

AustubeMills
SHAPING POSSIBILITIES

DESIGN CAPACITY TABLES

FOR STRUCTURAL STEEL HOLLOW SECTIONS

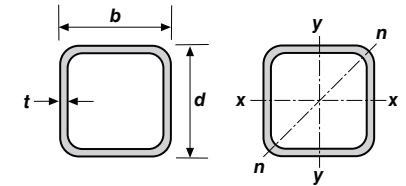


TABLE 3.1-6(1)

Square Hollow Sections C450PLUS® – designed as AS/NZS 1163 Grade C450L0

DIMENSIONS AND PROPERTIES

- 1 SHS
- 2 C450PLUS®
- 3 Finish



Dimensions and Ratios							Section Properties							Properties for Design to AS 4100				
Designation			Mass per m	External Surface Area		b-2t	Gross Section Area	About x-, y- and z-axis					Torsion Constant	Torsion Modulus	Form Factor	About x and y-axis		
d	b	t		per m	per t			A _g	I _x	Z _x	Z _y	S _x				r _x	J	C
mm	mm	mm	kg/m	m ² /m	m ² /t	mm ²	10 ⁶ mm ⁴	10 ³ mm ³	10 ³ mm ³	10 ³ mm ³	mm	10 ⁶ mm ⁴	10 ³ mm ³			(C,N,S)	10 ³ mm ³	
400 x 400 x	16.0	SHS	186	1.53	8.23	23.0	23700	571	2850	2140	3370	155	930	4350	1.00	30.9	N	3320
		12.5 SHS	148	1.55	10.5	30.0	18800	464	2320	1720	2710	157	744	3520	0.994	40.2	S	2310
		10.0 SHS	120	1.56	13.0	38.0	15300	382	1910	1400	2210	158	604	2890	0.785	51.0	S	1650
350 x 350 x	16.0	SHS	161	1.33	8.27	19.9	20500	372	2130	1610	2530	135	614	3250	1.00	26.7	C	2530
		12.5 SHS	128	1.35	10.5	26.0	16300	305	1740	1300	2040	137	493	2650	1.00	34.9	N	1900
		10.0 SHS	104	1.36	13.0	33.0	13300	252	1440	1060	1670	138	401	2180	0.904	44.3	S	1350
		8.0 SHS	84.2	1.37	16.2	41.8	10700	207	1180	865	1370	139	326	1790	0.715	56.0	S	971
300 x 300 x	16.0	SHS	136	1.13	8.33	16.8	17300	226	1510	1160	1810	114	378	2310	1.00	22.5	C	1810
		12.5 SHS	109	1.15	10.6	22.0	13800	187	1240	937	1470	116	305	1900	1.00	29.5	C	1470
		10.0 SHS	88.4	1.16	13.1	28.0	11300	155	1030	769	1210	117	250	1570	1.00	37.6	N	1080
		8.0 SHS	71.6	1.17	16.3	35.5	9120	128	853	628	991	118	203	1290	0.840	47.6	S	768
250 x 250 x	16.0	SHS	111	0.931	8.42	13.6	14100	124	992	774	1210	93.8	212	1530	1.00	18.3	C	1210
		12.5 SHS	89.0	0.946	10.6	18.0	11300	104	830	634	992	95.7	173	1270	1.00	24.1	C	992
		10.0 SHS	72.7	0.957	13.2	23.0	9260	87.1	697	523	822	97.0	142	1060	1.00	30.9	N	811
		9.0 SHS	65.9	0.961	14.6	25.8	8400	79.8	639	477	750	97.5	129	972	1.00	34.6	N	699
		8.0 SHS	59.1	0.966	16.3	29.3	7520	72.3	578	429	676	98.0	116	878	1.00	39.2	N	586
		6.0 SHS	45.0	0.974	21.7	39.7	5730	56.2	450	330	521	99.0	88.7	681	0.753	53.2	S	380
200 x 200 x	16.0	SHS	85.5	0.731	8.55	10.5	10900	58.6	586	469	728	73.3	103	914	1.00	14.1	C	728
		12.5 SHS	69.4	0.746	10.8	14.0	8840	50.0	500	389	607	75.2	85.2	772	1.00	18.8	C	607
		10.0 SHS	57.0	0.757	13.3	18.0	7260	42.5	425	324	508	76.5	70.7	651	1.00	24.1	C	508
		9.0 SHS	51.8	0.761	14.7	20.2	6600	39.2	392	297	465	77.1	64.5	599	1.00	27.1	C	465
		8.0 SHS	46.5	0.766	16.5	23.0	5920	35.7	357	268	421	77.6	58.2	544	1.00	30.9	N	415
		6.0 SHS	35.6	0.774	21.8	31.3	4530	28.0	280	207	327	78.6	44.8	425	0.952	42.0	S	272
		5.0 SHS	29.9	0.779	26.0	38.0	3810	23.9	239	175	277	79.1	37.8	362	0.785	51.0	S	207
150 x 150 x	10.0	SHS	41.3	0.557	13.5	13.0	5260	16.5	220	173	269	56.1	28.4	341	1.00	17.4	C	269
		9.0 SHS	37.7	0.561	14.9	14.7	4800	15.4	205	159	248	56.6	26.1	316	1.00	19.7	C	248
		8.0 SHS	33.9	0.566	16.7	16.8	4320	14.1	188	144	226	57.1	23.6	289	1.00	22.5	C	226
		6.0 SHS	26.2	0.574	22.0	23.0	3330	11.3	150	113	178	58.2	18.4	229	1.00	30.9	N	175
		5.0 SHS	22.1	0.579	26.2	28.0	2810	9.70	129	96.2	151	58.7	15.6	197	1.00	37.6	N	135

Notes:

- REFER to the Australian Tube Mills **PRODUCT AVAILABILITY GUIDE (PAG)** for information on the **availability of listed sections and associated finishes**. The PAG can be found at www.austubemills.com.
- Australian Tube Mills C450PLUS products satisfy both the strength and elongation requirements of AS/NZS 1163 Grades C350L0 (with the higher elongation requirements) and C450L0 (with the higher strength requirements of $f_y = 450$ MPa and $f_u = 500$ MPa). See Section 2.4.2 for a detailed definition of C450PLUS.
- For C450PLUS™: $f_y = 450$ MPa and $f_u = 500$ MPa; f_y = yield stress used in design; f_u = tensile strength used in design; as defined in AS 4100.
- C = Compact Section; N = Non-Compact Section; S = Slender Section (as defined in AS 4100).
- Australian Tube Mills C450PLUS to AS/NZS 1163 is cold-formed and is therefore allocated the CF residual stresses classification in AS 4100.

TABLE 3.3-2

Rectangular Hollow Sections to AS/NZS 1163

TELESCOPING INFORMATION

- 1 **RHS**
- 2 **Grade**
- 3 **Finish**

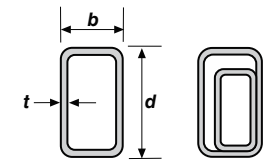
Female (outer)			Male (inner)		Nominal Clearance	
d	b	t	d	b	top	side
mm	mm	mm	mm	mm	mm	mm
400 x 300 x	16.0	RHS	350	250	18.0	18.0
	12.5	RHS	350	250	25.0	25.0
	10.0	RHS	350	250	30.0	30.0
	8.0	RHS	350	250	34.0	34.0
400 x 200 x	16.0	RHS	250	150	118.0	18.0
	12.5	RHS	250	150	125.0	25.0
	10.0	RHS	250	150	130.0	30.0
	8.0	RHS	250	150	134.0	34.0
350 x 250 x	16.0	RHS	300	200	18.0	18.0
	12.5	RHS	300	200	25.0	25.0
	10.0	RHS	300	200	30.0	30.0
	8.0	RHS	300	200	34.0	34.0
300 x 200 x	16.0	RHS	250	150	18.0	18.0
	12.5	RHS	250	150	25.0	25.0
	10.0	RHS	250	150	30.0	30.0
	8.0	RHS	250	150	34.0	34.0
	6.0	RHS	250	150	38.0	38.0
250 x 150 x	16.0	RHS	200	100	18.0	18.0
	12.5	RHS	200	100	25.0	25.0
	10.0	RHS	200	100	30.0	30.0
	9.0	RHS	200	100	32.0	32.0
	8.0	RHS	200	100	34.0	34.0
	6.0	RHS	200	100	38.0	38.0
	5.0	RHS	200	100	40.0	40.0
200 x 100 x	10.0	RHS	152	76	28.0	4.0
	9.0	RHS	152	76	30.0	6.0
	8.0	RHS	152	76	32.0	8.0
	6.0	RHS	152	76	36.0	12.0
	5.0	RHS	152	76	38.0	14.0
	4.0	RHS	152	76	40.0	16.0
152 x 76 x	6.0	RHS	127	51	13.0	13.0
	5.0	RHS	127	51	15.0	15.0
150 x 100 x	10.0	RHS	127	51	3.0	29.0
	9.0	RHS	127	51	5.0	31.0
	8.0	RHS	127	51	7.0	33.0
	6.0	RHS	127	51	11.0	37.0
	5.0	RHS	127	51	13.0	39.0
	4.0	RHS	127	51	15.0	41.0

Female (outer)			Male (inner)		Nominal Clearance	
d	b	t	d	b	top	side
mm	mm	mm	mm	mm	mm	mm
150 x 50 x	6.0	RHS	76	38	62.0	0.0
	5.0	RHS	76	38	64.0	2.0
	4.0	RHS	76	38	66.0	4.0
	3.0	RHS	76	38	68.0	6.0
	2.5	RHS	76	38	69.0	7.0
	2.0	RHS	76	38	70.0	8.0
127 x 51 x	6.0	RHS	76	38	39.0	1.0
	5.0	RHS	76	38	41.0	3.0
	3.5	RHS	76	38	44.0	6.0
125 x 75 x	6.0	RHS	100	50	13.0	13.0
	5.0	RHS	100	50	15.0	15.0
	4.0	RHS	100	50	17.0	17.0
	3.0	RHS	100	50	19.0	19.0
	2.5	RHS	100	50	20.0	20.0
	2.0	RHS	100	50	21.0	21.0
102 x 76 x	6.0	RHS	76	38	14.0	26.0
	5.0	RHS	76	38	16.0	28.0
	3.5	RHS	76	38	19.0	31.0
100 x 50 x	6.0	RHS	76	38	12.0	0.0
	5.0	RHS	76	38	14.0	2.0
	4.0	RHS	76	38	16.0	4.0
	3.5	RHS	76	38	17.0	5.0
	3.0	RHS	76	38	18.0	6.0
	2.5	RHS	76	38	19.0	7.0
	2.0	RHS	76	38	20.0	8.0
	1.6	RHS	76	38	20.8	8.8
76 x 38 x	4.0	RHS	50	25	18.0	5.0
	3.0	RHS	50	25	20.0	7.0
	2.5	RHS	50	25	21.0	8.0
75 x 50 x	6.0	RHS	50	25	13.0	13.0
	5.0	RHS	65	35	0.0	5.0
	4.0	RHS	65	35	2.0	7.0
	3.0	RHS	65	35	4.0	9.0
	2.5	RHS	65	35	5.0	10.0
	2.0	RHS	65	35	6.0	11.0
	1.6	RHS	65	35	6.8	11.8

Female (outer)			Male (inner)		Nominal Clearance	
d	b	t	d	b	top	side
mm	mm	mm	mm	mm	mm	mm
75 x 25 x	2.5	RHS	n/a	n/a	n/a	n/a
	2.0	RHS	n/a	n/a	n/a	n/a
	1.6	RHS	n/a	n/a	n/a	n/a
65 x 35 x	4.0	RHS	50	25	7.0	2.0
	3.0	RHS	50	25	9.0	4.0
	2.5	RHS	50	25	10.0	5.0
	2.0	RHS	50	25	11.0	6.0
50 x 25 x	3.0	RHS	n/a	n/a	n/a	n/a
	2.5	RHS	n/a	n/a	n/a	n/a
	2.0	RHS	n/a	n/a	n/a	n/a
	1.6	RHS	n/a	n/a	n/a	n/a
50 x 20 x	3.0	RHS	n/a	n/a	n/a	n/a
	2.5	RHS	n/a	n/a	n/a	n/a
	2.0	RHS	n/a	n/a	n/a	n/a
	1.6	RHS	n/a	n/a	n/a	n/a

How to use this chart:

- Select the size of Female (or Outer) member closest to your requirements from the left hand column.
- The next column lists the closest size Male (Inner) Member when positioned in the Female Member as noted in the Figure at the bottom right of this page.
- Based on (A) and (B) above, the Nominal Clearance between the Male and Female Members are listed in the last column(s). The configuration of these Nominal Clearances are as shown in the Figure below.
Note that the clearance is the total available difference between member dimensions, not the gap on both sides.
- Depending on the two members being telescoped, the available clearance will also be dependent on end application requirements. Members may need to slide freely inside each other, or be locked with a pin, spot welded or fixed with wedges. This means, in some cases, a 'sloppy' fit may be suitable, while for others the tightest fit possible may be more appropriate.
- Where two telescoping sections are being used, thickness should be similar and will be determined by normal structural requirements. If a third section is to be used consideration of both clearance and thickness within the size list available may be required.



- RHS has the obvious advantage that its shape prevents rotation of the section.
- Press Fit: for short pieces with no need for separation or sliding, an interference fit can be achieved using the available ductility of the steel. Sizes where clearance is shown as 0.0 may occasionally require press fit.

Notes:

- REFER to the Australian Tube Mills PRODUCT AVAILABILITY GUIDE (PAG) for information on the availability of listed sections and associated finishes. The PAG can be found at www.austubemills.com.**
- RHS is not a precision tube and all dimensions shown in this chart, although in accordance with the specifications, may vary marginally. Varying corner radii and the internal weld bead may need to be considered when a closer fit is required.
- Sizes with a clearance less than 2.0 mm are shown **bold** in the charts.
- For tight fits it is recommended that some form of testing is carried out prior to committing to material. Where telescoping over some length is required, additional allowance may be needed for straightness.

