*	3.35	4.27	11.0	1.61	4.55	6.17	22.0	9.11	0.152
	3.2		3.56	4.53	11.6	1.60	4.80	6.52	23.2	9.59	0.152
	4.0		4.37	5.57	13.8	1.57	5.70	7.87	27.5	11.4	0.152
	5.0		5.34	6.80	16.2	1.54	6.69	9.42	32.3	13.4	0.152
	6.3	*	6.53	8.31	18.7	1.50	7.76	11.2	37.5	15.5	0.152
	8.0	*	7.95	10.1	21.4	1.45	8.85	13.2	42.7	17.7	0.152
60.3	2.5	*	3.56	4.54	19.0	2.05	6.30	8.36	38.0	12.6	0.189
	2.6		3.70	4.71	19.7	2.04	6.52	8.66	39.3	13.0	0.189
	3.0	*	4.24	5.40	22.2	2.03	7.37	9.86	44.4	14.7	0.189
	3.2		4.51	5.74	23.5	2.02	7.78	10.4	46.9	15.6	0.189
	4.0		5.55	7.07	28.2	2.00	9.34	12.7	56.3	18.7	0.189
	5.0		6.82	8.69	33.5	1.96	11.1	15.3	67.0	22.2	0.189
	6.3	*	8.39	10.7	39.5	1.92	13.1	18.5	79.0	26.2	0.189
	8.0	*	10.32	13.1	46.0	1.87	15.3	22.1	92.0	30.5	0.189
	10.0	*	12.40	15.8	52.0	1.81	17.2	25.6	104	34.5	0.189
76.1	2.5	*	4.54	5.78	39.2	2.60	10.3	13.5	78.4	20.6	0.239
	2.6		4.71	6.00	40.6	2.60	10.7	14.1	81.2	21.3	0.239
	3.0	*	5.41	6.89	46.1	2.59	12.1	16.0	92.2	24.2	0.239
	3.2		5.75	7.33	48.8	2.58	12.8	17.0	97.6	25.6	0.239
	4.0		7.11	9.06	59.1	2.55	15.5	20.8	118	31.0	0.239

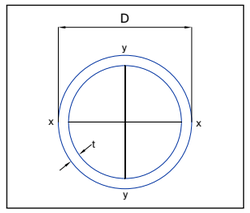
* Sizes not included in BS EN 10210 Part 2 (1997)

Dimensions	EN10210-2
Specification	EN10210-1
Size Range	OD 21.3mm to 1219mm



Designation			Mass per Metre	Area of Section	Second Moment of Inertia	Radius of Gyration	Elastic Modulus	Plastic Modulus	Torsional Constants		Surface Area per Metre
Outside Diameter	Thickness										
D	t			A	I	r	Z	S	J	C	
mm	mm		kg/m	cm²	cm⁴	cm	cm³	cm³	cm⁴	cm³	m²/m
76.1	5.0		8.77	11.2	70.9	2.52	18.6	25.3	142	37.3	0.239
	6.0	*	10.37	13.2	81.8	2.49	21.5	29.6	164	43.0	0.239
	6.3	*	10.84	13.8	84.8	2.48	22.3	30.8	170	44.6	0.239
	8.0	*	13.44	17.1	101	2.42	26.4	37.3	201	52.9	0.239
	10.0	*	16.30	20.8	116	2.36	30.5	44.0	232	61.0	0.239
	12.0	*	18.97	24.2	128	2.31	33.8	49.9	257	67.5	0.239
88.9	2.5	*	5.33	6.79	63.4	3.06	14.3	18.7	127	28.5	0.279
	3.0	*	6.36	8.10	74.8	3.04	16.8	22.1	150	33.6	0.279
	3.2		6.76	8.62	79.2	3.03	17.8	23.5	158	35.6	0.279
	3.6	*	7.57	9.65	87.9	3.02	19.8	26.2	176	39.5	0.279
	4.0		8.38	10.7	96.3	3.00	21.7	28.9	193	43.3	0.279
	5.0		10.35	13.2	116	2.97	26.2	35.2	233	52.4	0.279
	6.0		12.27	15.6	135	2.94	30.4	41.3	270	60.7	0.279
	6.3		12.83	16.3	140	2.93	31.5	43.1	280	63.1	0.279
	8.0	*	15.96	20.3	168	2.87	37.8	52.5	336	75.6	0.279
	10.0	*	19.46	24.8	196	2.81	44.1	62.6	392	88.2	0.279
	12.0	*	22.76	29.0	220	2.75	49.4	71.5	439	98.8	0.279
	14.0	*	25.86	32.9	239	2.69	53.8	79.5	478	108	0.279
101.6	3.6	*	8.70	11.1	133	3.47	26.2	34.6	266	52.5	0.319
	5.0		11.91	15.2	177	3.42	34.9	46.7	355	69.9	0.319
	6.3		14.81	18.9	215	3.38	42.3	57.3	430	84.7	0.319
	8.0		18.47	23.5	260	3.32	51.1	70.3	519	102	0.319
	10.0		22.59	28.8	305	3.26	60.1	84.2	611	120	0.319
	12.0	*	26.52	33.8	345	3.20	67.9	96.9	690	136	0.319
	14.0	*	30.24	38.5	379	3.14	74.6	108	758	149	0.319
114.3	3.0	*	8.23	10.5	163	3.94	28.4	37.2	325	56.9	0.359
	3.2		8.77	11.2	172	3.93	30.2	39.5	345	60.4	0.359
	3.6	*	9.83	12.5	192	3.92	33.6	44.1	384	67.2	0.359
	4.0		10.88	13.9	211	3.90	36.9	48.7	422	73.9	0.359
	5.0		13.48	17.2	257	3.87	45.0	59.8	514	89.9	0.359
	6.0		16.03	20.4	300	3.83	52.5	70.4	600	105	0.359
	6.3		16.78	21.4	313	3.82	54.7	73.6	625	109	0.359
	8.0		20.97	26.7	379	3.77	66.4	90.6	759	133	0.359
	10.0		25.72	32.8	450	3.70	78.7	109	899	157	0.359
	12.0	*	30.27	38.6	511	3.64	89.5	126	1023	179	0.359
	14.0	*	34.63	44.1	566	3.58	99.0	142	1131	198	0.359
	16.0	*	38.79	49.4	613	3.52	107	156	1225	214	0.359
139.7	3.2	*	10.77	13.7	320	4.83	45.8	59.6	640	91.6	0.439
	3.6	*	12.08	15.4	357	4.81	51.1	66.7	713	102	0.439
	4.0		13.39	17.1	393	4.80	56.2	73.7	786	112	0.439
	5.0		16.61	21.2	481	4.77	68.8	90.8	961	138	0.439
	6.0		19.78	25.2	564	4.73	80.8	107	1129	162	0.439

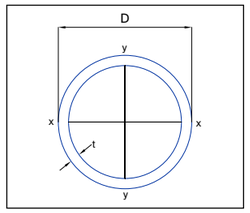
6.1.1 Hot Finished Circular Hollow Section (CHS)



Designation			Mass per Metre	Area of Section	Second Moment of Inertia	Radius of Gyration	Elastic Modulus	Plastic Modulus	Torsional Constants		Surface Area per Metre
Outside Diameter	Thickness										
D	t			A	I	r	Z	S	J	C	
mm	mm		kg/m	cm²	cm⁴	cm	cm³	cm³	cm⁴	cm³	m²/m
139.7	6.3		20.73	26.4	589	4.72	84.3	112	1177	169	0.439
	8.0		25.98	33.1	720	4.66	103	139	1441	206	0.439
	10.0		31.99	40.7	862	4.60	123	169	1724	247	0.439
	12.0		37.79	48.1	990	4.53	142	196	1980	283	0.439
	14.0	*	43.40	55.3	1105	4.47	158	222	2211	317	0.439
168.3	3.2	*	13.03	16.6	566	5.84	67.2	87.2	1131	134	0.529
	3.6	*	14.62	18.6	632	5.82	75.1	97.7	1264	150	0.529
	4.0		16.21	20.6	697	5.81	82.8	108	1394	166	0.529
	4.5	*	18.18	23.2	777	5.79	92.4	121	1554	185	0.529
	5.0		20.14	25.7	856	5.78	102	133	1712	203	0.529
	6.0		24.02	30.6	1009	5.74	120	158	2017	240	0.529
	6.3		25.17	32.1	1053	5.73	125	165	2107	250	0.529
	8.0		31.63	40.3	1297	5.67	154	206	2595	308	0.529
	10.0		39.04	49.7	1564	5.61	186	251	3128	372	0.529
	12.0		46.26	58.9	1810	5.54	215	294	3620	430	0.529
	12.5		48.03	61.2	1868	5.53	222	304	3737	444	0.529
	14.0	*	53.27	67.9	2036	5.48	242	334	4073	484	0.529
177.8	4.5	*	19.23	24.5	920	6.13	104	135	1841	207	0.559
	5.0		21.31	27.1	1014	6.11	114	149	2028	228	0.559
	6.3		26.65	33.9	1250	6.07	141	185	2499	281	0.559
	8.0		33.50	42.7	1541	6.01	173	231	3083	347	0.559
	10.0		41.38	52.7	1862	5.94	209	282	3724	419	0.559
	12.0		49.07	62.5	2159	5.88	243	330	4318	486	0.559
	14.0	*	56.55	72.0	2434	5.81	274	377	4868	548	0.559
193.7	3.6	*	16.88	21.5	972	6.72	100	130	1943	201	0.609
	5.0		23.27	29.6	1320	6.67	136	178	2640	273	0.609
	6.0		27.77	35.4	1560	6.64	161	211	3119	322	0.609
	6.3		29.12	37.1	1630	6.63	168	221	3260	337	0.609
	8.0		36.64	46.7	2016	6.57	208	276	4031	416	0.609
	10.0		45.30	57.7	2442	6.50	252	338	4883	504	0.609
	12.0		53.77	68.5	2839	6.44	293	397	5678	586	0.609
	12.5		55.86	71.2	2934	6.42	303	411	5869	606	0.609
	14.0	*	62.04	79.0	3210	6.37	331	453	6419	663	0.609
	16.0		70.12	89.3	3554	6.31	367	507	7109	734	0.609
219.1	3.6	*	19.13	24.4	1415	7.62	129	167	2830	258	0.688
	5.0		26.40	33.6	1928	7.57	176	229	3856	352	0.688
	6.0		31.53	40.2	2282	7.54	208	273	4564	417	0.688
	6.3		33.06	42.1	2386	7.53	218	285	4772	436	0.688
	8.0		41.65	53.1	2960	7.47	270	357	5919	540	0.688
	10.0		51.57	65.7	3598	7.40	328	438	7197	657	0.688
	12.0		61.29	78.1	4200	7.33	383	515	8400	767	0.688
	12.5		63.69	81.1	4345	7.32	397	534	8689	793	0.688
	14.2	*	71.75	91.4	4820	7.26	440	597	9640	880	0.688
	16.0		80.14	102	5297	7.20	483	661	10590	967	0.688
	20.0		98.20	125	6261	7.07	572	795	12520	1143	0.688

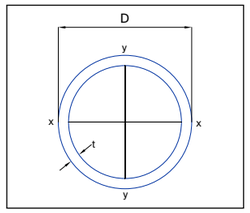
* Sizes not included in BS EN 10210 Part 2 (1997)

Dimensions	EN10210-2
Specification	EN10210-1
Size Range	OD 21.3mm to 1219mm



Designation			Mass per Metre	Area of Section	Second Moment of Inertia	Radius of Gyration	Elastic Modulus	Plastic Modulus	Torsional Constants		Surface Area per Metre
Outside Diameter	Thickness										
D	t			A	I	r	Z	S	J	C	
mm	mm		kg/m	cm²	cm⁴	cm	cm³	cm³	cm⁴	cm³	m²/m
244.5	5.0		29.53	37.6	2699	8.47	221	287	5397	441	0.768
	6.0		35.29	45.0	3199	8.43	262	341	6397	523	0.768
	6.3		37.01	47.1	3346	8.42	274	358	6692	547	0.768
	8.0		46.66	59.4	4160	8.37	340	448	8321	681	0.768
	10.0		57.83	73.7	5073	8.30	415	550	10150	830	0.768
	12.0		68.81	87.7	5938	8.23	486	649	11880	972	0.768
	12.5		71.52	91.1	6147	8.21	503	673	12300	1006	0.768
	14.0	*	79.58	101	6758	8.16	553	745	13520	1106	0.768
	14.2	*	80.65	103	6837	8.16	559	754	13670	1119	0.768
	16.0		90.16	115	7533	8.10	616	837	15070	1232	0.768
	20.0	*	110.73	141	8957	7.97	733	1011	17910	1465	0.768
273	5.0		33.05	42.1	3781	9.48	277	359	7562	554	0.858
	6.0		39.51	50.3	4487	9.44	329	428	8974	657	0.858
	6.3		41.44	52.8	4696	9.43	344	448	9392	688	0.858
	8.0		52.28	66.6	5852	9.37	429	562	11700	857	0.858
	10.0		64.86	82.6	7154	9.31	524	692	14310	1048	0.858
	12.0		77.24	98.4	8396	9.24	615	818	16790	1230	0.858
	12.5		80.30	102	8697	9.22	637	849	17400	1274	0.858
	14.0	*	89.42	114	9580	9.17	702	940	19160	1404	0.858
	14.2	*	90.63	115	9695	9.16	710	952	19390	1421	0.858
	16.0		101.41	129	10710	9.10	784	1058	21410	1569	0.858
	20.0		124.79	159	12800	8.97	938	1283	25600	1875	0.858
	25.0		152.90	195	15130	8.81	1108	1543	30250	2216	0.858
323.9	5.0		39.32	50.1	6369	11.3	393	509	12740	787	1.02
	6.0		47.04	59.9	7572	11.2	468	606	15150	935	1.02
	6.3		49.34	62.9	7929	11.2	490	636	15860	979	1.02
	8.0		62.32	79.4	9910	11.2	612	799	19820	1224	1.02
	10.0		77.41	98.6	12160	11.1	751	986	24320	1501	1.02
	12.0		92.30	118	14320	11.0	884	1168	28640	1768	1.02
	12.5		95.99	122	14850	11.0	917	1213	29690	1833	1.02
	14.0	*	107.00	136	16400	11.0	1012	1345	32790	2025	1.02
	14.2	*	108.45	138	16600	11.0	1025	1363	33200	2050	1.02
	16.0		121.49	155	18390	10.9	1136	1518	36780	2271	1.02
	20.0		149.89	191	22140	10.8	1367	1850	44280	2734	1.02
	25.0		184.28	235	26400	10.6	1630	2239	52800	3260	1.02
355.6	6.0		51.73	65.9	10070	12.4	566	733	20140	1133	1.12
	6.3		54.27	69.1	10550	12.4	593	769	21090	1186	1.12
	8.0		68.58	87.4	13200	12.3	742	967	26400	1485	1.12
	10.0		85.23	109	16220	12.2	912	1195	32450	1825	1.12
	12.0		101.68	130	19140	12.2	1076	1417	38280	2153	1.12
	12.5		105.77	135	19850	12.1	1117	1472	39700	2233	1.12
	14.0	*	117.94	150	21950	12.1	1235	1635	43900	2469	1.12
	14.2	*	119.56	152	22230	12.1	1250	1656	44460	2500	1.12

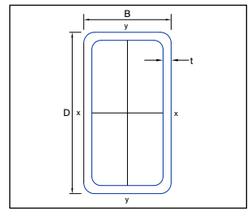
6.1.1 Hot Finished Circular Hollow Section (CHS)



Designation		Mass per Metre	Area of Section	Second Moment of Inertia	Radius of Gyration	Elastic Modulus	Plastic Modulus	Torsional Constants		Surface Area per Metre
Outside Diameter	Thickness									
D	t		A	I	r	Z	S	J	C	
mm	mm	kg/m	cm²	cm⁴	cm	cm³	cm³	cm⁴	cm³	m²/m
355.6	16.0	134.00	171	24660	12.0	1387	1847	49330	2774	1.12
	20.0	165.53	211	29790	11.9	1676	2255	59580	3351	1.12
	25.0	203.83	260	35680	11.7	2007	2738	71350	4013	1.12
406.4	6.0	59.25	75.5	15130	14.2	745	962	30260	1489	1.28
	6.3	62.16	79.2	15850	14.1	780	1009	31700	1560	1.28
	8.0	78.60	100	19870	14.1	978	1270	39750	1956	1.28
	10.0	97.76	125	24480	14.0	1205	1572	48950	2409	1.28
	12.0	116.72	149	28940	14.0	1424	1867	57870	2848	1.28
	12.5	121.43	155	30030	13.9	1478	1940	60060	2956	1.28
	14.0 *	135.48	173	33260	13.9	1637	2157	66520	3274	1.28
	14.2 *	137.35	175	33690	13.9	1658	2185	67370	3315	1.28
	16.0	154.05	196	37450	13.8	1843	2440	74900	3686	1.28
	20.0	190.58	243	45430	13.7	2236	2989	90860	4472	1.28
	25.0	235.15	300	54700	13.5	2692	3642	109400	5384	1.28
	32.0 *	295.46	376	66430	13.3	3269	4497	132900	6539	1.28
457	6.3	70.02	89.2	22650	15.9	991	1280	45310	1983	1.44
	8.0	88.58	113	28450	15.9	1245	1613	56890	2490	1.44
	10.0	110.24	140	35090	15.8	1536	1998	70180	3071	1.44
	12.0	131.69	168	41560	15.7	1819	2377	83110	3637	1.44
	12.5	137.03	175	43150	15.7	1888	2470	86290	3776	1.44
	14.2 *	155.07	198	48460	15.7	2121	2785	96930	4242	1.44
	16.0	174.01	222	53960	15.6	2361	3113	107900	4723	1.44
	20.0	215.54	275	65680	15.5	2874	3822	131400	5749	1.44
	25.0	266.34	339	79420	15.3	3475	4671	158800	6951	1.44
	32.0 *	335.40	427	97010	15.1	4246	5791	194000	8491	1.44
	40.0	411.35	524	114900	14.8	5031	6977	229900	10060	1.44
508	6.3	77.95	99.3	31250	17.7	1230	1586	62490	2460	1.60
	8.0	98.65	126	39280	17.7	1546	2000	78560	3093	1.60
	10.0	122.81	156	48520	17.6	1910	2480	97040	3820	1.60
	12.0	146.79	187	57540	17.5	2265	2953	115100	4530	1.60
	12.5	152.75	195	59760	17.5	2353	3070	119500	4705	1.60
	14.2 *	172.93	220	67200	17.5	2646	3463	134400	5291	1.60
	16.0	194.14	247	74910	17.4	2949	3874	149800	5898	1.60
	20.0	240.70	307	91430	17.3	3600	4766	182900	7199	1.60
	25.0	297.79	379	110900	17.1	4367	5837	221800	8734	1.60
	32.0 *	375.64	479	136100	16.9	5360	7261	272300	10720	1.60
	40.0	461.66	588	162200	16.6	6385	8782	324400	12770	1.60
	50.0	564.75	719	190900	16.3	7515	10530	381800	15030	1.60

* Sizes not included in BS EN 10210 Part 2 (1997)

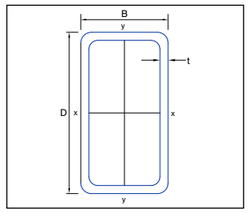
6.1.2 Hot Finished Rectangular Hollow Section (RHS)



Designation		Mass per Metre	Area of Section	Second Moment of Area		Radius of Gyration		Elastic Modulus		Plastic Modulus		Torsional Constants		Surface Area per Metre
Size	Thickness													
DxB	t		A	Axis x-x	Axis y-y	Axis x-x	Axis y-y	Axis x-x	Axis y-y	Axis x-x	Axis y-y	J	C	
mm	mm	kg/m	cm²	cm⁴	cm⁴	cm	cm	cm³	cm³	cm³	cm³	cm⁴	cm³	m²/m
50x25	2.5	2.72	3.43	10.4	3.39	1.74	0.994	4.16	2.71	5.33	3.22	8.42	4.61	0.144
	3	3.22	4.04	11.9	3.83	1.72	0.973	4.76	3.06	6.18	3.71	9.64	5.20	0.142
	3.2 *	3.41	4.28	12.5	3.98	1.71	0.964	4.98	3.18	6.50	3.89	10.1	5.41	0.142
	4 *	4.07	5.19	14.4	4.48	1.66	0.929	5.75	3.59	7.67	4.54	11.6	6.11	0.140
50x30	2.5	2.92	3.68	11.8	5.22	1.79	1.19	4.73	3.48	5.92	4.11	11.7	5.73	0.154
	3	3.45	4.34	13.6	5.94	1.77	1.17	5.43	3.96	6.88	4.76	13.5	6.51	0.152
	3.2 *	3.66	4.60	14.2	6.20	1.76	1.16	5.68	4.13	7.25	5.00	14.2	6.80	0.152
	4	4.46	5.59	16.5	7.08	1.72	1.13	6.60	4.72	8.59	5.88	16.6	7.77	0.150
	5	5.40	6.73	18.7	7.89	1.67	1.08	7.49	5.26	10.0	6.80	19.0	8.67	0.147
60x40	2.5	3.71	4.68	22.8	12.1	2.21	1.60	7.61	6.03	9.32	7.02	25.1	9.73	0.194
	3	4.39	5.54	26.5	13.9	2.18	1.58	8.82	6.95	10.9	8.19	29.2	11.2	0.192
	3.2 *	4.66	5.88	27.8	14.6	2.18	1.57	9.27	7.29	11.5	8.64	30.8	11.7	0.192
	4	5.72	7.19	32.8	17.0	2.14	1.54	10.9	8.52	13.8	10.3	36.7	13.7	0.190
	5	6.97	8.73	38.1	19.5	2.09	1.50	12.7	9.77	16.4	12.2	43.0	15.7	0.187
	6	8.15	10.2	42.3	21.4	2.04	1.45	14.1	10.7	18.6	13.7	48.2	17.3	0.185
	6.3	8.49	10.6	43.4	21.9	2.02	1.44	14.5	11.0	19.2	14.2	49.5	17.6	0.184
	8 *	10.00	12.8	47.9	23.7	1.94	1.36	16.0	11.9	22.1	16.1	55.4	19.2	0.179
80x40	3	5.34	6.74	54.2	18.0	2.84	1.63	13.6	9.00	17.1	10.4	43.8	15.3	0.232
	3.2 *	5.67	7.16	57.2	18.9	2.83	1.63	14.3	9.46	18.0	11.0	46.2	16.1	0.232
	4	6.97	8.79	68.2	22.2	2.79	1.59	17.1	11.1	21.8	13.2	55.2	18.9	0.230
	5	8.54	10.7	80.3	25.7	2.74	1.55	20.1	12.9	26.1	15.7	65.1	21.9	0.227
	6	10.00	12.6	90.5	28.5	2.68	1.50	22.6	14.2	30.0	17.8	73.4	24.2	0.225
	6.3	10.50	13.1	93.3	29.2	2.67	1.49	23.3	14.6	31.1	18.4	75.6	24.8	0.224
	8	12.80	16.0	106	32.1	2.58	1.42	26.5	16.1	36.5	21.2	85.8	27.4	0.219
	10 *	14.90	18.9	115	33.7	2.47	1.33	28.8	16.9	41.3	23.5	92.5	28.9	0.214
80x50	3 *	5.81	7.34	63.1	30.2	2.93	2.03	15.8	12.1	19.4	13.9	64.8	19.7	0.252
	4 *	7.53	9.59	79.8	37.7	2.88	1.98	19.9	15.1	24.9	17.8	82.6	24.6	0.250
	5 *	9.33	11.7	94.4	44.1	2.84	1.94	23.6	17.7	29.9	21.3	98.4	28.8	0.247
	6 *	11.00	13.8	107	49.5	2.79	1.90	26.8	19.8	34.4	24.4	112	32.3	0.245
	8 *	14.11	17.6	127	57.4	2.69	1.81	31.7	23.0	42.2	29.6	135	37.5	0.239
	10 *	16.40	20.9	140	62.1	2.59	1.72	35.0	24.8	48.3	33.4	150	40.6	0.234
90x50	3	6.28	7.94	84.4	33.5	3.26	2.05	18.8	13.4	23.2	15.3	76.5	22.4	0.272
	3.2 *	6.63	8.44	89.1	35.3	3.25	2.04	19.8	14.1	24.6	16.2	80.9	23.6	0.272
	3.6 *	7.46	9.42	98.3	38.7	3.23	2.03	21.8	15.5	27.2	18.0	89.4	25.9	0.271
	4	8.15	10.4	107	41.9	3.21	2.01	23.8	16.8	29.8	19.6	97.5	28.0	0.270
	5	10.10	12.7	127	49.2	3.16	1.97	28.3	19.7	36.0	23.5	116	32.9	0.267
	6	11.90	15.0	145	55.4	3.11	1.92	32.2	22.1	41.6	27.0	133	37.0	0.265
	6.3	12.50	15.6	150	57.0	3.10	1.91	33.3	22.8	43.2	28.0	138	38.1	0.264
	8	15.30	19.2	174	64.6	3.01	1.84	38.6	25.8	51.4	32.9	160	43.2	0.259
	10 *	18.00	22.9	194	70.2	2.91	1.75	43.0	28.1	59.3	37.4	179	47.1	0.254
100x50	3	6.75	8.54	110	36.8	3.58	2.08	21.9	14.7	27.3	16.8	88.4	25.0	0.292
	3.2 *	7.18	9.08	116	38.8	3.57	2.07	23.2	15.5	28.9	17.7	93.4	26.4	0.292
	4	8.86	11.2	140	46.2	3.53	2.03	27.9	18.5	35.2	21.5	113	31.4	0.290
	5	10.90	13.7	167	54.3	3.48	1.99	33.3	21.7	42.6	25.8	135	36.9	0.287
	6	12.90	16.2	190	61.2	3.43	1.95	38.1	24.5	49.4	29.7	154	41.6	0.285
	6.3	13.40	16.9	197	63.0	3.42	1.93	39.4	25.2	51.3	30.8	160	42.9	0.284
	8	16.60	20.8	230	71.7	3.33	1.86	46.0	28.7	61.4	36.3	186	48.9	0.279

* Sizes not included in BS EN 10210 Part 2 (1997)

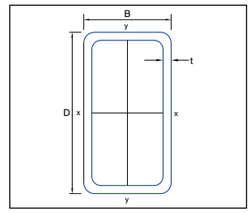
6.1.2 Hot Finished Rectangular Hollow Section (RHS)



Designation		Mass per Metre	Area of Section	Second Moment of Area		Radius of Gyration		Elastic Modulus		Plastic Modulus		Torsional Constants		Surface Area per Metre
Size	Thickness			Axis x-x	Axis y-y	Axis x-x	Axis y-y	Axis x-x	Axis y-y	Axis x-x	Axis y-y	J	C	
DxB	t		A											
mm	mm	kg/m	cm²	cm⁴	cm⁴	cm	cm	cm³	cm³	cm³	cm³	cm⁴	cm³	m²/m
100x60	3	7.22	9.14	124	55.7	3.68	2.47	24.7	18.6	30.2	21.2	121	30.7	0.312
	3.6 *	8.59	10.9	145	64.8	3.65	2.44	28.9	21.6	35.6	24.9	142	35.6	0.311
	5	11.70	14.7	189	83.6	3.58	2.38	37.8	27.9	47.4	32.9	188	45.9	0.307
	6	13.80	17.4	217	95.0	3.53	2.34	43.4	31.7	55.1	38.1	216	52.1	0.305
	6.3	14.40	18.1	225	98.1	3.52	2.33	45.0	32.7	57.3	39.5	224	53.8	0.304
	8	17.80	22.4	264	113	3.44	2.25	52.8	37.8	68.7	47.1	265	62.2	0.299
120x60	3.6 *	9.72	12.3	227	76.3	4.30	2.49	37.9	25.4	47.2	28.9	183	43.3	0.351
	5	13.30	16.7	299	98.8	4.23	2.43	49.9	32.9	63.1	38.4	242	56.0	0.347
	6	15.70	19.8	345	113	4.18	2.39	57.5	37.5	73.6	44.5	279	63.8	0.345
	6.3	16.40	20.7	358	116	4.16	2.37	59.7	38.8	76.7	46.3	290	65.9	0.344
	8	20.40	25.6	425	135	4.08	2.30	70.8	45.0	92.7	55.4	344	76.6	0.339
	10	24.30	30.9	488	152	3.97	2.21	81.4	50.5	109.2	64.4	396	86.1	0.334
120x80	5	14.80	18.7	365	193	4.42	3.21	60.9	48.2	74.6	56.1	401	77.9	0.387
	6	17.60	22.2	423	222	4.37	3.17	70.6	55.6	87.3	65.5	468	89.6	0.385
	6.3	18.40	23.2	440	230	4.36	3.15	73.3	57.6	91.0	68.2	487	92.9	0.384
	8	22.90	28.8	525	273	4.27	3.08	87.5	68.1	111	82.6	587	110	0.379
	10	27.90	34.9	609	313	4.18	2.99	102	78.1	131	97.3	688	126	0.374
150x100	5	18.70	23.7	739	392	5.58	4.07	98.5	78.5	119	90.1	807	127	0.487
	6	22.30	28.2	862	456	5.53	4.02	115	91.2	141	106	946	147	0.485
	6.3	23.30	29.5	898	474	5.52	4.01	120	94.8	147	110	986	153	0.484
	8	29.10	36.8	1087	569	5.44	3.94	145	114	180	135	1203	183	0.479
	10	35.70	44.9	1282	665	5.34	3.85	171	133	216	161	1432	214	0.474
	12.5	42.80	54.6	1488	763	5.22	3.74	198	153	256	190	1679	246	0.468
160x80	4.5 *	16.24	20.6	679	229	5.75	3.33	84.9	57.1	106	64.8	547	97.2	0.468
	5	18.00	22.7	744	249	5.72	3.31	93.0	62.3	116	71.1	600	106	0.467
	6	21.30	27.0	868	288	5.67	3.27	108	72.0	136	83.3	701	122	0.465
	6.3	22.30	28.2	903	299	5.66	3.26	113	74.8	142	86.8	730	127	0.464
	8	27.90	35.2	1091	356	5.57	3.18	136	89.0	175	106	883	151	0.459
	10	34.20	42.9	1284	411	5.47	3.10	161	103	209	125	1041	175	0.454
	12	39.50	50.3	1449	455	5.37	3.01	181	114	240	142	1175	194	0.449
	12.5	41.60	52.1	1485	465	5.34	2.99	186	116	247	146	1204	198	0.448
200x100	5	22.70	28.7	1495	505	7.21	4.19	149	101	185	114	1204	172	0.587
	6	27.00	34.2	1754	589	7.16	4.15	175	118	218	134	1414	200	0.585
	6.3	28.30	35.8	1829	613	7.15	4.14	183	123	228	140	1475	208	0.584
	8	35.40	44.8	2234	739	7.06	4.06	223	148	282	172	1804	251	0.579
	10	43.60	54.9	2664	869	6.96	3.98	266	174	341	206	2156	295	0.574
	12	50.80	64.7	3047	979	6.86	3.89	305	196	395	237	2469	333	0.569
	12.5	53.40	67.1	3136	1004	6.84	3.87	314	201	408	245	2541	341	0.568
	16 +	66.40	83.0	3678	1147	6.66	3.72	368	229	491	290	2982	391	0.559
200x120	16 *	71.38	89.4	4221	1813	6.87	4.50	422	302	550	377	4247	497	0.599
200x150	6 *	31.70	40.2	2318	1485	7.60	6.08	232	198	277	227	2820	313	0.685
	6.3 *	33.22	42.1	2420	1549	7.58	6.07	242	207	289	237	2947	326	0.684
	8 *	41.70	52.8	2971	1894	7.50	5.99	297	253	359	294	3643	398	0.679
	9 *	46.60	58.9	3276	2084	7.46	5.95	328	278	398	325	4033	437	0.677
	10 *	51.40	64.9	3568	2264	7.41	5.91	357	302	436	356	4409	475	0.674
	12 *	60.90	76.7	4109	2596	7.32	5.82	411	346	508	414	5119	543	0.669
	12.5 *	63.20	79.6	4236	2673	7.30	5.80	424	356	525	428	5287	559	0.668

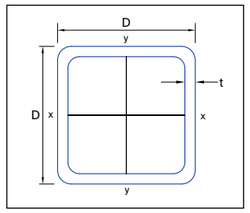
* Sizes not included in BS EN 10210 Part 2 (1997) + Seamless process

Dimensions	EN10210-2
Specification	EN10210-1
Size Range	50mm x 30mm to 500mm x 300mm



Designation		Mass per Metre	Area of Section	Second Moment of Area		Radius of Gyration		Elastic Modulus		Plastic Modulus		Torsional Constants		Surface Area per Metre
Size	Thickness			Axis x-x	Axis y-y	Axis x-x	Axis y-y	Axis x-x	Axis y-y	Axis x-x	Axis y-y	J	C	
DxB	t		A											
mm	mm	kg/m	cm²	cm⁴	cm⁴	cm	cm	cm³	cm³	cm³	cm³	cm⁴	cm³	m²/m
250x150	6	36.40	46.2	3965	1796	9.27	6.24	317	239	385	270	3877	396	0.785
	6.3	38.00	48.4	4143	1874	9.25	6.22	331	250	402	283	4054	413	0.784
	8	48.00	60.8	5111	2298	9.17	6.15	409	306	501	350	5021	506	0.779
	10	59.30	74.9	6174	2755	9.08	6.06	494	367	611	426	6090	605	0.774
	12.5	73.00	92.1	7387	3265	8.96	5.96	591	435	740	514	7326	717	0.768
	16	91.50	115	8879	3873	8.79	5.80	710	516	906	625	8868	849	0.759
300x100	5 *	30.52	38.7	4146	731	10.3	4.34	276	146	354	161	2040	262	0.787
	6 *	36.20	46.2	4893	854	10.3	4.30	326	171	419	190	2399	306	0.785
	6.3 *	38.00	48.4	5111	890	10.3	4.29	341	178	439	199	2504	319	0.784
	10 *	58.80	74.9	7613	1275	10.1	4.13	508	255	666	296	3676	458	0.774
	12 *	70.30	88.7	8818	1447	9.97	4.04	588	289	779	343	4223	520	0.769
300x200	6	45.80	58.2	7486	4013	11.3	8.31	499	401	596	451	8100	651	0.985
	6.3	48.10	61.0	7829	4193	11.3	8.29	522	419	624	472	8476	681	0.984
	8	60.50	76.8	9717	5184	11.3	8.22	648	518	779	589	10560	840	0.979
	10	75.00	94.9	11820	6278	11.2	8.13	788	628	956	721	12910	1015	0.974
	12	89.15	113	13800	7294	11.1	8.05	920	729	1124	847	15140	1178	0.969
	12.5	92.60	117	14270	7537	11.0	8.02	952	754	1165	877	15680	1217	0.968
	16	117.00	147	17390	9109	10.9	7.87	1159	911	1441	1080	19250	1468	0.959
350x150	10 *	75.00	94.9	14320	3737	12.3	6.27	818	498	1035	566	9633	867	0.974
	12.5 *	92.60	117	17300	4450	12.2	6.17	988	593	1263	686	11620	1032	0.968
400x200	6.3 *	57.90	73.6	15700	5376	14.6	8.55	785	538	960	594	12610	917	1.18
	8	73.10	92.8	19560	6660	14.5	8.47	978	666	1203	743	15740	1135	1.18
	10	90.70	115	23910	8084	14.4	8.39	1196	808	1480	911	19260	1376	1.17
	12.5	112.00	142	29060	9738	14.3	8.28	1453	974	1813	1111	23440	1656	1.17
	16	142.00	179	35740	11820	14.1	8.13	1787	1182	2256	1374	28870	2010	1.16
450x250	8	85.40	109	30080	12140	16.6	10.6	1337	971	1622	1081	27080	1629	1.38
	10	106.00	135	36900	14820	16.5	10.5	1640	1185	2000	1331	33280	1986	1.37
	12.5	132.00	167	45030	17970	16.4	10.4	2001	1438	2458	1631	40720	2406	1.37
	16	167.00	211	55710	22040	16.2	10.2	2476	1763	3070	2029	50550	2947	1.36
500x200	10 *	106.00	135	41760	9891	17.6	8.6	1670	989	2105	1101	25870	1737	1.37
500x300	10	122.00	155	53760	24440	18.6	12.6	2150	1629	2595	1826	52450	2696	1.57
	12.5	152.00	192	65810	29780	18.5	12.5	2633	1985	3196	2244	64390	3281	1.57
	16	192.00	243	81780	36770	18.3	12.3	3271	2451	4005	2804	80330	4044	1.56

6.1.3 Hot Finished Square Hollow Section (SHS)

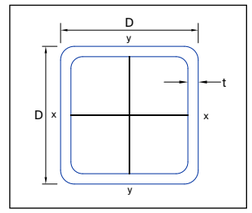


Designation			Mass per Metre	Area of Section	Second Moment of Area	Radius of Gyration	Elastic Modulus	Plastic Modulus	Torsional Constants		Surface Area per Metre
Size	Thickness										
DxD	t			A	I	r	Z	S	J	C	
mm	mm		kg/m	cm^2	cm^4	cm	cm^3	cm^3	cm^4	cm^3	m^2/m
20x20	2		1.12	1.40	0.739	0.727	0.739	0.930	1.22	1.07	0.0748
	2.5		1.35	1.68	0.835	0.705	0.835	1.08	1.41	1.20	0.0736
25x25	2		1.41	1.80	1.56	0.932	1.25	1.53	2.52	1.81	0.0948
	2.5		1.74	2.18	1.81	0.909	1.44	1.82	2.97	2.08	0.0936
	3		2.00	2.54	2.00	0.886	1.60	2.06	3.35	2.30	0.0923
	3.2	*	2.15	2.68	2.06	0.877	1.65	2.15	3.48	2.37	0.0918
30x30	2.5		2.14	2.68	3.33	1.11	2.22	2.74	5.40	3.22	0.114
	3		2.47	3.14	3.74	1.09	2.50	3.14	6.16	3.60	0.112
	3.2	*	2.65	3.32	3.89	1.08	2.59	3.29	6.44	3.74	0.112
35x35	4	*	3.76	4.79	7.48	1.25	4.28	5.47	12.5	6.16	0.130
	6	*	5.16	6.57	8.81	1.16	5.03	6.91	15.4	7.19	0.125
40x40	2.5		2.92	3.68	8.54	1.52	4.27	5.14	13.6	6.22	0.154
	3		3.45	4.34	9.78	1.50	4.89	5.97	15.7	7.10	0.152
	3.2	*	3.66	4.60	10.2	1.49	5.11	6.28	16.5	7.42	0.152
	4		4.46	5.59	11.8	1.45	5.91	7.44	19.5	8.54	0.150
	5		5.40	6.73	13.4	1.41	6.68	8.66	22.5	9.60	0.147
45x45	4	*	5.01	6.39	17.6	1.66	7.82	9.71	28.7	11.3	0.170
	5	*	6.07	7.73	20.1	1.61	8.95	11.41	33.5	12.9	0.167
50x50	2.5		3.71	4.68	17.5	1.93	6.99	8.29	27.5	10.2	0.194
	3		4.39	5.54	20.2	1.91	8.08	9.70	32.1	11.8	0.192
	3.2	*	4.66	5.88	21.2	1.90	8.49	10.2	33.8	12.4	0.192
	4		5.72	7.19	25.0	1.86	9.99	12.3	40.4	14.5	0.190
	5		6.97	8.73	28.9	1.82	11.6	14.5	47.6	16.7	0.187
	6		8.15	10.2	32.0	1.77	12.8	16.5	53.6	18.4	0.185
	6.3		8.49	10.6	32.8	1.76	13.1	17.0	55.2	18.8	0.184
60x60	3		5.39	6.74	36.2	2.32	12.1	14.3	56.9	17.7	0.232
	3.2	*	5.67	7.16	38.2	2.31	12.7	15.2	60.2	18.6	0.232
	4		6.97	8.79	45.4	2.27	15.1	18.3	72.5	22.0	0.230
	5		8.54	10.7	53.3	2.23	17.8	21.9	86.4	25.7	0.227
	6		10.00	12.6	59.9	2.18	20.0	25.1	98.6	28.8	0.225
	6.3		10.50	13.1	61.6	2.17	20.5	26.0	102	29.6	0.224
	8		12.80	16.0	69.7	2.09	23.2	30.4	118	33.4	0.219
	10	*	14.90	18.9	75.5	2.00	25.2	34.4	131	36.0	0.214
70x70	3		6.28	7.94	59.0	2.73	16.9	19.9	92	24.8	0.272
	3.6	*	7.46	9.42	68.6	2.70	19.6	23.3	108	28.7	0.271
	5		10.10	12.7	88.5	2.64	25.3	30.8	142	36.8	0.267
	6		11.90	15.0	101	2.59	28.7	35.5	163	41.6	0.265
	6.3		12.50	15.6	104	2.58	29.7	36.9	169	42.9	0.264
	8		15.30	19.2	120	2.50	34.2	43.8	200	49.2	0.259
75x75	3.2	*	7.25	9.08	77.5	2.92	20.7	24.3	121	30.3	0.292
	4	*	8.93	11.2	93.2	2.89	24.8	29.6	147	36.3	0.290
	5	*	11.00	13.7	111	2.84	29.6	35.8	177	43.0	0.287
	6	*	12.90	16.2	126	2.80	33.7	41.4	204	48.9	0.285
	6.3	*	13.50	16.9	131	2.78	34.9	43.0	212	50.5	0.284
	8	*	16.60	20.8	152	2.71	40.5	51.3	252	58.4	0.279

* Sizes not included in EN 10210 Part 2 (1997)

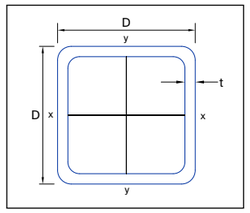
\+ Seamless process

Dimensions	EN10210-2
Specification	EN10210-1
Size Range	40mm x 40mm to 400mm x 400mm



Designation			Mass per Metre	Area of Section	Second Moment of Area	Radius of Gyration	Elastic Modulus	Plastic Modulus	Torsional Constants		Surface Area per Metre
Size	Thickness										
DxD	t			A	I	r	Z	S	J	C	
mm	mm		kg/m	cm^2	cm^4	cm	cm^3	cm^3	cm^4	cm^3	m^2/m
80x80	3		7.18	9.14	89.8	3.13	22.5	26.3	140	33.0	0.312
	3.6	*	8.59	10.9	105	3.11	26.2	31.0	164	38.5	0.311
	5		11.70	14.7	137	3.05	34.2	41.1	217	49.8	0.307
	6		13.80	17.4	156	3.00	39.1	47.8	252	56.8	0.305
	6.3		14.40	18.1	162	2.99	40.5	49.7	262	58.7	0.304
	8		17.80	22.4	189	2.91	47.3	59.5	312	68.3	0.299
90x90	3.6	*	9.72	12.3	152	3.52	33.8	39.7	237	49.7	0.351
	5		13.30	16.7	200	3.45	44.4	53.0	316	64.8	0.347
	6		15.70	19.8	230	3.41	51.1	61.8	367	74.3	0.345
	6.3		16.40	20.7	238	3.40	53.0	64.3	382	77.0	0.344
	8		20.40	25.6	281	3.32	62.6	77.6	459	90.5	0.339
100x100	4		12.00	15.2	232	3.91	46.4	54.4	361	68.2	0.390
	5		14.80	18.7	279	3.86	55.9	66.4	439	81.8	0.387
	6		17.60	22.2	323	3.82	64.6	77.6	513	94.3	0.385
	6.3		18.40	23.2	336	3.80	67.1	80.9	534	97.8	0.384
	8		22.90	28.8	400	3.73	79.9	98.2	646	116	0.379
	10		27.90	34.9	462	3.64	92.4	116	761	133	0.374
120x120	5		18.00	22.7	498	4.68	83.0	97.6	777	122	0.467
	6		21.30	27.0	579	4.63	96.6	115	911	141	0.465
	6.3		22.30	28.2	603	4.62	100	120	950	147	0.464
	8		27.90	35.2	726	4.55	121	146	1160	176	0.459
	10		34.20	42.9	852	4.46	142	175	1382	206	0.454
	12.5		41.60	52.1	982	4.34	164	207	1623	236	0.448
140x140	5		21.10	26.7	807	5.50	115	135	1253	170	0.547
	6		25.10	31.8	944	5.45	135	159	1475	198	0.545
	8		32.90	41.6	1195	5.36	171	204	1892	249	0.539
	10		40.40	50.9	1416	5.27	202	246	2272	294	0.534
	12.5		49.50	62.1	1653	5.16	236	293	2696	342	0.528
150x150	5		22.70	28.7	1002	5.90	134	156	1550	197	0.587
	6		27.00	34.2	1174	5.86	156	184	1828	230	0.585
	6.3		28.30	35.8	1223	5.85	163	192	1909	240	0.584
	8		35.40	44.8	1491	5.77	199	237	2351	291	0.579
	10		43.60	54.9	1773	5.68	236	286	2832	344	0.574
	12.5		52.40	67.1	2080	5.57	277	342	3375	402	0.568
	16	+	66.40	83.0	2430	5.41	324	411	4026	467	0.559
160x160	12.5		57.30	72.1	2576	5.98	322	395	4158	467	0.608
	16		70.20	89.4	3028	5.82	379	476	4988	546	0.599
180x180	6		32.60	41.4	2077	7.09	231	269	3215	340	0.705
	6.3		34.20	43.3	2168	7.07	241	281	3361	355	0.704
	8		43.00	54.4	2661	7.00	296	349	4162	434	0.699
	10		53.00	66.9	3193	6.91	355	424	5048	518	0.694
	12.5		65.20	82.1	3790	6.80	421	511	6070	613	0.688
	16		81.40	102	4504	6.64	500	621	7343	724	0.679

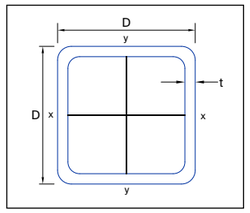
6.1.3 Hot Finished Square Hollow Section (SHS)



Designation		Mass per Metre	Area of Section	Second Moment of Area	Radius of Gyration	Elastic Modulus	Plastic Modulus	Torsional Constants		Surface Area per Metre
Size	Thickness									
DxD	t		A	I	r	Z	S	J	C	
mm	mm	kg/m	cm²	cm⁴	cm	cm³	cm³	cm⁴	cm³	m²/m
200x200	5	30.50	38.7	2445	7.95	245	283	3756	362	0.787
	6	36.40	46.2	2883	7.90	288	335	4449	426	0.785
	6.3	38.20	48.4	3011	7.89	301	350	4653	444	0.784
	8	48.00	60.8	3709	7.81	371	436	5778	545	0.779
	10	59.30	74.9	4471	7.72	447	531	7031	655	0.774
	12.5	73.00	92.1	5336	7.61	534	643	8491	778	0.768
	16	91.50	115	6394	7.46	639	785	10340	927	0.759
220x220	5 *	33.50	42.7	3281	8.76	298	344	5028	442	0.867
	6	40.00	51.0	3875	8.72	352	408	5963	521	0.865
	8	52.70	67.2	5002	8.63	455	532	7765	669	0.859
	10	65.10	82.9	6050	8.54	550	650	9473	807	0.854
	12	77.20	98.3	7023	8.45	638	762	11090	933	0.849
	14 *	88.90	113	7922	8.36	720	868	12620	1049	0.844
250x250	6	45.80	58.2	5752	9.94	460	531	8825	681	0.985
	6.3	48.10	61.0	6014	9.93	481	556	9238	712	0.984
	8	60.50	76.8	7455	9.86	596	694	11530	880	0.979
	10	75.00	94.9	9055	9.77	724	851	14110	1065	0.974
	12.5	92.60	117	10920	9.66	873	1037	17160	1279	0.968
	16	117.00	147	13270	9.50	1061	1280	21140	1546	0.959
260x260	6	47.60	60.6	6491	10.4	499	576	9951	740	1.02
	6.3	49.90	63.5	6788	10.3	522	603	10420	773	1.02
	8	62.80	80.0	8423	10.3	648	753	13010	956	1.02
	10	77.70	98.9	10240	10.2	788	924	15930	1159	1.01
	12	92.20	117	11950	10.1	920	1087	18730	1348	1.01
	12.5	95.80	122	12370	10.1	951	1127	19410	1394	1.01
	14 *	106.00	136	13560	10.0	1043	1244	21400	1525	1.00
	14.2 *	108.00	137	13710	9.99	1055	1259	21660	1542	1.00
	16	120.00	153	15060	9.91	1159	1394	23940	1689	1.00
300x300	6.3	57.95	73.6	10550	12.0	703	809	16140	1043	1.18
	8	73.10	92.8	13130	11.9	875	1013	20190	1294	1.18
	9 *	81.93	104	14600	11.9	973	1130	22520	1437	1.18
	10	90.70	115	16030	11.8	1068	1246	24810	1575	1.17
	12	107.97	137	18780	11.7	1252	1470	29250	1840	1.17
	12.5	112.00	142	19440	11.7	1296	1525	30330	1904	1.17
	16	142.00	179	23850	11.5	1590	1895	37620	2325	1.16
350x350	6 *	64.50	82.2	16170	14.0	924	1058	24650	1373	1.38
	8	85.70	109	21130	13.9	1207	1392	32380	1789	1.38
	10	106.00	135	25880	13.9	1479	1715	39890	2185	1.37
	12	127.00	161	30440	13.8	1739	2030	47150	2563	1.37
	12.5	132.00	167	31540	13.7	1802	2107	48930	2654	1.37
	14 *	146.00	186	34790	13.7	1988	2334	54190	2922	1.36
	14.2 *	148.00	189	35210	13.7	2012	2364	54880	2957	1.36
	16	167.00	211	38940	13.6	2225	2630	60990	3264	1.36
	19 *	190.00	248	44820	13.5	2561	3055	70760	3744	1.35
	22 *	217.00	283	50270	13.3	2873	3460	80010	4187	1.34
	25 *	242.00	318	55320	13.2	3161	3845	88750	4595	1.34

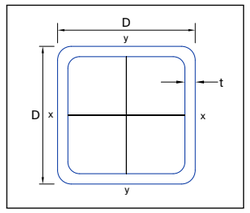
* Sizes not included in EN 10210 Part 2 (1997) + Seamless process Δ S.A.W process

Dimensions	EN10210-2
Specification	EN10210-1
Size Range	40mm x 40mm to 400mm x 400mm



Designation		Mass per Metre	Area of Section	Second Moment of Area	Radius of Gyration	Elastic Modulus	Plastic Modulus	Torsional Constants		Surface Area per Metre
Size	Thickness									
DxD	t		A	I	r	Z	S	J	C	
mm	mm	kg/m	cm²	cm⁴	cm	cm³	cm³	cm⁴	cm³	m²/m
350x350	6 *	64.50	82.2	16170	14.0	924	1058	24650	1373	1.38
	8	85.70	109	21130	13.9	1207	1392	32380	1789	1.38
	10	106.00	135	25880	13.9	1479	1715	39890	2185	1.37
	12	127.00	161	30440	13.8	1739	2030	47150	2563	1.37
	12.5	132.00	167	31540	13.7	1802	2107	48930	2654	1.37
	14 *	146.00	186	34790	13.7	1988	2334	54190	2922	1.36
	14.2 *	148.00	189	35210	13.7	2012	2364	54880	2957	1.36
	16	167.00	211	38940	13.6	2225	2630	60990	3264	1.36
	19 *	190.00	248	44820	13.5	2561	3055	70760	3744	1.35
	22 *	217.00	283	50270	13.3	2873	3460	80010	4187	1.34
	25 *	242.00	318	55320	13.2	3161	3845	88750	4595	1.34
400x400	8 *	97.90	125	31860	16.0	1593	1830	48700	2363	1.58
	10	122.00	155	39130	15.9	1956	2260	60090	2895	1.57
	12	145.00	185	46130	15.8	2306	2679	71180	3405	1.57
	12.5	152.00	192	47840	15.8	2392	2782	73910	3530	1.57
	14 *	168.00	214	52870	15.7	2643	3087	81960	3894	1.56
	14.2 *	170.00	217	53530	15.7	2676	3127	83030	3942	1.56
	16	192.00	243	59340	15.6	2967	3484	92440	4362	1.56
	20 #	237.00	300	71540	15.4	3577	4247	112500	5237	1.55
	22 *	251.00	327	77260	15.4	3863	4612	122100	5646	1.54
	25 *	282.00	368	85380	15.2	4269	5141	135900	6223	1.54
450x450	12 *	162.00	209	66460	17.8	2954	3419	102200	4368	1.77
	16 *	213.00	275	85860	17.7	3816	4459	133200	5620	1.76
	19 *	250.00	324	99540	17.5	4424	5208	155400	6497	1.75
	22 *	286.00	371	112500	17.4	5000	5929	176700	7324	1.74
	25 *	321.00	418	124700	17.3	5544	6624	197200	8101	1.74
	28 Δ*	355.00	464	136300	17.1	6058	7292	216800	8832	1.73
	32 Δ*	399.00	524	150700	17.0	6696	8143	241700	9735	1.72
500x500	12 *	181.00	233	92030	19.89	3681	4248	141200	5451	1.97
	16 *	238.00	307	119300	19.71	4771	5554	184400	7038	1.96
	19 *	280.00	362	138600	19.58	5545	6498	215500	8159	1.95
	22 *	320.00	415	157100	19.44	6283	7411	245600	9222	1.94
	25 *	360.00	468	174600	19.31	6986	8295	274600	10230	1.94
	28 Δ*	399.00	520	191300	19.18	7653	9149	302600	11180	1.93
	32 Δ*	450.00	588	212300	19.00	8491	10242	338200	12370	1.92
	36 Δ*	498.00	654	231700	18.82	9269	11283	372000	13470	1.91
550x550	16 *	263.00	339	160400	21.75	5833	6769	247300	8616	2.16
	19 *	309.00	400	186800	21.62	6793	7930	289500	10010	2.15
	22 *	355.00	459	212100	21.49	7714	9058	330400	11340	2.14
	25 *	399.00	518	236300	21.35	8594	10150	370100	12610	2.14
	28 Δ*	443.00	576	259500	21.22	9436	11220	408400	13810	2.13
	32 Δ*	500.00	652	288700	21.04	10500	12580	457500	15330	2.12
	36 Δ*	555.00	726	316100	20.86	11500	13890	504400	16740	2.11
	40 Δ*	608.00	799	341800	20.68	12430	15140	549000	18060	2.10

6.1.3 Hot Finished
Square Hollow Section (SHS)



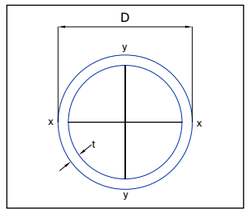
Designation			Mass per Metre	Area of Section	Second Moment of Inertia	Radius of Gyration	Elastic Modulus	Plastic Modulus	Torsional Constants		Surface Area per Metre
Outside Diameter	Thickness										
D	t			A	I	r	Z	S	J	C	
mm	mm		kg/m	cm²	cm⁴	cm	cm³	cm³	cm⁴	cm³	m²/m
600x600	25	Δ*	439.00	568	311100	23.40	10370	12200	485300	15230	2.34
	28	Δ*	487.00	632	342100	23.26	11410	13490	536300	16720	2.33
	32	Δ*	550.00	716	381600	23.08	12720	15160	601900	18600	2.32
	36	Δ*	611.00	798	418800	22.91	13960	16770	664900	20370	2.31
	40	Δ*	671.00	879	453900	22.73	15130	18310	725100	22030	2.30
700x700	25	Δ*	517.00	668	504700	27.48	14420	16850	782900	21240	2.74
	28	Δ*	575.00	744	556600	27.35	15900	18670	867000	23380	2.73
	32	Δ*	651.00	844	623100	27.17	17800	21040	975800	26110	2.72
	36	Δ*	724.00	942	686500	26.99	19610	23330	1081000	28700	2.71
	40	Δ*	797.00	1039	746900	26.81	21340	25540	1182000	31160	2.70

* Sizes not included in EN 10210 Part 2 (1997) Δ S.A.W process

6.2 Cold Formed Hollow Section
Standard specifications

Material	Yield strength N/mm²		Tensile strength N/mm²	Min. Elongation $L_0=5.65\sqrt{S_0}$	Min. Charpy V-notch.	Dimensions & Tolerances
EN 10219	≤16mm	>16 - ≤40mm	3-40mm			*EN10219*
S275J0H	275	265	410-560	20%	27J @ 0°C	
S275J2H	275	265	410-560	20%	27J @ -20°C	
S355J0H	355	345	470-630	20%	27J @ 0°C	
S355J2H	355	345	470-630	20%	27J @ -20°C	
S460MH	460	440	530-720	17%	40J @ -20°C	

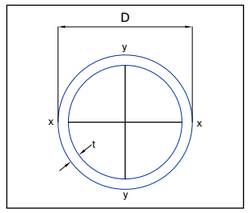
6.2.1 Cold Formed Circular Hollow Section (CHS)



Designation			Mass per Metre	Area of Section	Ratio For Local Buckling	Second Moment of Inertia	Radius of Gyration	Elastic Modulus	Plastic Modulus	Torsional Constants		Surface Area per Metre
Outside	Thickness											
D	t			A	D/t	I	r	Z	S	J	C	
mm	mm		kg/m	cm²		cm⁴	cm	cm³	cm³	cm⁴	cm³	m²/m
26.9	2.0		1.23	1.56	13.5	1.22	0.883	0.907	1.24	2.44	1.81	0.0845
	2.5		1.50	1.92	10.8	1.44	0.867	1.07	1.49	2.88	2.14	0.0845
	3.2	*	1.87	2.38	8.41	1.70	0.846	1.27	1.81	3.41	2.53	0.0845
33.7	2.0		1.56	1.99	16.9	2.51	1.12	1.49	2.01	5.02	2.98	0.106
	2.5		1.92	2.45	13.5	3.00	1.11	1.78	2.44	6.00	3.56	0.106
	3.0		2.27	2.89	11.2	3.44	1.09	2.04	2.84	6.88	4.08	0.106
	3.2	*	2.41	3.07	10.5	3.60	1.08	2.14	2.99	7.21	4.28	0.106
	4.0	*	2.93	3.73	8.43	4.19	1.06	2.49	3.55	8.38	4.97	0.106
42.4	2.5		2.46	3.13	17.0	6.26	1.41	2.95	3.99	12.5	5.91	0.133
	3.0		2.91	3.71	14.1	7.25	1.40	3.42	4.67	14.5	6.84	0.133
	3.2	*	3.09	3.94	13.3	7.62	1.39	3.59	4.93	15.2	7.19	0.133
	3.6	*	3.44	4.39	11.8	8.33	1.38	3.93	5.44	16.7	7.86	0.133
	4.0		3.79	4.83	10.6	8.99	1.36	4.24	5.92	18.0	8.48	0.133
48.3	2.5		2.82	3.60	19.3	9.46	1.62	3.92	5.25	18.9	7.83	0.152
	3.0		3.35	4.27	16.1	11.0	1.61	4.55	6.17	22.0	9.11	0.152
	3.2	*	3.56	4.53	15.1	11.6	1.60	4.80	6.52	23.2	9.59	0.152
	3.6	*	3.97	5.06	13.4	12.7	1.59	5.26	7.21	25.4	10.5	0.152
	4.0		4.37	5.57	12.1	13.8	1.57	5.70	7.87	27.5	11.4	0.152
60.3	2.5		3.56	4.54	24.1	19.0	2.05	6.30	8.36	38.0	12.6	0.189
	3.0		4.24	5.40	20.1	22.2	2.03	7.37	9.86	44.4	14.7	0.189
	3.2	*	4.51	5.74	18.8	23.5	2.02	7.78	10.4	46.9	15.6	0.189
	3.6	*	5.03	6.41	16.8	25.9	2.01	8.58	11.6	51.7	17.2	0.189
	4.0		5.55	7.07	15.1	28.2	2.00	9.34	12.7	56.3	18.7	0.189
76.1	2.5		4.54	5.78	30.4	39.2	2.60	10.3	13.5	78.4	20.6	0.239
	3.0		5.41	6.89	25.4	46.1	2.59	12.1	16.0	92.2	24.2	0.239
	3.2	*	5.75	7.33	23.8	48.8	2.58	12.8	17.0	97.6	25.6	0.239
	3.6	*	6.44	8.20	21.1	54.0	2.57	14.2	18.9	108	28.4	0.239
	4.0		7.11	9.06	19.0	59.1	2.55	15.5	20.8	118	31.0	0.239
88.9	3.0		6.36	8.10	29.6	74.8	3.04	16.8	22.1	150	33.6	0.279
	3.2	*	6.76	8.62	27.8	79.2	3.03	17.8	23.5	158	35.6	0.279
	4.0		8.38	10.7	22.2	96.3	3.00	21.7	28.9	193	43.3	0.279
	5.0		10.35	13.2	17.8	116	2.97	26.2	35.2	233	52.4	0.279
114.3	3.0		8.23	10.5	38.1	163	3.94	28.4	37.2	325	56.9	0.359
	3.2	*	8.77	11.2	35.7	172	3.93	30.2	39.5	345	60.4	0.359
	3.6	*	9.83	12.5	31.8	192	3.92	33.6	44.1	384	67.2	0.359
	5.0		13.48	17.2	22.9	257	3.87	45.0	59.8	514	89.9	0.359
	6.0		16.03	20.4	19.1	300	3.83	52.5	70.4	600	105	0.359
	6.3		16.78	21.4	18.1	313	3.82	54.7	73.6	625	109	0.359
139.7	5.0		16.61	21.2	27.9	481	4.77	68.8	90.8	961	138	0.439
	6.3		20.73	26.4	22.2	589	4.72	84.3	112	1177	169	0.439
	8.0		25.98	33.1	17.5	720	4.66	103	139	1441	206	0.439
	10.0		31.99	40.7	14.0	862	4.60	123	169	1724	247	0.439

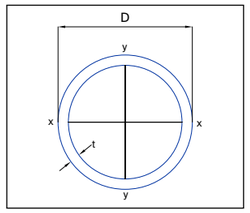
* Sizes not included in BS EN 10219 Part 2 (1997)

Dimensions	EN10219-2
Specification	EN10219-1
Size Range	OD 21.3mm to 1219mm



Designation			Mass per Metre	Area of Section	Ratio For Local Buckling	Second Moment of Inertia	Radius of Gyration	Elastic Modulus	Plastic Modulus	Torsional Constants		Surface Area per Metre
Outside	Thickness											
D	t			A	D/t	I	r	Z	S	J	C	
mm	mm		kg/m	cm²		cm⁴	cm	cm³	cm³	cm⁴	cm³	m²/m
168.3	4.0		16.21	20.6	42.1	697	5.81	82.8	108	1394	166	0.529
	5.0		20.14	25.7	33.7	856	5.78	102	133	1712	203	0.529
	6.3		25.17	32.1	26.7	1053	5.73	125	165	2107	250	0.529
	8.0		31.63	40.3	21.0	1297	5.67	154	206	2595	308	0.529
	10.0		39.04	49.7	16.8	1564	5.61	186	251	3128	372	0.529
	12.5	*	48.03	61.2	13.5	1868	5.53	222	304	3737	444	0.529
193.7	4.0		18.71	23.8	48.4	1073	6.71	111	144	2146	222	0.609
	4.5	*	21.00	26.7	43.0	1198	6.69	124	161	2395	247	0.609
	5.0		23.27	29.6	38.7	1320	6.67	136	178	2640	273	0.609
	6.0		27.77	35.4	32.3	1560	6.64	161	211	3119	322	0.609
	6.3		29.12	37.1	30.7	1630	6.63	168	221	3260	337	0.609
	8.0		36.64	46.7	24.2	2016	6.57	208	276	4031	416	0.609
	10.0		45.30	57.7	19.4	2442	6.50	252	338	4883	504	0.609
	12.5		55.86	71.2	15.5	2934	6.42	303	411	5869	606	0.609
219.1	4.5	*	23.82	30.3	48.7	1747	7.59	159	207	3494	319	0.688
	5.0		26.40	33.6	43.8	1928	7.57	176	229	3856	352	0.688
	6.0		31.53	40.2	36.5	2282	7.54	208	273	4564	417	0.688
	6.3		33.06	42.1	34.8	2386	7.53	218	285	4772	436	0.688
	8.0		41.65	53.1	27.4	2960	7.47	270	357	5919	540	0.688
	10.0		51.57	65.7	21.9	3598	7.40	328	438	7197	657	0.688
	12.0		61.29	78.1	18.3	4200	7.33	383	515	8400	767	0.688
	12.5		63.69	81.1	17.5	4345	7.32	397	534	8689	793	0.688
	16.0	*	80.14	102	13.7	5297	7.20	483	661	10600	967	0.688
244.5	5.0		29.53	37.6	48.9	2699	8.47	221	287	5397	441	0.768
	6.0		35.29	45.0	40.8	3199	8.43	262	341	6397	523	0.768
	6.3		37.01	47.1	38.8	3346	8.42	274	358	6692	547	0.768
	8.0		46.66	59.4	30.6	4160	8.37	340	448	8321	681	0.768
	10.0		57.83	73.7	24.5	5073	8.30	415	550	10150	830	0.768
	12.0		68.81	87.7	20.4	5938	8.23	486	649	11880	972	0.768
	12.5		71.52	91.1	19.6	6147	8.21	503	673	12300	1006	0.768
	16.0	*	90.16	115	15.3	7533	8.10	616	837	15070	1232	0.768
273	5.0		33.05	42.1	54.6	3781	9.48	277	359	7562	554	0.858
	6.0		39.51	50.3	45.5	4487	9.44	329	428	8974	657	0.858
	6.3		41.44	52.8	43.3	4696	9.43	344	448	9392	688	0.858
	8.0		52.28	66.6	34.1	5852	9.37	429	562	11700	857	0.858
	10.0		64.86	82.6	27.3	7154	9.31	524	692	14310	1048	0.858
	12.0		77.24	98.4	22.8	8396	9.24	615	818	16790	1230	0.858
	12.5		80.30	102	21.8	8697	9.22	637	849	17400	1274	0.858
	16.0	*	101.41	129	17.1	10710	9.10	784	1058	21410	1569	0.858

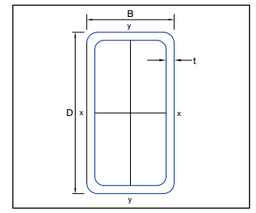
6.2.1 Cold Formed Circular Hollow Section (CHS)



Designation		Mass per Metre	Area of Section	Ratio For Local Buckling	Second Moment of Inertia	Radius of Gyration	Elastic Modulus	Plastic Modulus	Torsional Constants		Surface Area per Metre
Outside	Thickness										
D	t		A	D/t	I	r	Z	S	J	C	
mm	mm	kg/m	cm²		cm⁴	cm	cm³	cm³	cm⁴	cm³	m²/m
323.9	5.0	39.32	50.1	64.8	6369	11.3	393	509	12740	787	1.02
	6.0	47.04	59.9	54.0	7572	11.2	468	606	15150	935	1.02
	6.3	49.34	62.9	51.4	7929	11.2	490	636	15860	979	1.02
	8.0	62.32	79.4	40.5	9910	11.2	612	799	19820	1224	1.02
	10.0	77.41	98.6	32.4	12160	11.1	751	986	24320	1501	1.02
	12.0	92.30	118	27.0	14320	11.0	884	1168	28640	1768	1.02
	12.5	95.99	122	25.9	14850	11.0	917	1213	29690	1833	1.02
	16.0 *	121.49	155	20.2	18390	10.9	1136	1518	36780	2271	1.02
355.6	5.0	43.23	55.1	71.1	8464	12.4	476	615	16930	952	1.12
	6.0	51.73	65.9	59.3	10070	12.4	566	733	20140	1133	1.12
	6.3	54.27	69.1	56.4	10550	12.4	593	769	21090	1186	1.12
	8.0	68.58	87.4	44.5	13200	12.3	742	967	26400	1485	1.12
	10.0	85.23	109	35.6	16220	12.2	912	1195	32450	1825	1.12
	12.0	101.68	130	29.6	19140	12.2	1076	1417	38280	2153	1.12
	12.5	105.77	135	28.4	19850	12.1	1117	1472	39700	2233	1.12
	16.0	134.00	171	22.2	24660	12.0	1387	1847	49330	2774	1.12
406.4	6.0	59.25	75.5	67.7	15130	14.2	745	962	30260	1489	1.28
	6.3	62.16	79.2	64.5	15850	14.1	780	1009	31700	1560	1.28
	8.0	78.60	100	50.8	19870	14.1	978	1270	39750	1956	1.28
	10.0	97.76	125	40.6	24480	14.0	1205	1572	48950	2409	1.28
	12.0	116.72	149	33.9	28940	14.0	1424	1867	57870	2848	1.28
	12.5	121.43	155	32.5	30030	13.9	1478	1940	60060	2956	1.28
	16.0	154.05	196	25.4	37450	13.8	1843	2440	74900	3686	1.28
457	6.0	66.73	85.0	76.2	21620	15.9	946	1220	43240	1892	1.44
	6.3	70.02	89.2	72.5	22650	15.9	991	1280	45310	1983	1.44
	8.0	88.58	113	57.1	28450	15.9	1245	1613	56890	2490	1.44
	10.0	110.24	140	45.7	35090	15.8	1536	1998	70180	3071	1.44
	12.0	131.69	168	38.1	41560	15.7	1819	2377	83110	3637	1.44
	12.5	137.03	175	36.6	43150	15.7	1888	2470	86290	3776	1.44
	16.0	174.01	222	28.6	53960	15.6	2361	3113	107900	4723	1.44
508	6.0	74.28	94.6	84.7	29810	17.7	1174	1512	59620	2347	1.60
	6.3	77.95	99.3	80.6	31250	17.7	1230	1586	62490	2460	1.60
	8.0	98.65	126	63.5	39280	17.7	1546	2000	78560	3093	1.60
	10.0	122.81	156	50.8	48520	17.6	1910	2480	97040	3820	1.60
	12.0	146.79	187	42.3	57540	17.5	2265	2953	115100	4530	1.60
	12.5	152.75	195	40.6	59760	17.5	2353	3070	119500	4705	1.60
	16.0	194.14	247	31.8	74910	17.4	2949	3874	149800	5898	1.60

* Sizes not included in BS EN 10219 Part 2 (1997)

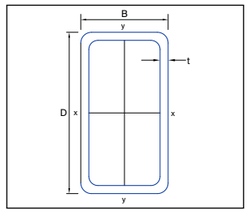
6.2.2 Cold Formed Rectangular Hollow Section (RHS)



Designation		Mass per Metre	Area of Section	Second Moment of Area		Radius of Gyration		Elastic Modulus		Plastic Modulus		Torsional Constants		Surface Area per Metre
Size	Thickness													
DxB	t		A	Axis x-x	Axis y-y	Axis x-x	Axis y-y	Axis x-x	Axis y-y	Axis x-x	Axis y-y	J	C	
mm	mm	kg/m	cm²	cm⁴	cm⁴	cm	cm	cm³	cm³	cm³	cm³	cm⁴	cm³	m²/m
19x9	1.0 *	0.411	0.494	0.206	0.062	0.645	0.354	0.216	0.138	0.283	0.165	0.165	0.244	0.053
	1.2 *	0.421	0.577	0.231	0.069	0.633	0.346	0.243	0.153	0.323	0.188	0.187	0.273	0.052
	1.6 *	0.540	0.728	0.268	0.078	0.607	0.328	0.282	0.174	0.390	0.224	0.222	0.315	0.051
25x12	1.0 *	0.555	0.674	0.510	0.160	0.869	0.487	0.408	0.266	0.521	0.310	0.410	0.467	0.071
	1.2 *	0.659	0.793	0.583	0.181	0.857	0.478	0.467	0.302	0.604	0.358	0.473	0.532	0.070
	1.6 *	0.859	1.02	0.705	0.215	0.833	0.460	0.564	0.358	0.749	0.440	0.582	0.638	0.069
25x13	1.2 *	0.670	0.817	0.617	0.219	0.869	0.517	0.494	0.337	0.632	0.398	0.549	0.586	0.072
	1.6 *	0.860	1.05	0.749	0.262	0.845	0.500	0.599	0.402	0.786	0.492	0.679	0.707	0.071
32x16	1.0 *	0.707	0.894	1.15	0.391	1.14	0.661	0.722	0.488	0.905	0.558	0.962	0.847	0.093
	1.2 *	0.838	1.06	1.34	0.449	1.12	0.652	0.836	0.562	1.06	0.650	1.12	0.978	0.092
	1.6 *	1.10	1.37	1.66	0.550	1.10	0.634	1.04	0.688	1.34	0.818	1.41	1.21	0.091
38x19	1.0 *	0.858	1.07	1.99	0.676	1.36	0.793	1.05	0.711	1.30	0.805	1.65	1.23	0.111
	1.2 *	1.02	1.27	2.32	0.783	1.35	0.784	1.22	0.824	1.53	0.943	1.93	1.43	0.110
	1.6 *	1.34	1.66	2.91	0.973	1.33	0.766	1.53	1.02	1.95	1.20	2.46	1.79	0.109
38x25	1.0 *	0.949	1.19	2.40	1.26	1.42	1.03	1.26	1.01	1.52	1.14	2.63	1.66	0.123
	1.2 *	1.13	1.42	2.80	1.47	1.41	1.02	1.48	1.17	1.79	1.35	3.10	1.94	0.122
	1.6 *	1.50	1.85	3.55	1.85	1.39	1.00	1.87	1.48	2.30	1.72	3.99	2.45	0.121
50x25	1.0 *	1.15	1.43	4.69	1.60	1.81	1.06	1.87	1.28	2.31	1.43	3.85	2.22	0.147
	1.2 *	1.37	1.71	5.50	1.88	1.80	1.05	2.20	1.50	2.73	1.69	4.54	2.59	0.146
	1.6 *	1.81	2.23	7.02	2.37	1.77	1.03	2.81	1.90	3.53	2.17	5.85	3.29	0.145
	2.0 *	2.15	2.74	8.38	2.81	1.75	1.01	3.35	2.25	4.26	2.62	7.06	3.92	0.143
	2.3 *	2.48	3.10	9.31	3.10	1.73	1.00	3.72	2.48	4.78	2.92	7.90	4.34	0.142
	2.5 *	2.62	3.34	9.89	3.28	1.72	0.991	3.95	2.62	5.11	3.12	8.43	4.60	0.141
	3.0 *	3.07	3.91	11.2	3.67	1.69	0.969	4.47	2.93	5.86	3.56	9.64	5.18	0.140
	3.2 *	3.41	4.13	11.6	3.80	1.68	0.960	4.65	3.04	6.14	3.73	10.1	5.38	0.139
50x30	2.0	2.31	2.94	9.54	4.29	1.80	1.21	3.81	2.86	4.74	3.33	9.77	4.84	0.153
	2.5	2.82	3.59	11.3	5.05	1.77	1.19	4.52	3.37	5.70	3.98	11.7	5.72	0.151
	3.0	3.30	4.21	12.8	5.70	1.75	1.16	5.13	3.80	6.57	4.58	13.5	6.49	0.150
	4.0	4.20	5.35	15.3	6.69	1.69	1.12	6.10	4.46	8.05	5.58	16.5	7.71	0.146
60x40	1.6 *	2.37	3.03	15.2	8.16	2.24	1.64	5.07	4.08	6.12	4.64	16.9	6.72	0.195
	2.3 *	3.33	4.25	20.7	11.0	2.20	1.61	6.88	5.50	8.44	6.38	23.4	9.10	0.192
	2.5	3.60	4.59	22.1	11.7	2.19	1.60	7.36	5.87	9.06	6.84	25.1	9.72	0.191
	3.0	4.25	5.41	25.4	13.4	2.17	1.58	8.46	6.72	10.5	7.94	29.3	11.2	0.190
	4.0	5.45	6.95	31.0	16.3	2.11	1.53	10.3	8.14	13.2	9.89	36.7	13.7	0.186
	4.5 *	6.01	7.67	33.3	17.4	2.08	1.51	11.1	8.72	14.3	10.7	39.9	14.7	0.185
65x38	1.6 *	2.45	3.13	17.8	7.79	2.39	1.58	5.49	4.10	6.70	4.63	17.4	6.91	0.201
	2.3 *	3.40	4.39	24.2	10.5	2.35	1.55	7.46	5.53	9.24	6.37	24.0	9.36	0.198
	3.0	4.38	5.59	29.8	12.8	2.31	1.51	9.18	6.75	11.5	7.93	30.0	11.5	0.196
	3.2	4.54	5.92	31.3	13.4	2.30	1.51	9.63	7.06	12.2	8.35	31.6	12.1	0.195
	4.0 *	5.64	7.19	36.5	15.5	2.25	1.47	11.2	8.17	14.5	9.89	37.5	14.0	0.192

* Sizes not included in BS EN 10219 Part 2 (1997)

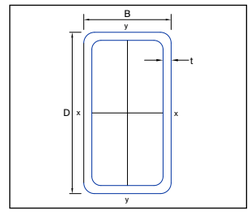
6.2.2 Cold Formed Rectangular Hollow Section (RHS)



Designation		Mass per Metre	Area of Section	Second Moment of Area		Radius of Gyration		Elastic Modulus		Plastic Modulus		Torsional Constants		Surface Area per Metre
Size	Thickness													
DxB	t		A	Axis x-x	Axis y-y	Axis x-x	Axis y-y	Axis x-x	Axis y-y	Axis x-x	Axis y-y	J	C	
mm	mm	kg/m	cm²	cm⁴	cm⁴	cm	cm	cm³	cm³	cm³	cm³	cm⁴	cm³	m²/m
75x38	1.6 *	2.70	3.45	25.3	8.85	2.71	1.60	6.76	4.66	8.3	5.21	21.2	8.03	0.221
	1.9 *	3.22	4.06	29.4	10.2	2.69	1.59	7.85	5.39	9.7	6.08	24.7	9.30	0.219
	2.3 *	3.86	4.85	34.6	12.0	2.67	1.57	9.23	6.30	11.5	7.19	29.2	10.9	0.218
	3.0 *	4.99	6.19	42.8	14.7	2.63	1.54	11.4	7.72	14.5	8.98	36.6	13.4	0.216
	3.2 *	5.17	6.56	45.0	15.4	2.62	1.53	12.0	8.09	15.3	9.46	38.6	14.1	0.215
	4.0 *	6.27	7.99	52.8	17.9	2.57	1.50	14.1	9.40	18.3	11.2	45.9	16.5	0.212
	4.5 *	6.94	8.84	57.1	19.2	2.54	1.47	15.2	10.1	19.9	12.3	50.0	17.8	0.211
75x50	1.9 *	3.60	4.51	35.5	19.1	2.81	2.05	9.48	7.62	11.4	8.65	39.5	12.5	0.243
	2.3 *	4.31	5.40	41.9	22.4	2.79	2.04	11.2	8.96	13.6	10.3	46.9	14.8	0.242
	3.0 *	5.59	6.91	52.2	27.8	2.75	2.00	13.9	11.1	17.1	12.9	59.3	18.4	0.240
	3.2 *	5.80	7.33	54.9	29.2	2.74	2.00	14.6	11.7	18.0	13.6	62.6	19.3	0.239
	4.0 *	7.08	8.95	65.0	34.3	2.69	1.96	17.3	13.7	21.7	16.3	75.3	22.9	0.236
	4.5 *	7.88	9.92	70.6	37.2	2.67	1.94	18.8	14.9	23.8	17.9	82.7	24.9	0.235
	4.6 *	8.04	10.1	71.6	37.7	2.66	1.93	19.1	15.1	24.2	18.2	84.1	25.2	0.234
	4.8 *	8.33	10.5	73.7	38.8	2.65	1.92	19.6	15.5	24.9	18.8	86.8	26.0	0.234
	5.0 *	8.53	10.9	75.6	39.7	2.64	1.91	20.2	15.9	25.7	19.3	89.5	26.7	0.233
	6.0 *	9.92	12.6	84.4	44.1	2.58	1.87	22.5	17.6	29.2	21.9	102	29.8	0.229
80x40	3.0	5.19	6.61	52.3	17.6	2.81	1.63	13.1	8.78	16.5	10.2	43.9	15.3	0.230
	4.0	6.71	8.55	64.8	21.5	2.75	1.59	16.2	10.7	20.9	12.8	55.2	18.8	0.226
90x50	3.0	6.13	7.81	81.9	32.7	3.24	2.05	18.2	13.1	22.6	15.0	76.7	22.4	0.270
	3.6 *	7.24	9.23	94.7	37.7	3.20	2.02	21.1	15.1	26.4	17.5	89.6	25.8	0.268
	4.0	7.97	10.1	103	40.7	3.18	2.00	22.8	16.3	28.8	19.1	97.7	28.0	0.266
	5.0	9.70	12.4	121	47.4	3.12	1.96	26.8	18.9	34.4	22.7	116	32.7	0.263
100x50	1.9 *	4.36	5.46	71.6	24.5	3.62	2.12	14.3	9.82	17.6	10.9	58.7	16.9	0.293
	2.3 *	5.23	6.55	84.8	29.0	3.60	2.10	17.0	11.6	21.0	13.0	69.9	20.0	0.292
	3.0	6.60	8.41	106	36.1	3.56	2.07	21.3	14.4	26.7	16.4	88.6	25.0	0.290
	3.2 *	7.07	8.93	112	38.0	3.55	2.06	22.5	15.2	28.2	17.4	93.7	26.4	0.289
	4.0	8.59	10.9	134	44.9	3.50	2.03	26.8	18.0	34.1	20.9	113	31.3	0.286
	4.5 *	9.70	12.2	147	48.9	3.47	2.00	29.3	19.5	37.6	23.0	124	34.2	0.285
	5.0	10.50	13.4	158	52.5	3.44	1.98	31.6	21.0	40.8	25.0	135	36.8	0.283
	6.0	12.30	15.6	179	58.7	3.38	1.94	35.8	23.5	46.9	28.5	154	41.4	0.279
	6.3	12.50	15.9	176	58.2	3.32	1.91	35.1	23.3	46.9	28.6	158	42.1	0.273
100x60	3.0	7.07	9.01	121	54.6	3.66	2.46	24.1	18.2	29.6	20.8	122	30.6	0.310
	3.6 *	8.37	10.7	140	63.3	3.63	2.44	28.0	21.1	34.7	24.3	143	35.6	0.308
	4.0	9.22	11.7	153	68.7	3.60	2.42	30.5	22.9	37.9	26.6	156	38.7	0.306
	5.0	11.30	14.4	181	80.8	3.55	2.37	36.2	26.9	45.6	31.9	188	45.8	0.303
	6.0	13.20	16.8	205	91.2	3.49	2.33	41.1	30.4	52.5	36.6	216	51.9	0.299
	6.3	13.50	17.2	203	90.9	3.44	2.30	40.7	30.3	52.8	36.9	223	53.0	0.293

* Sizes not included in BS EN 10219 Part 2 (1997)

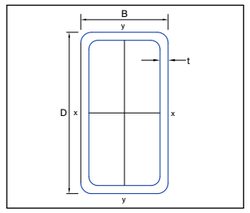
Dimensions	EN10219-2
Specification	EN10219-1
Size Range	40mm x 20mm to 400mm x 300mm



Designation		Mass per Metre	Area of Section	Second Moment of Area		Radius of Gyration		Elastic Modulus		Plastic Modulus		Torsional Constants		Surface Area per Metre
Size	Thickness													
DxB	t		A	Axis x-x	Axis y-y	Axis x-x	Axis y-y	Axis x-x	Axis y-y	Axis x-x	Axis y-y	J	C	
mm	mm	kg/m	cm²	cm⁴	cm⁴	cm	cm	cm³	cm³	cm³	cm³	cm⁴	cm³	m²/m
100x75	2.3 *	6.04	7.70	112	72.3	3.82	3.06	22.5	19.3	26.6	21.9	138	31.0	0.342
	3.0 *	8.02	9.91	142	91.1	3.78	3.03	28.4	24.3	33.9	27.9	177	39.1	0.340
	3.2 *	8.33	10.5	150	96.2	3.77	3.02	30.0	25.6	35.9	29.5	187	41.3	0.339
	4.0 *	10.20	12.9	180	115	3.73	2.99	36.0	30.8	43.7	35.9	228	49.7	0.336
	4.5 *	11.50	14.4	198	127	3.71	2.96	39.6	33.7	48.3	39.6	253	54.6	0.335
	4.6 *	11.70	14.7	201	129	3.70	2.96	40.3	34.3	49.2	40.3	257	55.5	0.334
	4.8 *	12.10	15.3	208	133	3.69	2.95	41.6	35.4	51.0	41.8	267	57.4	0.334
	5.0 *	12.80	15.9	215	137	3.68	2.94	42.9	36.5	52.7	43.2	276	59.2	0.333
	6.0 *	15.10	18.6	245	156	3.63	2.89	49.0	41.6	61.0	49.9	320	67.7	0.329
120x60	3.0	8.01	10.2	189	64.4	4.30	2.51	31.5	21.5	39.2	24.2	156	37.1	0.350
	3.6 *	9.50	12.1	221	74.8	4.27	2.48	36.8	24.9	46.1	28.4	184	43.2	0.348
	4.0	10.50	13.3	241	81.2	4.25	2.47	40.1	27.1	50.5	31.1	201	47.0	0.346
	5.0	12.80	16.4	287	96.0	4.19	2.42	47.8	32.0	60.9	37.4	242	55.8	0.343
	6.0	15.10	19.2	328	109	4.13	2.38	54.7	36.3	70.6	43.1	280	63.6	0.339
	6.3	15.50	19.7	327	109	4.07	2.35	54.5	36.4	71.2	43.7	289	65.1	0.333
120x80	4.0	11.70	14.9	295	157	4.44	3.24	49.1	39.3	59.8	45.2	331	64.9	0.386
	5.0	14.40	18.4	353	188	4.39	3.20	58.9	46.9	72.4	54.7	402	77.8	0.383
	6.0	17.00	21.6	406	215	4.33	3.15	67.7	53.8	84.3	63.5	469	89.4	0.379
	6.3	17.50	22.2	408	217	4.28	3.12	68.1	54.3	85.6	64.7	488	92.1	0.373
	8.0	21.40	27.2	476	252	4.18	3.04	79.3	62.9	102.0	76.9	584	108.0	0.366
125x50	2.3 *	6.04	7.70	148	35.5	4.39	2.15	23.7	14.2	29.9	15.7	93.9	25.3	0.342
	3.0 *	8.02	9.91	187	44.4	4.34	2.12	29.9	17.7	38.1	20.0	119	31.6	0.340
	3.2 *	8.33	10.5	198	46.7	4.33	2.11	31.6	18.7	40.4	21.1	126	33.4	0.339
	4.0 *	10.20	12.9	238	55.6	4.28	2.07	38.0	22.2	49.0	25.5	152	39.8	0.336
	4.5 *	11.50	14.4	261	60.6	4.25	2.05	41.7	24.2	54.2	28.1	167	43.5	0.335
	4.6 *	11.70	14.7	265	61.5	4.25	2.04	42.4	24.6	55.2	28.6	170	44.2	0.334
	4.8 *	12.10	15.3	274	63.4	4.23	2.04	43.8	25.3	57.2	29.6	176	45.6	0.334
	5.0 *	12.80	15.9	282	65.2	4.22	2.03	45.2	26.1	59.1	30.6	182	47.0	0.333
	6.0 *	15.10	18.6	322	73.3	4.16	1.98	51.5	29.3	68.3	35.1	209	53.1	0.329
	6.4 *	15.60	19.4	322	74.0	4.08	1.95	51.6	29.6	69.6	35.9	217	54.7	0.323
125x75	2.3 *	6.95	8.85	192	87.5	4.65	3.14	30.6	23.3	37.0	26.1	190	39.1	0.392
	3.0 *	9.23	11.4	243	111	4.61	3.11	38.9	29.5	47.3	33.3	243	49.5	0.390
	3.2 *	9.60	12.1	257	117	4.60	3.10	41.1	31.1	50.1	35.3	258	52.3	0.389
	4.0 *	11.80	14.9	311	141	4.56	3.07	49.7	37.5	61.1	43.0	315	63.1	0.386
	4.5 *	13.30	16.7	342	155	4.53	3.04	54.8	41.2	67.7	47.5	349	69.5	0.385
	5.0 *	14.70	18.4	373	168	4.50	3.02	59.6	44.7	74.1	52.0	382	75.6	0.383
	6.0 *	17.20	21.6	428	192	4.45	2.98	68.5	51.1	86.2	60.3	444	86.7	0.379
	6.4 *	18.20	22.6	435	196	4.39	2.94	69.6	52.2	88.5	62.1	467	90.3	0.373
150x50	3.0 *	9.23	11.4	299	52.6	5.12	2.15	39.8	21.1	51.4	23.5	150	38.3	0.390
	3.2 *	9.60	12.1	316	55.5	5.10	2.14	42.1	22.2	54.5	24.9	159	40.4	0.389
	4.0 *	11.80	14.9	381	66.2	5.05	2.10	50.9	26.5	66.5	30.1	192	48.3	0.386

* Sizes not included in BS EN 10219 Part 2 (1997)

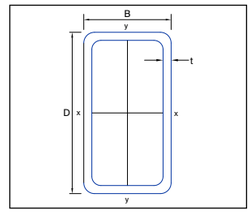
6.2.2 Cold Formed Rectangular Hollow Section (RHS)



Designation		Mass per Metre	Area of Section	Second Moment of Area		Radius of Gyration		Elastic Modulus		Plastic Modulus		Torsional Constants		Surface Area per Metre
Size	Thickness													
DxB	t		A	Axis x-x	Axis y-y	Axis x-x	Axis y-y	Axis x-x	Axis y-y	Axis x-x	Axis y-y	J	C	
mm	mm	kg/m	cm²	cm⁴	cm⁴	cm	cm	cm³	cm³	cm³	cm³	cm⁴	cm³	m²/m
150x50	4.5 *	13.30	16.7	420	72.2	5.02	2.08	56.0	28.9	73.6	33.2	212	52.9	0.385
	4.6 *	13.50	17.0	427	73.4	5.01	2.08	57.0	29.4	75.0	33.8	215	53.7	0.384
	4.8 *	14.00	17.7	442	75.7	5.00	2.07	58.9	30.3	77.8	35.0	223	55.4	0.384
	5.0 *	14.70	18.4	456	77.9	4.99	2.06	60.8	31.1	80.5	36.2	230	57.1	0.383
	6.0 *	17.30	21.6	523	87.9	4.92	2.02	69.8	35.2	93.5	41.7	264	64.8	0.379
	6.4 *	18.20	22.6	528	89.3	4.84	1.99	70.4	35.7	95.7	42.9	275	66.9	0.373
150x75	3.0 *	10.10	12.9	380	130	5.42	3.17	50.6	34.7	62.5	38.7	312	59.8	0.440
	3.2 *	10.90	13.7	402	137	5.41	3.16	53.6	36.6	66.3	41.0	331	63.3	0.439
	4.0 *	13.40	16.9	488	166	5.37	3.13	65.1	44.2	81.1	50.1	404	76.6	0.436
	4.5 *	15.10	18.9	539	183	5.34	3.11	71.9	48.7	90.0	55.5	448	84.4	0.435
	4.6 *	15.30	19.3	549	186	5.33	3.10	73.2	49.5	91.7	56.5	457	85.9	0.434
	4.8 *	14.00	20.1	568	192	5.32	3.09	75.8	51.2	95.2	58.6	474	88.9	0.434
	5.0 *	16.70	20.9	588	198	5.31	3.08	78.4	52.9	98.6	60.7	491	91.9	0.433
	6.0 *	19.70	24.6	679	228	5.25	3.04	90.5	60.7	115	70.6	572	105.8	0.429
	6.4 *	20.70	25.8	693	233	5.19	3.01	92.4	62.2	119	73.1	603	110.4	0.423
	9.0 *	27.60	34.5	865	287	5.01	2.89	115	76.6	153	93.6	775	138.1	0.411
150x100	3.0 *	11.58	14.4	461	248	5.65	4.15	61.4	49.5	73.5	55.8	507	81.4	0.490
	3.2 *	12.00	15.3	488	262	5.64	4.14	65.1	52.5	78.0	59.2	539	86.2	0.489
	4.0	14.90	18.9	595	319	5.60	4.10	79.3	63.7	95.7	72.5	662	105	0.486
	4.5 *	16.90	21.2	658	352	5.58	4.08	87.7	70.4	106	80.5	736	116	0.485
	4.6 *	17.10	21.6	670	358	5.57	4.07	89.4	71.7	108	82.1	751	118	0.484
	4.8 *	17.80	22.5	695	371	5.56	4.06	92.7	74.3	113	85.2	780	123	0.484
	5.0	18.30	23.4	719	384	5.55	4.05	95.9	76.8	117	88.3	809	127	0.483
	6.0	21.70	27.6	835	444	5.50	4.01	111	88.8	137	103	948	147	0.479
	6.3	22.40	28.5	848	453	5.45	3.98	113	90.5	140	106	992	152	0.473
	6.4 *	23.20	29.0	858	458	5.44	3.98	114	91.6	142	107	1005	154	0.473
	8.0	27.70	35.2	1008	536	5.35	3.90	134	107	169	128	1206	182	0.466
	9.0 *	31.40	39.0	1089	577	5.29	3.85	145	115	185	140	1320	197	0.461
	9.5 *	33.30	40.8	1127	597	5.26	3.82	150	119	192	145	1374	204	0.459
	12.7 *	42.30	50.1	1232	655	4.96	3.61	164	131	221	167	1619	234	0.435
160x80	5.0	17.50	22.4	722	244	5.68	3.30	90.2	61.0	113	69.7	601	106	0.463
	6.0	20.70	26.4	836	281	5.62	3.26	105	70.2	132	81.3	702	122	0.459
	8.0	26.40	33.6	1001	335	5.46	3.16	125	83.7	163	100	882	150	0.446
175x100	4.8 *	19.70	24.9	1013	426	6.38	4.14	116	85.2	142	96.7	969	144	0.534
	6.4 *	25.70	32.2	1260	528	6.26	4.05	144	106	180	122	1251	182	0.523
	9.5 *	37.10	45.5	1673	694	6.06	3.90	191	139	246	166	1719	243	0.509
	12.7 *	47.30	56.5	1867	777	5.75	3.71	213	155	288	195	2052	283	0.485
175x125	4.8 *	21.60	27.3	1187	708	6.60	5.09	136	113	163	129	1410	184	0.584
	6.4 *	28.30	35.4	1487	886	6.49	5.01	170	142	207	164	1832	234	0.573
	9.5 *	40.90	50.3	1999	1184	6.30	4.85	228	189	285	226	2554	317	0.559
	12.7 *	52.40	62.8	2286	1356	6.03	4.65	261	217	340	270	3129	377	0.535

* Sizes not included in BS EN 10219 Part 2 (1997)

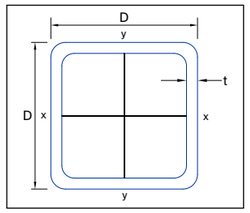
Dimensions	EN10219-2
Specification	EN10219-1
Size Range	40mm x 20mm to 400mm x 300mm



Designation		Mass per Metre	Area of Section	Second Moment of Area		Radius of Gyration		Elastic Modulus		Plastic Modulus		Torsional Constants		Surface Area per Metre
Size	Thickness													
DxB	t		A	Axis x-x	Axis y-y	Axis x-x	Axis y-y	Axis x-x	Axis y-y	Axis x-x	Axis y-y	J	C	
mm	mm	kg/m	cm²	cm⁴	cm⁴	cm	cm	cm³	cm³	cm³	cm³	cm⁴	cm³	m²/m
200x100	4.0	18.00	22.9	1200	411	7.23	4.23	120	82.2	148	91.7	985	142	0.586
	4.5 *	20.50	25.7	1331	455	7.20	4.21	133	90.9	165	102	1097	157	0.585
	4.6 *	20.80	26.2	1357	463	7.20	4.20	136	92.6	168	104	1119	160	0.584
	4.8 *	21.60	27.3	1409	480	7.19	4.20	141	96.0	175	108	1163	166	0.584
	5.0	22.30	28.4	1459	497	7.17	4.19	146	99.4	181	112	1206	172	0.583
	6.0	26.40	33.6	1703	577	7.12	4.14	170	115	213	132	1417	200	0.579
	6.3	27.40	34.8	1739	591	7.06	4.12	174	118	219	135	1483	208	0.573
	6.4 *	28.30	35.4	1761	598	7.06	4.11	176	120	222	137	1503	210	0.573
	8.0	33.90	43.2	2091	705	6.95	4.04	209	141	267	165	1811	250	0.566
	9.0 *	40.52	48.0	2276	764	6.89	3.99	228	153	293	180	1988	272	0.561
	9.5 *	40.90	50.3	2362	792	6.85	3.97	236	158	306	188	2073	282	0.559
	12.0	49.10	60.1	2607	876	6.59	3.82	261	175	350	215	2414	322	0.538
	12.7 *	52.40	62.8	2679	898	6.53	3.78	268	180	363	223	2496	331	0.535
200x150	4.5 *	25.40	30.2	1761	1135	7.64	6.13	176	151	209	172	2169	243	0.685
	6.0 *	31.10	39.6	2268	1457	7.56	6.06	227	194	271	223	2826	313	0.679
	6.3 *	33.30	41.1	2330	1499	7.53	6.04	233	200	280	230	2965	325	0.673
	9.0 *	45.30	57.0	3097	1985	7.37	5.90	310	265	379	312	4055	435	0.661
	9.5 *	48.40	59.8	3225	2066	7.34	5.88	322	275	396	326	4244	454	0.659
	12.0 *	58.50	72.1	3668	2353	7.14	5.71	367	314	463	380	5099	532	0.638
	12.7 *	62.50	75.5	3794	2432	7.09	5.67	379	324	482	396	5316	552	0.635
250x150	5.0	30.10	38.4	3304	1508	9.28	6.27	264	201	320	225	3285	337	0.783
	6.0	35.80	45.6	3886	1768	9.23	6.23	311	236	378	266	3886	396	0.779
	6.3	37.20	47.4	4001	1825	9.18	6.20	320	243	391	276	4078	412	0.773
	8.0	46.50	59.2	4886	2219	9.08	6.12	391	296	482	340	5050	504	0.766
	9.0 *	52.30	66.0	5369	2433	9.02	6.07	430	324	533	375	5596	554	0.761
	10.0	57.00	72.6	5825	2634	8.96	6.02	466	351	582	409	6121	602	0.757
	12.0	66.00	84.1	6458	2925	8.77	5.90	517	390	658	463	7088	684	0.738
	12.5	68.30	87.0	6633	3002	8.73	5.87	531	400	678	477	7315	704	0.736
300x100	6.0	35.8	45.6	4777	842	10	4.30	318	168	411	188	2403	306	0.779
	6.3	37.2	47.4	4907	868	10	4.28	327	174	425	194	2515	318	0.773
	10.0	57.0	72.6	7106	1224	10	4.11	474	245	631	285	3681	455	0.757
300x200	6.0	45.20	57.6	7370	3962	11.3	8.29	491	396	588	446	8115	651	0.979
	6.3	47.10	60.0	7624	4104	11.3	8.27	508	410	610	463	8524	680	0.973
	8.0	59.10	75.2	9389	5042	11.2	8.19	626	504	757	574	10630	838	0.966
	9.0 *	66.50	84.0	10370	5561	11.1	8.14	691	556	840	637	11820	927	0.961
	10.0	72.70	92.6	11310	6058	11.1	8.09	754	606	921	698	12990	1012	0.957
	12.0	84.80	108	12790	6854	10.9	7.96	853	685	1056	801	15240	1167	0.938
	12.5	88.00	112	13180	7060	10.8	7.94	879	706	1091	828	15770	1204	0.936
400x200	6.0 *	54.70	69.6	14790	5092	14.6	8.55	739	509	906	562	12070	877	1.18
	8.0	71.60	91.2	18970	6517	14.4	8.45	949	652	1173	728	15820	1133	1.17
	9.0 *	80.60	102	21020	7204	14.4	8.40	1051	720	1305	809	17620	1255	1.16
	10.0 *	88.40	113	23000	7864	14.3	8.36	1150	786	1434	888	19370	1373	1.16
	12.0 *	104.00	132	26250	8977	14.1	8.24	1312	898	1656	1027	22780	1591	1.14
	12.5	108.00	137	27100	9260	14.1	8.22	1355	926	1714	1062	23590	1644	1.14

* Sizes not included in BS EN 10219 Part 2 (1997)

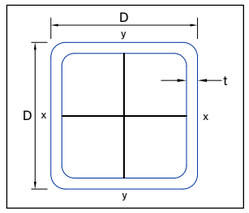
6.2.3 Cold Formed Square Hollow Section (SHS)



Designation			Mass per Metre	Area of Section	Second Moment of Area	Radius of Gyration	Elastic Modulus	Plastic Modulus	Torsional Constants		Surface Area per Metre
Size	Thickness										
DxD	t			A	I	r	Z	S	J	C	
mm	mm		kg/m	cm^2	cm^4	cm	cm^3	cm^3	cm^4	cm^3	m^2/m
12x12	1.0	*	0.357	0.414	0.0808	0.442	0.135	0.167	0.138	0.205	0.0446
	1.2	*	0.421	0.481	0.0897	0.432	0.150	0.189	0.157	0.229	0.0439
	1.6	*	0.540	0.600	0.102	0.412	0.169	0.224	0.187	0.263	0.0425
13x13	1.2	*	0.400	0.529	0.118	0.473	0.182	0.228	0.205	0.278	0.0479
	1.6	*	0.500	0.664	0.136	0.453	0.209	0.273	0.247	0.324	0.0465
16x16	1.0	*	0.456	0.574	0.210	0.605	0.263	0.318	0.349	0.397	0.0606
	1.2	*	0.540	0.673	0.239	0.595	0.298	0.366	0.403	0.453	0.0599
	1.6	*	0.699	0.856	0.284	0.576	0.354	0.449	0.498	0.543	0.0585
19x19	1.0	*	0.555	0.694	0.368	0.728	0.387	0.463	0.600	0.584	0.0726
	1.2	*	0.659	0.817	0.421	0.718	0.444	0.537	0.699	0.671	0.0719
	1.6	*	0.859	1.05	0.511	0.698	0.538	0.668	0.876	0.819	0.0705
20x20	2.0		1.05	1.34	0.692	0.720	0.692	0.877	1.21	1.06	0.0731
	2.5	*	1.25	1.59	0.766	0.694	0.766	1.00	1.39	1.19	0.0714
25x25	1.0	*	0.752	0.934	0.884	0.973	0.707	0.833	1.41	1.06	0.0966
	1.2	*	0.897	1.11	1.03	0.963	0.820	0.975	1.66	1.24	0.0959
	1.6	*	1.18	1.43	1.28	0.944	1.02	1.24	2.12	1.54	0.0945
	1.8	*	1.33	1.59	1.38	0.934	1.11	1.35	2.33	1.68	0.0938
	2.0		1.36	1.74	1.48	0.924	1.19	1.47	2.53	1.80	0.0931
	2.3	*	1.54	1.95	1.61	0.909	1.29	1.62	2.80	1.97	0.0921
	2.4	*	1.70	2.02	1.65	0.904	1.32	1.67	2.88	2.02	0.0918
	2.5		1.64	2.09	1.69	0.899	1.35	1.71	2.97	2.07	0.0914
	3.0		1.89	2.41	1.84	0.874	1.47	1.91	3.33	2.27	0.0897
	3.2	*	2.15	2.53	1.89	0.864	1.51	1.98	3.45	2.34	0.0890
30x30	1.2	*	1.08	1.35	1.83	1.17	1.22	1.44	2.93	1.84	0.116
	1.6	*	1.41	1.75	2.31	1.15	1.54	1.84	3.77	2.32	0.115
	1.8	*	1.57	1.95	2.52	1.14	1.68	2.03	4.16	2.54	0.114
	2.3	*	1.97	2.41	2.99	1.11	2.00	2.45	5.07	3.03	0.112
	3.0		2.48	3.01	3.50	1.08	2.34	2.96	6.15	3.58	0.110
	3.2	*	2.62	3.17	3.62	1.07	2.41	3.08	6.42	3.71	0.109

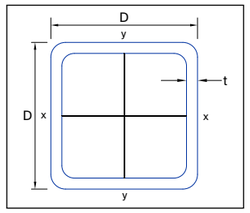
* Sizes not included in BS EN 10219 Part 2 (1997)

Dimensions	EN10219-2
Specification	EN10219-1
Size Range	20mm x 20mm to 400mm x 400mm



Designation			Mass per Metre	Area of Section	Second Moment of Area	Radius of Gyration	Elastic Modulus	Plastic Modulus	Torsional Constants		Surface Area per Metre
Size	Thickness										
DxD	t			A	I	r	Z	S	J	C	
mm	mm		kg/m	cm^2	cm^4	cm	cm^3	cm^3	cm^4	cm^3	m^2/m
32x32	1.2	*	1.13	1.44	2.25	1.25	1.41	1.65	3.58	2.11	0.124
	1.6	*	1.50	1.88	2.84	1.23	1.78	2.12	4.62	2.68	0.123
	1.8	*	1.69	2.09	3.11	1.22	1.95	2.33	5.11	2.94	0.122
	2.0	*	1.82	2.30	3.36	1.21	2.10	2.54	5.58	3.18	0.121
	2.3	*	2.02	2.60	3.71	1.20	2.32	2.84	6.24	3.52	0.120
	2.4	*	2.18	2.69	3.82	1.19	2.39	2.93	6.45	3.62	0.120
	3.0	*	2.68	3.25	4.38	1.16	2.74	3.44	7.62	4.18	0.118
	3.2	*	2.78	3.42	4.54	1.15	2.84	3.59	7.96	4.34	0.117
38x38	1.2	*	1.37	1.73	3.86	1.49	2.03	2.37	6.09	3.05	0.148
	1.6	*	1.81	2.26	4.92	1.47	2.59	3.06	7.90	3.90	0.147
	1.8	*	2.06	2.52	5.42	1.47	2.85	3.39	8.76	4.29	0.146
	2.0	*	2.22	2.78	5.88	1.46	3.10	3.70	9.60	4.67	0.145
	2.3	*	2.48	3.15	6.54	1.44	3.44	4.15	10.8	5.20	0.144
	2.4	*	2.66	3.27	6.74	1.44	3.55	4.29	11.2	5.37	0.144
	3.0	*	3.29	3.97	7.85	1.41	4.13	5.10	13.3	6.28	0.142
	3.2	*	3.41	4.19	8.18	1.40	4.30	5.34	14.0	6.55	0.141
40x40	2.0		2.31	2.94	6.94	1.54	3.47	4.13	11.3	5.23	0.153
	2.5		2.82	3.59	8.22	1.51	4.11	4.97	13.6	6.21	0.151
	3.0		3.30	4.21	9.32	1.49	4.66	5.72	15.8	7.07	0.150
	4.0		4.20	5.35	11.1	1.44	5.54	7.01	19.4	8.48	0.146
50x50	1.6	*	2.45	3.03	11.7	1.96	4.68	5.46	18.5	7.03	0.195
	1.8	*	2.79	3.39	12.9	1.96	5.18	6.07	20.6	7.79	0.194
	2.0		2.93	3.74	14.1	1.95	5.66	6.66	22.6	8.51	0.193
	2.3	*	3.40	4.25	15.9	1.93	6.34	7.52	25.6	9.55	0.192
	2.4	*	3.62	4.42	16.4	1.93	6.56	7.80	26.6	9.89	0.192
	2.5		3.60	4.59	16.9	1.92	6.78	8.07	27.5	10.2	0.191
	3.0		4.25	5.41	19.5	1.90	7.79	9.39	32.1	11.8	0.190
	3.2	*	4.54	5.73	20.4	1.89	8.16	9.89	33.9	12.3	0.189
	4.0		5.45	6.95	23.7	1.85	9.49	11.7	40.4	14.4	0.186
	4.5	*	6.11	7.67	25.5	1.82	10.2	12.8	44.1	15.6	0.185
	4.6	*	6.21	7.81	25.8	1.82	10.3	13.0	44.8	15.8	0.184
	4.8	*	6.43	8.09	26.5	1.81	10.6	13.3	46.1	16.2	0.184
	5.0		6.69	8.36	27.0	1.80	10.8	13.7	47.5	16.6	0.183
	6.0	*	7.71	9.63	29.5	1.75	11.8	15.3	53.2	18.2	0.179
	6.4	*	8.05	9.76	28.0	1.69	11.2	15.0	53.4	18.1	0.173

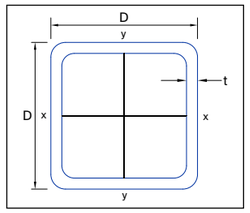
6.2.3 Cold Formed Square Hollow Section (SHS)



Designation			Mass per Metre	Area of Section	Second Moment of Area	Radius of Gyration	Elastic Modulus	Plastic Modulus	Torsional Constants		Surface Area per Metre
Size	Thickness										
DxD	t			A	I	r	Z	S	J	C	
mm	mm		kg/m	cm^2	cm^4	cm	cm^3	cm^3	cm^4	cm^3	m^2/m
60x60	1.6	*	2.88	3.67	20.7	2.37	6.89	8.0	32.4	10.4	0.235
	2.3	*	4.06	5.17	28.3	2.34	9.44	11.1	45.2	14.2	0.232
	3.0		5.19	6.61	35.1	2.31	11.7	14.0	57.1	17.7	0.230
	3.2	*	5.50	7.01	36.9	2.30	12.3	14.7	60.3	18.6	0.229
	4.0		6.71	8.55	43.6	2.26	14.5	17.6	72.6	22.0	0.226
	4.5	*	7.43	9.47	47.2	2.23	15.7	19.3	79.8	23.9	0.225
	6.0		9.44	12.0	56.1	2.16	18.7	23.7	98.4	28.6	0.219
63.5x63.5	2.3	*	4.31	5.49	33.9	2.48	10.7	12.5	53.8	16.0	0.246
	3.0	*	5.52	7.03	42.1	2.45	13.3	15.8	68.2	20.0	0.244
	4.5	*	8.04	10.1	57.0	2.38	18.0	21.9	95.7	27.2	0.239
	6.0	*	10.57	12.9	68.2	2.30	21.5	27.0	119	32.8	0.233
65x65	1.6	*	3.06	3.99	26.5	2.58	8.16	9.4	41.4	12.2	0.255
	2.3	*	4.31	5.63	36.4	2.54	11.2	13.1	57.9	16.9	0.252
	2.4	*	4.51	5.86	37.8	2.54	11.6	13.6	60.1	17.5	0.252
	3.0	*	5.59	7.21	45.4	2.51	14.0	16.6	73.3	21.0	0.250
	3.2	*	5.80	7.65	47.8	2.50	14.7	17.5	77.6	22.2	0.249
	4.0	*	7.08	9.35	56.6	2.46	17.4	21.0	93.7	26.3	0.246
	4.5	*	7.88	10.4	61.6	2.44	18.9	23.1	103	28.7	0.245
	4.6	*	8.03	10.6	62.5	2.43	19.2	23.5	105	29.2	0.244
	4.8	*	8.33	11.0	64.3	2.42	19.8	24.3	109	30.0	0.244
	5.0	*	8.92	11.4	66.1	2.41	20.3	25.0	112	30.9	0.243
	6.0	*	10.40	13.2	73.9	2.36	22.7	28.5	128	34.7	0.239
	6.4	*	10.60	13.6	72.9	2.32	22.4	28.6	133	35.4	0.233
70x70	2.5		5.17	6.59	49.4	2.74	14.1	16.5	78.5	21.2	0.271
	3.0		6.13	7.81	57.5	2.71	16.4	19.4	92.4	24.7	0.270
	3.6	*	7.24	9.23	66.5	2.69	19.0	22.7	108	28.7	0.268
	4.0		7.97	10.1	72.1	2.67	20.6	24.8	119	31.1	0.266
	5.0		9.70	12.4	84.6	2.62	24.2	29.6	142	36.7	0.263
75x75	2.3	*	5.23	6.55	57.1	2.95	15.2	17.7	90.0	22.9	0.292
	2.4	*	5.48	6.82	59.3	2.95	15.8	18.4	93.6	23.7	0.292
	3.0	*	6.81	8.41	71.6	2.92	19.1	22.5	115	28.7	0.290
	3.2	*	7.07	8.93	75.5	2.91	20.1	23.8	121	30.3	0.289
	4.0	*	8.66	10.9	90.2	2.87	24.1	28.8	147	36.3	0.286
	4.5	*	9.70	12.2	98.6	2.85	26.3	31.7	163	39.7	0.285
	4.6	*	9.85	12.4	100	2.84	26.7	32.2	166	40.4	0.284
	4.8	*	10.20	12.9	103	2.83	27.5	33.4	172	41.7	0.284
	5.0	*	10.76	13.4	106	2.82	28.4	34.5	177	42.9	0.283
	6.0	*	12.78	15.6	120	2.77	32.0	39.6	205	48.7	0.279
	6.4	*	13.10	16.2	120	2.73	32.0	40.1	214	50.2	0.273

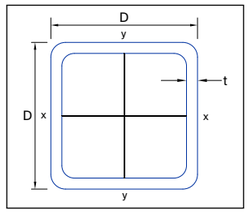
* Sizes not included in BS EN 10219 Part 2 (1997)

Dimensions	EN10219-2
Specification	EN10219-1
Size Range	20mm x 20mm to 400mm x 400mm



Designation			Mass per Metre	Area of Section	Second Moment of Area	Radius of Gyration	Elastic Modulus	Plastic Modulus	Torsional Constants		Surface Area per Metre
Size	Thickness										
DxD	t			A	I	r	Z	S	J	C	
mm	mm		kg/m	cm^2	cm^4	cm	cm^3	cm^3	cm^4	cm^3	m^2/m
80x80	3.0		7.07	9.01	88	3.12	22.0	25.8	140	33.0	0.310
	3.6	*	8.37	10.7	102	3.09	25.5	30.2	165	38.4	0.308
	4.0		9.22	11.7	111	3.07	27.8	33.1	180	41.8	0.306
	5.0		11.30	14.4	131	3.03	32.9	39.7	218	49.7	0.303
	6.0		13.20	16.8	149	2.98	37.3	45.8	252	56.6	0.299
	6.3		13.50	17.2	149	2.94	37.1	46.1	261	57.9	0.293
90x90	2.3	*	6.23	7.93	101	3.56	22.4	25.9	158	33.6	0.352
	3.0		8.01	10.2	127	3.53	28.3	33.0	201	42.5	0.350
	3.2	*	8.33	10.8	135	3.52	29.9	35.0	214	44.9	0.349
	3.6	*	9.50	12.1	149	3.50	33.0	38.9	238	49.6	0.348
	4.0		10.50	13.3	162	3.48	36.0	42.6	261	54.2	0.346
	4.5	*	11.50	14.9	178	3.46	39.5	47.1	289	59.6	0.345
	4.6	*	11.70	15.2	181	3.45	40.2	48.0	295	60.6	0.344
	5.0		12.80	16.4	193	3.43	42.9	51.4	316	64.7	0.343
	6.0		15.10	19.2	220	3.39	49.0	59.5	368	74.2	0.339
100x100	2.3	*	6.95	8.85	140	3.97	27.9	32.3	217	41.9	0.392
	3.0		8.96	11.4	177	3.94	35.4	41.2	279	53.2	0.390
	3.2	*	9.60	12.1	187	3.93	37.5	43.7	296	56.3	0.389
	4.0		11.70	14.9	226	3.89	45.3	53.3	362	68.1	0.386
	4.5	*	13.30	16.7	249	3.87	49.9	59.0	402	75.1	0.385
	4.6	*	13.50	17.0	254	3.86	50.7	60.2	410	76.4	0.384
	4.8	*	14.00	17.7	263	3.85	52.5	62.4	425	79.1	0.384
	5.0		14.40	18.4	271	3.84	54.2	64.6	441	81.7	0.383
	6.0		17.00	21.6	311	3.79	62.3	75.1	514	94.1	0.379
	6.3		17.50	22.2	314	3.76	62.8	76.4	536	97.0	0.373
	6.4	*	18.20	22.6	318	3.75	63.5	77.3	543	98.1	0.373
	8.0		21.40	27.2	366	3.67	73.2	91.1	645	114	0.366
	9.0	*	24.10	30.0	391	3.61	78.1	98.6	700	123	0.361
120x120	4.0		14.20	18.1	402	4.71	67.0	78.3	637	101	0.466
	5.0		17.50	22.4	485	4.66	80.9	95.4	778	122	0.463
	6.0		20.70	26.4	562	4.61	93.7	112	913	141	0.459
	6.3		21.40	27.3	572	4.58	95.3	114	955	146	0.453
	8.0		26.40	33.6	677	4.49	113	138	1163	175	0.446

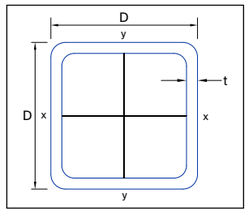
6.2.3 Cold Formed Square Hollow Section (SHS)



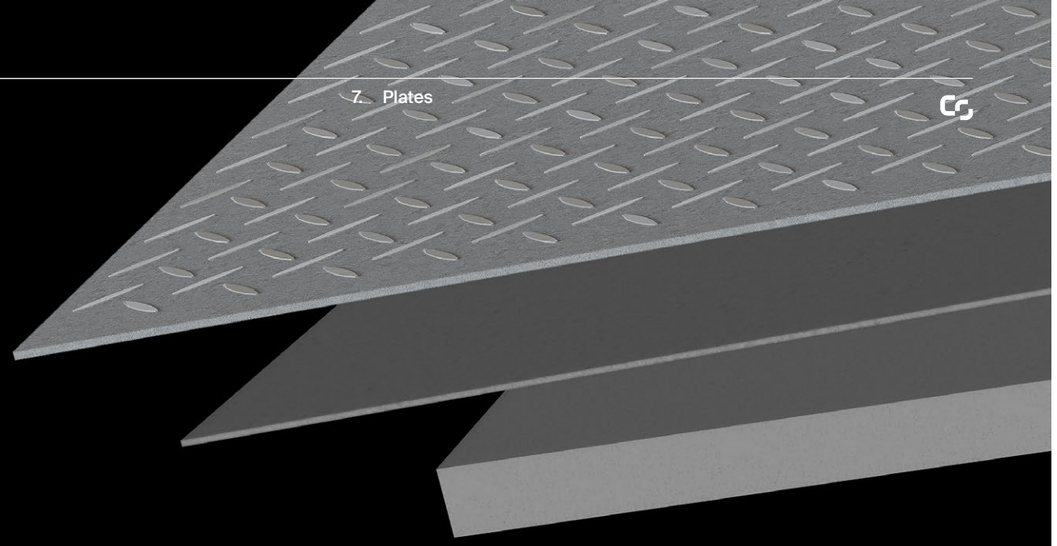
Designation		Mass per Metre	Area of Section	Second Moment of Area	Radius of Gyration	Elastic Modulus	Plastic Modulus	Torsional Constants		Surface Area per Metre
Size	Thickness									
DxD	t		A	I	r	Z	S	J	C	
mm	mm	kg/m	cm²	cm⁴	cm	cm³	cm³	cm⁴	cm³	m²/m
125x125	2.3 *	8.75	11.2	278	4.99	44.5	51.1	430	66.8	0.492
	3.0 *	11.30	14.4	355	4.96	56.7	65.6	553	85.1	0.490
	3.2 *	12.00	15.3	376	4.95	60.1	69.6	587	90.2	0.489
	4.5 *	16.90	21.2	506	4.89	80.9	94.8	804	122	0.485
	4.6 *	17.10	21.6	515	4.88	82.5	96.7	820	124	0.484
	4.8 *	17.80	22.5	534	4.87	85.5	100	852	129	0.484
	5.0 *	18.70	23.4	553	4.86	88.4	104	884	133	0.483
	6.0 *	22.10	27.6	641	4.82	103	122	1038	154	0.479
	6.4 *	23.20	29.0	660	4.78	106	126	1101	162	0.473
	9.0 *	31.38	39.0	838	4.64	134	165	1454	208	0.461
150x150	3.0 *	13.70	17.4	623	5.98	83.0	95.5	965	125	0.590
	3.2 *	14.50	18.5	661	5.97	88.1	101	1026	132	0.589
	4.0	18.00	22.9	808	5.93	108	125	1265	162	0.586
	4.5 *	20.50	25.7	896	5.91	120	139	1411	180	0.585
	4.6 *	20.80	26.2	914	5.90	122	142	1440	183	0.584
	4.8 *	21.60	27.3	948	5.89	126	147	1497	190	0.584
	5.0	22.30	28.4	982	5.89	131	153	1554	197	0.583
	6.0	26.40	33.6	1146	5.84	153	180	1833	230	0.579
	6.3	27.40	34.8	1174	5.80	156	185	1922	239	0.573
	6.4 *	28.30	35.4	1189	5.80	158	188	1949	242	0.573
	8.0	33.90	43.2	1412	5.71	188	226	2364	289	0.566
	9.0 *	40.52	48.0	1537	5.66	205	248	2608	316	0.561
175x175	4.0 *	21.20	26.9	1303	6.95	149	172	2028	224	0.686
	4.5 *	23.70	30.2	1449	6.93	166	192	2265	249	0.685
	5.0 *	26.20	33.4	1591	6.91	182	211	2498	273	0.683
	6.0 *	31.10	39.6	1864	6.86	213	249	2954	320	0.679
	6.4 *	33.40	41.8	1942	6.82	222	261	3145	338	0.673
	9.0 *	45.30	57.0	2546	6.68	291	348	4246	446	0.661
	9.5 *	48.40	59.8	2650	6.66	303	364	4446	465	0.659
	12.7 *	62.50	75.5	3124	6.43	357	443	5585	568	0.635
180x180	5.0	27.00	34.4	1737	7.11	193	224	2724	290	0.703
	6.0	32.10	40.8	2037	7.06	226	264	3223	340	0.699
	6.3	33.30	42.4	2096	7.03	233	273	3383	354	0.693
	8.0	41.50	52.8	2546	6.94	283	336	4189	432	0.686
	10.0	50.70	64.6	3017	6.84	335	404	5074	515	0.677
	12.0	58.50	74.5	3322	6.68	369	454	5865	584	0.658
	12.5	60.50	77.0	3406	6.65	378	467	6050	600	0.656

* Sizes not included in BS EN 10219 Part 2 (1997)

Dimensions	EN10219-2
Specification	EN10219-1
Size Range	20mm x 20mm to 400mm x 400mm



Designation		Mass per Metre	Area of Section	Second Moment of Area	Radius of Gyration	Elastic Modulus	Plastic Modulus	Torsional Constants		Surface Area per Metre
Size	Thickness									
DxD	t		A	I	r	Z	S	J	C	
mm	mm	kg/m	cm²	cm⁴	cm	cm³	cm³	cm⁴	cm³	m²/m
200x200	5.0	30.10	38.4	2410	7.93	241	279	3763	362	0.783
	6.0	35.80	45.6	2833	7.88	283	330	4459	426	0.779
	6.3	37.20	47.4	2922	7.85	292	341	4682	444	0.773
	8.0	46.50	59.2	3566	7.76	357	421	5815	544	0.766
	9.0 *	52.30	66.0	3918	7.71	392	465	6454	599	0.761
	10.0	57.00	72.6	4251	7.65	425	508	7072	651	0.757
	12.0	66.00	84.1	4730	7.50	473	576	8230	743	0.738
	12.5	68.30	87.0	4859	7.47	486	594	8502	765	0.736
203x203	4.5 *	28.10	35.2	2295	8.07	226	261	3567	339	0.797
	6.4 *	38.40	48.9	3103	7.96	306	357	4973	464	0.785
	9.5 *	56.00	70.4	4288	7.80	422	503	7088	646	0.771
	12.7 *	72.60	89.7	5161	7.58	508	621	9030	801	0.747
250x250	6.0	45.20	57.6	5672	9.92	454	524	8843	681	0.979
	6.3	47.10	60.0	5873	9.89	470	544	9290	711	0.973
	8.0	59.10	75.2	7229	9.80	578	676	11600	878	0.966
	9.0 *	66.50	84.0	7984	9.75	639	750	12910	972	0.961
	10.0	72.70	92.6	8707	9.70	697	822	14200	1062	0.957
	12.0	84.80	108	9859	9.55	789	944	16690	1226	0.938
	12.5	88.00	112	10160	9.52	813	975	17280	1266	0.936
254x254	6.4 *	48.50	62.0	6257	10.0	493	571	9898	746	0.989
	9.5 *	71.20	89.8	8781	9.89	691	813	14240	1053	0.975
	12.7 *	92.90	116	10830	9.68	853	1023	18420	1328	0.951
300x300	6.0	54.70	69.6	9964	12.0	664	764	15430	997	1.18
	8.0	71.60	91.2	12800	11.8	853	991	20310	1293	1.17
	9.0 *	80.60	102	14180	11.8	946	1102	22660	1434	1.16
	10.0	88.40	113	15520	11.7	1035	1211	24970	1572	1.16
	12.0	104.00	132	17770	11.6	1184	1402	29510	1829	1.14
	12.5	108.00	137	18350	11.6	1223	1451	30600	1892	1.14
	16.0	138.00	171	22080	11.4	1472	1774	37840	2299	1.12
350x350	9.0 *	94.70	120	22970	13.8	1312	1522	36370	1987	1.36
	12.0	124.00	156	29050	13.6	1660	1949	47600	2552	1.34
	16.0	163.00	203	36510	13.4	2086	2488	61480	3238	1.32
400x400	9.0 *	109.00	138	34790	15.9	1739	2009	54720	2630	1.56
	12.0	143.00	180	44320	15.7	2216	2587	71840	3395	1.54
	16.0	188.00	235	56150	15.5	2808	3322	93280	4336	1.52



7. Plates

Flat steel product that can be used for structural and construction applications, shipbuilding and offshore equipment.

7.1 Plates
7.2 Sheets
7.3 Chequered Plates

Plates
Standard specifications

Material	Yield strength N/mm²							Tensile strength N/mm²	Min. Elongation $L_0=5.65\sqrt{S_0}$	Min. Charpy V-notch.	Dimensions & Tolerances
AS 3678	**≤8mm**	**>8 - ≤12mm**	**>12 - ≤20mm**	**>20 - ≤32mm**	**>32 - ≤50mm**	**>50 - ≤80mm**	**>80 - ≤150mm**				***AS 3678***
Grade 250	280	260	250	250	250	240	230	min. 410	22%	27J @ 0°C	
Grade 300	320	310	300	280	280	270	260	min. 430	21%	27J @ 0°C	
Grade 350	360	360	350	340	340	340	330	min. 450	20%	27J @ 0°C	
Grade 400	400	400	380	360	360	360	-	min. 480	18%	27J @ 0°C	
Grade 450	450	450	450	420	400	-	-	min. 500	18%	27J @ 0°C	
ASTM A36 (1996)	min. 250							400-550	20-21 %	-	***ASTM A6***
ASTM A131											
Grade AH36	355							490-620	22%	50J @ 0°C	
Grade DH36	355							490-620	22%	50J @ -20°C	
Grade EH36	355							490-620	22%	50J @ -40°C	
API 2W											***ASTM A6***
Grade 50	345							448	23%	41J @ -40°C	
EN 10025	**≤16mm**	**>16 - ≤40mm**	**>40 - ≤63mm**	**>63 - ≤80mm**	**>80 - ≤100mm**	**>100 - ≤150mm**	**>150 - ≤200mm**	**3-100mm**			***EN10029***
S275JR	275	265	255	245	235	225	215	410-560	18-23 %	27J @ 20°C	
S355JR	355	345	335	325	315	295	285	470-630	17-22 %	27J @ 20°C	
S355J0	355	345	335	325	315	295	285	470-630	17-22 %	27J @ 0°C	
S355J2	355	345	335	325	315	295	285	470-630	17-22 %	27J @ -20°C	
S460M	460	440	430	410	400	385	-	500-720	17%	40J @ -20°C	
EN 10225	**≤25mm**	**>25 - ≤40mm**	**>40 - ≤63mm**	**>63 - ≤100mm**							***EN10029***
S355G10+M / S355MLO	355	345	335	325	-	-	-	470-630	22%	50J @ -40°C	
JIS 3101	**≤16mm**	**>16 - ≤40mm**	**>40 - ≤100mm**	**>100mm**				**t<100mm**			***JIS 3193***
SS400	245	235	215	205	-	-	-	400-510	17-23 %	-	
SS490	285	275	255	245	-	-	-	490-610	15-21 %	-	
SS540	400	390	-	-	-	-	-	540	13-17 %	-	
JIS 3106	**≤16mm**	**>16 - ≤40mm**	**>40 - ≤75mm**	**>75 - ≤100mm**	**>100 - ≤160mm**	**>160 - ≤200mm**		**t<100mm**			
SM400A	245	235	215	215	205	195	-	400-510	18-24 %	-	
SM400B	245	235	215	215	205	195	-	400-510	18-24 %	27J @ 0°C	
SM400C	245	235	215	215	205	195	-	400-510	18-24 %	47J @ 0°C	
SM490A	325	315	295	295	285	275	-	490-610	17-23 %	-	
SM490B	325	315	295	295	285	275	-	490-610	17-23 %	27J @ 0°C	
SM490C	325	315	295	295	-	-	-	490-610	17-23 %	47J @ 0°C	
SM490YA	365	355	335	325	-	-	-	490-610	15-21 %	-	
SM490YB	365	355	335	325	-	-	-	490-610	15-21 %	27J @ 0°C	
SM520B	365	355	335	325	-	-	-	520-640	15-21%	27J @ 0°C	
SM520C	365	355	335	325	-	-	-	520-640	15-21 %	47J @ 0°C	

7.1 Plates

Metric units 7.85kg/mm m² – 0.7293 kg/mm ft²

Thickness	Unit Weight	Width x Length (ft)						
		4 x 8	4 x 16	5 x 10	5 x 20	6 x 20	8 x 20	10 x 30
t	M	Weight / pc	Weight / pc	Weight / pc	Weight / pc	Weight / pc	Weight / pc	Weight / pc
mm	kg/ft²	kg	kg	kg	kg	kg	kg	kg
6	4.376	140	280	219	438	525	700	1313
7	5.105	163	327	255	511	613	817	1532
8	5.834	187	373	292	583	700	934	1750
9	6.564	210	420	328	656	788	1050	1969
10	7.293	233	467	365	729	875	1167	2188
11	8.022	257	513	401	802	963	1284	2407
12	8.752	280	560	438	875	1050	1400	2625
12.7	9.262	296	593	463	926	1111	1482	2779
13	9.481	303	607	474	948	1138	1517	2844
14	10.21	327	653	511	1021	1225	1634	3063
15	10.94	350	700	547	1094	1313	1750	3282
16	11.67	373	747	583	1167	1400	1867	3501
17	12.40	397	793	620	1240	1488	1984	3719
18	13.13	420	840	656	1313	1575	2100	3938
19	13.86	443	887	693	1386	1663	2217	4157
20	14.59	467	934	729	1459	1750	2334	4376
21	15.32	490	980	766	1532	1838	2450	4595
22	16.04	513	1027	802	1604	1925	2567	4813
23	16.77	537	1074	839	1677	2013	2684	5032
24	17.50	560	1120	875	1750	2100	2801	5251
25	18.23	583	1167	912	1823	2188	2917	5470
25.4	18.52	593	1186	926	1852	2223	2964	5557
26	18.96	607	1214	948	1896	2275	3034	5689
27	19.69	630	1260	985	1969	2363	3151	5907
28	20.42	653	1307	1021	2042	2450	3267	6126
29	21.15	677	1354	1057	2115	2538	3384	6345
30	21.88	700	1400	1094	2188	2625	3501	6564

Dimensions	4ft x 8ft to 10ft x 40ft
Specification	EN10025/ ASTM A 36/ ASTM A 572/ EN10225/ ASTM A131/ API2W/ ASME A 516
Size Range	Thickness 6mm to 150mm

Thickness	Unit Weight	Width x Length (ft)						
		4 x 8	4 x 16	5 x 10	5 x 20	6 x 20	8 x 20	10 x 30
t	M	Weight / pc	Weight / pc	Weight / pc	Weight / pc	Weight / pc	Weight / pc	Weight / pc
mm	kg/ft²	kg	kg	kg	kg	kg	kg	kg
32	23.34	747	1494	1167	2334	2801	3734	7001
34	24.80	793	1587	1240	2480	2976	3967	7439
36	26.25	840	1680	1313	2625	3151	4201	7876
38	27.71	887	1774	1386	2771	3326	4434	8314
40	29.17	934	1867	1459	2917	3501	4668	8752
45	32.82	1050	2100	1641	3282	3938	5251	9846
50	36.47	1167	2334	1823	3647	4376	5834	10940
55	40.11	1284	2567	2006	4011	4813	6418	12033
60	43.76	1400	2801	2188	4376	5251	7001	13127
65	47.40	1517	3034	2370	4740	5689	7585	14221
70	51.05	1634	3267	2553	5105	6126	8168	15315
75	54.70	1750	3501	2735	5470	6564	8752	16409
80	58.34	1867	3734	2917	5834	7001	9335	17503
90	65.64	2100	4201	3282	6564	7876	10502	19691
100	72.93	2334	4668	3647	7293	8752	11669	21879
110	80.22	2567	5134	4011	8022	9627	12836	24067
120	87.52	2801	5601	4376	8752	10502	14003	26255
125	91.16	2917	5834	4558	9116	10940	14586	27349
130	94.81	3034	6068	4740	9481	11377	15169	28443
140	102.1	3267	6535	5105	10210	12252	16336	30631
150	109.4	3501	7001	5470	10940	13127	17503	32819

7.2
Sheets

Dimensions	4ft x 8ft to 5ft x 20ft
Specification	EN10025/ ASTM A 36
Size Range	Thickness 3mm to 6mm

Metric units 7.85kg/mm m² - 0.7293 kg/mm ft²

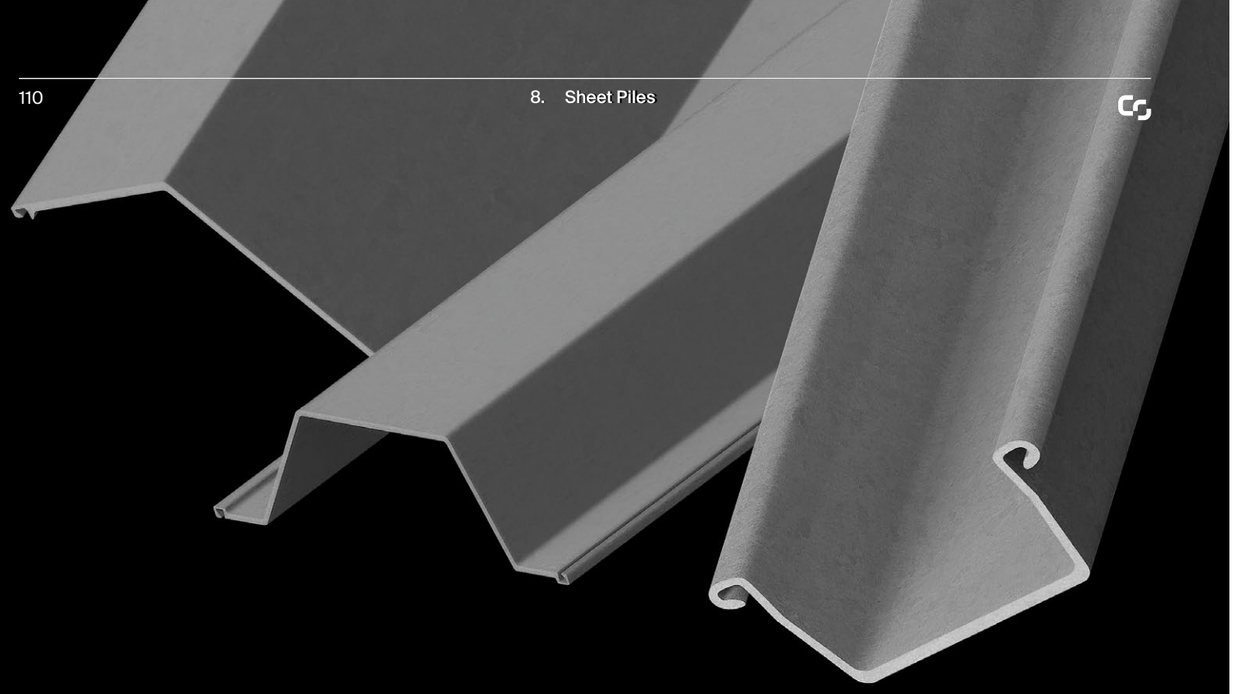
Thickness	Unit Weight	Width x Length (ft)						
		4 x 8	4 x 16	5 x 10	5 x 20	6 x 20	8 x 20	10 x 30
t	M	Weight / pc	Weight / pc	Weight / pc	Weight / pc	Weight / pc	Weight / pc	Weight / pc
mm	kg/ft²	kg	kg	kg	kg	kg	kg	kg
1.2	0.875	28.0	-	43.8	-	-	-	-
1.5	1.094	35.0	-	54.7	-	-	-	-
1.6	1.167	37.3	-	58.3	-	-	-	-
1.9	1.386	44.3	-	69.3	-	-	-	-
2.3	1.677	53.7	-	83.9	-	-	-	-
2.6	1.896	60.7	-	94.8	-	-	-	-
3	2.188	70.0	-	109	219	-	-	-
3.2	2.334	74.7	-	117	-	-	-	-
4.5	3.282	105	210	164	328	394	-	-
5	3.647	117	233	182	365	438	-	-

7.3
Chequered Plates

Dimensions	4ft x 8ft to 5ft x 10ft
Specification	EN10025/ ASTM A 36
Size Range	Thickness 3mm to 6mm

Metric units 8.08kg/mm m² - 0.7507 kg/mm ft²

Width x Length (ft)		4 x 8	4 x 10	4 x 16	4 x 20	5 x 10	5 x 20
Thickness	Weight	Weight / pc					
		32	40	64	80	50	100
mm	kg/ft2	kg	kg	kg	kg	kg	kg
2.3	1.73	55.3	69.1	111	138	86.3	-
3	2.25	72.1	90.1	144	180	113	-
3.2	2.40	76.9	96.1	154	192	120	-
4	3.00	96.1	120	192	240	150	-
4.3	3.23	103	129	207	258	161	-
4.5	3.38	108	135	216	270	169	-
5	3.75	120	150	240	300	188	-
5.8	4.35	139	174	279	348	218	435
6	4.50	144	180	288	360	225	450
7.5	5.63	180	225	360	450	282	563
8	6.01	192	240	384	480	300	601
9	6.76	216	270	432	541	338	676
12	9.01	288	360	577	721	450	901

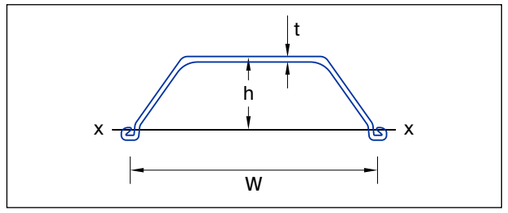


8.
Sheet Piles

Structural steel sections with vertical interlocking edges that are driven into the ground to create a continuous retaining wall against soil or water.

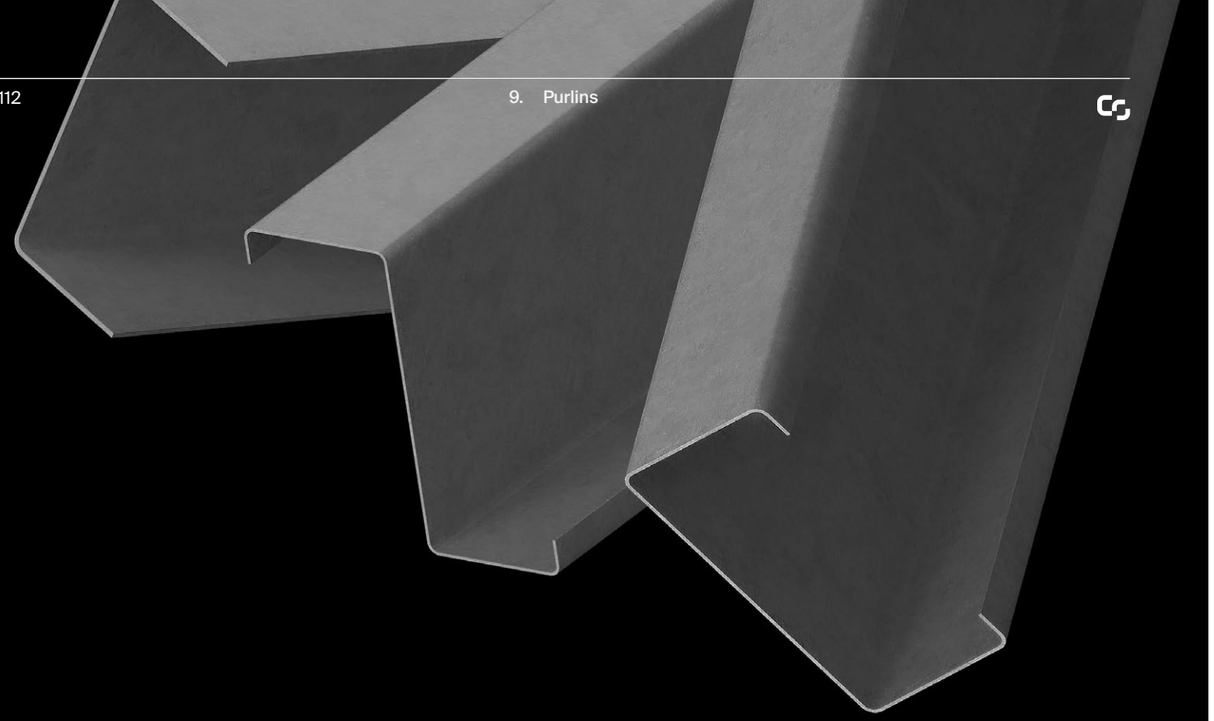
8.1 U Type

8.1
U Type Sheet Piles
Standard specifications



Specification EN10248/ JIS A 5528

Section	Width b	Height h	Thickness t	Sectional Area	Weight	Weight	Moment of Inertia	Section Modulus
	mm	mm	mm	cm^2	kg/m	kg/m^2	cm^4/m	cm^3/m
II	400	100	10.5	61.18	48.0	120	8740	874
III	400	125	13.0	76.42	60.0	150	16800	1340
III_A	400	150	13.1	74.4	58.4	146	22800	1520
IV	400	170	15.5	96.99	76.1	190	38600	2270
V_L	500	200	24.3	133.8	105.0	210	63000	3150
V_{IL}	500	225	27.6	153	120.0	240	86000	3820
II_W	600	130	10.3	78.7	61.8	103	13000	1000
III_W	600	180	13.4	103.9	81.6	136	32400	1800
IV_W	600	210	18.0	135.3	106.0	177	56700	2700



9. Purlins

Horizontal steel member commonly used to support roof structures.

9.1 Plain Channels
9.2 Lipped Channels
9.3 C-Purlin
9.4 Z-Purlin

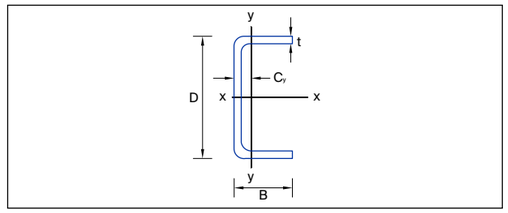
Purlins
Standard specifications

Material	Yield strength N/mm²	Tensile strength N/mm²	Min. Elongation	Min. Charpy V-notch.	Dimensions & Tolerances
JIS 3350					***JIS 3350***
SSC400	245	400-540	17-21%	-	
AS 1397					***AS 1365***
G250	250	320	22%	-	
G300	300	340	18%	-	
G350	350	420	14%	-	
G450	450	480	9%	-	
EN 10346					***EN 10162***
S220GD	220	300	20%	-	
S250GD	250	330	19%	-	
S280GD	280	360	18%	-	
S320GD	320	390	17%	-	
S350GD	350	420	16%	-	
S390GD	390	460	16%	-	
S420GD	420	480	15%	-	
S450GD	450	510	14%	-	

High-Tensile Galvanised C and Z Purlins
Mechanical properties/tolerances

Steel grade	Base steel	Mechanical properties			Tolerances				Zinc
	Thickness	Yield strength	Tensile strength	Minimum elongation	Depth	Flange width	Length	Hole Centres	coating
ASTM A446, Grade E (mod.) & AS 1397 G450	1.6mm, 2.0mm and 2.5 mm	min. 450 N/mm²	min. 510 N/mm²	10%	±1mm	±2mm	±3mm	±1.5mm	min. 275g/m² coating

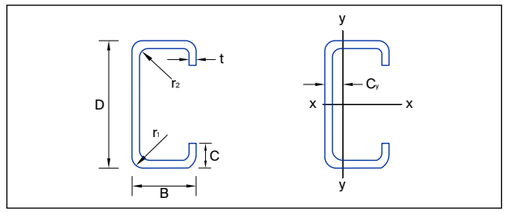
9.1
Plain Channels



Specification JIS G 3350/ EN 10162

Designation		Thick-ness	Area of Section	Centre of Gravity	Second Moment of Area		Radius of Gyration		Elastic Modulus		Plastic Modulus		Buckling Constant	Torsional Index	Warping Constant	Torsional Constant
Size DxB	Mass per Metre	t	A	C_y	I_x	I_y	r_x	r_y	Z_x	Z_y	S_x	S_y	u	x	H	J
mm	kg/m	mm	cm^2	cm	cm^4	cm^4	cm	cm	cm^3	cm^3	cm^3	mm^3			$dm^6 \times 10^{-3}$	cm^4
60x30	1.44	1.6	1.84	0.823	10.3	1.63	2.37	0.944	3.45	0.751	4.00	1.37	0.897	29.7	0.0101	0.0165
	2.03	2.3	2.59	0.856	14.2	2.25	2.34	0.932	4.72	1.05	5.54	1.94	0.891	20.4	0.0138	0.0490
75x45	2.00	1.6	2.56	1.30	23.9	5.37	3.06	1.45	6.37	1.68	7.22	5.85	0.891	37.7	0.0528	0.0226
	2.84	2.3	3.62	1.34	33.1	7.49	3.02	1.44	8.83	2.37	10.1	7.83	0.885	26.1	0.0739	0.0673
	3.65	3.0	4.65	1.37	41.7	9.46	2.99	1.43	11.1	3.02	12.9	9.51	0.878	19.9	0.0939	0.150
100x50	2.44	1.6	3.12	1.32	50.0	7.87	4.01	1.59	10.0	2.14	11.5	3.88	0.901	50.1	0.136	0.0274
	3.47	2.3	4.43	1.36	69.9	11.0	3.97	1.58	14.0	3.03	16.1	5.52	0.898	34.6	0.189	0.0815
	4.47	3.0	5.70	1.39	88.6	14.0	3.94	1.57	17.7	3.88	20.6	7.12	0.895	26.3	0.240	0.181
125x50	3.92	2.3	5.00	1.21	117	11.8	4.85	1.54	18.8	3.12	22.0	5.72	0.900	43.2	0.315	0.0916
	5.06	3.0	6.45	1.24	149	15.1	4.81	1.53	23.9	4.01	28.2	7.46	0.898	32.7	0.397	0.204
	7.42	4.5	9.46	1.31	212	21.4	4.74	1.51	34.0	5.81	40.6	11.2	0.895	21.3	0.555	0.689
150x65	4.91	2.3	6.27	1.61	218	25.8	5.90	2.03	29.1	5.29	33.7	9.56	0.902	52.2	1.00	0.114
	6.36	3.0	8.10	1.64	279	33.1	5.87	2.02	37.2	6.81	43.4	12.4	0.900	39.7	1.27	0.253
	9.36	4.5	11.9	1.71	401	47.6	5.79	2.00	53.4	9.94	63.0	18.5	0.897	26.0	1.81	0.856
175x75	5.73	2.3	7.30	1.83	347	40.2	6.89	2.35	39.7	7.09	45.9	12.8	0.902	61.1	2.12	0.132
	7.42	3.0	9.45	1.86	445	51.5	6.86	2.33	50.8	9.14	59.1	16.6	0.901	46.5	2.70	0.294
	10.95	4.5	14.0	1.93	643	74.6	6.79	2.31	73.5	13.4	86.3	24.8	0.898	30.6	3.87	0.992
200x75	6.18	2.3	7.88	1.71	473	41.7	7.75	2.30	47.3	7.21	55.4	13.0	0.899	70.0	2.88	0.142
	8.01	3.0	10.2	1.74	608	53.6	7.72	2.29	60.8	9.30	71.4	16.9	0.898	53.3	3.67	0.316
	11.84	4.5	15.1	1.80	881	77.7	7.64	2.27	88.1	13.6	104	25.6	0.897	35.0	5.24	1.07
225x75	6.63	2.3	8.45	1.60	624	43.1	8.60	2.26	55.5	7.30	65.6	13.2	0.894	79.0	3.79	0.152
	8.59	3.0	11.0	1.63	803	55.4	8.56	2.25	71.3	9.43	84.6	17.3	0.894	60.1	4.83	0.339
	12.72	4.5	16.2	1.70	1166	80.4	8.48	2.23	104	13.8	124	26.3	0.893	39.4	6.88	1.14
250x75	7.08	2.3	9.03	1.50	802	44.3	9.43	2.22	64.2	7.39	76.5	13.4	0.888	88.2	4.84	0.163
	9.18	3.0	11.7	1.54	1032	56.9	9.39	2.21	82.5	9.54	98.8	17.6	0.888	67.1	6.17	0.361
	13.60	4.5	17.3	1.60	1502	82.7	9.31	2.18	120	14.0	145	27.1	0.888	44.0	8.79	1.22

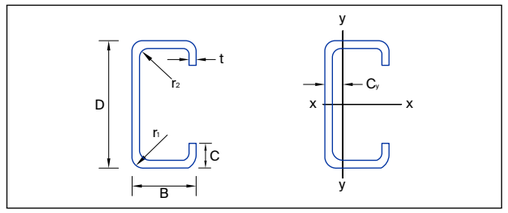
9.2
Lipped Channels



Specification JIS G 3350/ EN 10162

Designation		Thick-ness	Inside Outside Radius		Area of Section	Centre of Gravity	Second Moment of Area		Radius of Gyration		Elastic Modulus		Plastic Modulus		Buckling Constant	Torsional Index	Warp Constant	Torsion Constant
Size DxBxC	Mass per Metre	t	r_1	r_2	A	C_y	I_x	I_y	r_x	r_y	Z_x	Z_y	S_x	S_y	u	x	H	J
mm	kg/m	mm	mm	mm	cm^2	cm	cm^4	cm^4	cm	cm	cm^3	cm^3	cm^3	cm^3			$dm^6 \times 10^{-3}$	cm^4
60x30x10	1.62	1.6	4.0	2.4	2.05	1.06	11.4	2.50	2.36	1.10	3.81	1.29	4.48	2.12	0.808	35.5	0.0219	0.0182
	2.25	2.3	5.8	3.5	2.83	1.05	15.2	3.20	2.32	1.06	5.06	1.64	6.05	2.57	0.801	24.5	0.0281	0.0530
75x45x15	2.31	1.6	4.0	2.4	2.93	1.72	26.8	8.59	3.03	1.71	7.15	3.09	8.27	4.62	0.776	46.7	0.129	0.0258
	3.24	2.3	5.8	3.5	4.09	1.71	36.5	11.5	2.99	1.67	9.73	4.11	11.4	6.31	0.772	32.2	0.171	0.0754
	4.12	3.0	7.5	4.5	5.18	1.70	44.9	13.8	2.94	1.63	12.0	4.94	14.2	7.79	0.769	24.5	0.206	0.165
	4.37	3.2	8.0	4.8	5.48	1.70	47.1	14.4	2.93	1.62	12.6	5.15	14.9	8.18	0.767	22.9	0.215	0.199
100x50x20	2.88	1.6	4.0	2.4	3.65	1.86	57.9	13.8	3.98	1.95	11.6	4.41	13.5	6.73	0.788	62.9	0.373	0.032
	4.06	2.3	5.8	3.5	5.13	1.86	79.6	18.7	3.94	1.91	15.9	5.95	18.7	9.28	0.785	43.5	0.503	0.094
	5.18	3.0	7.5	4.5	6.53	1.85	99	22.9	3.90	1.87	19.8	7.27	23.6	11.6	0.781	33.1	0.616	0.205
	5.50	3.2	8.0	4.8	6.92	1.85	104	24.0	3.88	1.86	20.9	7.60	24.9	12.2	0.780	31.0	0.645	0.248
	6.71	4.0	10.0	6.0	8.41	1.84	123	27.7	3.83	1.82	24.7	8.79	29.8	14.5	0.775	24.7	0.747	0.478
	7.43	4.5	11.3	6.8	9.29	1.84	134	29.7	3.80	1.79	26.8	9.40	32.6	14.4	0.772	21.8	0.802	0.674
125x50x20	4.51	2.3	5.8	3.5	5.70	1.68	135	20.3	4.86	1.89	21.5	6.11	25.5	8.91	0.819	51.6	0.767	0.104
	5.77	3.0	7.5	4.5	7.28	1.68	169	24.8	4.81	1.85	27.0	7.47	32.2	11.2	0.814	39.4	0.942	0.228
	6.13	3.2	8.0	4.8	7.72	1.68	178	26.0	4.80	1.84	28.4	7.82	34.0	11.8	0.813	36.9	0.987	0.275
	7.50	4.0	10.0	6.0	9.41	1.67	212	30.2	4.74	1.79	33.9	9.05	40.9	14.1	0.808	29.4	1.15	0.531
	8.31	4.5	11.3	6.8	10.4	1.66	231	32.3	4.71	1.76	36.9	9.7	45.0	15.4	0.804	26.1	1.24	0.750
150x65x20	5.50	2.3	5.8	3.5	6.97	2.11	245	40.5	5.93	2.41	32.7	9.23	38.1	13.8	0.840	59.6	2.03	0.126
	7.07	3.0	7.5	4.5	8.93	2.10	310	50.2	5.89	2.37	41.3	11.4	48.4	17.4	0.836	45.6	2.53	0.277
	7.51	3.2	8.0	4.8	9.48	2.10	327	52.7	5.87	2.36	43.6	12.0	51.2	18.4	0.835	42.7	2.66	0.336
	9.22	4.0	10.0	6.0	11.6	2.09	393	62.0	5.82	2.31	52.4	14.1	62.1	22.1	0.831	34.1	3.14	0.649
	10.25	4.5	11.3	6.8	12.9	2.09	432	67.1	5.78	2.28	57.5	15.2	68.5	24.2	0.828	30.3	3.41	0.917
175x75x20	6.31	2.3	5.8	3.5	8.00	2.34	386	60.3	6.95	2.75	44.1	11.7	51.1	17.8	0.853	68.0	3.92	0.144
	8.13	3.0	7.5	4.5	10.3	2.33	489	75.1	6.90	2.70	55.9	14.5	65.2	22.5	0.850	52.0	4.90	0.318
	8.63	3.2	8.0	4.8	10.9	2.33	518	79.1	6.88	2.69	59.1	15.3	69.1	23.7	0.849	48.7	5.17	0.385
	10.63	4.0	10.0	6.0	13.4	2.32	626	93.6	6.83	2.64	71.5	18.1	84.1	28.7	0.845	38.9	6.15	0.745
	11.84	4.5	11.3	6.8	14.9	2.31	689	102	6.80	2.61	78.7	19.6	93.0	31.6	0.842	34.6	6.71	1.05
200x75x20	6.76	2.3	5.8	3.5	8.58	2.19	527	63.0	7.84	2.71	52.7	11.9	61.5	18.0	0.860	76.8	5.22	0.154
	8.71	3.0	7.5	4.5	11.0	2.18	669	78.5	7.79	2.67	66.9	14.8	78.5	22.9	0.856	58.8	6.53	0.340
	9.27	3.2	8.0	4.8	11.7	2.18	708	82.6	7.77	2.65	70.8	15.5	83.2	24.3	0.855	55.1	6.89	0.412
	11.40	4.0	10.0	6.0	14.4	2.17	857	98	7.71	2.61	85.7	18.4	101	29.5	0.850	44.1	8.22	0.798
	12.73	4.5	11.3	6.8	16.0	2.17	945	106	7.68	2.57	94.5	19.9	112	32.6	0.847	39.2	8.98	1.13

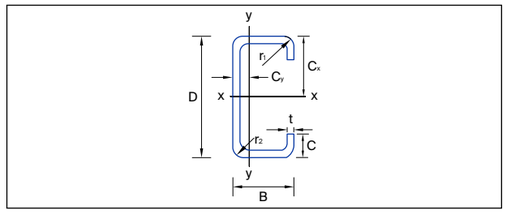
9.2
Lipped Channels



Specification JIS G 3350/ EN 10162

Designation		Thick -ness	Inside Outside Radius		Area of Section	Centre of Gravity	Second Moment of Area		Radius of Gyration		Elastic Modulus		Plastic Modulus		Buckling Constant	Torsional Index	Warp Constant	Torsion Constant
Size DxBxC	Mass per Metre	t	r_1	r_2	A	C_y	I_x	I_y	r_x	r_y	Z_x	Z_y	S_x	S_y	u	x	H	J
mm	kg/m	mm	mm	mm	cm^2	cm	cm^4	cm^4	cm	cm	cm^3	cm^3	cm^3	cm^3			$dm^6 \times 10^{-3}$	cm^4
200x75x25	6.95	2.3	5.8	3.5	8.81	2.33	540	69.0	7.83	2.80	54.0	13.3	63.3	19.6	0.846	79.2	6.07	0.158
	8.93	3.0	7.5	4.5	11.3	2.32	687	86.3	7.78	2.76	68.7	16.7	80.8	24.9	0.843	60.6	7.62	0.349
	9.52	3.2	8.0	4.8	12.0	2.32	727	90.9	7.77	2.75	72.7	17.5	85.7	26.4	0.842	56.8	8.03	0.423
	11.70	4.0	10.0	6.0	14.8	2.31	881	108	7.71	2.70	88.1	20.8	105	32.0	0.838	45.3	9.59	0.819
	13.10	4.5	11.3	6.8	16.5	2.31	972	118	7.68	2.67	97.2	22.7	116	35.4	0.835	40.3	10.5	1.16
225x75x20	7.21	2.3	5.8	3.5	9.15	2.06	694	65.3	8.71	2.67	61.7	12.0	72.6	18.3	0.862	85.8	6.74	0.165
	9.30	3.0	7.5	4.5	11.8	2.05	883	81.4	8.66	2.63	78.4	14.9	92.8	23.4	0.858	65.8	8.46	0.363
	9.89	3.2	8.0	4.8	12.5	2.05	934	85.7	8.64	2.62	83.1	15.7	98.4	24.8	0.857	61.7	8.92	0.439
	12.20	4.0	10.0	6.0	15.4	2.05	1134	101	8.58	2.57	101	18.6	120	30.3	0.852	49.4	10.7	0.851
	13.61	4.5	11.3	6.8	17.2	2.04	1252	110	8.54	2.53	111	20.2	133	33.6	0.849	43.9	11.6	1.206
225x75x25	7.40	2.3	5.8	3.5	9.38	2.19	713	71.6	8.72	2.76	63.3	13.5	74.6	19.9	0.851	87.9	7.77	0.169
	9.54	3.0	7.5	4.5	12.1	2.19	907	89.6	8.66	2.72	80.6	16.9	95.5	25.3	0.848	67.4	9.76	0.372
	10.10	3.2	8.0	4.8	12.8	2.18	960	94.4	8.65	2.71	85.4	17.8	101	26.9	0.847	63.1	10.3	0.450
	12.50	4.0	10.0	6.0	15.8	2.18	1166	112	8.59	2.66	104	21.1	124	32.8	0.843	50.5	12.3	0.873
	14.00	4.5	11.3	6.8	17.6	2.17	1288	122	8.55	2.64	115	23.0	137	36.4	0.840	44.9	13.5	1.24
250x75x20	7.67	2.3	5.8	3.5	9.73	1.94	890	67.3	9.57	2.63	71.2	12.1	84.4	18.6	0.861	94.9	8.50	0.175
	9.89	3.0	7.5	4.5	12.5	1.94	1133	83.9	9.51	2.59	90.7	15.1	108	23.8	0.857	72.8	10.7	0.385
	10.52	3.2	8.0	4.8	13.3	1.94	1200	88.4	9.49	2.58	96.0	15.9	115	25.3	0.856	68.3	11.3	0.467
	12.99	4.0	10.0	6.0	16.4	1.93	1459	105	9.43	2.53	117	18.8	140	31.1	0.851	54.7	13.5	0.905
	14.49	4.5	11.3	6.8	18.3	1.93	1612	114	9.39	2.49	129	20.4	155	34.6	0.848	48.7	14.7	1.28
250x75x25	7.85	2.3	5.8	3.5	10	2.07	914	74.0	9.58	2.73	73.1	13.6	86.7	20.1	0.853	96.9	9.73	0.179
	10.13	3.0	7.5	4.5	12.8	2.07	1165	92.5	9.53	2.69	93.2	17.0	111	25.8	0.850	74.3	12.2	0.394
	10.80	3.2	8.0	4.8	13.6	2.07	1234	97.5	9.51	2.67	98.7	17.9	118	27.4	0.849	69.6	12.9	0.478
	13.30	4.0	10.0	6.0	16.8	2.06	1501	116	9.45	2.63	120	21.3	144	33.6	0.844	55.7	15.5	0.926
	14.85	4.5	11.3	6.8	18.7	2.06	1659	126	9.41	2.60	133	23.2	160	37.4	0.842	49.5	16.9	1.31

9.3
C-Purlin



Specification JIS G 3350/ EN 10162

Designation		Thickness	Web	Flange	Lip	Area of Section	Moment of Intertia		Radius of Gyration	
Size Number	Mass per Metre	t	D	B	C	A	I_x	I_y	r_x	r_y
mm	kg/m	mm	mm	mm	mm	cm^2	cm^4	cm^4	cm	cm
C10010	1.78	1.0	102	51	12.5	2.16	36.4	7.55	4.11	1.87
C10012	2.10	1.2	102	51	12.5	2.58	43.2	8.92	4.10	1.86
C10015	2.62	1.5	102	51	13.5	3.23	53.7	11.2	4.08	1.87
C10019	3.29	1.9	102	51	14.5	4.09	67.3	14.2	4.1	1.87
C15012	2.89	1.2	152	64	14.5	3.54	129	18.8	6.0	2.31
C15015	3.59	1.5	152	64	15.5	4.43	161	23.7	6.0	2.31
C15019	4.51	1.9	152	64	16.5	5.61	202	30.0	6.0	2.31
C15024	5.70	2.4	152	64	18.5	7.12	254	38.6	6.0	2.33
C20015	4.49	1.5	203	76	15.5	5.55	353	39.6	8.0	2.67
C20019	5.74	1.9	203	76	19.0	7.13	451	53.1	8.0	2.73
C20024	7.24	2.4	203	76	21.0	9.04	569	68.1	7.9	2.74
C25019	6.50	1.9	254	76	18.5	8.08	762	56.1	9.7	2.64
C25024	8.16	2.4	254	76	20.5	10.20	962	72.1	9.7	2.65
C30024	10.09	2.4	300	96	27.5	12.60	1700	151	11.6	3.46
C30030	12.76	3.0	300	96	31.5	16.00	2130	196	11.6	3.5
C35030	15.23	3.0	350	125	30.0	19.10	3580	382	13.7	4.47

Designation		Section Modulus		Centroid	Shear Centre	Torion Constant	Mono-symmetry Section Constant	Section Modulus in Bending	Area in Compression
Size Number	Mass per Metre	Z_x	Z_y	$\bar{X}$	X_o	J	ßy	Zxe	Ae
mm	kg/m	cm^3	cm^3	mm	mm	mm^4	mm	cm^3	cm^2
C10010	1.78	7.13	2.19	16.1	39.9	71.9	123	5.37	113
C10012	2.10	8.48	2.59	16.0	39.7	124	123	6.74	153
C10015	2.62	10.5	3.29	161.0	40.1	242	122	8.73	217
C10019	3.29	13.2	4.21	16.2	40.4	492	122	12.3	329
C15012	2.89	17.0	4.17	18.3	46.5	170	171	11.8	165
C15015	3.59	21.1	5.29	18.4	46.9	332	171	17.1	244
C15019	4.51	26.6	6.74	18.5	47.1	675	170	21.8	340
C15024	5.70	33.5	8.79	18.9	48.0	1370	169	30.9	527
C20015	4.49	34.7	7.17	19.9	51.6	416	223	24.1	251
C20019	5.74	44.4	9.77	20.8	53.6	858	221	36.6	381
C20024	7.24	56.0	12.7	21.1	54.4	1740	219	47.5	541
C25019	6.50	60.0	9.86	18.1	48.5	972	276	46.2	381
C25024	8.16	75.7	12.8	18.4	49.3	1970	274	64.9	543
C30024	10.09	113.0	21.7	25.0	66.0	2430	320	91.1	632
C30030	12.76	142.0	28.5	25.8	67.9	4790	316	124	897
C35030	15.23	205.0	42.3	33.2	86.3	5730	378	159	940

9.4
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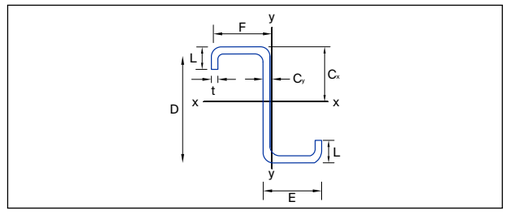
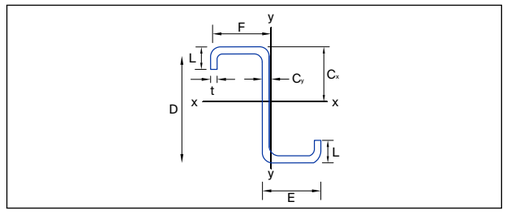


Designation		Thickness	Web	Flange 1	Flange 2	Lip	Area of Section	Moment of Intertia		Section Modulus	Radius of Gyration	
Size Number	Mass per Metre	t	D	E	F	L	A	I_x	I_y	Z_y		α
mm	kg/m	mm	mm	mm	mm	mm	cm^2	cm^4	cm^4	cm^3	mm	(°)
Z10010	1.78	1.0	102	53	49	12.5	2.16	45.1	4.37	1.55	14.2	27.6
Z10012	2.10	1.2	102	53	49	12.5	2.58	53.6	5.16	1.84	14.2	27.5
Z10015	2.62	1.5	102	53	49	13.5	3.23	66.8	6.52	2.32	14.2	27.8
Z10019	3.29	1.9	102	53	49	14.5	4.09	84.0	8.29	2.94	14.2	28.1
Z15012	2.89	1.2	152	65	61	15.5	3.54	147	1.15	3.14	18.1	21.8
Z15015	3.59	1.5	152	65	61	16.5	4.43	184	1.45	3.96	18.1	22.0
Z15019	4.51	1.9	152	65	61	17.5	5.61	232	1.84	5.02	18.1	22.1
Z15024	5.70	2.4	152	66	60	19.5	7.12	292	2.38	6.38	18.3	22.5
Z20015	4.49	1.5	203	79	74	15.5	5.55	389	2.55	5.53	21.4	18.5
Z20019	5.74	1.9	203	79	74	18.5	7.13	502	3.42	7.45	21.9	19.1
Z20024	7.24	2.4	203	79	73	21.5	9.07	636	4.43	9.64	22.1	19.4
Z25019	6.50	1.9	254	79	74	18.0	8.08	808	3.81	7.82	21.7	14.0
Z25024	8.16	2.4	254	79	73	21.0	10.30	1020	4.93	10.2	21.9	14.3
Z30024	10.09	2.4	300	100	93	27.0	12.60	1830	1.01	16.8	28.3	16.0
Z30030	12.76	3.0	300	100	93	31.0	16.00	2310	1.32	21.9	28.7	16..3
Z35030	15.23	3.0	350	129	121	30.0	19.10	3920	2.49	32.8	36.1	17.8

Specification JIS G 3350/ EN 10162



Designation		Moment of Intertia		Product of Moment Intertia	Section Modulus		Radius of Gyration		Torsion Constant	Warping Constant	Section Modulus in Bending	Area in Compression
Size Number	Mass per Metre	I_x	I_y	I_xI_y	Z_x	Z_y	r_x	r_y	J	Iw	Zxe	Ae
mm	kg/m	cm^4	cm^4	cm^4	cm^3	cm3	mm	mm	mm^4	cm^6	cm^3	mm^2
Z10010	1.78	36.4	13.1	16.8	7.0	2.56	41.1	24.7	71.9	215	5.3	113
Z10012	2.10	43.2	15.5	19.8	8.3	3.02	41.0	24.5	124	253	6.7	153
Z10015	2.62	53.7	19.7	24.9	10.3	3.84	40.8	24.7	242	321	8.8	217
Z10019	3.29	67.3	25.0	31.4	13.0	4.92	40.6	24.7	492	409	12.4	329
Z15012	2.89	128	30.3	46.9	16.7	4.78	60.3	29.3	170	1160	11.9	169
Z15015	3.59	160	38.3	58.8	20.8	6.06	60.1	29.4	332	1460	17.2	248
Z15019	4.51	201	48.7	74.4	26.1	7.73	59.9	29.5	675	1860	22.4	347
Z15024	5.70	253	63.2	95.0	32.6	10.0	59.6	29.8	1370	2410	31.4	535
Z20015	4.49	353	62.1	109	34.3	8.05	79.7	33.4	416	4260	23.8	248
Z20019	5.74	452	84.3	145	43.9	11.0	79.6	34.4	858	5830	36.4	378
Z20024	7.24	570	110	186	55.3	14.4	79.3	34.8	1740	7630	48.4	546
Z25019	6.50	762	83.3	181	59.3	10.8	97.1	32.1	972	9480	45.7	379
Z25024	8.16	964	108	233	74.9	14.2	96.9	32.5	1970	12400	66.0	547
Z30024	10.09	1700	232	457	112	23.8	116	42.8	2430	36600	89.9	628
Z30030	12.76	2130	304	588	140	31.4	116	43.6	4790	48200	125	908
Z35030	15.23	3580	593	1070	202	47.2	137	55.7	5730	124000	159	940

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