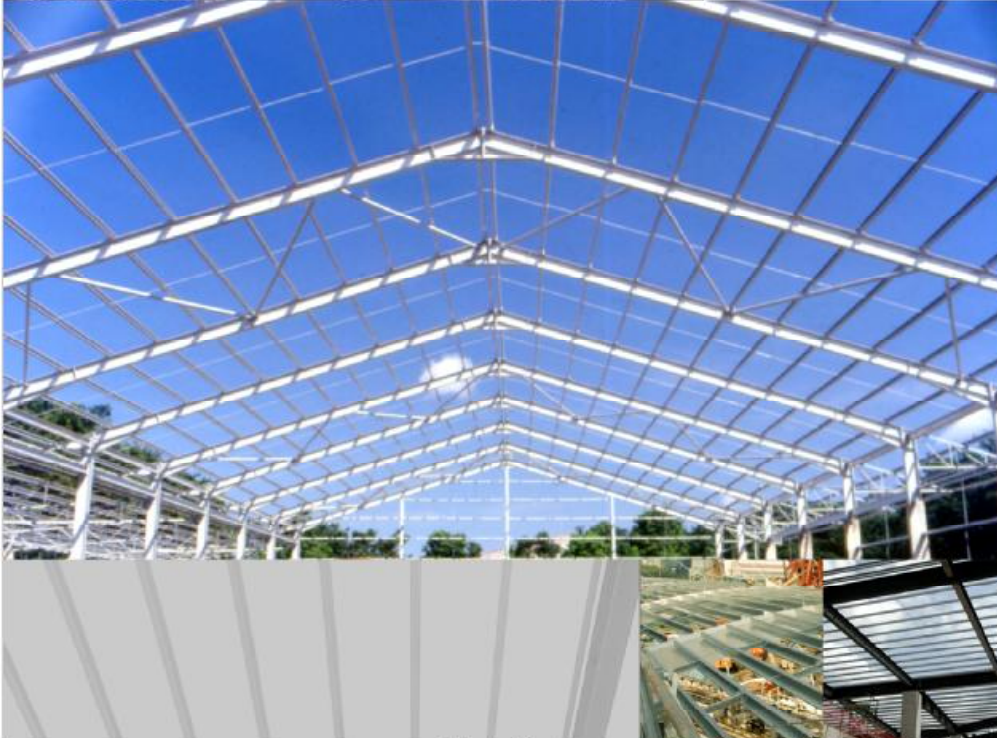


LCP PURLINS & GIRTS™



Purlin and Girt Structural System

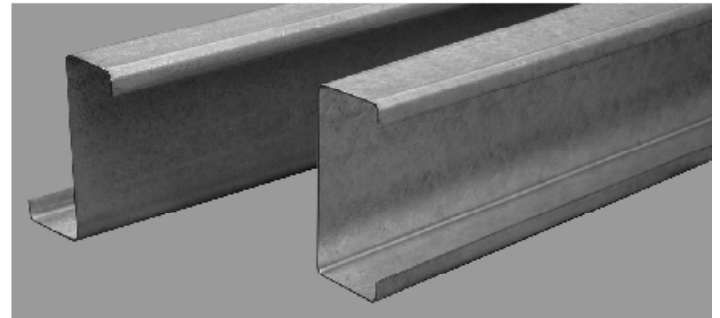


CERT NO. FM 59085
BS EN ISO 9001 : 2000

BC 1:2008 FPC
Cert. No. ABS BC1 SG 0001

FEATURES

Cold formed purlins and girts are recognised as being efficient, economical structural members suitable for a wide range of building applications. **LCP Building Products Pte. Ltd.** offers a full range of section depths from 100mm to 350mm deep. LCP purlins also conforms to AS/NZS 4600 or BS 5950 and the latest EC3 design.



AESTHETICALLY PLEASING & COST EFFECTIVE

- ▶ High tensile steel – for high strength and low weight
- ▶ Z275 zinc coating – for economic corrosion protection
- ▶ Full range of accessories – from brackets to bolts to ensure ease of use and installation.
- ▶ Full size range – for ease of design in both C & Z sections
- ▶ Downturn lip available – For those projects requiring this feature
- ▶ Special size capability – non standard range of special shapes and channels available to suit individual requirements

MARKING

Each bundle of purlin or girt is marked to show customer's name, delivery location, invoice number, purlin type, length and mark number. Mark numbers match the marking plan supplied prior to manufacture.

MATERIALS

LCP PURLINS are cold rolled formed sections manufactured from high strength galvanised steel in base thicknesses ranging from 1.0mm BMT (G550 grade, 550 MPa minimum yield stress material) to 3.0mm BMT (G450 grade, 450 MPa minimum yield stress) with a Z275 zinc coating (275 grams per square metre minimum coating mass) in accordance with AS 1397.

High tensile steel material meeting the requirement of BC 1 : 2008 Factory Production Control Certificate.

TOLERANCES

All sections will be produced within the following tolerances:

Section length	+0mm / -10mm
Section web (dim. A)	±1mm
Section flange (dim. B, D, E)	±1mm
Internal flange angle	±1°
Internal lip angles	+ 5° / -2°
Hole centres	±1mm

Please contact **LCP Building Products Pte Ltd** for any specific tolerance details.

PROPERTIES

C Section						Z Section						
Section	Web depth (mm)	Flange width (mm)	Lip length (mm)	Thickness BMT (mm)	Section Mass (kg/m)	Section	Web depth (mm)	Broad Flange (mm)	Narrow Flange (mm)	Lip length (mm)	Thickness BMT (mm)	Section Mass (kg/m)
C10010	102	51	12.5	1.0	1.75	Z10010	102	53	49	12.5	1.0	1.75
C10012	102	51	13.0	1.2	2.09	Z10012	102	53	49	13.0	1.2	2.09
C10015	102	51	14.0	1.5	2.60	Z10015	102	53	49	14.0	1.5	2.60
C10019	102	51	15.0	1.9	3.27	Z10019	102	53	49	15.0	1.9	3.27
C10024	102	51	16.0	2.4	4.12	Z10024	102	53	49	16.0	2.4	4.12
C15010	152	64	14.5	1.0	2.41	Z15010	152	65	61	14.5	1.0	2.41
C15012	152	64	15.0	1.2	2.87	Z15012	152	65	61	15.0	1.2	2.87
C15015	152	64	16.0	1.5	3.56	Z15015	152	65	61	16.0	1.5	3.56
C15019	152	64	17.0	1.9	4.49	Z15019	152	65	61	17.0	1.9	4.49
C15024	152	64	18.5	2.4	5.65	Z15024	152	65	61	18.5	2.4	5.65
C20015	203	76	16.0	1.5	4.53	Z20015	203	79	74	16.0	1.5	4.53
C20019	203	76	19.5	1.9	5.71	Z20019	203	79	74	19.5	1.9	5.71
C20024	203	76	21.0	2.4	7.18	Z20024	203	79	74	21.0	2.4	7.18
C25019	254	76	19.0	1.9	6.46	Z25019	254	79	74	19.0	1.9	6.46
C25024	254	76	20.5	2.4	8.13	Z25024	254	79	74	20.5	2.4	8.13
C30024	300	96	28.0	2.4	10.14	Z30024	300	100	93	28.0	2.4	10.14
C30030	300	96	31.5	3.0	12.64	Z30030	300	100	93	31.5	3.0	12.64
C35030	350	125	30.0	3.0	15.14	Z35030	350	129	121	30.0	3.0	15.14

INSTALLATION

LCP C & Z sections are easily installed in single, double, double lapped, continuous lapped and reduced end lap systems. For Single Span, Double Span & Double Lapped please refer to LCP PURLINS & GIRTS quick selection table at page 5.

For Continuous lapped and reduced end lap systems, please contact **LCP Building Products Pte. Ltd.**

SIMPLE END CONNECTIONS

This simple connection uses two standard bolts and a standard cleat and is common to both Z and C sections (see Fig 1). An overhang may sometimes be required for support of raking girts. A double cleat may also be used to join separate lengths of section above a common portal frame (see Fig 2).

NON-STRUCTURAL CONNECTIONS

All Z sections are rolled with broad and narrow flanges. Lapping is easily accomplished by inverting alternative sections, enabling sections to nest together. Non-structural laps formed in this way result in substantial savings in cleats and bolts (see Fig 3).

For even greater economy and performance, use structural laps.

STRUCTURAL CONNECTIONS

Structural laps provide greater load carrying capacity to the section. The lap/span ratio must be 15% or greater and all laps should use six bolts, including two through the bottom flange. Z sections can be lapped in any thickness combination and allow heavier, stronger sections to be used in end bay applications (see Fig 4).

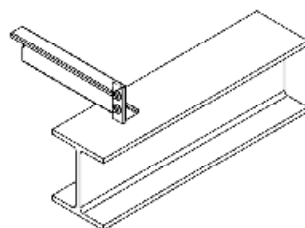
STANDARD ERECTION DETAILS

Z sections perform best when installed in single bay lengths plus structural laps. The added strength and lower deflection characteristics favourably effect building economy. Bridging must be installed prior to cladding to reduce section twist and increase performance.

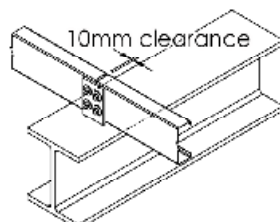
C sections are simple to use and are primarily suited for single or double spans.

For best performance, install Z and C sections with the cladding flange facing up the roof or wall slope.

**SIMPLE END
(Fig 1)**



**DOUBLE CLEAT
(Fig 2)**



BOLTS

Bolts used in the assembly of purlins are usually M12 (Grade 4.6) nuts and bolts with either integral washers or two washers. However, 300mm and 350mm purlin sizes require the use of M16 bolts. Please contact **LCP Building Products Pte. Ltd.** for higher grade 8.8 bolts that may be required in some installations.

HOLES

Purlins and girts are usually delivered with standard holes of Ø14mm, Ø16mm, Ø18mm, Ø22mm or slot hole Ø18x22mm punched to details supplied. This allows purlins to be used on arrival at site. The computer controlled production line allows holes almost at any position or frequency. Holes are positioned from hole details sheets supplied prior to manufacturing.

LCP Building Products Pte. Ltd. can supply purlins and girts punched to conventional hole centres.

Ensure hole detail sheets show correct hole centres and spacing required and location and type of bridging holes.

C/Z Purlin Depth 'D' (mm)	Typical Hole Centre 'A' (mm)
100	40
150	60
200	110
250	160
300/350	210

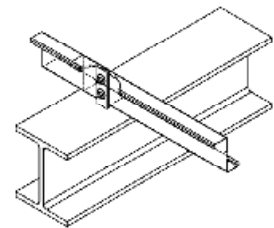
STORAGE

All sections must be kept dry during transport, stored above ground and covered to prevent moisture from entering packs. Wet packs should be broken open, dried with a cloth and separated to allow air circulation.

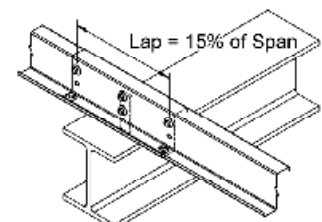
DETAILING

Care should be taken to ensure correct layout of purlin hole punching. Generally, it is recommended detail purlins with flanges facing up the roof slope. When bay spacings are the same on both ends and sides of the building, "opposite hand" details for the reverse side can be used.

**NON-STRUCTURAL LAP
(Fig 3)**



**STRUCTURAL LAP
(Fig 4)**



FASCIA

Specifically designed, or a standard C section, fascia purlins are normally subjected to lower loads and usually provide a convenient surface to mount the roof drainage gutters.

This is assisted by the use of special low profile head fascia bolts.

Should the fascia purlin, via the fascia bridging system support the wall girts, ensure sufficient allowance is made to carry this extra load.

Regular use is made of Standard C sections, eg. C250 standard sections as the fascia purlin. Available in long roll formed lengths and within standard lead times, C sections are sometimes a more economical alternative to special fascia sections.

For details of the specifically designed fascia available, please contact **LCP Building Products Pte. Ltd.** office. These sections are 230 or 260mm web depth, D with up or down turned bottom lips.

SPECIAL PROFILES

For special or large projects, **LCP Building Products Pte. Ltd.** is able to produce purlins outside the standard size range. Special purlin allowable loads are calculated with the aid of computer analysis and requests for information should be directed to **LCP Building Products Pte. Ltd.**

DOWNTURN LIPS

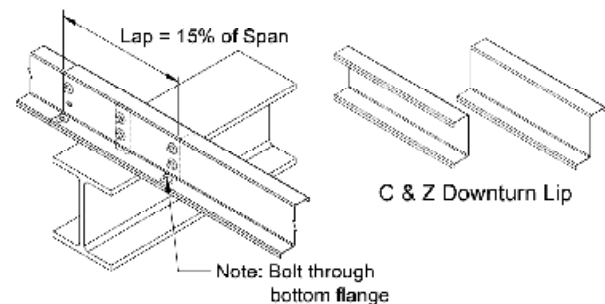
Many **LCP** purlins, both **Z** and **C** profiles, can be supplied with downturn lips for special projects. Purlins of this shape cannot normally be lapped and are usually used in single or double span construction. However, **LCP Building Products Pte. Ltd.** can supply "lappable" Z to special enquires providing a unique section which offers strength and economy as well as the downturned lip. Please contact **LCP Building Products Pte. Ltd.** office for details on order quantity and delivery.

RAKING GIRTS

Raking girts are required when cladding gable ends at buildings. The girt then provides support to fixing points for claddings and flashings.

Raking girts are normally fixed beneath overhung purlins to line up with the end wall girts. Roof purlins and the raking girt will need detailing to provide hole locations. Using standard brackets the raking girt is easily fitted to the ends of the purlins or alternatively bolted directly to the purlin flange hole.

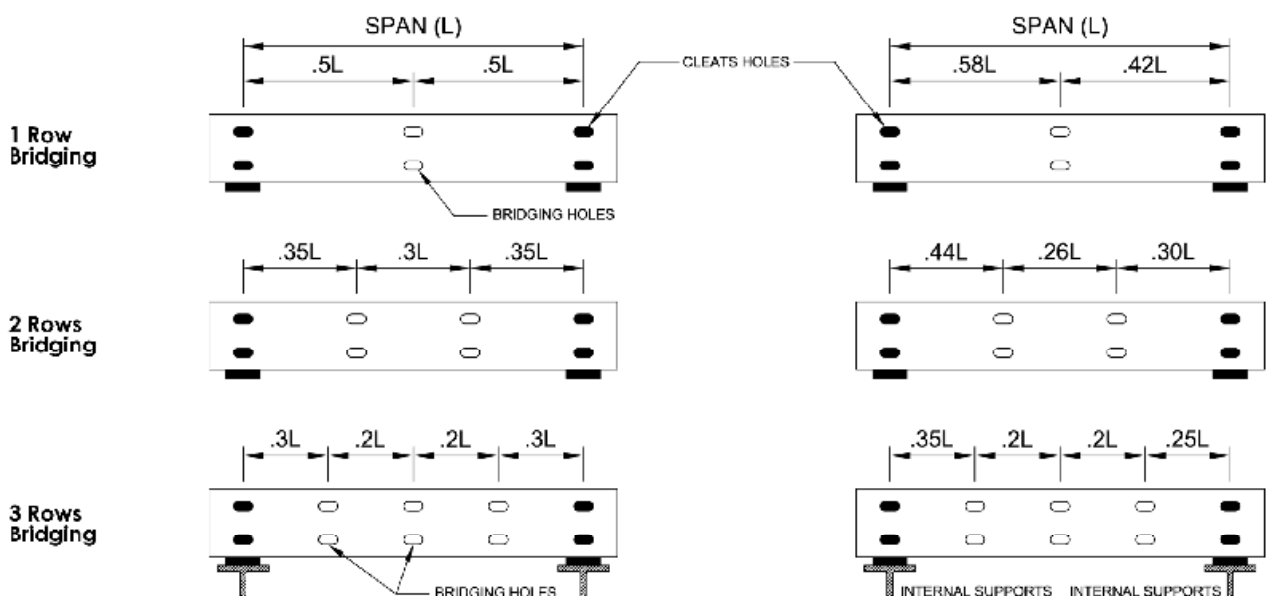
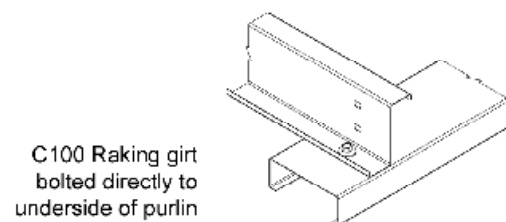
A raking girt bracket is available for connecting raking girts to fascia purlins.



BRIDGING POSITIONS

To maximize performance and to reach the design loads given in the performance chart, bridging should be positioned as shown below.

Actual position dimensions may be rounded to the nearest 50mm.



LAP DETAILS TO SUIT APPLICATION

SECTION PROPERTIES

The following section properties are subject to slight variation due to commercial tolerances on dimensions (note: however, the total material used will not vary). Any designs carried out using these properties should be calculated using AS/NZS 4600 or BS 5950 or EC3.

C SECTION PROPERTIES

LCP PURLINS & GIRTS™ - Full C Section Properties												
Section	Area A_g mm ²	$A_g^{\#}$ mm ²	I_x 10 ⁶ mm ⁴	I_y 10 ⁶ mm ⁴	Z_x 10 ³ mm ³	Z_y 10 ³ mm ³	r_x mm	r_y mm	β_x mm	J_v mm ⁴	I_w 10 ⁹ mm ⁶	
C10010	215	143	0.36	0.08	7.14	2.20	41.1	18.7	123	72	0.16	
C10012	258	172	0.44	0.09	8.52	2.66	41.0	18.7	122	124	0.20	
C10015	323	215	0.54	0.11	10.6	3.35	40.8	18.7	122	242	0.25	
C10019	409	272	0.68	0.15	13.2	4.30	40.5	18.8	121	492	0.33	
C10024	516	343	0.83	0.18	16.2	5.31	40.1	18.7	120	995	0.39	
C15010	295	223	1.08	0.16	14.2	3.53	60.5	23.2	170	98	0.73	
C15012	355	269	1.30	0.19	17.0	4.26	60.4	23.2	170	170	0.88	
C15015	443	335	1.61	0.24	21.2	5.36	60.2	23.2	169	332	1.12	
C15019	561	424	2.03	0.30	26.7	6.86	60.0	23.2	168	674	1.43	
C15024	710	537	2.54	0.39	33.5	8.78	59.7	23.3	167	1359	1.84	
C20015	555	447	3.54	0.40	34.8	7.26	79.7	26.8	221	416	3.19	
C20019	713	576	4.53	0.54	44.6	9.92	79.6	27.4	219	857	4.41	
C20024	903	730	5.69	0.68	56.0	12.7	79.3	27.4	218	1728	5.63	
C25019	808	671	7.64	0.57	60.2	10.0	97.1	26.5	272	972	7.17	
C25024	1022	849	9.62	0.72	75.7	12.8	96.9	26.5	270	1958	9.14	
C30024	1268	1095	17.0	1.51	113	21.7	116	34.6	317	2419	27.2	
C30030	1593	1377	21.3	1.97	142	28.6	116	35.1	313	4770	36.3	
C35030	1905	1689	35.8	3.83	205	42.4	137	44.7	376	5715	91.6	

Z SECTION PROPERTIES

LCP PURLINS & GIRTS™ - Full Z Section Properties												
Section	Area A_g mm ²	$A_g^{\#}$ mm ²	I_x 10 ⁶ mm ⁴	I_y 10 ⁶ mm ⁴	Z_x 10 ³ mm ³	Z_y 10 ³ mm ³	r_x mm	r_y mm	β_x mm	β_y mm	J_v mm ⁴	I_w 10 ⁹ mm ⁶
Z10010	215	143	0.36	0.13	7.27	2.66	41.1	24.7	9.85	11.8	72	0.24
Z10012	258	172	0.44	0.16	8.68	3.21	41.0	24.8	9.85	11.8	124	0.29
Z10015	323	215	0.54	0.20	10.8	4.04	40.8	24.8	9.87	11.7	242	0.36
Z10019	409	272	0.68	0.25	13.5	5.23	40.5	24.8	9.87	11.6	492	0.46
Z10024	516	343	0.83	0.32	16.5	6.32	40.1	24.9	9.87	11.6	995	0.58
Z15010	295	223	1.08	0.26	14.4	4.17	60.4	29.5	12.4	12.7	98	1.06
Z15012	355	269	1.30	0.31	17.2	5.04	60.3	29.5	12.4	12.7	170	1.28
Z15015	443	335	1.61	0.39	21.4	6.34	60.1	29.6	12.4	12.7	332	1.61
Z15019	561	424	2.03	0.50	26.6	8.11	59.9	29.7	12.5	12.6	674	2.05
Z15024	710	537	2.54	0.63	34.0	10.5	59.6	29.8	15.4	15.6	1359	2.62
Z20015	555	447	3.54	0.63	35.3	8.45	79.7	33.6	17.5	17.0	416	4.64
Z20019	713	576	4.53	0.86	45.2	11.5	79.6	34.6	17.4	16.6	857	6.34
Z20024	903	730	5.69	1.08	56.9	14.8	79.3	34.6	17.4	16.5	1728	8.06
Z25019	808	671	7.64	0.85	60.9	11.4	97.2	32.3	22.3	19.7	972	10.3
Z25024	1022	849	9.62	1.07	76.8	14.7	96.9	32.3	22.4	19.6	1958	13.1
Z30024	1268	1095	17.0	2.32	115	24.8	116	42.8	28.7	25.3	2419	38.5
Z30030	1593	1377	21.3	3.05	144	32.8	116	43.7	28.7	24.9	4770	50.9
Z35030	1905	1689	35.8	5.95	207	49.0	137	55.8	29.4	27.5	5715	130

#: Includes Area reduction for 4 (2 web and 2 flange) adjacent standard 18mm x 22mm holes.

LCP PURLINS & GIRTS QUICK SELECTION TABLE

LCP C/Z PURLINS & GIRTS™ SPAN for double skin metal roof (Ultimate Load 2.28kN/m)

Section	Single Span [C or Z]		[Limited by transportation] Double Span [C or Z]			15% lapping Double Span [Z] Lapped			
	C/Z 10015	3.3(0)*	3.3(1)	3.3(0)*	3.4(1)	3.7(0)*	4.0(1)		
C/Z 10019	3.5(0)*	3.5(1)	3.8(0)*	4.1(1)*	4.1(2)	4.1(0)*	4.7(1)*	4.7(2)	
C/Z 10024	3.8(0)*	3.8(1)	4.3(0)*	4.8(1)*	4.8(2)	4.6(0)*	5.4(1)*	5.4(2)	
C/Z 15019	4.8(0)*	5.1(1)	4.8(0)*	5.4(1)		5.1(0)*	6.2(1)*	6.3(2)	
C/Z 15024	5.2(0)*	5.5(1)	5.3(0)*	6.4(1)*	6.4(2)	5.4(0)*	7.2(1)*	7.4(2)	
C/Z 20019	5.6(0)*	6.6(1)	5.7(0)*	6.6(1)		6.0(0)*	7.7(1)		
C/Z 20024	6.1(0)*	7.2(1)	6.2(0)*	7.8(1)		6.4(0)*	8.7(1)*	9.1(2)	
C/Z 25019	6.3(0)*	7.4(1)	6.3(0)*	7.4(1)		6.6(0)*	8.6(1)*	8.6(2)	
C/Z 25024	6.7(0)*	8.5(1)*	8.5(2)	6.8(0)*	8.5(1)*	8.5(2)	7.0(0)*	9.7(1)*	10.2(2)
C/Z 30024	10.1(1)*	10.3(2)	8.5(1)*	8.5(2)		11.4(1)*	12.1(2)*	12.1(3)	
C/Z 30030	11.0(1)*	11.0(2)	8.5(1)*	8.5(2)		12.6(1)*	14.0(2)*	14.0(3)	
C/Z 35030	12.2(1)*	12.9(2)*	12.9(3)	8.5(1)*	8.5(2)		14.1(1)*	15.4(2)*	15.4(3)

LCP C/Z PURLINS & GIRTS™ SPAN for Single skin metal roof (Ultimate Load 1.38kN/m)

Section	Single Span [C or Z]		[Limited by transportation] Double Span [C or Z]			15% lapping Double Span [Z] Lapped					
	C/Z 10015	3.9(0)*	3.9(1)	4.2(0)*	4.4(1)*	4.4(2)	4.6(0)*	5.2(1)*	5.2(2)		
C/Z 10019	4.2(0)*	4.2(1)*	4.2(2)	4.8(0)*	5.2(1)*	5.2(2)	5.1(0)*	5.8(1)*	5.8(2)		
C/Z 10024	4.5(0)*	4.5(1)*	4.5(2)	5.4(0)*	6.1(1)*	6.1(2)*	6.1(3)	5.6(0)*	6.4(1)*	6.4(2)*	6.4(3)
C/Z 15019	6.0(0)*	6.0(1)		5.9(0)*	6.9(1)*	6.9(2)		6.2(0)*	7.7(1)*	8.0(2)	
C/Z 15024	6.4(0)*	6.4(1)*	6.4(2)	6.5(0)*	8.0(1)*	8.1(2)		6.7(0)*	8.8(1)*	9.0(2)	
C/Z 20019	7.0(0)*	7.8(1)		7.0(0)*	8.4(1)*	8.4(2)		7.4(1)*	9.6(2)*	9.8(3)	
C/Z 20024	7.5(0)*	8.4(1)*	8.4(2)	7.6(0)*	8.5(1)*	8.5(2)		7.8(0)*	10.6(1)*	11.3(2)	
C/Z 25019	7.8(0)*	9.3(1)*	9.3(2)	7.7(0)*	8.5(1)*	8.5(2)		8.1(0)*	10.6(1)*	11.0(2)	
C/Z 25024	8.3(0)*	10.0(1)*	10.0(2)	8.3(0)*	8.5(1)*	8.5(2)		8.5(0)*	11.6(1)*	12.6(2)*	12.6(3)
C/Z 30024	12.0(1)*	12.0(2)		8.5(1)*	8.5(2)			13.6(1)*	15.1(2)*	15.1(3)	
C/Z 30030	12.8(1)*	12.8(2)*	12.8(3)	8.5(1)*	8.5(2)			14.9(1)*	16.2(2)*	16.2(3)*	
C/Z 35030	14.5(1)*	15.1(2)*	15.1(3)	8.5(1)*	8.5(2)			16.2(1)*	17.0(2)*	17.0(3)*	

Notes: Brackets () indicates numbers of rows of bridging and * denotes maximum span are outside of LCP recommended bridging requirements of minimum (20D or 4m), where D denotes web depth (refer to properties table in page 1).

Maximum roof slope adopted is 5 degrees, Serviceability Limit=L/150 and equivalent imposed DL=0.25kPa, LL=0.50kPa, WL=0.75kPa with purlin at 1.2m spacing for single skin metal roof. For double skin metal roof imposed DL=0.50kPa, LL=0.75kPa, WL=0.75kPa with purlin at 1.2m spacing.

BRIDGING

To enhance performance in longer spans, bridging is generally used. Where wind uplift loading is dominant, greater economy can generally be achieved by using additional bridging in the end spans. The performance of purlins is improved considerably when the roof or wall cladding is attached, so bridging is normally required to ensure easy installation of cladding.

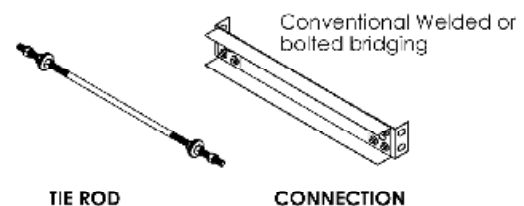
Generally, bridging spacing should not exceed 20 times the web depth, D. (eg. 3000mm for a 150mm deep section) or 4000mm, whichever is the least.

CONVENTIONAL BRIDGING/STRUTS

Conventional bridging usually consists of bridging channel, bolted or welded connected to end plates which are bolted between parallel purlins.

This type of system is effective and bridging members may also be alternated with tie rods.

Ridge and fascia conventional bridging is similar in adjustment to LCP bridging.



N.B. 300mm and 350mm purlins and girts require the use of heavy duty conventional bolted bridging systems.

For Bridging installation please refer to page 6.

INSTALLATION

Bridging can be installed up the slope of the roof, fitting fascia bridging, then all intermediate bridging. Then install the ridge bridging to pull the purlins straight, and finally adjust the fascia bridging to correct fascia purlin twist.

Alternatively, install the ridge bridging and straighten the ridge purlins, then install the immediate bridging to the fascia. Fit and adjust the fascia bridging for straightness and twist.

LCP bridging detail sheets cover the slight differences between "up the slope" and "down the slope" components.

Note that on steep roofs or where long bridging runs are used, the turn-buckles used for the ridge bridging are not intended to pull straight a large number of sagging purlins.

Similarly, care should be taken when girts are used on high wall, that long intermediate bridging members are not subjected to an excessive compressive load.

Please refer to page 3 for correct bridging positions.

ACCESSORIES

Clamp plates and angle connectors provide a quick, easy and efficient method of connecting purlins and girts together with other non-structural framing members such as window or door surrounds. Large slots in all brackets allow for combinations of different purlin sizes.

For those applications where web fixing is possible, a general purpose bracket is available to reduce fixing time and expense. All these brackets and plates are produced from galvanised steel.

