

# Standard Terminology

The following terms are used to describe the common products or processes relevant to the manufacture of BTM® Precision Tubing.

The relevant Technical Specification (TS) should be referred to for details of the tolerances applicable to the various characteristics. A list of Technical Specifications available is shown on page 6.

## 1. BASIC PRODUCT TYPES

- 1.1 **ERW** refers to tube made from steel strip that has been formed into a tubular section and welded by the ERW (Electric Resistance Welded) process. Unless otherwise specified, this is made from uncoated hot or cold rolled strip.
- 1.2 **BTM® GALVATUBE™** is ERW tube made from GALVATUBE® pre-galvanised steel strip. The weldline is recoated with zinc to ensure a complete zinc coating on the outside surface.
- 1.3 **Aluminised** tube is ERW tube made from low carbon steel strip precoated with aluminium alloy. Aluminised tube is used in automotive exhaust applications and the weldline is generally recoated (refer to TS28).
- 1.4 **Stainless** tube is ERW tube made from T409 stainless steel strip. Stainless tube is used in automotive exhaust applications.
- 1.5 **VHS®** refers to very high strength tube that is manufactured using the ERW process, and subsequently heat treated to increase the tube's tensile properties.

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## 2. SURFACE FINISHES

- 2.1 **Bright Quality** applies to ERW tube made from cold rolled strip. Tubes supplied with this finish are suitable for applications where the surface finish is an important feature (eg for subsequent plating). The amount of polishing required prior to plating will depend on the standard of finish required.
- 2.2 **Commercial Quality** applies to ERW tube and is a lower surface finish standard than for Bright quality, suitable for the bulk of general fabrication applications.
- 2.3 **Black Quality** refers to the ERW tube made from hot rolled strip. This surface finish is of a lesser quality than Commercial.

## 3. PHYSICAL CONDITIONS

- 3.1 **As Formed (AF)** refers to ERW tubes direct from the Weldmill. They are suitable for general manipulation.

## 4. HEIGHT OF THE WELD UPSET (FIN) - ERW

- 4.1 **External Weld Upset.** The external weld upset or fin on ERW tube is removed completely i.e. flush with the outside surface of the tube.
- 4.2 **Internal Weld Upset.** Normally the internal weld upset or fin is not removed and the condition is designated **Normal Fin (NF)**. By prior arrangement with the mills, the internal weld fin can be removed in some cases. This condition is referred to as **Fin Cut (FC)**, **Fully Fin Cut (FFC)** or **Flush to Undercut (FTUC)** dependent upon the tolerances required (refer to Technical Specifications)

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## 5. LENGTH

- 5.1 **Mill Length (ML)** The term Mill Length (ML) is used to describe ERW tubes cut to a standard mill length of 6100mm on the weldmill.
- 5.2 **Non Standard Mill Length (NSML)** ERW tubes cut on the weldmill to a length other than 6100mm are described as Non Standard Mill Lengths (NSML). These are generally supplied within the length range 4000 - 8000mm.
- 5.3 **Cut Length (CL)** ERW tube cut to a specified length within precision tolerances are referred to as cut lengths (CL).

## 6. STRAIGHTNESS

Straightness is normally expressed as the maximum deviation that can be measured between the tube and a 1000mm straight edge, resting on the external surface parallel to the longitudinal axis.

Tubes in the 'as formed' condition are supplied to a straightness of 1 in 500 measured over the ordered length i.e. a 6100mm long tube when measured against a straight edge can have a deviation from straightness of up to 12.2mm.

Tube supplied as exact cut lengths are supplied to a straightness of 0.7mm max. deviation measured over any one metre gauge length (can also be expressed as 0.7mm max/1000mm i.e. approximately 1:1500). For cut lengths less than 1000mm long the straightness is measured prior to cutting.

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## 7. END CONDITION

- 7.1 **As Cut** refers to the end condition of the tube cut on a shear, saw or lathe without any subsequent end finishing.
- 7.2 **Deburred** means a safe to handle and no dimensional evidence of burr on the inside or outside of the tube.
- 7.3 **Chamfer** refers to a tube that has been tool cut at a specified angle over a specified distance on the outside and/or inside of the tube end.

## 8. PROTECTIVE COATINGS & SURFACE TREATMENTS

- 8.1 **Oiled** tubes have a temporary rust preventative applied before despatch to protect tubing from rust during transit and to withstand corrosion when tube is stored in normal conditions undercover. If a long term protection is required for extended stocking by the customer this should be referred to the mills.
- 8.2 **No Added Oil** is the condition of supply when tubes are not coated. This may increase the chance of corrosion. ERW tubes may still have traces of mill coolant.

## 9. OTHER TERMS

- 9.1 **Eccentricity** is the measure of variation between the maximum and minimum wall thickness of the tube.
- 9.2 **Non Destructive Testing** refers to all types of testing and inspection methods that do not destroy the material under test and may include hardness testing and eddy current testing.

# Standard Terminology

## 10. TECHNICAL SPECIFICATIONS

- TS 11 Black (hot rolled) ERW steel tubing for general applications
- TS 21 Low carbon ERW steel tubing for general applications (EzyForm™)
- TS 22 ERW steel tubing with specified mechanical properties(Hi-Lite®)
- TS 28 Low carbon ERW Hi-Form®and Hi-Form®(Aluminised) steel tubing for use in automotive exhaust systems
- TS 29 ERW stainless steel tubing for use in automotive exhaust applications
- TS 30 Low carbon ERW GALVATUBE™ steel tubing for general applications
- TS 31 Low carbon ERW steel tubing with special requirements
- TS 41 Low carbon ERW steel tubing for fluid carrying applications.
- TS 50 Low carbon powder coated ERW GALVATUBE™ or DuraGal® steel tubing (Tubecolor®).

# Standard Size Range

This section has been changed to show the entire range and the standard items within that range.

There are two forms of standard items (where an item is the combination of either outside diameter and wall thickness for circular tubing, or major and minor outside dimension and wall thickness for non-circular tubing):

## 1. REGULAR ITEMS

Regular items have a one pack minimum order quantity (MOQ). Please refer to the rolling programme for more details on the frequency of manufacture.

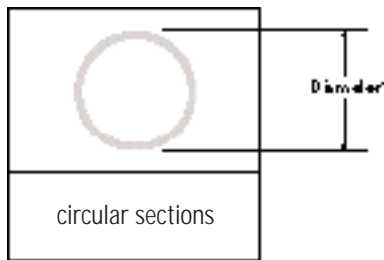
## 2. NON-REGULAR ITEMS

Non-regular items are not manufactured every rolling cycle, although the size may be regularly manufactured in other wall thicknesses. The MOQ for these items will vary, depending on whether the size is manufactured in other thicknesses, or whether there are existing orders for the item. The MOQ for a particular item can be obtained from your local OneSteel sales office.

Other sizes may be manufactured on enquiry.



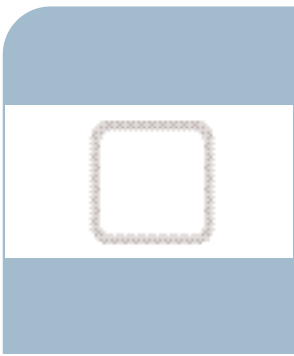
# Standard Size Range Circular Sections



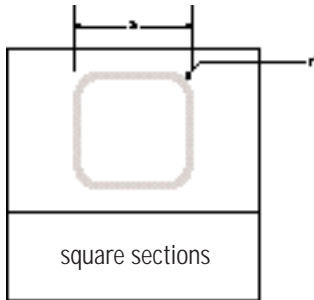
## DIAMETER (mm) (Standard diameters are shown in bold print)

12.0	22.0	40.0	50.0	70.0
<b>12.7</b>	<b>22.2</b>	40.97	50.7	71.12
13.2	24.0	<b>41.3</b>	<b>50.8</b>	73.0
13.8	24.8	41.6	<b>51.0</b>	75.0
14.0	25.0	42.2	53.8	76.0
14.3	<b>25.4</b>	42.4	54.0	<b>76.1</b>
15.8	26.67	42.7	<b>54.1</b>	<b>76.2</b>
15.88	27.4	43.2	57.0	80.0
<b>16.0</b>	<b>28.6</b>	44.14	<b>57.2</b>	82.6
17.0	30.1	<b>44.5</b>	60.3	<b>88.9</b>
17.1	<b>31.8</b>	44.87	63.2	100.0
18.0	<b>35.0</b>	<b>45.0</b>	<b>63.5</b>	<b>101.6</b>
<b>19.0</b>	37.82	45.2	65.0	
20.7	<b>38.0</b>	<b>47.6</b>	66.7	
21.3	<b>38.1</b>	48.6	69.9	

NOTE: Standard wall thicknesses are 0.9, 1.2, 1.4, 1.6, 2.0, 2.6 and 3.2mm, but not all thicknesses can be produced for each diameter. Other wall thicknesses may be available on request.



# Standard Size Range Square Sections



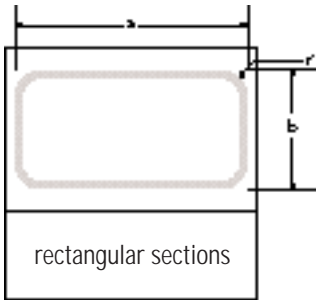
**DIMENSIONS (mm)** (Standard squares are shown in bold print)

a	x	a	r	a	x	a	r
<b>12.7</b>	<b>x</b>	<b>12.7</b>	<b>1.5</b>	30.0	x	30.0	3.0
15.0	x	15.0	2.0	<b>31.8</b>	<b>x</b>	<b>31.8</b>	<b>2.0</b>
<b>16.0</b>	<b>x</b>	<b>16.0</b>	<b>2.5</b>	31.8	x	31.8	8.0
<b>19.0</b>	<b>x</b>	<b>19.0</b>	<b>2.5</b>	35.0	x	35.0	2.5
19.0	x	19.0	1.5	<b>38.0</b>	<b>x</b>	<b>38.0</b>	<b>1.5</b>
<b>22.2</b>	<b>x</b>	<b>22.2</b>	<b>2.0</b>	40.0	x	40.0	2.0
25.0	x	25.0	2.5	<b>50.0</b>	<b>x</b>	<b>50.0</b>	<b>2.5</b>
<b>25.4</b>	<b>x</b>	<b>25.4</b>	<b>2.5</b>	60.0	x	60.0	<b>3.0</b>
28.6	x	28.6	4.0				

NOTE: 1. Standard wall thicknesses for EzyForm™ (TS21) tubing are 0.9, 1.2, 1.4, 1.6, and 2.0mm, but not all thicknesses can be produced for each section. Other wall thicknesses may be available on request.

2. The corner radii shown above are for wall thicknesses less than or equal to 1.6 mm. Thicker sections will normally have larger corner radii.

# Standard Size Range Rectangular Sections



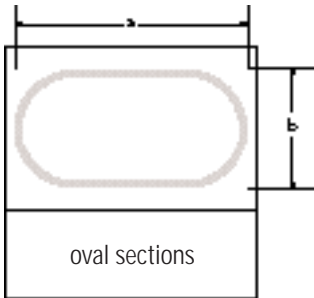
**DIMENSIONS (mm)** (Standard rectangles are shown in bold print)

a	x	b	r	a	x	b	r	a	x	b	r
12.0	x	9.0	2.0	40.0	x	25.0	6.0	<b>64.0</b>	<b>x</b>	<b>38.0</b>	<b>3.0</b>
20.0	x	10.0	2.0	43.0	x	32.0	8.0	<b>70.0</b>	<b>x</b>	<b>34.0</b>	<b>5.0</b>
20.0	x	15.0	2.5	44.5	x	20.0	3.5	<b>70.0</b>	<b>x</b>	<b>50.0</b>	<b>2.5</b>
<b>25.4</b>	<b>x</b>	<b>12.7</b>	<b>2.5</b>	44.5	x	25.4	3.0	<b>76.0</b>	<b>x</b>	<b>38.0</b>	<b>3.0</b>
25.4	x	19.0	2.5	47.6	x	23.8	3.0	80.0	x	20.0	2.5
<b>31.8</b>	<b>x</b>	<b>12.7</b>	<b>2.5</b>	50.0	x	20.0	3.5	<b>80.0</b>	<b>x</b>	<b>40.0</b>	<b>3.0</b>
31.8	x	16.0	2.5	50.0	x	10.0	1.5	95.0	x	45.0	12.0
31.8	x	22.2	3.0	<b>50.0</b>	<b>x</b>	<b>25.0</b>	<b>3.5</b>	100.0	x	50.0	4.0
<b>35.0</b>	<b>x</b>	<b>19.0</b>	2.0	<b>50.8</b>	<b>x</b>	<b>31.8</b>	<b>2.8</b>				
38.0	x	25.4	1.5	50.8	x	31.8	4.0				
38.0	x	25.4	3.5	50.8	x	41.3	4.0				
<b>38.1</b>	<b>x</b>	<b>25.4</b>	<b>2.5</b>	<b>57.0</b>	<b>x</b>	<b>35.0</b>	<b>2.5</b>				
40.0	x	20.0	6.0	60.0	x	30.0	3.0				

NOTE: 1. Standard wall thicknesses are 0.9, 1.2, 1.4, 1.6, and 2.0mm, but not all thicknesses can be produced for each section. Other wall thicknesses may be available on request.

2. The corner radii shown above are for wall thicknesses less than or equal to 1.6 mm. Thicker sections will normally have larger corner radii.

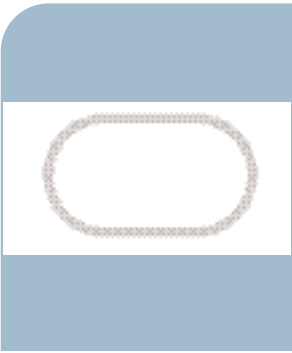
# Standard Size Range Oval Sections



## DIMENSIONS (mm) (Standard ovals are shown in bold print)

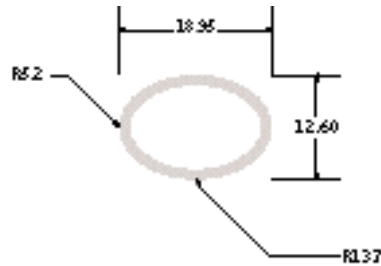
a	x	b	Sect. #	a	x	b	Sect. #
18.95	x	12.6	125	37.7	x	20.7	144
20.8	x	8.7	228	40.8	x	15.3	145
30.8	x	15.4	143	45.5	x	25.0	201
31.7	x	17.3	141	48.0	x	19.0	248
31.75	x	21.59	146	50.0	x	30.0	147
<b>31.8</b>	<b>x</b>	<b>16.0</b>	238	<b>50.8</b>	<b>x</b>	<b>15.9</b>	223
35.0	x	16.0	247	75.0	x	16.5	7516
35.0	x	16.2	140	111.76	x	19.05	130

NOTE: 1. Standard wall thicknesses are 0.9, 1.2, 1.4, 1.6 and 2.0mm, but not all thicknesses can be produced for each section. Other wall thicknesses may be available on request.

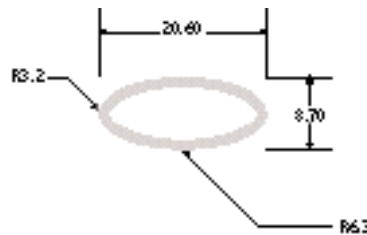


# Standard Size Range Oval Sections

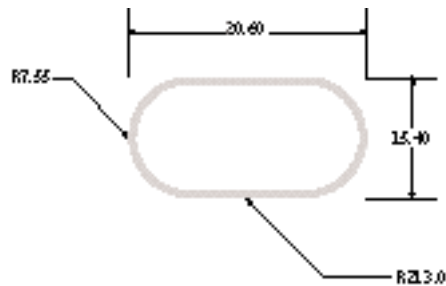
18.95 x 12.6  
(Section 125)

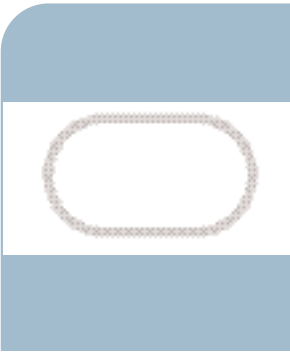


20.8 x 8.7  
(Section 228)



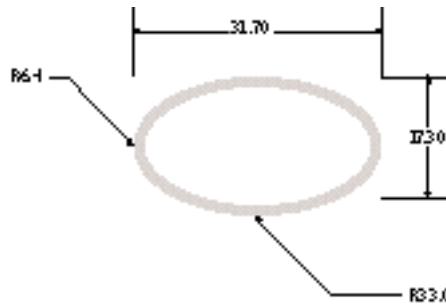
30.8 x 15.4  
(Section 143)



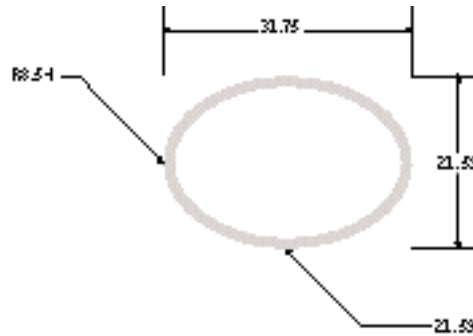


# Standard Size Range Oval Sections

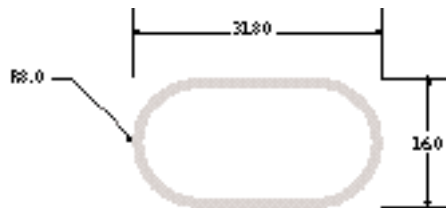
31.7 x 17.3  
(Section 141)

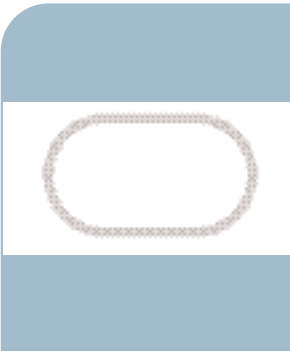


31.75 x 21.59  
(Section 146)



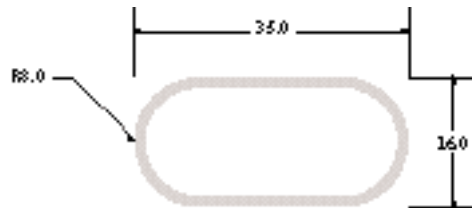
31.8 x 16.0  
(Section 238)



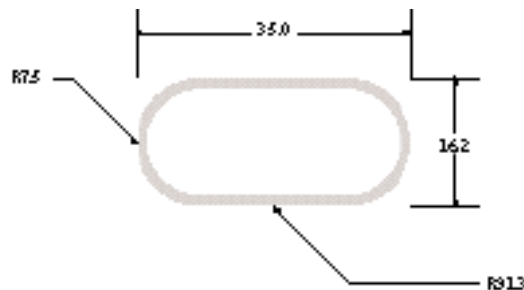


# Standard Size Range Oval Sections

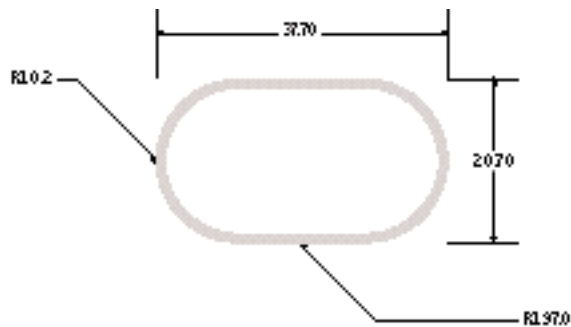
35.0 x 16.0  
(Section 247)

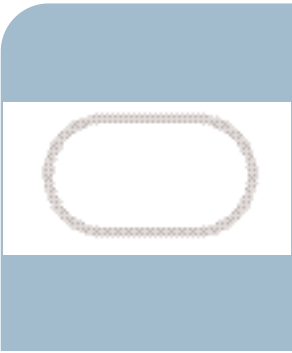


35.0 x 16.2  
(Section 140)



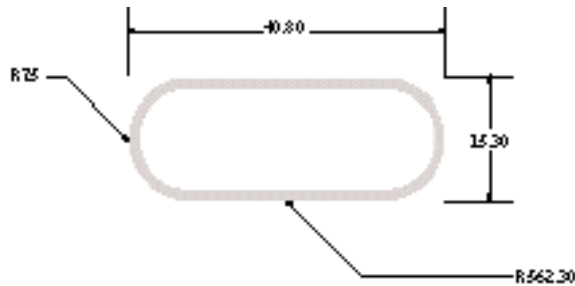
37.7 x 20.7  
(Section 144)



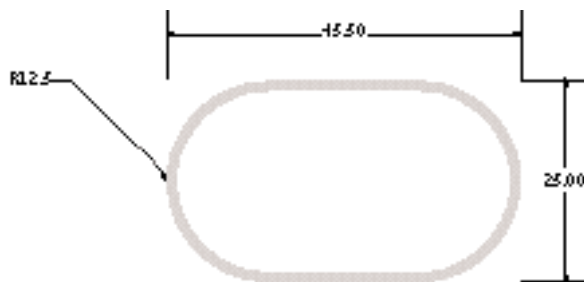


# Standard Size Range Oval Sections

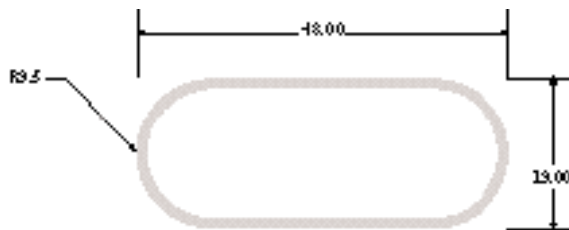
40.8 x 15.3  
(Section 145)

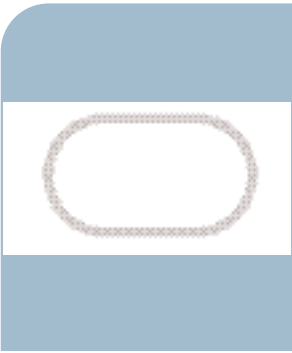


45.5 x 25.0  
(Section 201)



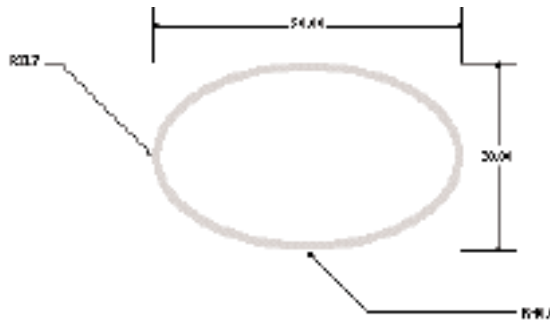
48.0 x 19.0  
(Section 248)



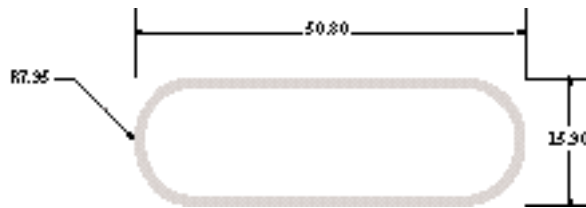


# Standard Size Range Oval Sections

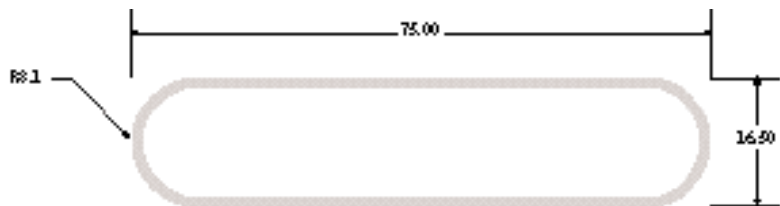
50.0 x 30.0  
(Section 147)



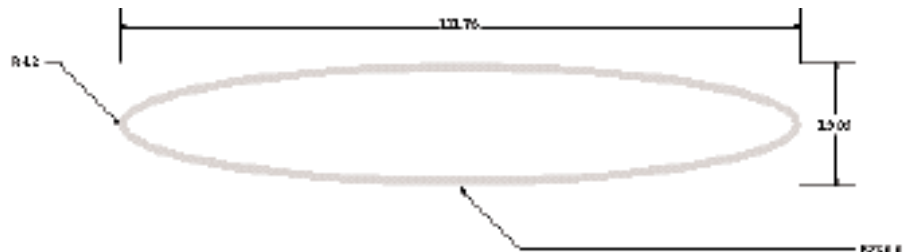
50.8 x 15.9  
(Section 223)

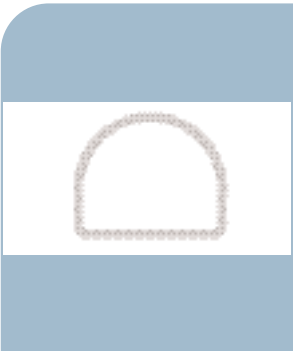


75.0 x 16.5  
(Section 7516)



111.76 x 19.05  
(Section 130)





# Standard Size Range Special Sections

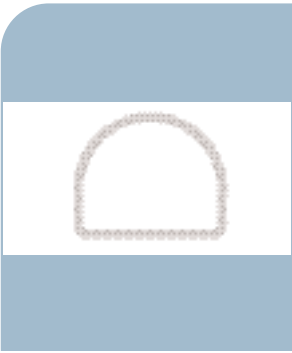
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## SECTION NAMES

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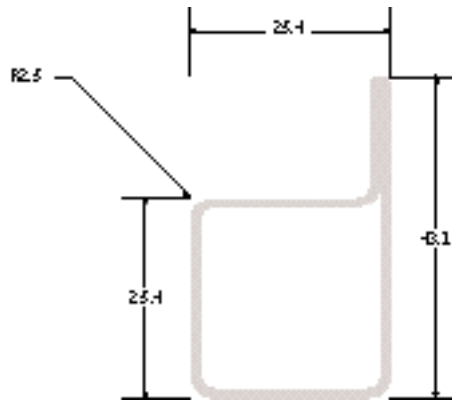
Section Name	Section Number
2525 Lip	S701
3519 Step	S702
Explorer	S703
Challenger 16	S706
3232 Lip	S709
5041 "D"	S712
Offsider	S796

NOTE: 1. Standard wall thicknesses are 1.2 and 1.6mm, but not all thicknesses can be produced for each section. Other wall thicknesses may be available on request.

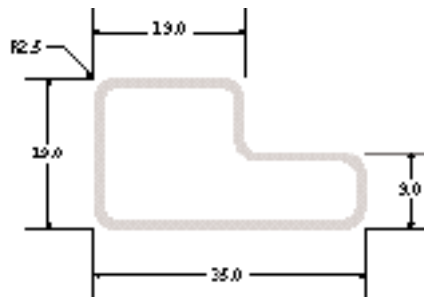


# Standard Size Range Special Sections

## 2525 Lip (Section 701)



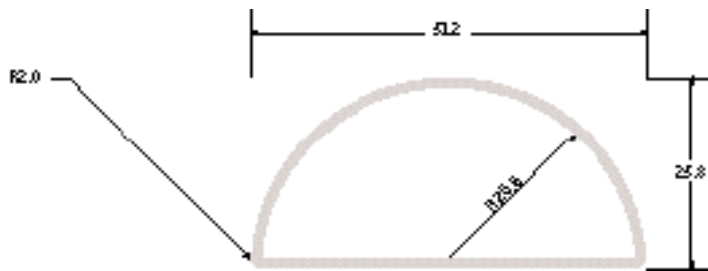
## 3519 Step (Section 702)



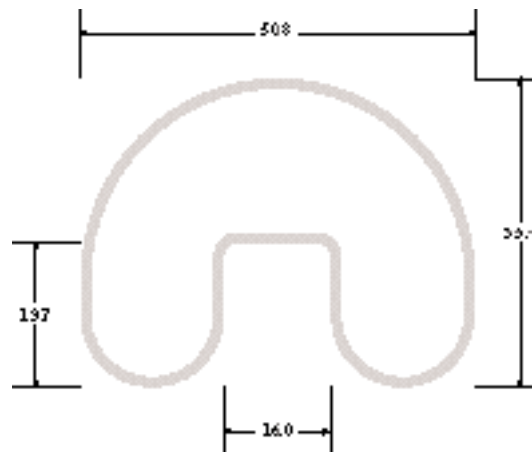


# Standard Size Range Special Sections

Explorer  
(Section 703)



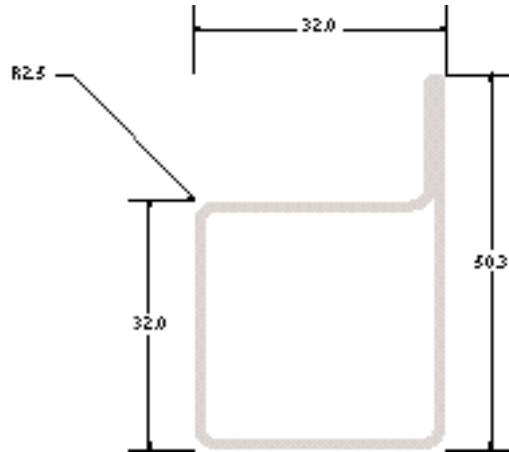
Challenger 16  
(Section 706)



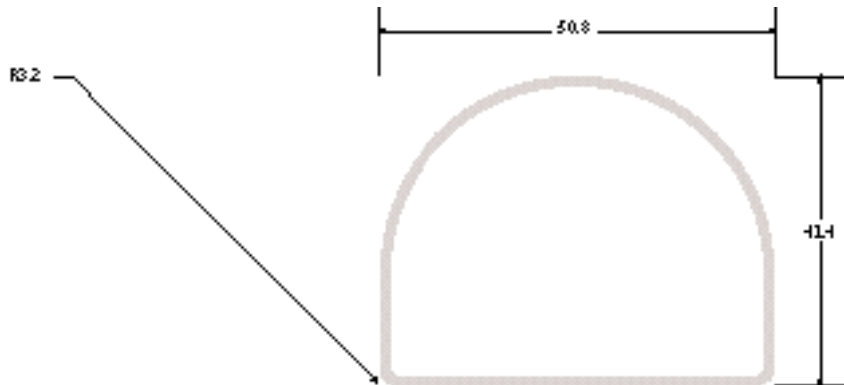


# Standard Size Range Special Sections

3232 Lip  
(Section 709)



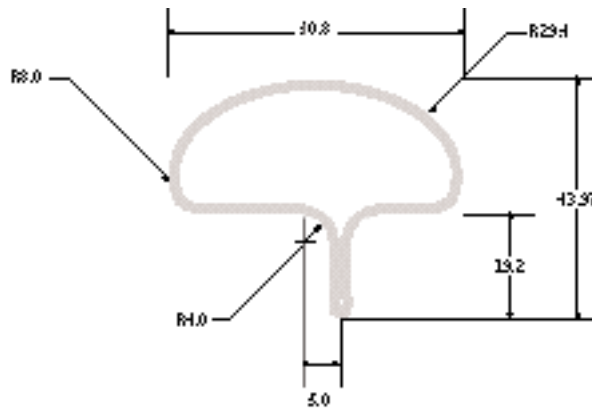
5041 "D"  
(Section 712)





# Standard Size Range Special Sections

Offsider  
(Section 796)

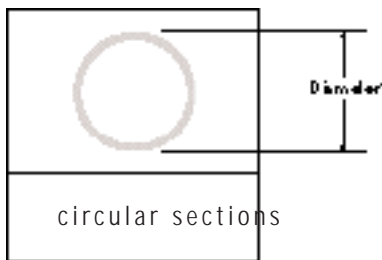


# Dimensions & Properties

This section includes information on dimensions and properties, grouped by shape.



# Dimensions & Properties



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## CIRCULAR TUBING

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The following dimensions and properties tables have been calculated for the standard range of circular tubing manufactured by OneSteel to Technical Specification TS21 in electric resistance welded (ERW) steel tubing.

They have been calculated on nominal sizes of tubing and do not take into account variations due to extremes of tolerances.

Details of tolerances applicable are available in BTM® Technical Specifications (eg. TS21 - Low Carbon ERW Steel Tubing for General Applications). These are available from any OneSteel Sales Office or [www.onesteel.com](http://www.onesteel.com)

The wall thicknesses shown are those currently available and produced as standard thicknesses. Other thicknesses may be available on enquiry. Other material grades and finishes may available, including TS30 GALVATUBE™, TS28 Hi-Form 28® Commercial Quality and Aluminised, TS11 Black and TS22 Hi-Lite®.

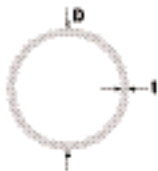
Whilst every care has been taken in the preparation of this guide, OneSteel accepts no liability for the accuracy of the information supplied.



# Dimensions & Properties

## CIRCULAR TUBING

Dimensions and Ratios										Properties							
Tube Dimensions		Mass per m	Lengths Per Pack	Pack Dimensions (Effective)		External Surface Area		D/t	Nom. Yield	Gross Section Area $A_g$	About any Axis					Torsion Constant J	Torsion Modulus C
D	t			Width	Height	per m	per t				I	Z	S	r			
mm	mm	kg/m		mm	mm	m <sup>2</sup> /m	m <sup>2</sup> /t	MPa	mm <sup>2</sup>	mm <sup>4</sup>	mm <sup>3</sup>	mm <sup>3</sup>	mm	mm <sup>4</sup>	mm <sup>3</sup>		
101.6	2.0	4.91	19	558	504	0.319	64.973	51	200	626	776,324	15,282	19,843	35.22	1,552,648	15,282	
101.6	1.6	3.95	19	558	504	0.319	80.892	64	200	503	628,479	12,372	16,001	35.36	1,256,959	12,372	
88.9	2.0	4.29	19	672	447	0.279	65.160	44	200	546	515,679	11,601	15,106	30.73	1,031,357	11,601	
88.9	1.6	3.44	19	672	447	0.279	81.077	56	200	439	418,185	9,408	12,195	30.87	836,370	9,408	
76.2	3.2	5.76	37	583	390	0.239	41.554	24	275	734	489,793	12,855	17,064	25.83	979,585	12,855	
76.2	2.6	4.72	37	583	390	0.239	50.726	29	250	601	407,576	10,698	14,090	26.04	815,151	10,698	
76.2	2.0	3.66	37	583	390	0.239	65.411	38	200	466	321,083	8,427	11,014	26.24	642,166	8,427	
76.2	1.6	2.94	37	583	390	0.239	81.325	48	200	375	260,973	6,850	8,906	26.38	521,947	6,850	
76.2	1.4	2.58	37	583	390	0.239	92.695	54	200	329	230,168	6,041	7,834	26.45	460,336	6,041	
76.2	1.2	2.22	37	583	390	0.239	107.856	63	200	283	198,855	5,219	6,751	26.52	397,710	5,219	
63.5	3.2	4.76	37	622	333	0.199	41.921	20	275	606	276,301	8,702	11,646	21.35	552,603	8,702	
63.5	2.6	3.90	37	622	333	0.199	51.087	24	275	497	231,034	7,277	9,649	21.55	462,068	7,277	
63.5	2.0	3.03	37	622	333	0.199	65.766	32	250	386	182,883	5,760	7,567	21.76	365,767	5,760	
63.5	1.6	2.44	37	622	333	0.199	81.676	40	200	311	149,122	4,697	6,132	21.89	298,244	4,697	
63.5	1.4	2.14	37	622	333	0.199	93.043	45	200	273	131,730	4,149	5,400	21.96	263,459	4,149	
63.5	1.2	1.84	37	622	333	0.199	108.202	53	200	235	113,990	3,590	4,658	22.03	227,980	3,590	
57.2	3.2	4.26	61	622	355	0.180	42.168	18	275	543	198,570	6,943	9,342	19.13	397,140	6,943	
57.2	2.6	3.50	61	622	355	0.180	51.329	22	275	446	166,569	5,824	7,757	19.33	333,139	5,824	
57.2	2.0	2.72	61	622	355	0.180	66.002	29	250	347	132,275	4,625	6,097	19.53	264,549	4,625	
57.2	1.6	2.19	61	622	355	0.180	81.909	36	200	279	108,085	3,779	4,948	19.67	216,169	3,779	
57.2	1.4	1.93	61	622	355	0.180	93.275	41	200	245	95,579	3,342	4,360	19.73	191,159	3,342	
57.2	1.2	1.66	61	622	355	0.180	108.432	48	200	211	82,795	2,895	3,764	19.80	165,590	2,895	
54.0	3.2	4.01	61	644	291	0.170	42.317	17	275	511	165,394	6,126	8,269	18.00	330,789	6,126	
54.0	2.6	3.30	61	644	291	0.170	51.474	21	275	420	139,006	5,148	6,875	18.20	278,011	5,148	
54.0	2.0	2.56	61	644	291	0.170	66.144	27	250	327	110,597	4,096	5,411	18.40	221,193	4,096	
54.0	1.6	2.07	61	644	291	0.170	82.049	34	250	263	90,485	3,351	4,395	18.53	180,971	3,351	
54.0	1.4	1.82	61	644	291	0.170	93.414	39	200	231	80,067	2,965	3,874	18.60	160,134	2,965	
54.0	1.2	1.56	61	644	291	0.170	108.570	45	200	199	69,401	2,570	3,346	18.67	138,802	2,570	

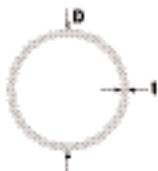




# Dimensions & Properties

## CIRCULAR TUBING

Dimensions and Ratios										Properties							
Tube Dimensions		Mass per m	Lengths Per Pack	Pack Dimensions (Effective)		External Surface Area		D/t	Nom. Yield	Gross Section Area $A_g$	About any Axis					Torsion Constant J	Torsion Modulus C
D	t			Width	Height	per m	per t				I	Z	S	r			
mm	mm	kg/m		mm	mm	m <sup>2</sup> /m	m <sup>2</sup> /t		MPa	mm <sup>2</sup>	mm <sup>4</sup>	mm <sup>3</sup>	mm <sup>3</sup>	mm	mm <sup>4</sup>	mm <sup>3</sup>	
50.8	3.2	3.76	61	609	365	0.160	42.485	16	275	479	136,141	5,360	7,261	16.87	272,282	5,360	
50.8	2.6	3.09	61	609	365	0.160	51.639	20	275	394	114,666	4,514	6,046	17.07	229,333	4,514	
50.8	2.0	2.41	61	609	365	0.160	66.305	25	275	307	91,428	3,600	4,766	17.27	182,856	3,600	
50.8	1.6	1.94	61	609	365	0.160	82.207	32	250	247	74,909	2,949	3,874	17.40	149,818	2,949	
50.8	1.4	1.71	61	609	365	0.160	93.571	36	200	217	66,331	2,611	3,417	17.47	132,662	2,611	
50.8	1.2	1.47	61	609	365	0.160	108.725	42	200	187	57,536	2,265	2,953	17.54	115,072	2,265	
47.6	3.2	3.50	61	574	345	0.150	42.678	15	275	446	110,563	4,645	6,319	15.74	221,125	4,645	
47.6	2.6	2.89	61	574	345	0.150	51.826	18	275	368	93,351	3,922	5,271	15.94	186,702	3,922	
47.6	2.0	2.25	61	574	345	0.150	66.488	24	275	287	74,614	3,135	4,161	16.14	149,228	3,135	
47.6	1.6	1.82	61	574	345	0.150	82.387	30	250	231	61,232	2,573	3,387	16.27	122,464	2,573	
47.6	1.4	1.60	61	574	345	0.150	93.749	34	250	203	54,264	2,280	2,989	16.34	108,528	2,280	
47.6	1.2	1.37	61	574	345	0.150	108.903	40	200	175	47,107	1,979	2,584	16.41	94,214	1,979	
47.6	0.9	1.04	61	574	345	0.150	144.271	53	200	132	36,009	1,513	1,963	16.51	72,019	1,513	
44.5	3.2	3.26	91	629	326	0.140	42.893	14	300	415	89,055	4,002	5,469	14.65	178,110	4,002	
44.5	2.6	2.69	91	629	326	0.140	52.036	17	275	342	75,395	3,389	4,570	14.84	150,791	3,389	
44.5	2.0	2.10	91	629	326	0.140	66.692	22	275	267	60,425	2,716	3,615	15.04	120,850	2,716	
44.5	1.6	1.69	91	629	326	0.140	82.587	28	250	216	49,677	2,233	2,946	15.18	99,354	2,233	
44.5	1.4	1.49	91	629	326	0.140	93.947	32	250	190	44,063	1,980	2,602	15.25	88,127	1,980	
44.5	1.2	1.28	91	629	326	0.140	109.099	37	200	163	38,286	1,721	2,250	15.31	76,572	1,721	
44.5	0.9	0.97	91	629	326	0.140	144.465	49	200	123	29,305	1,317	1,711	15.42	58,611	1,317	
41.3	3.2	3.01	91	628	306	0.130	43.152	13	300	383	69,990	3,389	4,656	13.52	139,981	3,389	
41.3	2.6	2.48	91	628	306	0.130	52.287	16	275	316	59,446	2,879	3,900	13.71	118,892	2,879	
41.3	2.0	1.94	91	628	306	0.130	66.936	21	275	247	47,796	2,315	3,092	13.91	95,592	2,315	
41.3	1.6	1.57	91	628	306	0.130	82.827	26	250	200	39,378	1,907	2,523	14.05	78,756	1,907	
41.3	1.4	1.38	91	628	306	0.130	94.185	30	250	175	34,966	1,693	2,230	14.12	69,931	1,693	
41.3	1.2	1.19	91	628	306	0.130	109.334	34	250	151	30,413	1,473	1,930	14.18	60,827	1,473	
41.3	0.9	0.90	91	628	306	0.130	144.696	46	200	114	23,316	1,129	1,469	14.29	46,633	1,129	

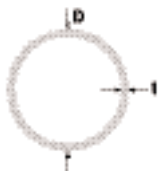




# Dimensions & Properties

## CIRCULAR TUBING

Dimensions and Ratios										Properties							
Tube Dimensions		Mass per m	Lengths Per Pack	Pack Dimensions (Effective)		External Surface Area		D/t	Nom. Yield	Gross Section Area $A_g$	About any Axis					Torsion Constant J	Torsion Modulus C
D	t			Width	Height	per m	per t				I	Z	S	r			
mm	mm	kg/m		mm	mm	m <sup>2</sup> /m	m <sup>2</sup> /t		MPa	mm <sup>2</sup>	mm <sup>4</sup>	mm <sup>3</sup>	mm <sup>3</sup>	mm	mm <sup>4</sup>	mm <sup>3</sup>	
38.0	3.2	2.75	91	620	285	0.119	43.470	12	300	350	53,408	2,811	3,886	12.36	106,816	2,811	
38.0	2.6	2.27	91	620	285	0.119	52.594	15	275	289	45,539	2,397	3,264	12.55	91,077	2,397	
38.0	2.0	1.78	91	620	285	0.119	67.233	19	275	226	36,757	1,935	2,595	12.75	73,513	1,935	
38.0	1.6	1.44	91	620	285	0.119	83.118	24	275	183	30,361	1,598	2,121	12.88	60,723	1,598	
38.0	1.4	1.26	91	620	285	0.119	94.472	27	250	161	26,994	1,421	1,876	12.95	53,988	1,421	
38.0	1.2	1.09	91	620	285	0.119	109.619	32	250	139	23,510	1,237	1,626	13.02	47,019	1,237	
38.0	0.9	0.82	91	620	285	0.119	144.976	42	200	105	18,058	950	1,239	13.12	36,117	950	
35.0	3.2	2.51	91	575	267	0.110	43.815	11	300	320	40,819	2,333	3,247	11.30	81,639	2,333	
35.0	2.6	2.08	91	575	267	0.110	52.927	13	300	265	34,951	1,997	2,735	11.49	69,901	1,997	
35.0	2.0	1.63	91	575	267	0.110	67.555	18	275	207	28,329	1,619	2,181	11.69	56,657	1,619	
35.0	1.6	1.32	91	575	267	0.110	83.432	22	275	168	23,465	1,341	1,786	11.82	46,929	1,341	
35.0	1.4	1.16	91	575	267	0.110	94.783	25	275	148	20,891	1,194	1,581	11.89	41,782	1,194	
35.0	1.2	1.00	91	575	267	0.110	109.926	29	250	127	18,220	1,041	1,372	11.96	36,439	1,041	
35.0	0.9	0.76	91	575	267	0.110	145.279	39	200	96	14,024	801	1,047	12.06	28,048	801	
31.8	3.2	2.26	127	622	302	0.100	44.263	10	300	288	29,765	1,872	2,628	10.17	59,531	1,872	
31.8	2.6	1.87	127	622	302	0.100	53.358	12	300	239	25,622	1,611	2,223	10.36	51,244	1,611	
31.8	2.0	1.47	127	622	302	0.100	67.969	16	275	187	20,878	1,313	1,779	10.56	41,756	1,313	
31.8	1.6	1.19	127	622	302	0.100	83.836	20	275	152	17,355	1,091	1,461	10.69	34,709	1,091	
31.8	1.4	1.05	127	622	302	0.100	95.182	23	275	134	15,478	973	1,295	10.76	30,957	973	
31.8	1.2	0.91	127	622	302	0.100	110.320	27	250	115	13,523	851	1,124	10.83	27,046	851	
31.8	0.9	0.69	127	622	302	0.100	145.665	35	250	87	10,436	656	860	10.93	20,873	656	
28.6	2.6	1.67	169	622	277	0.090	53.895	11	300	212	18,125	1,267	1,763	9.24	36,250	1,267	
28.6	2.0	1.31	169	622	277	0.090	68.483	14	300	167	14,866	1,040	1,418	9.43	29,731	1,040	
28.6	1.6	1.07	169	622	277	0.090	84.336	18	275	136	12,411	868	1,168	9.56	24,821	868	
28.6	1.4	0.94	169	622	277	0.090	95.675	20	275	120	11,093	776	1,037	9.63	22,186	776	
28.6	1.2	0.81	169	622	277	0.090	95.675	20	275	120	11,093	776	1,037	9.63	22,186	776	
28.6	0.9	0.61	169	622	277	0.090	146.142	23	250	78	7,520	526	691	9.80	15,039	526	

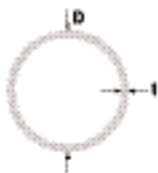




# Dimensions & Properties

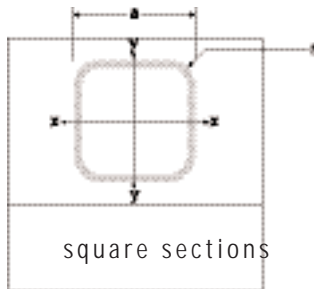
## CIRCULAR TUBING

Dimensions and Ratios									Properties							
Tube Dimensions		Mass per m	Lengths Per Pack	Pack Dimensions (Effective)		External Surface Area		D/t	Nom. Yield	Gross Section Area $A_g$	About any Axis				Torsion Constant J	Torsion Modulus C
D	t			Width	Height	per m	per t				I	Z	S	r		
mm	mm	kg/m	mm	mm	m <sup>2</sup> /m	m <sup>2</sup> /t	MPa	mm <sup>2</sup>	mm <sup>4</sup>	mm <sup>3</sup>	mm <sup>3</sup>	mm	mm <sup>4</sup>	mm <sup>3</sup>		
25.4	2.6	1.46	169	609	251	0.080	54.583	10	300	186	12,259	965	1,357	8.11	24,518	965
25.4	2.0	1.15	169	609	251	0.080	69.138	13	300	147	10,137	798	1,098	8.30	20,273	798
25.4	1.6	0.94	169	609	251	0.080	84.970	16	275	120	8,509	670	908	8.43	17,018	670
25.4	1.4	0.83	169	609	251	0.080	96.300	18	275	120	8,509	670	908	8.43	17,018	670
25.4	1.2	0.72	169	609	251	0.080	111.421	21	275	91	6,695	527	703	8.57	13,390	527
25.4	0.9	0.54	169	609	251	0.080	146.742	28	250	69	5,205	410	540	8.67	10,409	410
22.2	2.6	1.26	217	605	264	0.070	55.495	9	300	160	7,823	705	1,005	6.99	15,646	705
22.2	2.0	1.00	217	605	264	0.070	70.001	11	300	127	6,537	589	819	7.18	13,074	589
22.2	1.6	0.81	217	605	264	0.070	85.802	14	300	104	5,526	498	680	7.31	11,052	498
22.2	1.4	0.72	217	605	264	0.070	97.116	16	275	91	4,970	448	607	7.37	9,940	448
22.2	1.2	0.62	217	605	264	0.070	112.223	19	275	79	4,378	394	530	7.44	8,757	394
22.2	0.9	0.47	217	605	264	0.070	147.523	25	275	60	3,421	308	409	7.54	6,843	308
19.0	2.0	0.84	217	525	234	0.060	71.188	10	300	107	3,912	412	581	6.05	7,824	412
19.0	1.6	0.69	217	525	234	0.060	86.939	12	300	87	3,338	351	486	6.18	6,676	351
19.0	1.4	0.61	217	525	234	0.060	98.230	14	300	77	3,016	317	435	6.24	6,032	317
19.0	1.2	0.53	217	525	234	0.060	113.314	16	275	67	2,670	281	381	6.31	5,339	281
19.0	0.9	0.40	217	525	234	0.060	148.581	21	275	51	2,101	221	295	6.41	4,202	221
16.0	2.0	0.69	217	450	205	0.050	72.793	8	300	88	2,199	275	395	5.00	4,398	275
16.0	1.6	0.57	217	450	205	0.050	88.464	10	300	72	1,899	237	333	5.12	3,799	237
16.0	1.4	0.50	217	450	205	0.050	99.717	11	300	64	1,727	216	299	5.19	3,453	216
16.0	1.2	0.44	217	450	205	0.050	114.764	13	300	56	1,538	192	263	5.25	3,075	192
16.0	0.9	0.34	217	450	205	0.050	149.979	18	275	43	1,221	153	205	5.35	2,442	153
12.7	1.6	0.44	217	368	173	0.040	91.094	8	300	56	877	138	199	3.97	1,754	138
12.7	1.4	0.39	217	368	173	0.040	102.265	9	300	50	805	127	180	4.03	1,611	127
12.7	1.2	0.34	217	368	173	0.040	117.234	11	300	43	724	114	159	4.09	1,449	114
12.7	0.9	0.26	217	368	173	0.040	152.338	14	300	33	584	92	126	4.18	1,168	92





# Dimensions & Properties



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## SQUARE TUBING

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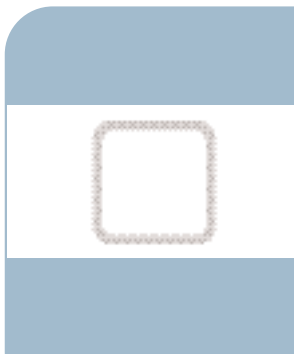
The following dimensions and properties tables have been calculated for the standard range of square tubing manufactured by OneSteel to Technical Specification TS21 in electric resistance welded (ERW) steel tubing.

They have been calculated on nominal sizes of tubing and do not take into account variations due to extremes of tolerances.

Details of tolerances applicable are available in BTM<sup>®</sup> Technical Specifications (eg. TS21 - Low Carbon ERW Steel Tubing for General Applications). These are available from any OneSteel Sales Office or [www.onesteel.com](http://www.onesteel.com)

The wall thicknesses shown are those currently available and produced as standard thicknesses. Other thicknesses may be available on enquiry. Other material grades and finishes are available, including TS30 GALVATUBE<sup>™</sup>, TS28 Hi-Form 28<sup>®</sup> Commercial Quality and Aluminised, TS11 Black and TS22 Hi-Lite<sup>®</sup>.

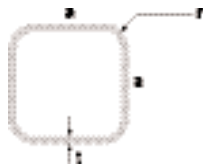
Whilst every care has been taken in the preparation of this guide, OneSteel accepts no liability for the accuracy of the information supplied.

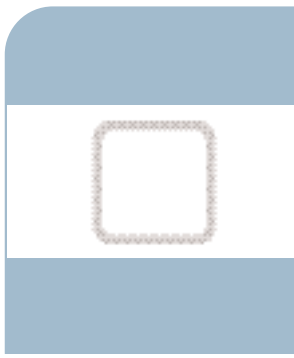


# Dimensions & Properties

## SQUARE TUBING

Dimensions and Ratios												Properties							
Tube Dimensions				Mass per m	External Surface Area		Per Pack	Pack Lengths Dimensions (Effective)			Section Nom. Yield	Gross					Torsion Constant J	Torsion Modulus C	
a	a	t	r		per m	per m		per t	Width	Height		D/t	Area A <sub>g</sub>	About x - and y - axis					
mm	mm	mm	mm	kg/m	m <sup>2</sup> /m	m <sup>2</sup> /t	mm	mm		MPa	mm <sup>2</sup>	I <sub>x</sub> mm <sup>4</sup>	Z <sub>x</sub> mm <sup>3</sup>	S <sub>x</sub> mm <sup>3</sup>	r <sub>x</sub> mm	mm <sup>4</sup>	mm <sup>3</sup>		
60.0	60.0	2.0	3.0	3.59	0.235	65.4	40	530	325	37	200	457	254,473	8,482	9,893	23.6	395,887	12,606	
60.0	60.0	1.6	3.0	2.89	0.235	81.4	40	530	325	47	200	368	207,294	6,910	8,008	23.7	323,445	10,352	
50.0	50.0	2.0	2.5	2.97	0.196	65.8	60	550	325	31	250	379	144,618	5,785	6,790	19.5	224,320	8,527	
50.0	50.0	1.6	2.5	2.39	0.196	81.7	60	550	325	39	200	305	118,239	4,730	5,509	19.7	184,055	7,040	
41.0	41.0	2.0	3.0	2.40	0.159	66.3	80	460	353	25	275	305	76,546	3,734	4,429	15.8	121,168	5,534	
41.0	41.0	1.6	3.0	1.93	0.159	82.2	80	460	353	32	250	246	62,889	3,068	3,606	16.0	99,938	4,599	
38.0	38.0	2.0	1.5	2.25	0.149	66.5	84	582	253	24	275	286	61,790	3,252	3,860	14.7	94,222	4,687	
38.0	38.0	1.6	1.5	1.81	0.149	82.4	84	582	253	30	250	231	50,873	2,678	3,146	14.8	77,956	3,908	
38.0	38.0	1.4	1.5	1.59	0.149	93.8	84	582	253	34	250	203	45,156	2,377	2,779	14.9	69,365	3,492	
38.0	38.0	1.2	1.5	1.37	0.149	108.9	84	582	253	40	200	175	39,262	2,066	2,404	15.0	60,459	3,056	
31.8	31.8	2.0	2.0	1.84	0.124	67.1	128	559	279	20	275	235	34,623	2,178	2,615	12.1	53,910	3,152	
31.8	31.8	1.6	2.0	1.49	0.124	83.0	128	559	279	25	275	235	28,670	1,803	2,140	12.3	44,875	2,649	
31.8	31.8	1.4	2.0	1.31	0.124	94.3	128	559	279	28	250	167	25,520	1,605	1,893	12.4	40,051	2,376	
31.8	31.8	1.2	2.0	1.13	0.124	109.5	128	559	279	33	250	144	22,253	1,400	1,641	12.4	35,015	2,087	
25.4	25.4	2.0	2.5	1.43	0.097	68.1	180	507	279	15	275	182	16,441	1,295	1,584	9.5	26,408	1,888	
25.4	25.4	1.6	2.5	1.16	0.097	84.0	180	507	279	19	275	148	13,736	1,082	1,304	9.6	22,184	1,605	
25.4	25.4	1.4	2.5	1.02	0.097	95.3	180	507	279	22	275	130	12,281	967	1,157	9.7	19,890	1,448	
25.4	25.4	1.2	2.5	0.88	0.097	110.4	180	507	279	26	250	112	10,756	847	1,006	9.8	17,468	1,279	

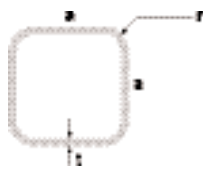




# Dimensions & Properties

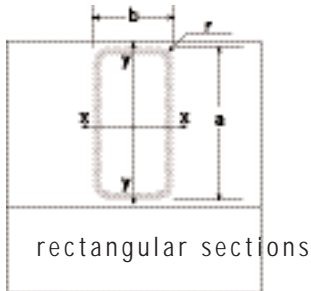
## SQUARE TUBING

Dimensions and Ratios												Properties							
Tube Dimensions				Mass per m	External Surface Area		Per Pack	Pack Lengths Dimensions (Effective)			Section Nom. Yield	Gross					Torsion Constant J	Torsion Modulus C	
a	a	t	r		per m	per m		per t	Width	Height		D/t	Area A <sub>g</sub>	About x - , y - and n - axis					
mm	mm	mm	mm	kg/m	m <sup>2</sup> /m	m <sup>2</sup> /t	mm	mm		MPa	mm <sup>2</sup>	I <sub>x</sub> mm <sup>4</sup>	Z <sub>x</sub> mm <sup>3</sup>	S <sub>x</sub> mm <sup>3</sup>	r <sub>x</sub> mm	mm <sup>4</sup>	mm <sup>3</sup>		
22.2	22.2	2.0	2.0	1.24	0.085	68.8	180	450	247	14	300	158	10,707	965	1,192	8.2	16,983	1,381	
22.2	22.2	1.6	2.0	1.01	0.085	84.6	180	450	247	17	275	129	9,003	811	985	8.4	14,372	1,184	
22.2	22.2	1.4	2.0	0.89	0.085	95.9	180	450	247	19	275	113	8,075	727	876	8.4	12,933	1,073	
22.2	22.2	1.2	2.0	0.77	0.085	111.1	180	450	247	23	275	98	7,095	639	763	8.5	11,400	953	
22.2	22.2	0.9	2.0	0.58	0.085	146.4	180	450	247	30	250	74	5,521	497	587	8.6	8,916	753	
19.0	19.0	2.0	2.5	1.03	0.072	69.8	230	487	215	11	300	131	6,223	655	825	6.9	10,251	951	
19.0	19.0	1.6	2.5	0.84	0.072	85.6	230	487	215	14	300	107	5,278	556	686	7.0	8,745	825	
19.0	19.0	1.4	2.5	0.74	0.072	96.9	230	487	215	16	275	94	4,755	500	612	7.1	7,902	751	
19.0	19.0	1.2	2.5	0.64	0.072	112.0	230	487	215	19	275	82	4,195	442	535	7.2	6,994	670	
19.0	19.0	0.9	2.5	0.49	0.072	147.4	230	487	215	25	275	62	3,286	346	413	7.3	5,503	534	
16.0	16.0	1.6	2.5	0.69	0.060	86.9	192	434	153	12	300	87	2,953	369	464	5.8	4,988	548	
16.0	16.0	1.4	2.5	0.61	0.060	98.2	192	434	153	14	300	77	2,675	334	416	5.9	4,532	503	
16.0	16.0	1.2	2.5	0.53	0.060	113.3	192	434	153	16	275	67	2,374	297	365	5.9	4,034	452	
15.0	15.0	1.6	2.5	0.64	0.056	87.5	200	350	175	11	300	81	2,366	315	400	5.4	4,029	469	
15.0	15.0	1.4	2.5	0.56	0.056	98.8	200	350	175	13	300	72	2,149	286	359	5.5	3,669	432	
15.0	15.0	1.2	2.5	0.49	0.056	113.9	200	350	175	15	275	62	1,911	255	315	5.5	3,273	389	
12.7	12.7	1.6	1.5	0.54	0.048	88.9	200	304	152	10	300	69	1,419	224	286	4.5	2,293	315	
12.7	12.7	1.4	1.5	0.48	0.048	100.1	200	304	152	11	300	61	1,298	204	258	4.6	2,106	292	
12.7	12.7	1.2	1.5	0.42	0.048	115.2	200	304	152	13	300	53	1,162	183	228	4.7	1,894	266	





# Dimensions & Properties



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## RECTANGULAR TUBING

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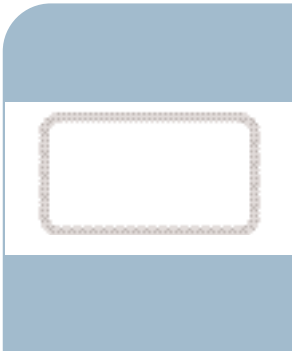
The following dimensions and properties tables have been calculated for the standard range of rectangular tubing manufactured by OneSteel to Technical Specification TS21 in electric resistance welded (ERW) steel tubing.

They have been calculated on nominal sizes of tubing and do not take into account variations due to extremes of tolerances.

Details of tolerances applicable are available in BTM<sup>®</sup> Technical Specifications (eg. TS21 - Low Carbon ERW Steel Tubing for General Applications). These are available from any OneSteel Sales Office or [www.onesteel.com](http://www.onesteel.com)

The wall thicknesses shown are those currently available and produced as standard thicknesses. Other thicknesses may be available on enquiry. Other material grades and finishes are available, including TS30 GALVATUBE<sup>™</sup>, TS28 Hi-Form 28<sup>®</sup> Commercial Quality and Aluminised, TS11 Black and TS22 Hi-Lite<sup>®</sup>.

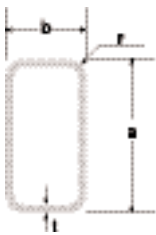
Whilst every care has been taken in the preparation of this guide, OneSteel accepts no liability for the accuracy of the information supplied.

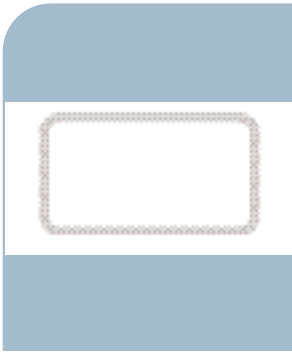


# Dimensions & Properties

## RECTANGULAR TUBING

Dimensions and Ratios												Properties												
Tube Dimensions				Mass per m	External Surface Area		Lengths Per Pack	Pack Dimensions (Effective)		EquivNom. D/t	Yield	Gross Section Area		About x - Axis					About y - Axis				Torsion Constant J	Torsion Modulus C
a	b	t	r		per m	per m		per t	Width			Height	$A_g$	$I_x$	$Z_x$	$S_x$	$r_x$	$I_y$	$Z_y$	$S_y$	$r_y$	mm <sup>4</sup>		
mm	mm	mm	mm	kg/m	m <sup>2</sup> /m	m <sup>2</sup> /t	mm	mm	MPa	mm <sup>2</sup>	mm <sup>4</sup>	mm <sup>3</sup>	mm <sup>3</sup>	mm	mm <sup>4</sup>	mm <sup>3</sup>	mm <sup>3</sup>	mm	mm <sup>4</sup>	mm <sup>3</sup>				
80.0	40.0	2.0	3.0	3.59	0.236	65.4	42	610	265	37	200	457	379,011	9,475	11,745	28.8	128,561	6,428	7,242	16.8	307,309	11,015		
80.0	40.0	1.6	3.0	2.89	0.236	81.4	42	610	265	47	200	368	308,001	7,770	9,496	28.9	105,378	5,269	5,880	16.9	252,013	9,077		
70.0	50.0	2.0	2.5	3.60	0.236	65.4	42	540	325	38	200	459	320,965	9,170	10,978	26.4	190,725	7,629	8,710	20.4	371,665	12,211		
70.0	50.0	1.6	2.5	2.90	0.236	81.4	42	540	325	47	200	369	261,065	7,459	8,880	26.6	155,733	6,229	7,058	20.5	303,927	10,037		
70.0	34.0	2.0	5.0	3.03	0.199	65.8	42	540	229	32	250	386	236,514	6,758	8,503	24.7	76,929	4,525	5,150	14.1	194,180	7,961		
70.0	34.0	1.6	5.0	2.44	0.199	81.7	42	540	229	40	200	311	192,687	5,505	6,888	24.9	63,324	3,725	4,192	14.3	159,763	6,589		
57.0	35.0	2.0	2.5	2.72	0.180	66.0	72	563	305	29	250	347	151,507	5,316	6,515	20.9	70,589	4,034	4,635	14.3	152,100	6,639		
57.0	35.0	1.6	2.5	2.19	0.180	81.9	72	563	305	36	200	279	123,792	4,344	5,287	21.0	58,114	3,321	3,775	14.4	125,345	5,508		
50.8	31.8	2.0	2.8	2.42	0.160	66.3	54	507	216	26	250	308	106,104	4,177	5,140	18.6	50,873	3,200	3,705	12.8	109,774	5,268		
50.8	31.8	1.6	2.8	1.95	0.160	82.2	54	507	216	32	250	249	86,915	3,422	4,178	18.7	42,010	2,642	3,024	13.0	90,735	4,387		
50.8	31.8	1.4	2.8	1.71	0.160	93.6	54	507	216	36	200	218	76,953	3,030	3,685	18.8	37,344	2,349	2,672	13.1	80,697	3,916		
50.0	25.0	2.0	3.5	2.16	0.144	66.6	110	550	300	23	275	275	84,899	3,396	4,305	17.6	28,355	2,268	2,637	10.1	70,487	3,926		
50.0	25.0	1.6	3.5	1.75	0.144	82.5	110	550	300	29	250	222	69,667	2,787	3,505	17.7	23,591	1,887	2,161	10.3	58,613	3,291		
50.0	25.0	1.4	3.5	1.53	0.144	93.9	110	550	300	33	250	195	61,736	2,469	3,093	17.8	21,049	1,684	1,914	10.4	52,282	2,948		
50.0	25.0	1.2	3.5	1.32	0.144	109.0	110	550	300	38	200	168	53,590	2,144	2,675	17.8	18,397	1,472	1,660	10.5	45,685	2,587		
47.6	23.8	2.0	3.0	2.06	0.138	66.7	121	574	287	22	275	263	73,412	3,085	3,911	16.7	24,376	2,048	2,389	9.6	60,115	3,519		
47.6	23.8	1.6	3.0	1.67	0.138	82.6	121	574	287	27	250	212	60,316	2,534	3,187	16.9	20,322	1,708	1,960	9.8	50,197	2,958		
47.6	23.8	1.4	3.0	1.46	0.138	94.0	121	574	287	31	250	187	53,483	2,247	2,814	16.9	18,151	1,525	1,737	9.9	44,736	2,653		
47.6	23.8	1.2	3.0	1.26	0.138	109.1	121	574	287	37	200	161	46,455	1,952	2,434	17.0	15,887	1,334	1,508	9.9	39,132	2,330		

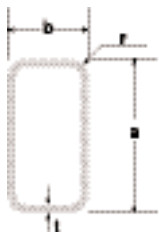


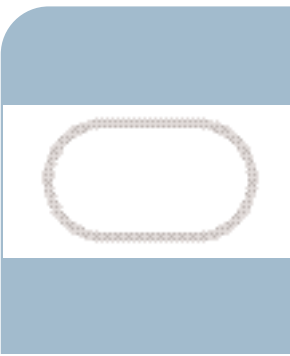


# Dimensions & Properties

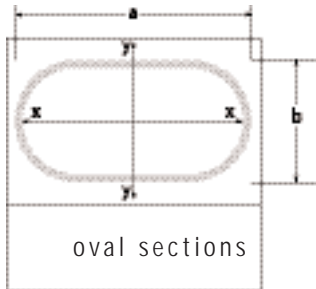
## RECTANGULAR TUBING

Dimensions and Ratios												Properties												
Tube Dimensions				Mass per m	External Surface Area		Lengths Per Pack	Pack Dimensions (Effective)		Equiv D/t	Nom. Yield	Gross Section Area		About x - Axis					About y - Axis				Torsion Constant J	Torsion Modulus C
a	b	t	r		per m	per m		per t	Width			Height	MPa	A <sub>g</sub>	I <sub>x</sub>	Z <sub>x</sub>	S <sub>x</sub>	r <sub>x</sub>	I <sub>y</sub>	Z <sub>y</sub>	S <sub>y</sub>	r <sub>y</sub>		
mm	mm	mm	mm	kg/m	m <sup>2</sup> /m	m <sup>2</sup> /t	mm	mm			mm <sup>2</sup>	mm <sup>4</sup>	mm <sup>3</sup>	mm <sup>3</sup>	mm	mm <sup>4</sup>	mm <sup>3</sup>	mm <sup>3</sup>	mm	mm <sup>4</sup>	mm <sup>3</sup>			
44.5	25.4	2.0	3.0	2.02	0.135	66.8	70	495	203	21	275	257	64,800	2,912	3,650	15.9	26,666	2,100	2,457	10.2	61,555	3,529		
44.5	25.4	1.6	3.0	1.63	0.135	82.7	70	495	203	27	250	207	53,296	2,395	2,976	16.0	22,189	1,747	2,014	10.32	51,230	2,963		
44.5	25.4	1.4	3.0	1.43	0.135	94.1	70	495	203	31	250	182	47,282	2,125	2,628	16.1	19,799	1,559	1,784	10.4	45,719	2,656		
44.5	25.4	1.2	3.0	1.23	0.135	109.2	70	495	203	36	200	157	41,090	1,847	2,274	16.2	17,305	1,363	1,548	10.5	39,966	2,332		
38.1	25.4	2.0	1.5	1.85	0.124	67.1	80	430	228	20	275	236	45,443	2,392	2,952	13.9	23,854	1,875	2,215	10.1	48,425	2,974		
38.1	25.4	1.6	1.5	1.50	0.124	83.0	80	430	228	25	275	191	37,509	1,974	2,412	14.0	19,869	1,564	1,818	10.2	40,420	2,506		
38.1	25.4	1.4	1.5	1.32	0.124	94.3	80	430	228	28	250	168	33,335	1,754	2,133	14.1	17,738	1,397	1,611	10.3	36,124	2,250		
38.1	25.4	1.2	1.5	1.13	0.124	109.5	80	430	228	33	250	145	29,021	1,527	1,847	14.2	15,512	1,221	1,398	10.4	31,624	1,980		
35.0	19.0	2.0	2.0	1.54	0.105	67.8	144	470	253	17	275	197	29,648	1,694	2,156	12.3	11,005	1,158	1,138	7.5	25,801	1,926		
35.0	19.0	1.6	2.0	1.25	0.105	83.6	144	470	253	21	257	159	24,580	1,405	1,768	12.4	9,279	977	1,144	7.6	21,759	1,642		
35.0	19.0	1.4	2.0	0.10	0.105	95.0	144	470	253	24	275	140	21,894	1,251	1,566	12.5	8,335	877	1,017	7.7	19,547	1,483		
35.0	19.0	1.2	2.0	0.95	0.105	110.1	144	470	253	28	250	121	19,102	1,092	1,359	12.6	7,333	772	886	7.8	17,199	1,312		
31.8	22.2	1.6	3.0	1.23	0.103	83.7	100	368	247	20	275	157	20,986	1,320	1,633	11.6	11,946	1,076	1,272	8.7	25,118	1,765		
31.8	22.2	1.4	3.0	1.08	0.103	95.1	100	368	247	23	275	138	18,708	1,177	1,447	11.7	10,698	964	1,129	8.8	22,507	1,590		
31.8	22.2	1.2	3.0	0.93	0.103	110.2	100	368	247	27	250	119	16,336	1,027	1,256	11.7	9,384	845	982	8.9	19,755	1,404		
31.8	12.7	1.6	2.5	1.00	0.085	84.6	180	527	177	17	275	127	14,388	905	1,196	10.6	3,218	507	609	5.0	9,001	905		
31.8	12.7	1.4	2.5	0.88	0.085	96.0	180	527	177	19	275	112	12,860	809	1,062	10.7	2,925	461	545	5.1	8,169	826		
31.8	12.7	1.2	2.5	0.76	0.085	111.1	180	527	177	22	275	97	11,259	708	924	10.8	2,604	410	478	5.2	7,262	740		
25.4	12.7	1.6	2.5	0.84	0.072	85.6	238	482	203	14	300	107	7,972	628	820	8.6	2,583	407	495	4.9	6,645	705		
25.4	12.7	1.4	2.5	0.74	0.072	96.9	238	482	203	16	275	95	7,155	563	731	8.7	2,350	370	444	5.0	6,038	646		
25.4	12.7	1.2	2.5	0.64	0.025	112.0	238	482	203	19	275	82	6,290	495	637	8.8	2,095	330	390	5.1	5,374	579		
25.4	12.7	0.9	2.5	0.49	0.072	147.3	238	482	203	25	275	62	4,899	386	491	8.9	1,665	262	303	5.2	4,264	465		





# Dimensions & Properties



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## OVAL SECTIONS

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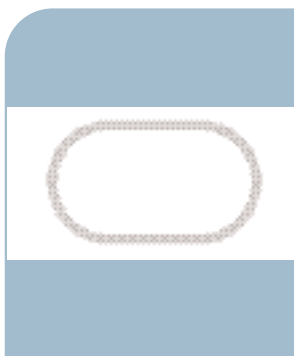
The following dimensions and properties tables have been calculated for oval electric resistance welded (ERW) steel tubing.

They have been calculated on nominal sizes of tubing and do not take into account variations due to extremes of tolerances.

Details of tolerances applicable are available in BTM<sup>®</sup> Technical Specifications (eg. TS21 - Low Carbon ERW Steel Tubing for General Applications). These are available from any OneSteel Sales Office or [www.onesteel.com](http://www.onesteel.com)

The wall thicknesses shown are those currently available and produced as standard thicknesses. Other thicknesses may be available on enquiry. Other material grades and finishes are available, including TS30 GALVATUBE<sup>™</sup>, TS28 Hi-Form 28<sup>®</sup> Commercial Quality and Aluminised, TS11 Black and TS22 Hi-Lite<sup>®</sup>.

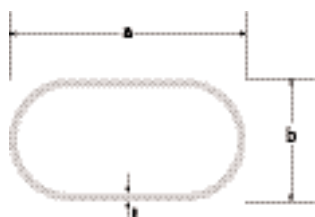
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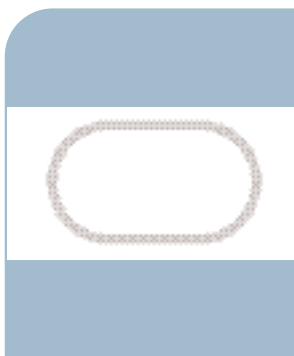


# Dimensions & Properties

## OVAL SECTIONS

Dimensions										Properties					
Tube Dimensions					Mass per m	Lengths per Pack	Pack Dimensions (Effective)		Gross Sectional Area	About x-x axis			About y-y axis		
a	x	b	x	t			Width	Height		$I_x$	$Z_x$	$r_x$	$I_y$	$Z_y$	$r_y$
mm		mm		mm	kg/m	mm	mm	mm <sup>2</sup>	mm <sup>4</sup>	mm <sup>3</sup>	mm	mm <sup>4</sup>	mm <sup>3</sup>	mm	
18.95 (Section 125)	x	12.6	x	1.2	0.44	200	300	210	56	1,041	165	4.3	2,026	214	6.0
				1.4	0.51	200	300	210	65	1,162	184	4.2	2,281	241	5.9
				1.6	0.57	200	300	210	73	1,271	202	4.2	2,516	266	5.9
20.8 (Section 228)	x	8.7	x	1.2	0.44	200	260	180	55	566	130	3.1	2,201	212	6.3
				1.4	0.51	200	260	180	64	623	143	3.1	2,478	238	6.2
				1.6	0.57	200	260	180	72	672	154	3.1	2,732	263	6.2
30.8 (Section 143)	x	15.4	x	1.2	0.71	195	455	276	90	3,154	410	5.9	8,928	580	10.0
				1.4	0.82	195	455	276	104	3,561	462	5.8	10,185	661	9.9
				1.6	0.93	195	455	276	118	3,938	511	5.8	11,381	739	9.8
				2.0	1.14	195	455	276	145	4,607	598	5.6	13,600	883	9.7
31.7 (Section 141)	x	17.3	x	1.2	0.72	196	450	315	90	3,079	356	5.8	9,134	576	10.1
				1.4	0.83	196	450	315	104	3,477	402	5.8	10,420	657	10.0
				1.6	0.94	196	450	315	118	3,845	445	5.7	11,643	735	9.9
31.75 (Section 146)	x	21.59	x	1.2	0.75	200	510	350	97	5,539	513	7.5	10,346	652	10.3
				1.4	0.87	200	510	350	113	6,297	583	7.5	11,818	744	10.2
				1.6	0.99	200	510	350	128	7,012	650	7.4	13,223	833	10.2
31.8 (Section 238)	x	16.0	x	1.2	0.73	162	340	320	94	3,610	451	6.2	9,971	627	10.3
				1.4	0.85	162	340	320	108	4,091	511	6.1	11,384	716	10.2
				1.6	0.96	162	340	320	123	4,531	566	6.1	12,732	801	10.2
				2.0	1.18	162	340	320	151	5,317	665	5.9	15,239	958	10.0
35.0 (Section 247)	x	16.0	x	1.2	0.79	200	460	320	101	4,040	505	6.3	12,950	740	11.3
				1.4	0.92	200	460	320	117	4,570	571	6.2	14,810	846	11.2
				1.6	1.05	200	460	320	133	5,064	633	6.2	16,591	948	11.2
				2.0	1.29	200	460	320	164	5,948	744	6.0	19,923	1,138	11.0
35.0 (Section 140)	x	16.2	x	1.2	0.79	100	400	200	100	3,830	473	6.2	12,640	722	11.2
				1.4	0.91	100	400	200	116	4,331	535	6.1	14,452	826	11.2
				1.6	1.03	100	400	200	132	4,796	592	6.0	16,186	925	11.1
				2.0	1.27	100	400	200	162	5,629	695	5.9	19,427	1,110	11.0
37.7 (Section 144)	x	20.7	x	1.2	0.89	132	440	310	114	7,291	704	8.0	17,463	926	12.4
				1.4	1.04	132	440	310	132	8,300	802	7.9	20,012	1,062	12.3
				1.6	1.18	132	440	310	150	9,254	894	7.9	22,462	1,192	12.2
				2.0	1.46	132	440	310	185	11,009	1,064	7.7	27,088	1,437	12.1

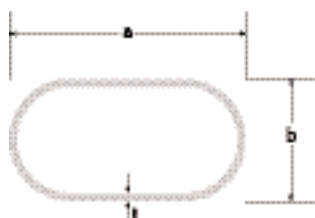




# Dimensions & Properties

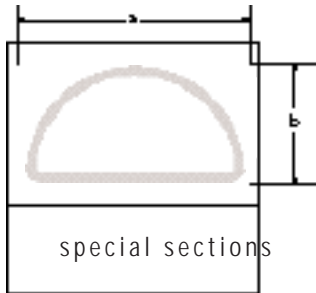
## OVAL SECTIONS

Dimensions										Properties					
Tube Dimensions					Mass per m	Lengths per Pack	Pack Dimensions (Effective)		Gross Sectional Area	About x-x axis			About y-y axis		
a	x	b	x	t			Width	Height		$I_x$	$Z_x$	$r_x$	$I_y$	$Z_y$	$r_y$
mm		mm		mm	kg/m		mm	mm	mm <sup>2</sup>	mm <sup>4</sup>	mm <sup>3</sup>	mm	mm <sup>4</sup>	mm <sup>3</sup>	mm
40.8 (Section 145)	x	15.3	x	1.2	0.89	150	420	300	114	4,290	561	6.1	19,251	944	13.0
				1.4	1.04	150	420	300	132	4,850	634	6.1	22,064	1,082	12.9
				1.6	1.18	150	420	300	150	5,370	702	6.0	24,770	1,214	12.9
				2.0	1.46	150	420	300	185	6,298	823	5.8	29,874	1,464	12.7
45.5 (Section 210)	x	25.0	x	1.2	1.09	81	410	275	139	13,342	1,067	9.8	31,465	1,383	15.0
				1.4	1.27	81	410	275	161	15,254	1,220	9.7	36,171	1,590	15.0
				1.6	1.44	81	410	275	183	17,082	1,367	9.7	40,731	1,790	14.9
				2.0	1.78	81	410	275	227	20,500	1,640	9.5	49,427	2,173	14.8
48.0 (Section 248)	x	19.0	x	1.2	1.07	100	532	229	137	8,191	862	7.7	32,699	1,362	15.5
				1.4	1.25	100	532	229	159	9,318	981	7.7	37,585	1,566	15.4
				1.6	1.42	100	532	229	180	10,382	1,093	7.6	42,318	1,763	15.3
				2.0	1.75	100	532	229	223	12,332	1,298	7.4	51,339	2,139	15.2
50.0 (Section 147)	x	30.0	x	0.9	0.91	110	Bundle		112	13,383	892	10.9	29,557	1,182	16.2
				1.2	1.20	110	Bundle		149	17,366	1,157	10.8	38,598	1,544	16.1
				1.6	1.58	110	Bundle		196	22,329	1,489	10.7	50,052	2,002	16.0
				2.0	1.96	110	Bundle		243	26,911	1,794	10.5	60,843	2,434	15.8
50.8 (Section 223)	x	15.9	x	1.2	1.09	102	350	397	139	6,042	760	6.6	35,953	1,415	16.1
				1.4	1.27	102	350	397	161	6,844	816	6.5	41,335	1,627	16.0
				1.6	1.44	102	350	397	184	7,594	955	6.4	46,550	1,833	15.9
				2.0	1.78	102	350	397	227	8,943	1,125	6.3	56,496	2,224	15.8
75.0 (Section 7516)	x	16.5	x	1.2	1.56	100	575	265	198	9,932	1,204	7.1	107,554	2,868	23.3
				1.4	1.81	100	575	265	230	11,273	1,366	7.0	124,171	3,311	23.2
				1.6	2.06	100	575	265	262	12,532	1,519	6.9	140,427	3,745	23.1
111.76 (Section 130)	x	19.05	x	1.2	2.18	100	Bundle		277	12,525	1,315	6.7	302,423	5,412	33.1
				1.4	2.53	100	Bundle		322	14,212	1,492	6.6	350,075	6,265	33.0
				1.6	2.89	100	Bundle		367	15,793	1,658	6.6	396,961	7,104	32.9





# Dimensions & Properties



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## SPECIAL SECTIONS

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The following dimensions and properties tables have been calculated for the range of special sections manufactured by OneSteel in electric resistance welded (ERW) steel tubing.

They have been calculated on nominal sizes of tubing and do not take into account variations due to extremes of tolerances.

Details of tolerances applicable are available in BTM<sup>®</sup> Technical Specifications (eg. TS21 - Low Carbon ERW Steel Tubing for General Applications). These are available from any OneSteel Office or [www.onesteel.com](http://www.onesteel.com)

Note that the sketches shown in the Standard Size Range Section are for indicative purposes only.

The wall thickness shown are those currently available. Other thicknesses may be available on enquiry. All special sections are available in TS21 commercial quality EzyForm<sup>™</sup> and TS30 GALVATUBE<sup>™</sup>. Other material grades and finishes may be available.

Whilst every care has been taken in the preparation of this guide, OneSteel accepts no liability for the accuracy of the information supplied.



# Dimensions & Properties

## SPECIAL SECTIONS

SPECIAL SECTIONS										
Dimensions							Properties			
Designation		Mass per m	Lengths Per Pack	Pack Dimensions (Effective)		Cross Sectional mm <sup>2</sup>	About x - axis		About y - axis	
Name and Section Number	x t mm			Width mm	Height mm		$I_x$ mm <sup>4</sup>	$r_x$ mm	$I_y$ mm <sup>4</sup>	$r_y$ mm
2525 Lip (S701)	1.2	1.17	105	Bundle		149	23,361	12.5	14,468	9.8
	1.6	1.54	105	Bundle		196	30,338	12.4	18,322	9.7
3519 Step (S702)	1.2	0.92	100	Bundle		118	5,436	6.8	15,053	11.3
Explorer (S703)	1.2	1.19	74	507	216	151	14,120	9.7	40,141	16.3
	1.6	1.56	74	507	216	199	18,074	9.5	52,045	16.2
	2.0	1.94	74	507	216	247	21,684	9.4	63,255	16.0
Challenger 16 (S706)	1.2	1.66	80	Bundle		211	32,582	12.4	58,549	16.6
	1.6	2.20	80	Bundle		280	42,069	12.3	76,433	16.5
	2.0	2.72	80	Bundle		347	50,922	12.1	93,553	16.4
3232 Lip (S709)	1.6	1.93	100	Bundle		246	57,927	15.3	38,015	12.4
	2.0	2.39	100	Bundle		305	70,826	15.2	45,623	12.2
5041 "D" (S712)	1.2	1.38	56	Bundle		187	44,614	15.4	62,017	18.2
	1.6	1.99	56	Bundle		247	57,906	15.3	80,753	18.1
	2.0	2.39	56	Bundle		307	70,455	15.1	98,573	17.9
Offsider (S796)	1.2	1.94	133	507	216	247	36,600	12.2	50,662	14.3