CI/SFB
(27)
FEB 2011

Metalcraft
ROOFING

MSS Purlins & Girts

Camlok™ Bracing

Standard Bracing

MC Sections

MS Tophats

Technical Manual and Load Tables

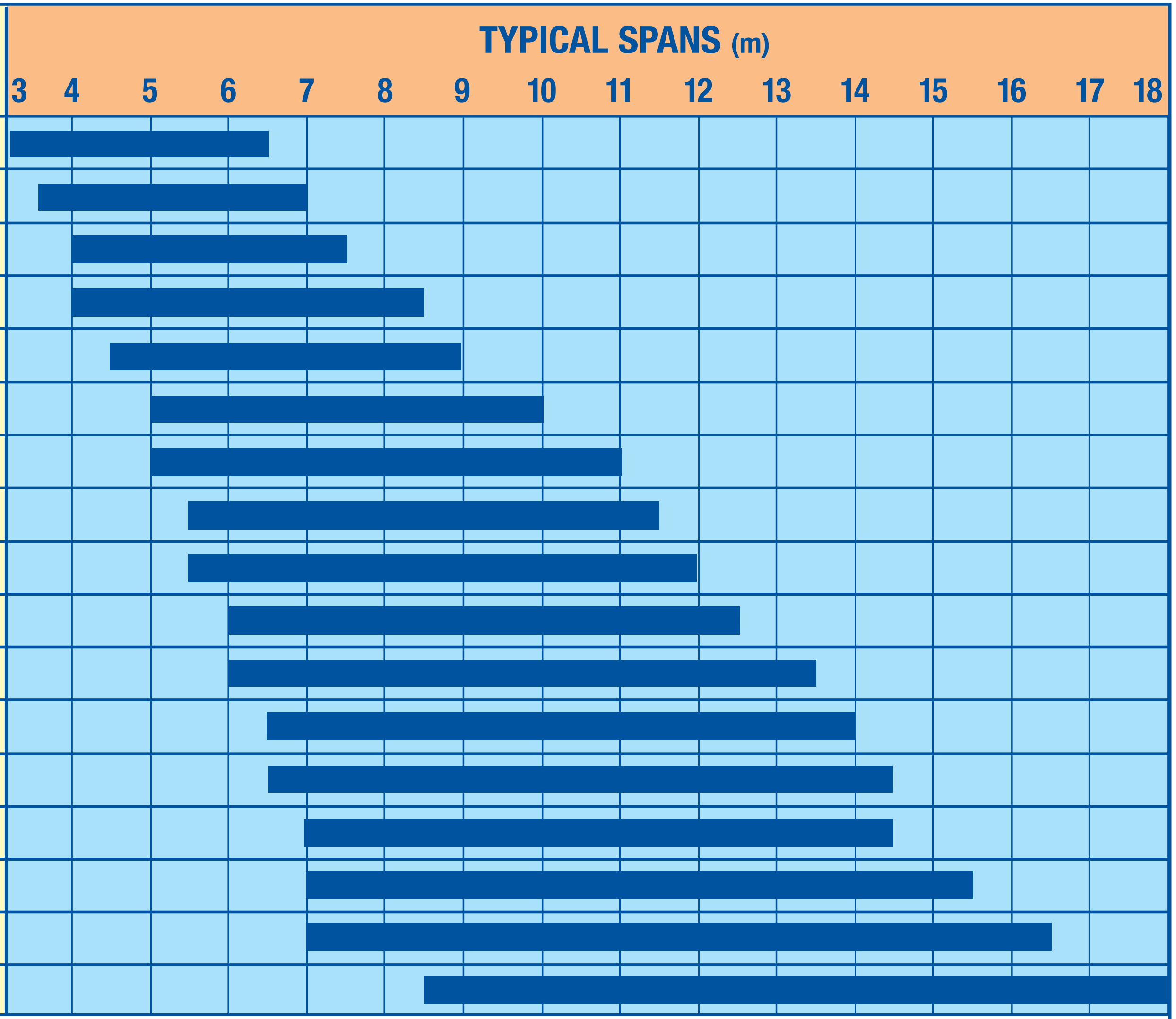
MSS PURLINS & GIRTS SYSTEM

CAMLOK™ BRACING
STANDARD BRACING

MC SECTIONS
MS TOPHATS

MSS Purlins Typical Usage Span Chart Guide

Size	D X B (mm)	t (mm)	Mass (kg/m)
MSS 150/12	150 x 65	1.15	3.00
MSS 150/15	150 x 65	1.45	3.79
MSS 150/18	150 x 65	1.75	4.60
MSS 200/12	200 x 75	1.15	3.68
MSS 200/15	200 x 75	1.45	4.64
MSS 200/18	200 x 75	1.75	5.61
MSS 250/13	250 x 85	1.25	4.80
MSS 250/15	250 x 85	1.45	5.58
MSS 250/18	250 x 85	1.75	6.73
MSS 275/15	275 x 90	1.45	6.08
MSS 275/18	275 x 90	1.75	7.26
MSS 300/15	300 x 100	1.45	6.60
MSS 300/18	300 x 100	1.75	7.96
MSS 325/15	325 x 100	1.45	6.98
MSS 325/18	325 x 100	1.75	8.36
MSS 350/18	350 x 100	1.75	8.91
MSS 400/20	400 x 100	1.95	10.9



NOTE: This chart is a quick reference only. Each situation should be considered seperately and designed using standard procedures

FOR FURTHER INFORMATION AND ORDERS CONTACT METALCRAFT ROOFING.

CONTENTS

MSS Purlin

MC Section

MS Tophats

Profile

Metalcraft ROOFING

INTRODUCTION

This publication has been prepared to assist the designer in specifying Metalcraft Super Span (MSS) Purlin and Girts, Metalcraft "C" Section (MC Section), complete with either Camlok™ or Standard Bracing systems, and MS Tophats.

MSS Purlin and Girts, MC Sections and MS Tophats are manufactured by Metalcraft Roofing from high strength galvanised steel coil in accordance with AS1397.

MSS Purlin and Girts, MC Sections, with the Camlok™ or Standard Bracing system are designed for use as a bolted framework system used with primary structural steel work. They are supplied cut to length and can be pre-punched with a variety of holes to suit a number of applications.

Purlins, Girts and Bracing are rollformed to provide an efficient, lightweight support system for roofing and wall cladding and are recognised as being efficient, economical structural members suitable for a wide range of building applications.

The Camlok™ Purlin Bracing system provides a complete, efficient, cost effective and easily erected system.

MSS Purlin and Girts, and MC Sections, complete with either Camlok™ or Standard Bracing systems and components are a complete system, supplied ready for erection and will require minimal maintenance throughout the life of the building. The Z275 galvanised finish on the purlins and bracing systems, give an excellent corrosion protection and reduces the need for painting.

MSS Purlin and Girts, MC Sections, Bracing systems and MS Tophats, comply with the New Zealand Building Code, and are designed to AS/NZS 4600: 1996 Cold formed steel structures.

MS Tophats can be used for roof purlins, wall girts and floor joists, and are an economic option for these and other applications such as carports and fencing. They are an economical alternative to timber and 'C' section purlins for spans up to 7 meters.

Easy to use they fasten directly to their supports which eliminates the requirements for cleats. Being symmetrical there is no requirements for braces or nogs to prevent twisting and allows the profile to be easily lapped for maximum performance.

MS Tophats are manufactured from high strength galvanised steel coil, the Z275 minimum coating provides good protection in most exposed internal environments. Consideration should be given when used in a lined exterior dwelling. Thermal breaks are required between the tophat and cladding to avoid thermal bridging. Contact with materials not compatible with zinc should be avoided.

HANDLING AND STORAGE

The presence of water between the stacked sections will create premature corrosion, it is recommended the sections are separated and dried if this situation occurs. Cutting if required should be done with hacksaws or snips, use of abrasive disc blades is not recommended.

EFFECTIVE DESIGN WIDTH

Metalcraft Roofing does not provide values of the effective design width of section elements and where required must be considered by the designer.

DISCLAIMER

This publication is intended to provide accurate information to the best of our knowledge in regards to MSS Purlin and Girts, MC Sections, Bracing systems and MS Tophats Sections. It does not constitute a complete description of the goods nor an express statement about their suitability for any particular purpose. All data is provided as a guide only and Metalcraft Roofing do not accept any liability for loss or damage suffered from the use of this data.

PRODUCER INFORMATION

MSS Purlins and Girts, and MC Sections, complete with Bracing Systems, and MS Tophats are manufactured by Metalcraft Roofing, using galvanised steel coil in accordance with AS1397.

EXTENT AND LIMITATION OF USE

MSS Purlins and Girts, MC Sections, with a Camlok™ or Standard Bracing system, and MS Tophats will depend on spans, loads, bridging and product sizes and should be used with the information provided within this manual. Design and use of these products outside the information provided may result in a reduction in performance.

MATERIAL SPECIFICATIONS

The galvanised coating used on the steel to manufacture MSS Purlins and Girts, MC Sections, Bracing systems and MS Tophats is designed for internal use only. The coating must be kept clear of corrosive environments and should not be used in contact with chemically treated timber or other treated products in the presence of moisture. If there is evidence of damage to the coating, the area should be cleaned and spot primed to the suppliers recommendations.

Product	Steel Grade Thickness	Base Metal mm	Zinc Weight
MSS Purlins & Girts	G500 (Mpa)	<1.5	275 gm/m^2
MC Sections	G500 (Mpa)	<1.5	275 gm/m^2
MSS Purlins & Girts	G450 (Mpa)	>1.5	275 gm/m^2
MC Sections	G450 (Mpa)	>1.5	275 gm/m^2
Bracing	G250 (Mpa)	1.15	275 gm/m^2
Sag Rod		12mm Dia 16mm Dia	Zinc Plate to AS1789 or Galv to AS1640
Tophat	G550 (Mpa)	<1.15	275 gm/m^2

PRODUCT HANDLING, STORAGE, INSTALLATION AND MAINTENANCE REQUIREMENTS

MSS Purlins and Girts, MC Sections, Bracing system must be handled, stored and installed using the procedures outlined in this document. The following factors could limit the performance of the product.

1. Site or storage or transit exposure that allows the product to get wet and trap water between flat surfaces. If this happens the product should be dried and restacked.
2. Damage to the profile or surface coating during, handling, storage, installation or by other trade work.
3. The product must be installed in a manner for which they were designed without imposing excessive loads during construction or in their later use.
4. All fixing to the structural steelwork including fitting of bracing must be completed before any loads are imposed.
5. All ancillary products must be of the correct size and design as specified.
6. Other work such as welding, gas cutting or drilling should be carried out under the Design Engineers Supervision as some loss of strength may occur.

USAGE OUTSIDE GUIDELINES

Where MSS Purlins, Girts, MC Sections, Bracing systems and MS Tophats are being used outside the limitations and procedures given in the manual and this Producer Statement together with any doubt as to the handling, storage or installation of this product, written approval should be obtained from the manufacturer for any such specific project and prior to the project commencing.

N.Z.B.C. COMPLIANCE

Use of the MSS Purlins and Girts, MC Sections, Bracing systems and MS Tophats in accordance with the stated guidelines and limitations thereby complies with NZBC Approved Documents:

- B1 Structures
- B2 Durability (BS DD 24:1973) and past history of galvanised steel products in dry interior environments indicates a life of up to 50 years can be reasonably expected.

PERFORMANCE

Metalcraft MSS Purlins and Girts, MC Sections, Bracing systems and MS Tophats are accurately roll-formed from the specified grade of steel, thus ensuring that they achieve the stated performance.

Load capacities in the tables have been established by calculations in accordance with AS/NZS 4600:1996 "Cold Formed Steel Structures".

Sections chosen using the data provided in the tables will perform as specified when the design, fabrication and erection are carried out in accordance with Metalcraft recommendations and good trade practice.

DURABILITY

Metalcraft MSS Purlins and Girts, and MC Sections, Bracing systems and MS Tophats will meet a service life of up to 50 years, complying with the durability requirements of NZBC Approved Document B2 providing they are kept free from moisture.

For adverse conditions, including use within 1km of salt marine locations or in severe industrial and unusually corrosive environments, please contact the manufacturer for specialist advice.

PRODUCT INFORMATION

Metalcraft Industries Ltd require that all information on these products be made available to all sectors of the construction chain to ensure the product is fully maintained and its full life can be realised.

TOLERANCES

All dimensions are nominal, (rolling tolerances to be considered)

Web depth	+/-2 mm	Flange width	+/-2mm
Lip	+/-1 mm	Length	+/-6mm
Hole Centres	+/-1.5mm	Web/Flange Angle	88-93

Metalcraft Industries Ltd have staff freely available to assist in product selection and to comment upon usage prior to projects being started.

TABLES

Tables are supported by Engineers calculations.

ACKNOWLEDGMENT

Franklin Consultants Ltd has assisted in the development of the purlin system and production of the manual.

EMC^2 Ltd has assisted in the development of the Tophat system and production of the manual.

Metalcraft ROOFING

DESIGN CONSIDERATIONS

1.0 AXIAL & FLEXURAL LOADING

1.1 GENERAL

MSS Purlins and Girts have been designed to comply with the requirements of AS/NZS 4600: 1996 (Cold Formed Steel Structures). Strength Reduction Factors are in accordance with 1.6 of the above Code.

ie Bending $\phi_b = 0.9$

Axial $\phi_c = 0.85$

The self weight of the purlin is not included in the load tables and should be added along with other dead loads. All loads are ultimate loads for strength calculations, and serviceability loads for deflection calculations, all in accordance with NZS 4203: 1992.

1.2 Vertical loads on purlins

The load span tables show $\phi_b w_u$ (ultimate uniformly distributed load in kN/m) for establishing the purlin strength. Any other loading format must be specifically designed. The restraints as set out in **2.0.** must apply.

w_x (applied uniformly distributed load in kN/m) for maximum inwards and outwards load combinations, (derived from NZS 4203) is required in order to establish the strength requirement for the purlin.

The load span tables also show w_s (serviceability load in kN/m) for establishing the purlin stiffness based on deflection at these loads of L/150. The applied serviceability load is required for maximum inwards and outwards load combinations.

1.3 Axial Loads with or without Flexure, Symbols:-

N^* = Applied ulitmate axial load

$\phi_c N_{uc}$ = $.85 N_{uc}$ = The member capacity in compression (kN).

w_x = Applied uniformly distributed ultimate load (kN/m).

$\phi_b w_u$ = Maximum U.D.L. (ultimate) from the tables.

ϕ_b = .9 (strength reduction factor in bending).

C_{mx} = 1.0 For both ends unrestrained. (Ref. AS/NZS 4600:1996 clause 3.5.1)

$\alpha_{nx} = 1 - \left(\frac{N^*}{N_e}\right)$

N_e = Elastic buckling load about the bending axis.

1.4 Columns:-

1.4.1 Axial loads only:-

The member capacity in compression $= \phi_c N_{uc}$ from the axial load tables.

1.4.2 Axial load and bending:-

$\phi_c N_{uc}$ must be determined for the level of restraint

i.e. (a) 1, 2 or 3 lateral braces

or (b) One flange restrained (OFR)

or (c) Two flanges restrained (Fully restrained)

For bending about the major axis (X axis) the interaction equation below applies:-

$$\frac{N^*}{\phi_c N_{uc}} + \left(\frac{C_{mx}}{\phi_b w_u}\right)\left(\frac{w_x}{\alpha_{nx}}\right) \leqslant 1.0 \text{ applies}$$

1.4.3 for one flange restrained (OFR) to apply the following criteria must be met.

(i) Channel and Z-sections not exceeding 3.2 mm in thickness.

(ii) Channel and Z-sections with depths of 150 to 300mm.

(iii) Flanges are edge stiffened compression elements.

(iv) $70 \leqslant$ depth/thickness $\leqslant 170$.

DESIGN CONSIDERATIONS

(v) $2.8 \leqslant$ depth/flange width < 5.0

(vi) $16 \leqslant$ flat width/thickness of flange < 50.

(vii) Both flanges prevented from moving laterally at the supports.

(viii) Roof or wall panels with fasteners spaced 300 mm on centre or less and having a minimum rotational lateral stiffness of 10.3 kN/mm^2 (fastener at mid-flange width as determined by the relevant AISI test procedure. (See Note.)

(ix) Minimum yield stress of 230 MPa.

(x) Span lengths from 4.5 to 9 m.

1.4.4 For the fully restrained case to apply the above criteria must be met on both faces of the channel or Z section.

For Bending about the minor axis, (y axis) and for bi-axial bending, calculations from first principles must be carried out.

1.5 Purlins:-

Axial load and bending. The same applies as for columns with combined axial load and bending.

1.6 Braces:-

The standard bracing channel is limited to a purlin spacing of 3000.

2.0 RESTRAINT

2.1 General:-

The following restraints are required to achieve the tabulated loads.

2.2 Roof Purlins with uniformly distributed loading:-

One flange of purlin to have roof cladding with normal screw fixings. Compression flange not restrained by roof sheeting to be restrained by lateral braces as shown in the tables. For pitches over 10° the resultant forces in the plane of the roof must be allowed for.

2.3 Girts with horizontal loading:-

Vertical loads are carried by the bracing system, with a maximum brace spacing of 3000 and sheeting screw fixed to the girts.

2.4 Roof Purlins with combined axial load and bending:-

Restraint by braces and roof sheeting to one flange is required. If the roof sheeting fixing meets the criteria of 1.4.3 then the value of $\phi_c N_{uc}$ can be the greater of OFR or that for the value for the braced purlin. If both flanges are restrained by screw fixed sheeting then the fully restrained case for axial loads applies. Refer 1.4.4.

2.5 Columns Axial Load only:-

No restraint required over the column length.

2.6 Combined Axial and bending:-

As noted in 2.3.2 above but the level of restraint applicable must be determined.

MSS DESIGN EXAMPLES

PURLINS & GIRTS – SINGLE SPAN

1. Symbols:-

w_x = Calculated ultimate load/metre on the purlin (kN/metre).

w_s = Serviceability load/metre on the purlin (kN/metre).

$\phi_b w_u$ = Allowable ultimate load/metre on the purlin (kN/metre) from the tables.

N^* = Ultimate axial load applied to the purlin (kN)

α_{nx} = $1 - \frac{N^*}{N_e}$

C_{mx} = 1

$\phi_c N_{uc}$ = Axial load capacity from the tables.

N_e = Elastic buckling load from the tables.

2. Uniformly Distributed load on roof purlins

Design Example

Restraints:- Screw fixed roofing provides a fully restrained condition for downwards (or inwards) loading. Braces provide lateral restraint for upwards (or outwards) loading.

Span L = 10m

Purlin spacing = 1.6m

Derived loadings/m on purlins - from known dead load, live load & wind pressure on the roof

Serviceability $w_s=0.72$ ↑ $w_s=0.24$ ↓

Calculated

Ultimate Load $w_x=0.89$ ↑ $w_x=0.99$ ↓

Serviceability:- Maximum deflection ↑ or ↓ = $\frac{L}{150}$

Try: 250/15 From load span tables

for 10.0m span $w_s=0.72$

Therefore: 250/15 OK

Ultimate Loads:-

Check: 250/15 From load span charts for

10.0m span & 2 braces $\phi_b w_u = 1.23 > 0.89$

10.0m span fully restrained $\phi_b w_u = 1.63 > 0.99$

Therefore: 250/15 with 2 braces is OK

3. Uniformly Distributed load on roof purlins plus axial load

Design Example:- As in **2.** but an axial load extended on the purlin from wind pressure on the end wall of the building

Span L = 10m simply supported

Purlin spacing = 1.6m

Axial load N^* = 15kN

Ultimate loads = $W_x=0.89$ ↑ $W_x=0.99$ ↓

Try: 250/18 purlin with 2 braces

the interaction equation is

$$\frac{N^*}{\phi_c N_{uc}} + \left(\frac{C_{mx}}{\phi_b w_u}\right)\left(\frac{w_x}{\alpha_{nx}}\right) \leqslant 1.0$$

			Loads:- Outward	Inward
$\frac{N^*}{\phi_c N_{uc}}$	outwards load (from table)	$= \frac{15}{50.76}$	= 0.296	
$\frac{N^*}{\phi_c N_{uc}}$	inwards load (from table)	$= \frac{15}{50.76}$	=	0.296
$\frac{C_{mx}}{\phi_b w_u}$	outwards load (from table)	$= \frac{1}{1.54}$	= 0.649	
$\frac{C_{mx}}{\phi_b w_u}$	inwards load (from table)	$= \frac{1}{1.96}$	=	0.510
$\frac{w_x}{\alpha_{nx}} = \frac{w_x}{1 - \left(\frac{N^*}{N_e}\right)}$	outwards load (from table)	$= \frac{.89}{1 - \left(\frac{15}{160.68}\right)}$	= 0.982	
$\frac{w_x}{\alpha_{nx}} = \frac{w_x}{1 - \left(\frac{N^*}{N_e}\right)}$	inwards load (from table)	$= \frac{.99}{1 - \left(\frac{15}{160.68}\right)}$	=	1.092

for outwards load

$$\frac{N^*}{\phi_c N_{uc}} + \left(\frac{C_{mx}}{\phi_b w_u}\right)\left(\frac{w_x}{\alpha_{nx}}\right) = .296 + (.649 \times .982) = .933$$

for inwards load
Ditto

$$= .296 + (.510 \times 1.092) = .853$$

Therefore: 250/18 purlin with 2 braces is required

MSS DESIGN EXAMPLES

LAPPED PURLINS (UNIFORMLY DISTRIBUTED LOAD)

Design Considerations

1. All loads on members are uniformly distributed and shown in kilonewtons per metre.

2. All spans for continuous lapped members and double lapped spans are assumed to be equal.

3. All loadings are Limit State in compliance with NZS 4203:1992. The self weight of the purlin is not included in the load tables.

4. These tables are for use by structural engineers and it is assumed they will derive linear loads inwards and outwards on the members. The derivation of loads is not shown in the example calculations.

The tables are based on a total lap length between bolt centres being equal to 10% of the span or 600mm whichever is the greater. Minimum bolt size M16 8.8/S. Because the compression flange varies from top to bottom it will in nearly all cases not be restrained by screw fixed sheeting. Therefore the braced condition will normally apply for all lapped purlins for both inwards and outwards loads.

The fully restrained condition only applies where both the top and bottom flanges are held against lateral movement by screw fixed sheeting.

The serviceability load (w_s) is the uniformly distributed load (kN/m) at which the midspan deflection equals $\frac{\text{Span}}{150}$

The standard bracing channel is limited to a purlin spacing of 3000.

Use of tables (UDL = Uniformly distributed load)

5. For the end bays, internal spans and double spans.

Calculate Ultimate UDL Inwards

Calculate Ultimate UDL Outwards

Serviceability wind UDL Inwards

Serviceability wind UDL Outwards

Serviceability DL at deflection limit = $\frac{L}{300}$

6. Calculate the Purlin required.

NOTE: Generally the fully restrained condition does not apply as both flanges are not normally screw fixed to sheeting.

Design Example

Consider a large supermarket with 10.5m spans over 10 bays and purlins at 2.2 centres top flange only fastened to sheeting.

	2 End Bays	**Internal Bays**
UDL Inwards (Ultimate)	1.36 ↓	1.36 ↓
UDL Outwards (Ultimate)	1.72 ↑	1.23 ↑
Serviceability Wind Inwards	0.64 ↓	0.64 ↓
Serviceability Wind Outwards	1.30 ↑	0.99 ↑
Serviceability Dead Load	0.33 ↓	0.33 ↓

Note fully restrained does not apply

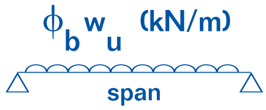
So at ultimate the max UDL applies at the braced condition

		2 End Bays	**Internal Bays**
Max ultimate Load	w_x	1.7	1.36
Purlin		MSS 250/15 3 Braces	MSS 250/13 1 Brace
Allowed	$\phi_b w_u$	1.90	1.65
Max Serviceability Wind	w_s	1.30	0.99
	DL	0.33 @L/300 or 0.66 @L/150	0.33 (0.66)
Purlin		MSS 250/18 2 braces	MSS 250/13 1 brace
Allowed	w_s	1.44	2.28
	$\phi_b w_u$	2.13	1.65
Final Selection		MSS 250/18 2 braces	MSS 250/13 1 brace

Metalcraft ROOFING

MSS STRENGTH LOAD SPAN TABLE

UNIFORMLY DISTRIBUTED LOAD = $\phi_b w_u$ (kN/m)



SINGLE SPAN

Span	MSS 150/12				MSS 150/15				MSS 150/18				MSS 200/12				MSS 200/15			
	$\phi_b w_u$ (kN/m)			w_s kN/m	$\phi_b w_u$ (kN/m)			w_s kN/m	$\phi_b w_u$ (kN/m)			w_s kN/m	$\phi_b w_u$ (kN/m)			w_s kN/m	$\phi_b w_u$ (kN/m)			w_s kN/m
m	1B	2B	FR		1B	2B	FR		1B	2B	FR		1B	2B	FR		1B	2B	FR	
3.0	6.37	6.37	6.37	5.40	8.72	8.72	8.72	6.69	10.0	10.0	10.0	7.93	9.39	9.39	9.39	11.6	13.0	13.0	13.0	14.3
3.5	4.68	4.68	4.68	3.40	6.41	6.41	6.41	4.21	7.08	7.35	7.35	4.99	6.90	6.90	6.90	7.27	9.58	9.58	9.58	9.01
4.0	3.58	3.58	3.58	2.28	4.40	4.91	4.91	2.82	5.21	5.63	5.63	3.35	5.28	5.28	5.28	4.87	7.33	7.33	7.33	6.04
4.5	2.39	2.83	2.83	1.60	3.29	3.88	3.88	1.98	3.93	4.45	4.45	2.35	4.17	4.17	4.17	3.42	5.80	5.80	5.80	4.24
5.0	1.83	2.29	2.29	1.17	2.50	3.14	3.14	1.44	3.01	3.49	3.60	1.71	3.38	3.38	3.38	2.49	3.96	4.69	4.69	3.09
5.5	1.41	1.90	1.90	0.88	1.91	2.59	2.59	1.09	2.33	2.81	2.98	1.29	2.21	2.79	2.79	1.87	3.10	3.88	3.88	2.32
6.0	1.09	1.59	1.59	0.68	1.46	1.93	2.18	0.84	1.81	2.29	2.50	0.99	1.75	2.35	2.35	1.44	2.45	3.26	3.26	1.79
6.5	0.84	1.15	1.36	0.53	1.11	1.59	1.86	0.66	1.40	1.89	2.13	0.78	1.39	2.00	2.00	1.14	1.93	2.78	2.78	1.41
7.0	0.64	0.96	1.17	0.43	0.85	1.31	1.60	0.53	1.08	1.57	1.84	0.62	1.10	1.72	1.72	0.91	1.50	2.06	2.39	1.13
7.5	0.50	0.80	1.02	0.35	0.66	1.09	1.40	0.43	0.83	1.31	1.60	0.51	0.87	1.50	1.50	0.74	1.17	1.74	2.09	0.92
8.0	0.39	0.67	0.90	0.28	0.52	0.91	1.23	0.35	0.65	1.10	1.41	0.42	0.69	1.05	1.32	0.61	0.93	1.47	1.83	0.75
8.5	0.32	0.56	0.79	0.24	0.42	0.75	1.09	0.29	0.52	0.92	1.25	0.35	0.56	0.89	1.17	0.51	0.75	1.25	1.62	0.63
9.0		0.47	0.71	0.20	0.34	0.63	0.97	0.25	0.42	0.78	1.11	0.29	0.45	0.76	1.04	0.43	0.61	1.06	1.45	0.53
9.5		0.39	0.64	0.17	0.27	0.52	0.87	0.21	0.34	0.65	1.00	0.25	0.37	0.65	0.94	0.36	0.50	0.90	1.30	0.45
10.0		0.32	0.57	0.15	0.23	0.43	0.78	0.18	0.28	0.54	0.90	0.21	0.31	0.55	0.85	0.31	0.41	0.76	1.17	0.39
10.5		0.27	0.52	0.13		0.36	0.71	0.16	0.23	0.45	0.82	0.18	0.26	0.47	0.77	0.27	0.34	0.64	1.06	0.33
11.0						0.30	0.65	0.14	0.19	0.38	0.74	0.16	0.22	0.40	0.70	0.23	0.29	0.54	0.97	0.29
11.5									0.16	0.32	0..68	0.14		0.34	0.64	0.20		0.46	0.89	0.25
12.0									0.13	0.27	0.63	0.12		0.30	0.59	0.18		0.39	0.81	0.22
12.5																		0.34	0.75	0.20
13.0																		0.29	0.69	0.18
13.5																				
14.0																				
14.5																				
15.0																				
15.5																				
16.0																				
16.5																				
17.0																				
17.5																				
18.0																				
$\phi_b M_u$	**7.20**				**9.82**				**11.25**				**10.6**				**14.7**			
$\phi_v V_u$	**13.2**				**26.5**				**38.9**				**8.82**				**17.7**			

1B = One brace mid span

2B = Two braces within the span

3B = Three braces within the span

FR = Assumes compression flange fully restrained

ws = Uniformly distributed serviceability load for deflection limit = Span/150 (kN/m)

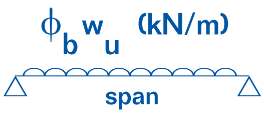
$\phi_b w_u$ = Strength load resistance applied at the centroid (kN/m)

$\phi_b M_u$ = Section strength in bending at the F.R. condition (kN.m.)

$\phi_v V_u$ = Section strength in shear (kN)

MSS STRENGTH LOAD SPAN TABLE

UNIFORMLY DISTRIBUTED LOAD = $\phi_b \, w_u$ (kN/m)



SINGLE SPAN

Span	MSS 200/18				MSS 250/13					MSS 250/15					MSS 250/18				
	$\phi_b w_u$ (kN/m)			w_s kN/m	$\phi_b w_u$ (kN/m)				w_s kN/m	$\phi_b w_u$ (kN/m)				w_s kN/m	$\phi_b w_u$ (kN/m)				w_s kN/m
m	1B	2B	FR		1B	2B	3B	FR		1B	2B	3B	FR		1B	2B	3B	FR	
3.0	15.3	15.3	15.3	17.0															
3.5	11.3	11.3	11.3	10.8															
4.0	8.63	8.63	8.63	7.18	8.27	8.27	8.27	8.27	9.74	10.2	10.2	10.2	10.2	11.2	12.3	12.3	12.3	12.3	13.4
4.5	6.20	6.82	6.82	5.04	6.53	6.53	6.53	6.53	6.84	8.07	8.07	8.07	8.07	7.87	9.69	9.69	9.69	9.69	9.38
5.0	4.80	5.52	5.52	3.68	5.29	5.29	5.29	5.29	4.99	6.54	6.54	6.54	6.54	5.74	7.85	7.85	7.85	7.85	6.83
5.5	3.77	4.56	4.56	2.76	4.37	4.37	4.37	4.37	3.75	5.40	5.40	5.40	5.40	4.31	5.75	6.49	6.49	6.49	5.14
6.0	2.98	3.83	3.83	2.13	3.68	3.68	3.68	3.68	2.89	3.73	4.54	4.54	4.54	3.32	4.65	5.45	5.45	5.45	3.96
6.5	2.36	2.98	3.27	1.67	2.44	3.13	3.13	3.13	2.27	3.03	3.87	3.87	3.87	2.61	3.78	4.64	4.64	4.64	3.11
7.0	1.87	2.50	2.82	1.34	1.99	2.70	2.70	2.70	1.82	2.47	3.34	3.34	3.34	2.09	3.09	4.00	4.00	4.00	2.49
7.5	1.48	2.11	2.45	1.09	1.63	2.35	2.35	2.35	1.48	2.02	2.91	2.91	2.91	1.70	2.53	3.49	3.49	3.49	2.03
8.0	1.16	1.78	2.16	0.90	1.33	2.07	2.07	2.07	1.22	1.65	2.55	2.55	2.55	1.40	2.07	2.72	3.07	3.07	1.67
8.5	0.93	1.52	1.91	0.75	1.08	1.83	1.83	1.83	1.02	1.34	1.89	2.26	2.26	1.17	1.69	2.35	2.72	2.72	1.39
9.0	0.75	1.29	1.70	0.63	0.89	1.31	1.63	1.63	0.86	1.09	1.63	2.02	2.02	0.98	1.38	2.04	2.42	2.42	1.17
9.5	0.61	1.10	1.53	0.54	0.74	1.14	1.47	1.47	0.73	0.90	1.42	1.81	1.81	0.84	1.13	1.77	2.17	2.17	1.00
10.0	0.51	0.94	1.38	0.46	0.62	0.99	1.32	1.32	0.62	0.74	1.23	1.63	1.63	0.72	0.94	1.54	1.96	1.96	0.85
10.5	0.42	0.80	1.25	0.40	0.52	0.86	1.20	1.20	0.54	0.62	1.07	1.48	1.48	0.62	0.78	1.34	1.78	1.78	0.74
11.0	0.35	0.68	1.14	0.35	0.44	0.75	1.09	1.09	0.47	0.53	0.94	1.35	1.35	0.54	0.66	1.17	1.62	1.62	0.64
11.5	0.30	0.58	1.04	0.30	0.37	0.66	1.00	1.00	0.41	0.45	0.81	1.24	1.24	0.47	0.56	1.02	1.48	1.48	0.56
12.0	0.25	0.49	0.96	0.27	0.32	0.57	0.92	0.92	0.36	0.38	0.71	1.13	1.13	0.41	0.48	0.89	1.21	1.36	0.49
12.5		0.42	0.88	0.24	0.27	0.50	0.85	0.85	0.32	0.33	0.61	1.05	1.05	0.37	0.41	0.77	1.10	1.26	0.44
13.0		0.36	0.82	0.21	0.24	0.43	0.78	0.78	0.28	0.28	0.53	0.80	0.97	0.33	0.35	0.67	1.00	1.16	0.39
13.5		0.32	0.76	0.19	0.21	0.38	0.58	0.73	0.25	0.25	0.46	0.73	0.90	0.29	0.31	0.58	0.91	1.08	0.35
14.0		0.28	0.70	0.17	0.18	0.33	0.53	0.68	0.23	0.22	0.41	0.66	0.83	0.26			0.82	1.00	0.31
14.5						0.30	0.48	0.63	0.20	0.19	0.36	0.60	0.78	0.24			0.75	0.93	0.28
15.0						0.26	0.44	0.59	0.18	0.17	0.32	0.55	0.73	0.21			0.68	0.87	0.25
15.5											0.28	0.50	0.68	0.19			0.62	0.82	0.23
16.0											0.25	0.46	0.64	0.18			0.57	0.77	0.21
16.5																	0.52	0.72	0.19
17.0																	0.48	0.68	0.17
17.5																			
18.0																			
$\phi_b M_u$	17.3				16.6					20.4					24.5				
$\phi_v V_u$	31.1				9.23					14.0					25.3				

1B = One brace mid span

2B = Two braces within the span

3B = Three braces within the span

FR = Assumes compression flange fully restrained

ws = Uniformly distributed serviceability load for deflection limit = Span/150 (kN/m)

$\phi_b \, w_u$ = Strength load resistance applied at the centroid (kN/m)

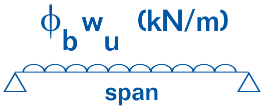
$\phi_b \, M_u$ = Section strength in bending at the F.R. condition (kN.m.)

$\phi_v \, V_u$ = Section strength in shear (kN)

Metalcraft ROOFING

MSS STRENGTH LOAD SPAN TABLE

UNIFORMLY DISTRIBUTED LOAD = $\phi_b w_u$ (kN/m)



SINGLE SPAN

Span	MSS 275/15 $\phi_b w_u$ (kN/m)				w_s kN/m	MSS 275/18 $\phi_b w_u$ (kN/m)				w_s kN/m	MSS 300/15 $\phi_b w_u$ (kN/m)				w_s kN/m	MSS 300/18 $\phi_b w_u$ (kN/m)				w_s kN/m
m	1B	2B	3B	FR		1B	2B	3B	FR		1B	2B	3B	FR		1B	2B	3B	FR	
3.0																				
3.5																				
4.0																				
4.5	9.28	9.28	9.28	9.28	10.2	11.3	11.3	11.3	11.3	12.3										
5.0	7.52	7.52	7.52	7.52	7.43	9.15	9.15	9.15	9.15	8.97	8.59	8.59	8.59	8.59	9.78	10.4	10.4	10.4	10.4	11.7
5.5	6.21	6.21	6.21	6.21	5.58	7.57	7.57	7.57	7.57	6.74	7.10	7.10	7.10	7.10	7.35	8.56	8.56	8.56	8.56	8.77
6.0	5.22	5.22	5.22	5.22	4.30	5.52	6.36	6.36	6.36	5.19	5.96	5.96	5.96	5.96	5.66	7.19	7.19	7.19	7.18	6.75
6.5	3.56	4.45	4.45	4.45	3.38	4.53	5.42	5.42	5.42	4.08	5.08	5.08	5.08	5.08	4.45	6.13	6.13	6.13	6.13	5.31
7.0	2.93	3.83	3.83	3.83	2.71	3.73	4.67	4.67	4.67	3.27	4.38	4.38	4.38	4.38	3.56	4.44	5.28	5.28	5.28	4.25
7.5	2.41	3.34	3.34	3.34	2.20	3.08	4.07	4.07	4.07	2.66	2.96	3.82	3.82	3.82	2.90	3.73	4.60	4.60	4.60	3.46
8.0	1.99	2.94	2.94	2.94	1.81	2.55	3.58	3.58	3.58	2.19	2.48	3.35	3.35	3.35	2.39	3.15	4.04	4.04	4.04	2.85
8.5	1.63	2.60	2.60	2.60	1.51	2.10	2.79	3.17	3.17	1.83	2.08	2.97	2.97	2.97	1.99	2.66	3.58	3.58	3.58	2.38
9.0	1.34	1.91	2.32	2.32	1.27	1.73	2.43	2.83	2.83	1.54	1.75	2.65	2.65	2.65	1.68	2.25	3.20	3.20	3.20	2.00
9.5	1.10	1.67	2.08	2.08	1.08	1.42	2.12	2.54	2.54	1.31	1.47	2.38	2.38	2.38	1.43	1.89	2.87	2.87	2.87	1.70
10.0	0.92	1.46	1.88	1.88	0.93	1.18	1.86	2.29	2.29	1.12	1.23	2.15	2.15	2.15	1.22	1.58	2.20	2.59	2.59	1.46
10.5	0.77	1.27	1.70	1.70	0.80	0.99	1.63	2.08	2.08	0.97	1.04	1.95	1.95	1.95	1.06	1.33	1.95	2.35	2.35	1.26
11.0	0.65	1.12	1.55	1.55	0.70	0.83	1.43	1.89	1.89	0.84	0.88	1.37	1.77	1.77	0.92	1.12	1.73	2.14	2.14	1.10
11.5	0.55	0.98	1.42	1.42	0.61	0.71	1.25	1.73	1.73	0.74	0.75	1.22	1.62	1.62	0.80	0.96	1.54	1.96	1.96	0.96
12.0	0.47	0.86	1.30	1.30	0.54	0.60	1.10	1.59	1.59	0.65	0.65	1.08	1.49	1.49	0.71	0.82	1.37	1.80	1.80	0.84
12.5	0.41	0.75	1.20	1.20	0.48	0.52	0.96	1.46	1.46	0.57	0.56	0.96	1.37	1.37	0.63	0.71	1.22	1.66	1.66	0.75
13.0	0.35	0.65	1.11	1.11	0.42	0.45	0.84	1.18	1.35	0.51	0.48	0.85	1.27	1.27	0.56	0.61	1.09	1.53	1.53	0.66
13.5	0.31	0.57	0.85	1.03	0.38	0.39	0.73	1.08	1.26	0.46	0.42	0.75	1.18	1.18	0.50	0.53	0.97	1.42	1.42	0.59
14.0		0.50	0.78	0.96	0.34	0.34	0.64	0.99	1.17	0.41	0.37	0.67	1.10	1.10	0.45	0.47	0.86	1.32	1.32	0.53
14.5		0.44	0.71	0.89	0.30		0.57	0.90	1.09	0.37	0.33	0.59	1.02	1.02	0.40	0.41	0.76	1.23	1.23	0.48
15.0		0.39	0.65	0.84	0.28		0.50	0.83	1.02	0.33	0.29	0.52	0.95	0.95	0.36	0.36	0.67	0.98	1.15	0.43
15.5		0.35	0.59	0.78	0.25		0.44	0.76	0.95	0.30		0.47	0.89	0.89	0.33	0.32	0.60	0.90	1.08	0.39
16.0		0.31	0.54	0.73	0.23		0.39	0.69	0.89	0.27		0.42	0.66	0.84	0.30	0.29	0.53	0.83	1.01	0.36
16.5		0.28	0.50	0.69	0.21		0.35	0.63	0.84	0.25		0.38	0.61	0.79	0.27	0.25	0.48	0.77	0.95	0.32
17.0												0.34	0.56	0.74	0.25	0.23	0.43	0.71	0.90	0.30
17.5												0.30	0.52	0.70	0.23	0.20	0.38	0.66	0.85	0.27
18.0																0.18	0.35	0.61	0.80	0.25
$\phi_b M_u$	23.5					26.8					26.8					32.4				
$\phi_v V_u$	10.4					12.9					12.9					15.6				

1B = One brace mid span

2B = Two braces within the span

3B = Three braces within the span

FR = Assumes compression flange fully restrained

ws = Uniformly distributed serviceability load for deflection limit = Span/150 (kN/m)

$\phi_b w_u$ = Strength load resistance applied at the centroid (kN/m)

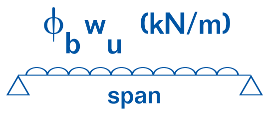
$\phi_b M_u$ = Section strength in bending at the F.R. condition (kN.m.)

$\phi_v V_u$ = Section strength in shear (kN)

Metalcraft ROOFING

MSS STRENGTH LOAD SPAN TABLE

UNIFORMLY DISTRIBUTED LOAD = $\phi_b w_u$ (kN/m)



SINGLE SPAN

Span	MSS 325/15 $\phi_b w_u$ (kN/m)				w_s kN/m	MSS 325/18 $\phi_b w_u$ (kN/m)				w_s kN/m	MSS 350/18 $\phi_b w_u$ (kN/m)				w_s kN/m	MSS 400/20 $\phi_b w_u$ (kN/m)				w_s kN/m
m	1B	2B	3B	FR		1B	2B	3B	FR		1B	2B	3B	FR		1B	2B	3B	FR	
3.0																				
3.5																				
4.0																				
4.5	11.5	11.5	11.5	11.5	16.2	14.1	14.1	14.1	14.1	19.5										
5.0	9.34	9.34	9.34	9.34	11.8	11.4	11.4	11.4	11.4	14.2										
5.5	7.71	7.71	7.71	7.71	8.86	9.44	9.44	9.44	9.44	10.7										
6.0	6.48	6.48	6.48	6.48	6.83	7.93	7.93	7.93	7.93	8.22	8.93	8.93	8.93	8.93	9.88	12.7	12.7	12.7	12.7	15.3
6.5	5.52	5.52	5.52	5.52	5.37	6.76	6.76	6.76	6.76	6.47	7.61	7.61	7.61	7.61	7.77	9.6	10.9	10.9	10.9	12.0
7.0	4.76	4.76	4.76	4.76	4.30	4.90	5.82	5.82	5.82	5.18	5.58	6.56	6.56	6.56	6.22	8.04	9.36	9.36	9.36	9.60
7.5	3.21	4.15	4.15	4.15	3.50	4.12	5.07	5.07	5.07	4.21	4.70	5.72	5.72	5.72	5.06	6.76	8.15	8.15	8.15	7.81
8.0	2.69	3.65	3.65	3.65	2.88	3.48	4.46	4.46	4.46	3.47	3.97	5.02	5.02	5.02	4.17	5.71	7.16	7.16	7.16	6.43
8.5	2.26	3.23	3.23	3.23	2.40	2.94	3.95	3.95	3.95	2.89	3.36	4.45	4.45	4.45	3.48	4.84	6.35	6.35	6.35	5.36
9.0	1.90	2.88	2.88	2.88	2.02	2.49	3.52	3.52	3.52	2.44	2.86	3.97	3.97	3.97	2.93	4.11	5.66	5.66	5.66	4.52
9.5	1.59	2.59	2.59	2.59	1.72	2.11	3.16	3.16	3.16	2.07	2.42	3.56	3.56	3.56	2.49	3.48	4.50	5.08	5.08	3.84
10.0	1.33	2.33	2.33	2.33	1.47	1.78	2.43	2.85	2.85	1.78	2.05	2.76	3.22	3.22	2.13	2.92	3.98	4.58	4.58	3.29
10.5	1.13	1.68	2.12	2.12	1.27	1.49	2.15	2.59	2.59	1.53	1.73	2.45	2.92	2.92	1.84	2.45	3.53	4.16	4.16	2.85
11.0	0.96	1.49	1.93	1.93	1.11	1.26	1.91	2.36	2.36	1.33	1.46	2.18	2.66	2.66	1.60	2.06	3.14	3.79	3.79	2.47
11.5	0.82	1.32	1.76	1.76	0.97	1.07	1.70	2.16	2.16	1.17	1.24	1.94	2.43	2.43	1.40	1.75	2.79	3.47	3.47	2.17
12.0	0.71	1.17	1.62	1.62	0.85	0.92	1.52	1.98	1.98	1.03	1.06	1.73	2.23	2.23	1.24	1.49	2.49	3.18	3.18	1.91
12.5	0.62	1.04	1.49	1.49	0.76	0.79	1.35	1.83	1.83	0.91	0.91	1.55	2.06	2.06	1.09	1.28	2.23	2.93	2.93	1.69
13.0	0.53	0.92	1.38	1.38	0.67	0.69	1.21	1.69	1.69	0.81	0.79	1.38	1.90	1.90	0.97	1.11	1.99	2.71	2.71	1.50
13.5	0.47	0.82	1.28	1.28	0.60	0.60	1.08	1.57	1.57	0.72	0.69	1.24	1.76	1.76	0.87	0.96	1.78	2.52	2.52	1.34
14.0	0.41	0.72	1.19	1.19	0.54	0.52	0.96	1.46	1.46	0.65	0.60	1.10	1.64	1.64	0.78	0.84	1.58	2.34	2.34	1.20
14.5	0.36	0.64	1.11	1.11	0.48	0.46	0.85	1.36	1.36	0.58	0.53	0.98	1.53	1.53	0.70	0.74	1.40	1.92	2.18	1.08
15.0	0.32	0.57	1.04	1.04	0.44	0.40	0.76	1.08	1.27	0.53	0.47	0.88	1.23	1.43	0.63	0.65	1.24	1.77	2.04	0.98
15.5	0.28	0.51	0.78	0.97	0.40	0.36	0.67	0.99	1.19	0.48	0.41	0.78	1.13	1.34	0.57	0.57	1.10	1.63	1.19	0.88
16.0	0.25	0.46	0.72	0.91	0.36	0.32	0.60	0.92	1.11	0.43	0.37	0.69	1.05	1.26	0.52	0.51	0.98	1.51	1.79	0.80
16.5	0.22	0.41	0.66	0.86	0.33		0.54	0.85	1.05	0.40	0.33	0.62	0.97	1.18	0.48	0.45	0.87	1.39	1.68	0.73
17.0	0.20	0.37	0.61	0.81	0.30		0.48	0.79	0.99	0.36		0.55	0.90	1.11	0.43	0.40	0.78	1.29	1.59	0.67
17.5	0.18	0.33	0.56	0.76	0.28		0.43	0.73	0.93	0.33		0.50	0.83	1.05	0.40	0.36	0.70	1.20	1.50	0.61
18.0	0.16	0.30	0.52	0.72	0.25		0.39	0.67	0.88	0.30		0.45	0.77	0.99	0.37	0.32	0.63	1.11	1.42	0.56
$\phi_b M_u$	29.1					35.6					40.2					57.3				
$\phi_v V_u$	8.71					15.3					16.4					19.3				

1B = One brace mid span

2B = Two braces within the span

3B = Three braces within the span

FR = Assumes compression flange fully restrained

ws = Uniformly distributed serviceability load for deflection limit = Span/150 (kN/m)

$\phi_b w_u$ = Strength load resistance applied at the centroid (kN/m)

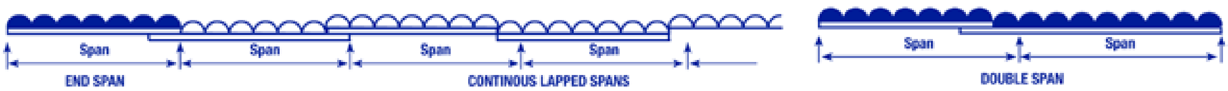
$\phi_b M_u$ = Section strength in bending at the F.R. condition (kN.m.)

$\phi_v V_u$ = Section strength in shear (kN)

MSS STRENGTH LOAD SPAN TABLE

UNIFORMLY DISTRIBUTED LOAD = $\phi_b w_u$ (kN/m)

LAPPED END SPAN AND DOUBLE SPAN



Span	MSS 150/12				MSS 150/15				MSS 150/18				MSS 200/12				MSS 200/15			
	$\phi_b w_u$ (kN/m)			w_s kN/m	$\phi_b w_u$ (kN/m)			w_s kN/m	$\phi_b w_u$ (kN/m)			w_s kN/m	$\phi_b w_u$ (kN/m)			w_s kN/m	$\phi_b w_u$ (kN/m)			w_s kN/m
m	1B	2B	FR		1B	2B	FR		1B	2B	FR		1B	2B	FR		1B	2B	FR	
3.0	8.34	8.34	8.34	9.94	11.4	11.4	11.4	13.0	13.12	13.12	13.12	15.44	12.3	12.3	12.3	7.93	17.1	17.1	17.1	24.7
3.5	6.13	6.13	6.13	6.38	8.40	8.40	8.40	8.20	9.64	9.64	9.64	9.73	9.02	9.02	9.02	4.99	12.5	12.5	12.5	16.6
4.0	4.62	4.69	4.69	4.33	6.31	6.43	6.43	5.49	7.33	7.38	7.38	6.52	6.91	6.91	6.91	3.35	9.60	9.60	9.60	11.3
4.5	3.55	3.71	3.71	3.07	4.84	5.08	5.08	3.86	5.64	5.83	5.83	4.58	5.36	6.46	5.46	2.35	7.43	7.58	7.58	8.06
5.0	2.79	3.00	3.00	2.26	3.78	4.11	4.11	2.81	4.43	4.72	4.72	3.34	4.23	4.42	4.42	1.91	5.86	6.14	6.14	5.92
5.5	2.22	2.48	2.48	1.70	3.00	3.40	3.40	2.11	3.54	3.90	3.90	2.51	3.40	3.65	3.65	1.29	4.71	5.08	5.08	4.48
6.0	1.79	2.06	2.08	1.31	2.41	2.82	2.86	1.63	2.86	3.27	3.28	1.93	2.77	3.07	3.07	0.99	3.83	4.26	4.26	3.47
6.5	1.45	1.73	1.78	1.03	1.95	2.35	2.43	1.28	2.33	2.74	2.79	1.52	2.77	2.60	2.62	0.78	3.14	3.60	3.63	2.73
7.0	1.19	1.46	1.53	0.83	1.57	1.99	2.10	1.02	1.91	2.32	2.41	1.22	1.88	2.21	2.26	0.62	2.59	3.06	3.13	2.19
7.5	0.93	1.25	1.33	0.67	1.22	1.69	1.83	0.83	1.54	1.98	2.10	0.99	1.56	1.89	1.97	0.51	2.15	2.62	2.73	1.78
8.0	0.73	1.07	1.17	0.55	0.96	1.45	1.61	0.69	1.21	1.70	1.84	0.81	1.30	1.63	1.73	0.42	1.73	2.26	2.40	1.47
8.5	0.59	0.93	1.04	0.46	0.77	1.25	1.42	0.57	0.97	1.48	1.63	0.68	1.05	1.42	1.53	0.35	1.38	1.96	2.13	1.22
9.0	0.48	0.80	0.93	0.39	0.62	1.08	1.27	0.48	0.78	1.28	1.46	0.57	0.85	1.24	1.36	0.29	1.12	1.71	1.90	1.03
9.5	0.39	0.70	0.83	0.33	0.57	0.94	1.14	0.41	0.63	1.12	1.31	0.49	0.70	1.09	1.22	0.25	0.92	1.50	1.70	0.88
10.0	0.32	0.59	0.75	0.28	0.42	0.78	1.03	0.35	0.52	0.98	1.18	0.42	0.58	0.96	1.11	0.21	0.76	1.32	1.54	0.75
10.5					0.35	0.65	0.93	0.30	0.43	0.82	1.07	0.36	0.48	0.85	1.00	0.18	0.64	1.17	1.39	0.65
11.0					0.29	0.55	0.85	0.26	0.36	0.69	0.98	0.31	0.41	0.74	0.91	0.16	0.53	0.98	1.27	0.57
11.5									0.30	0.59	0.89	0.27	0.35	0.43	0.84	0.14	0.45	0.84	1.16	0.49
12.0									0.25	0.50	0.82	0.24	0.30	0.54	0.77	0.12	0.39	0.72	1.07	0.44
12.5																	0.33	0.62	0.98	0.39
13.0																	0.29	0.53	0.91	0.34
13.5																				
14.0																				
14.5																				
15.0																				
15.5																				
16.0																				
16.5																				
17.0																				
17.5																				
18.0																				

1B = One brace mid span

2B = Two braces within the span

3B = Three braces within the span

FR = Assumes compression flange fully restrained

ws = Uniformly distributed serviceability load for deflection limit = Span/150 (kN/m)

$\phi_b w_u$ = Strength load resistance applied at the centroid (kN/m)

$\phi_b M_u$ = Section strength in bending at the F.R. condition (kN.m.)

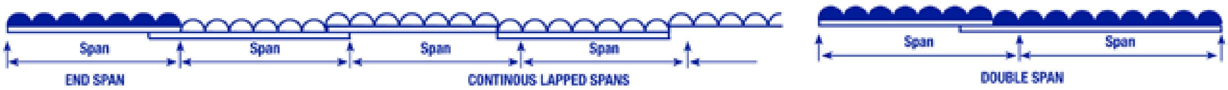
$\phi_v V_u$ = Section strength in shear (kN)

NOTE: 1. The tables are based on a total lap length between bolt centres being equal to 10% of the span or 600mm whichever is the greater.
2. Tables assume one flange continuously restrained by roof or wall cladding.

MSS STRENGTH LOAD SPAN TABLE

UNIFORMLY DISTRIBUTED LOAD = $\phi_b\ w_u$ (kN/m)

LAPPED END SPAN AND DOUBLE SPAN



Span	MSS 200/18				MSS 250/13					MSS 250/15					MSS 250/18				
	$\phi_b w_u$ (kN/m)			w_s kN/m	$\phi_b w_u$ (kN/m)				w_s kN/m	$\phi_b w_u$ (kN/m)				w_s kN/m	$\phi_b w_u$ (kN/m)				w_s kN/m
m	1B	2B	FR		1B	2B	3B	FR		1B	2B	3B	FR		1B	2B	3B	FR	
3.0	20.1	20.1	20.1	32.2															
3.5	14.8	14.8	14.8	20.7															
4.0	11.3	11.3	11.3	14.0	10.8	10.8	10.8	10.8	14.3	13.4	13.4	13.4	13.4	18.2	16.1	16.1	16.1	16.1	24.3
4.5	8.82	8.94	8.94	9.82	8.55	8.55	8.55	8.55	10.5	10.6	10.6	10.6	10.6	13.4	12.7	12.7	12.7	12.7	17.7
5.0	6.97	7.24	7.24	7.16	6.85	6.92	6.92	6.92	7.97	8.45	8.55	8.55	8.55	10.2	10.2	10.3	10.3	10.3	13.0
5.5	5.60	5.98	5.98	5.38	5.55	5.72	5.72	5.72	6.22	6.84	7.07	7.07	7.07	7.82	8.30	8.49	8.49	8.49	9.86
6.0	4.55	5.03	5.03	4.14	4.56	4.81	4.81	4.81	4.95	5.62	5.94	5.94	5.94	6.11	6.83	7.13	7.13	7.13	7.64
6.5	3.74	4.28	4.28	3.26	3.78	4.10	4.10	4.10	3.96	4.67	5.06	5.06	5.06	4.86	5.68	6.08	6.08	6.08	6.03
7.0	3.10	3.63	3.69	2.61	3.17	3.53	3.53	3.53	3.21	3.91	4.36	4.36	4.36	3.92	4.76	5.24	5.24	5.24	4.84
7.5	2.57	3.11	3.22	2.12	2.68	3.06	3.08	3.08	2.65	3.30	3.77	3.80	3.80	3.21	4.02	4.56	4.56	4.56	3.94
8.0	2.15	2.69	2.83	1.75	2.27	2.65	2.70	2.70	2.21	2.79	3.27	3.34	3.34	2.66	3.41	3.96	4.01	4.01	3.25
8.5	1.72	2.33	2.50	1.46	1.93	2.32	2.40	2.40	1.86	2.38	2.86	2.96	2.96	2.23	2.91	3.47	3.55	3.55	2.71
9.0	1.39	2.04	2.23	1.23	1.65	2.04	2.14	2.14	1.58	2.03	2.51	2.64	2.64	1.89	2.48	3.05	3.17	3.17	2.28
9.5	1.14	1.79	2.01	1.04	1.39	1.80	1.92	1.92	1.36	1.68	2.22	2.37	2.37	1.61	2.10	2.70	2.85	2.85	1.94
10.0	0.94	1.58	1.81	0.90	1.16	1.59	1.72	1.73	1.17	1.39	1.97	2.12	2.14	1.38	1.74	2.39	2.57	2.57	1.66
10.5	0.78	1.39	1.64	0.77	0.97	1.42	1.54	1.57	1.01	1.16	1.75	1.90	1.94	1.20	1.45	2.13	2.31	2.33	1.44
11.0	0.66	1.23	1.50	0.67	0.82	1.27	1.39	1.43	0.89	0.98	1.56	1.72	1.77	1.05	1.22	1.90	2.08	2.12	1.25
11.5	0.55	1.04	1.37	0.59	0.69	1.14	1.26	1.31	0.78	0.83	1.40	1.55	1.62	0.92	1.03	1.71	1.89	1.94	1.09
12.0	0.47	0.89	1.26	0.52	0.59	1.02	1.14	1.20	0.69	0.71	1.26	1.41	1.48	0.81	0.88	1.53	1.72	1.78	0.96
12.5	0.40	0.76	1.16	0.46	0.51	0.92	1.04	1.11	0.61	0.61	1.12	1.29	1.37	0.71	0.76	1.38	1.56	1.64	0.85
13.0	0.35	0.66	1.07	0.41	0.44	0.80	0.95	1.02	0.54	0.53	0.97	1.17	1.27	0.64	0.65	1.21	1.43	1.52	0.76
13.5	0.30	0.57	0.99	0.36	0.38	0.70	0.87	0.95	0.49	0.46	0.84	1.07	1.17	0.57	0.57	1.06	1.31	1.41	0.68
14.0	0.26	0.50	0.92	0.33	0.34	0.62	0.80	0.88	0.44	0.40	0.74	0.98	1.09	0.51	0.49	0.92	1.20	1.31	0.61
14.5					0.30	0.54	0.73	0.82	0.40	0.35	0.65	0.90	1.02	0.46	0.43	0.81	1.10	1.22	0.55
15.0					0.26	0.48	0.67	0.77	0.36	0.31	0.57	0.83	0.95	0.41	0.38	0.72	1.01	1.14	0.49
15.5										0.27	0.57	0.77	0.89	0.37	0.34	0.63	0.93	1.07	0.45
16.0										0.24	0.45	0.71	0.84	0.34	0.30	0.56	0.86	1.00	0.41
16.5																			
17.0																			
17.5																			
18.0																			

1B = One brace mid span
2B = Two braces within the span
3B = Three braces within the span
FR = Assumes compression flange fully restrained

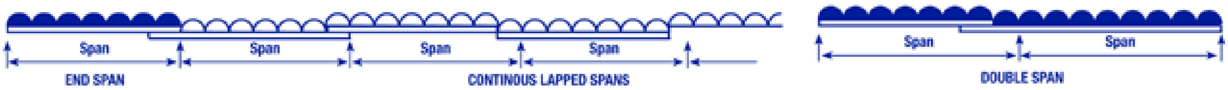
ws = Uniformly distributed serviceability load for deflection limit = Span/150 (kN/m)
$\phi_b\ w_u$ = Strength load resistance applied at the centroid (kN/m)
$\phi_b\ M_u$ = Section strength in bending at the F.R. condition (kN.m.)
$\phi_v\ V_u$ = Section strength in shear (kN)

NOTE: 1. The tables are based on a total lap length between bolt centres being equal to 10% of the span or 600mm whichever is the greater.
2. Tables assume one flange continuously restrained by roof or wall cladding.

MSS STRENGTH LOAD SPAN TABLE

UNIFORMLY DISTRIBUTED LOAD = $\phi_b w_u$ (kN/m)

LAPPED END SPAN AND DOUBLE SPAN



Span	MSS 275/15					MSS 275/18					MSS 300/15					MSS 300/18				
	$\phi_b w_u$ (kN/m)				w_s kN/m	$\phi_b w_u$ (kN/m)				w_s kN/m	$\phi_b w_u$ (kN/m)				w_s kN/m	$\phi_b w_u$ (kN/m)				w_s kN/m
m	1B	2B	3B	FR		1B	2B	3B	FR		1B	2B	3B	FR		1B	2B	3B	FR	
3.0																				
3.5																				
4.0											17.6	17.6	17.6	17.6	26.0	21.2	21.2	21.2	21.2	34.9
4.5	12.1	12.1	12.1	12.1	16.1	14.8	14.8	14.8	14.8	21.9	13.9	13.9	13.9	13.9	19.1	16.7	16.7	16.7	16.7	25.6
5.0	9.80	9.83	9.83	9.83	12.2	12.0	12.0	12.0	12.0	16.6	11.2	11.2	11.2	11.2	14.4	13.6	13.6	13.6	13.6	19.4
5.5	7.95	8.13	8.13	8.13	9.55	9.78	9.90	9.90	9.90	12.7	9.27	9.29	9.29	9.29	11.3	11.2	11.2	11.2	11.2	15.2
6.0	6.54	6.83	6.83	6.83	7.60	8.06	8.32	8.32	8.32	9.84	7.66	7.80	7.80	7.80	8.97	9.32	9.41	9.41	9.41	12.1
6.5	5.44	5.82	5.82	5.82	6.07	6.73	7.09	7.09	7.09	7.79	6.41	6.65	6.65	6.65	7.28	7.81	8.01	8.01	8.01	9.75
7.0	4.57	5.02	5.02	5.02	4.93	5.66	6.11	6.11	6.11	6.27	5.41	5.73	5.73	5.73	6.01	6.61	6.91	6.91	6.91	7.88
7.5	3.87	4.37	4.37	4.37	4.06	4.81	5.32	5.32	5.32	5.12	4.61	4.99	4.99	4.99	4.99	5.64	6.02	6.02	6.02	6.45
8.0	3.29	3.79	3.84	3.84	3.37	4.10	4.66	4.68	4.68	4.24	3.95	4.39	4.39	4.39	4.16	4.85	5.29	5.29	5.29	5.35
8.5	2.81	3.32	3.40	3.40	2.82	3.51	4.08	4.15	4.15	3.54	3.41	3.87	3.89	3.89	3.57	4.19	4.69	4.69	4.69	4.49
9.0	2.41	2.92	3.03	3.03	2.39	3.01	3.60	3.70	3.70	2.99	2.95	3.42	3.47	3.47	2.99	3.64	4.15	4.18	4.18	3.80
9.5	2.07	2.58	2.72	2.72	2.05	2.59	3.19	3.32	3.32	2.54	2.56	3.03	3.11	3.11	2.57	3.18	3.69	3.75	3.75	3.25
10.0	1.72	2.29	2.46	2.46	1.76	2.19	2.84	2.99	2.99	2.18	2.23	2.70	2.81	2.81	2.23	2.78	3.29	3.39	3.39	2.79
10.5	1.44	2.05	2.21	2.23	1.53	1.83	2.53	2.72	2.72	1.89	1.94	2.42	2.55	2.55	1.93	2.43	2.95	3.07	3.07	2.42
11.0	1.21	1.83	1.99	2.03	1.33	1.54	2.27	2.45	2.48	1.64	1.67	2.17	2.32	2.32	1.69	2.10	2.66	2.80	2.80	2.11
11.5	1.03	1.64	1.81	1.86	1.17	1.31	2.04	2.22	2.26	1.44	1.42	1.96	2.11	2.12	1.49	1.78	2.40	2.56	2.56	1.85
12.0	0.88	1.48	1.64	1.71	1.03	1.12	1.84	2.02	2.08	1.26	1.21	1.77	1.92	1.95	1.32	1.53	2.17	2.34	2.35	1.64
12.5	0.76	1.33	1.50	1.57	0.92	0.96	1.66	1.85	1.92	1.12	1.04	1.60	1.76	1.80	1.17	1.31	1.97	2.14	2.17	1.45
13.0	0.65	1.20	1.37	1.45	0.82	0.83	1.50	1.69	1.77	0.99	0.90	1.46	1.61	1.66	1.04	1.14	1.79	1.96	2.00	1.29
13.5	0.57	1.05	1.25	1.35	0.73	0.72	1.34	1.55	1.64	0.89	0.79	1.32	1.48	1.54	0.94	0.99	1.63	1.80	1.86	1.15
14.0	0.50	0.91	1.15	1.25	0.66	0.63	1.17	1.42	1.53	0.80	0.69	1.21	1.36	1.43	0.84	0.87	1.49	1.66	1.73	1.04
14.5	0.44	0.80	1.06	1.17	0.59	0.55	1.03	1.31	1.42	0.72	0.61	1.10	1.25	1.34	0.76	0.76	1.36	1.53	1.61	0.93
15.0	0.39	0.71	0.97	1.09	0.54	0.49	0.91	1.21	1.33	0.65	0.53	0.97	1.16	1.25	0.69	0.67	1.23	1.42	1.51	0.84
15.5	0.34	0.63	0.90	1.02	0.49	0.43	0.80	1.12	1.25	0.59	0.47	0.87	1.07	1.17	0.63	0.59	1.09	1.31	1.41	0.76
16.0	0.30	0.56	0.83	0.96	0.44	0.38	0.71	1.03	1.17	0.53	0.42	0.77	0.99	1.10	0.57	0.53	0.97	1.22	1.32	0.69
16.5	0.27	0.50	0.77	0.90	0.40	0.34	0.64	0.96	1.10	0.49	0.38	0.69	0.92	1.03	0.52	0.47	0.87	1.13	1.24	0.63
17.0	0.24	0.45	0.71	0.85	0.37	0.30	0.57	0.89	1.04	0.44	0.34	0.62	0.86	0.97	0.48	0.42	0.78	1.06	1.17	0.58
17.5	0.22	0.40	0.66	0.80	0.34	0.27	0.51	0.82	0.98	0.41	0.30	0.56	0.80	0.92	0.44	0.38	0.70	0.98	1.11	0.53
18.0	0.20	0.36	0.61	0.76	0.31	0.24	0.46	0.76	0.92	0.37	0.27	0.50	0.74	0.87	0.41	0.34	0.63	0.92	1.05	0.49

1B = One brace mid span

2B = Two braces within the span

3B = Three braces within the span

FR = Assumes compression flange fully restrained

ws = Uniformly distributed serviceability load for deflection limit = Span/150 (kN/m)

$\phi_b w_u$ = Strength load resistance applied at the centroid (kN/m)

$\phi_b M_u$ = Section strength in bending at the F.R. condition (kN.m.)

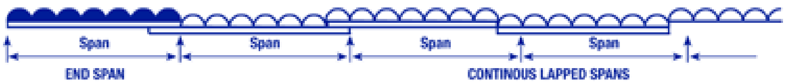
$\phi_v V_u$ = Section strength in shear (kN)

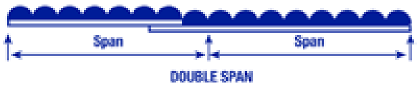
NOTE: 1. The tables are based on a total lap length between bolt centres being equal to 10% of the span or 600mm whichever is the greater.
2. Tables assume one flange continuously restrained by roof or wall cladding.

MSS STRENGTH LOAD SPAN TABLE

UNIFORMLY DISTRIBUTED LOAD = $\phi_b\ w_u$ (kN/m)

LAPPED END SPAN AND DOUBLE SPAN





Span	MSS 325/15					MSS 325/18					MSS 350/18					MSS 400/20				
	$\phi_b w_u$ (kN/m)				w_s kN/m	$\phi_b w_u$ (kN/m)				w_s kN/m	$\phi_b w_u$ (kN/m)				w_s kN/m	$\phi_b w_u$ (kN/m)				w_s kN/m
m	1B	2B	3B	FR		1B	2B	3B	FR		1B	2B	3B	FR		1B	2B	3B	FR	
3.0																				
3.5																				
4.0											26.3	26.3	26.3	26.3	47.9	37.5	37.5	37.5	37.5	76.3
4.5	15.1	15.1	15.1	15.1	21.6	18.4	18.4	18.4	18.4	29.5	20.8	20.8	20.8	20.8	35.0	29.6	29.6	29.6	29.6	55.7
5.0	12.2	12.2	12.2	12.2	16.4	14.9	14.9	14.9	14.9	22.4	16.8	16.8	16.8	16.8	26.5	24.0	24.0	24.0	24.0	42.1
5.5	10.1	10.1	10.1	10.1	12.7	12.3	12.3	12.3	12.3	17.4	13.9	13.9	13.9	13.9	20.6	19.8	19.8	19.8	19.8	32.7
6.0	8.32	8.48	8.48	8.48	10.1	10.3	10.4	10.4	10.4	13.9	11.6	11.7	11.7	11.7	16.4	16.6	16.7	16.7	16.7	25.9
6.5	6.96	7.23	7.23	7.23	8.23	8.61	8.84	8.84	8.84	11.3	9.74	9.96	9.96	9.96	13.3	13.9	14.2	14.2	14.2	21.0
7.0	5.88	6.23	6.23	6.23	6.79	7.29	7.62	7.62	7.62	9.34	8.25	8.59	8.59	8.59	11.0	11.8	12.3	12.3	12.3	17.3
7.5	5.01	5.43	5.43	5.43	5.68	6.22	6.64	6.64	6.64	7.69	7.05	7.48	7.48	7.48	9.18	10.1	10.7	10.7	10.7	14.4
8.0	4.29	4.77	4.77	4.77	4.81	5.35	5.83	5.83	5.83	6.41	6.07	6.57	6.57	6.57	7.65	8.66	9.38	9.38	9.38	12.1
8.5	3.70	4.20	4.23	4.23	4.06	4.63	5.17	5.17	5.17	5.40	5.25	5.82	5.82	5.82	6.44	7.49	8.31	8.31	8.31	10.2
9.0	3.20	3.71	3.77	3.77	3.46	4.02	4.58	4.61	4.61	4.59	4.57	5.18	5.19	5.19	5.48	6.51	7.39	7.41	7.41	8.60
9.5	2.78	3.29	3.38	3.38	2.98	3.50	4.07	4.14	4.14	3.92	3.99	4.60	4.66	4.66	4.69	5.68	6.57	6.65	6.65	7.34
10.0	2.42	2.93	3.05	3.05	2.58	3.06	3.63	3.73	3.73	3.38	3.49	4.11	4.21	4.21	4.04	4.98	5.86	6.00	6.00	6.32
10.5	2.11	2.63	2.77	2.77	2.25	2.68	3.25	3.39	3.39	2.93	3.06	3.68	3.82	3.82	3.57	4.36	5.26	5.44	5.44	5.47
11.0	1.81	2.36	2.52	2.52	1.98	2.35	2.93	3.09	3.09	2.56	2.69	3.32	3.48	3.48	3.06	3.83	4.73	4.96	4.96	4.77
11.5	1.55	2.13	2.29	2.31	1.75	2.00	2.64	2.82	2.82	2.24	2.31	3.00	3.18	3.18	2.69	3.26	4.27	4.54	4.54	4.19
12.0	1.33	1.92	2.09	2.12	1.55	1.71	2.39	2.58	2.59	1.98	1.98	2.71	2.91	2.92	2.37	2.78	3.87	4.16	4.17	3.69
12.5	1.15	1.74	1.91	1.95	1.38	1.47	2.17	2.36	2.39	1.76	1.70	2.46	2.66	2.69	2.10	2.39	3.52	3.80	3.84	3.27
13.0	1.00	1.58	1.75	1.81	1.24	1.27	1.98	2.16	2.21	1.57	1.47	2.24	2.44	2.49	1.88	2.06	3.20	3.34	3.55	2.91
13.5	0.87	1.44	1.60	1.67	1.11	1.11	1.80	1.99	2.05	1.40	1.28	2.05	2.25	2.31	1.68	1.79	2.92	3.21	3.29	2.60
14.0	0.76	1.31	1.48	1.56	1.00	0.97	1.65	1.83	1.90	1.26	1.12	1.87	2.07	2.15	1.57	1.56	2.67	2.96	3.06	2.34
14.5	0.67	1.19	1.36	1.45	0.91	0.85	1.50	1.69	1.78	1.13	0.98	1.71	1.91	2.00	1.36	1.37	2.44	2.73	2.85	2.10
15.0	0.59	1.06	1.26	1.36	0.82	0.75	1.38	1.56	1.66	1.02	0.86	1.57	1.77	1.87	1.23	1.21	2.24	2.53	2.67	1.90
15.5	0.52	0.94	1.17	1.27	0.75	0.66	1.23	1.45	1.55	0.93	0.76	1.42	1.64	1.75	1.12	1.07	2.00	2.34	2.50	1.72
16.0	0.47	0.84	1.08	1.19	0.68	0.59	1.09	1.35	1.46	0.84	0.68	1.26	1.53	1.64	1.01	0.95	1.78	2.18	2.34	1.57
16.5	0.42	0.76	1.00	1.12	0.63	0.53	0.97	1.25	1.37	0.77	0.61	1.12	1.42	1.55	0.93	0.84	1.58	2.02	2.20	1.43
17.0	0.37	0.68	0.93	1.06	0.57	0.47	0.87	1.16	1.29	0.70	0.54	1.01	1.32	1.46	0.85	0.75	1.42	1.89	2.08	1.31
17.5	0.33	0.61	0.87	1.00	0.53	0.42	0.78	1.09	1.22	0.65	0.49	0.90	1.23	1.37	0.78	0.67	1.27	1.76	1.96	1.20
18.0	0.30	0.56	0.81	0.94	0.49	0.38	0.71	1.01	1.15	0.59	0.44	0.82	1.15	1.30	0.71	0.60	1.14	1.64	1.85	1.10

1B = One brace mid span

2B = Two braces within the span

3B = Three braces within the span

FR = Assumes compression flange fully restrained

ws = Uniformly distributed serviceability load for deflection limit = Span/150 (kN/m)

$\phi_b\ w_u$ = Strength load resistance applied at the centroid (kN/m)

$\phi_b\ M_u$ = Section strength in bending at the F.R. condition (kN.m.)

$\phi_v\ V_u$ = Section strength in shear (kN)

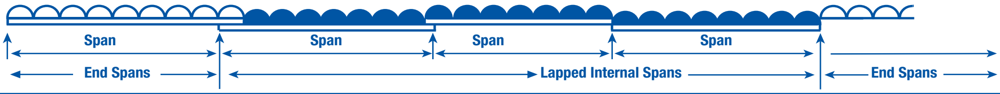
NOTE: 1. The tables are based on a total lap length between bolt centres being equal to 10% of the span or 600mm whichever is the greater.
2. Tables assume one flange continuously restrained by roof or wall cladding.

Metalcraft ROOFING

MSS STRENGTH LOAD SPAN TABLE

UNIFORMLY DISTRIBUTED LOAD = $\phi_b w_u$ (kN/m)

LAPPED INTERNAL SPAN



Span	MSS 150/12				MSS 150/15				MSS 150/18				MSS 200/12				MSS 200/15			
	$\phi_b w_u$ (kN/m)			w_s kN/m	$\phi_b w_u$ (kN/m)			w_s kN/m	$\phi_b w_u$ (kN/m)			w_s kN/m	$\phi_b w_u$ (kN/m)			w_s kN/m	$\phi_b w_u$ (kN/m)			w_s kN/m
m	1B	2B	FR		1B	2B	FR		1B	2B	FR		1B	2B	FR		1B	2B	FR	
3.0	11.6	11.6	11.6	22.6	15.8	15.8	15.8	28.5	19.0	19.0	19.0	33.8	17.0	17.0	17.0	43.3	23.6	23.6	23.6	59.3
3.5	8.48	8.48	8.48	14.4	11.6	11.6	11.6	17.9	14.0	14.0	14.0	21.3	12.5	12.5	12.5	28.3	17.4	17.4	17.4	37.8
4.0	6.49	6.49	6.49	9.69	8.90	8.90	8.90	12.0	10.2	10.2	10.2	14.2	9.57	9.57	9.57	19.4	13.3	13.3	13.3	25.5
4.5	5.13	5.13	5.13	6.82	7.03	7.03	7.03	8.44	8.07	80.7	80.7	10.0	7.56	7.56	7.56	14.0	10.5	10.5	10.5	18.0
5.0	4.16	4.16	4.16	4.97	5.66	5.70	5.70	6.15	6.54	6.54	6.54	7.3	6.12	6.12	6.12	10.3	8.50	8.50	8.50	13.2
5.5	3.34	3.43	3.43	3.73	4.53	4.53	4.71	4.62	5.31	5.40	5.40	5.48	5.00	5.06	5.06	7.77	7.02	7.03	7.03	9.89
6.0	2.71	2.89	2.89	2.88	3.67	3.96	3.96	3.56	4.32	4.76	4.54	4.22	4.15	4.25	4.25	6.03	5.75	5.91	5.91	7.62
6.5	2.23	2.46	2.46	2.26	3.00	3.37	3.37	2.80	3.55	3.87	3.87	3.32	3.44	3.62	3.62	4.77	4.75	5.03	5.03	5.99
7.0	1.84	2.12	2.12	1.81	2.47	2.90	2.91	2.24	2.94	3.34	3.34	2.66	2.87	3.12	3.12	3.84	3.96	4.34	4.34	4.80
7.5	1.53	1.85	1.85	1.47	2.04	2.53	2.53	1.82	2.45	2.91	2.91	2.16	2.41	2.72	2.72	3.13	3.32	3.78	3.78	3.90
8.0	1.27	1.60	1.62	1.21	1.69	2.18	2.23	1.50	2.05	2.55	2.55	1.78	2.03	2.39	2.39	2.59	2.80	3.32	3.32	3.21
8.5	1.05	1.39	1.44	1.01	1.39	1.89	1.96	1.25	1.72	2.22	2.26	1.48	1.72	2.12	2.12	2.16	2.35	2.93	2.94	2.68
9.0	0.87	1.22	1.28	0.85	1.15	1.65	1.76	1.05	1.44	1.94	2.02	1.25	1.45	1.86	1.89	1.82	1.98	2.57	2.62	2.26
9.5	0.71	1.07	1.15	0.72	0.95	1.44	1.58	0.90	1.21	1.70	1.81	1.06	1.23	1.64	1.70	1.55	1.66	2.27	2.36	1.92
10.0	0.59	0.94	1.04	0.62	0.79	1.27	1.42	0.77	1.0	1.50	1.63	0.91	1.04	1.45	1.53	1.33	1.39	2.00	2.13	1.64
10.5					0.66	1.11	1.29	0.66	0.84	1.33	1.48	0.79	0.87	1.29	1.39	1.15	1.17	1.78	1.93	1.42
11.0					0.56	0.98	1.18	0.58	0.71	1.18	1.35	0.69	0.74	1.15	1.27	1.00	0.98	1.58	1.76	1.24
11.5									0.60	1.05	1.24	0.60	0.63	1.02	1.16	0.87	0.84	1.41	1.61	1.08
12.0									0.51	0.93	1.14	0.53	0.54	0.92	1.06	0.77	0.72	1.26	1.48	0.95
12.5									0.44	0.83	1.05	0.47					0.62	1.13	1.36	0.84
13.0																	0.54	1.01	1.26	0.75
13.5																				
14.0																				
14.5																				
15.0																				
15.5																				
16.0																				
16.5																				
17.0																				
17.5																				
18.0																				

1B = One brace mid span

2B = Two braces within the span

3B = Three braces within the span

FR = Assumes compression flange fully restrained

ws = Uniformly distributed serviceability load for deflection limit = Span/150 (kN/m)

$\phi_b w_u$ = Strength load resistance applied at the centroid (kN/m)

$\phi_b M_u$ = Section strength in bending at the F.R. condition (kN.m.)

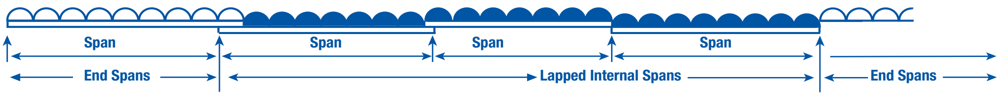
$\phi_v V_u$ = Section strength in shear (kN)

NOTE: 1. The tables are based on a total lap length between bolt centres being equal to 10% of the span or 600mm whichever is the greater.
2. Tables assume one flange continuously restrained by roof or wall cladding.

MSS STRENGTH LOAD SPAN TABLE

UNIFORMLY DISTRIBUTED LOAD = $\phi_b \ w_u$ (kN/m)

LAPPED INTERNAL SPAN



Span	MSS 200/18				MSS 250/13					MSS 250/15					MSS 250/18				
	$\phi_b w_u$ (kN/m)			w_s kN/m	$\phi_b w_u$ (kN/m)				w_s kN/m	$\phi_b w_u$ (kN/m)				w_s kN/m	$\phi_b w_u$ (kN/m)				w_s kN/m
m	1B	2B	FR		1B	2B	3B	FR		1B	2B	3B	FR		1B	2B	3B	FR	
3.0	27.8	27.8	27.8	72.5															
3.5	20.5	20.5	20.5	45.7															
4.0	15.7	15.7	15.7	30.6	15.0	15.0	15.0	15.0	36.2	18.5	18.5	18.5	18.5	45.1	22.2	22.2	22.2	22.2	56.3
4.5	12.4	12.4	12.4	21.5	11.8	11.8	11.8	11.8	26.0	14.6	14.6	14.6	14.6	32.1	17.6	17.6	17.6	17.6	39.8
5.0	10.0	10.0	10.0	15.7	9.59	9.59	9.59	9.59	19.4	11.8	11.8	11.8	11.8	23.6	14.2	14.2	14.2	14.2	29.1
5.5	8.28	8.28	8.28	11.8	7.92	7.92	7.92	7.92	14.9	9.79	9.79	9.79	9.79	18.0	11.8	11.8	11.8	11.8	21.9
6.0	6.83	6.96	6.96	9.06	6.66	6.66	6.66	6.66	11.6	8.22	8.22	8.22	8.22	14.1	9.88	9.88	4.88	4.88	17.0
6.5	5.65	5.93	5.93	7.13	5.65	5.67	5.67	5.67	9.25	6.97	7.01	7.01	7.01	11.0	8.41	8.41	8.41	8.41	13.3
7.0	4.72	5.11	5.11	5.71	4.76	4.89	4.89	4.89	7.46	5.87	6.04	6.04	6.04	8.84	7.15	7.26	7.26	7.26	10.6
7.5	3.96	4.45	4.45	4.64	4.04	4.26	4.26	4.26	6.11	4.98	5.26	5.26	5.26	7.21	6.07	6.32	6.32	6.32	8.62
8.0	3.35	3.91	3.91	3.82	3.45	3.74	3.74	3.74	5.06	4.26	4.63	4.63	4.63	5.95	5.19	5.56	5.56	5.56	7.11
8.5	2.83	3.47	3.47	3.19	2.97	3.32	3.32	3.32	4.24	3.65	4.10	4.10	4.10	4.97	4.46	4.92	4.92	4.92	5.92
9.0	2.40	3.09	3.09	2.69	2.56	2.96	2.96	2.96	3.59	3.15	3.65	3.65	3.65	4.19	3.85	4.39	4.39	4.39	4.99
9.5	2.04	2.78	2.78	2.28	2.21	2.66	2.66	2.66	3.06	2.72	3.28	3.28	3.28	3.56	3.33	3.94	3.94	3.94	4.24
10.0	1.73	2.51	2.51	1.96	1.91	2.38	2.40	2.40	2.63	2.35	2.94	2.96	2.96	3.05	2.88	3.56	3.56	3.56	3.64
10.5	1.46	2.27	2.27	1.69	1.65	2.13	2.17	2.17	2.28	2.03	2.63	2.69	2.69	2.64	2.50	3.20	3.22	3.22	3.14
11.0	1.23	2.06	2.07	1.47	1.43	1.91	1.98	1.98	1.99	1.75	2.36	2.45	2.45	2.29	2.17	2.87	2.94	2.94	2.73
11.5	1.05	1.86	1.89	1.29	1.23	1.72	1.81	1.81	1.74	1.57	2.12	2.24	2.24	2.01	1.88	2.58	2.69	2.69	2.39
12.0	0.90	1.68	1.74	1.13	1.06	1.55	1.66	1.66	1.54	1.30	1.91	2.06	2.06	1.77	1.62	2.33	2.47	2.47	2.11
12.5	0.77	1.53	1.60	1.00	0.92	1.40	1.53	1.53	1.36	1.12	1.73	1.88	1.89	1.56	1.40	2.11	2.28	2.28	1.86
13.0	0.67	1.39	1.48	0.89	0.80	1.27	1.39	1.42	1.21	0.97	1.56	1.72	1.75	1.39	1.21	1.91	2.09	2.10	1.66
13.5	0.58	1.27	1.37	0.80	0.70	1.15	1.28	1.31	1.08	0.84	1.42	1.58	1.62	1.24	1.06	1.73	1.92	1.95	1.48
14.0	0.57	1.16	1.28	0.71	0.61	1.05	1.17	1.22	0.97	0.74	1.29	1.45	1.51	1.11	0.93	1.57	1.76	1.81	1.33
14.5					0.54	0.95	1.08	1.14	0.87	0.65	1.17	1.33	1.41	1.00	0.81	1.43	1.62	1.69	1.19
15.0					0.48	0.86	0.99	1.07	0.79	0.57	1.06	1.22	1.32	0.90	0.72	1.31	1.49	1.58	1.08
15.5										0.51	0.97	1.13	1.23	0.82	0.64	1.19	1.38	1.48	0.98
16.0										0.45	0.88	1.04	1.16	0.75	0.57	1.08	1.27	1.39	0.89
16.5																			
17.0																			
17.5																			
18.0																			

1B = One brace mid span

2B = Two braces within the span

3B = Three braces within the span

FR = Assumes compression flange fully restrained

ws = Uniformly distributed serviceability load for deflection limit = Span/150 (kN/m)

$\phi_b \ w_u$ = Strength load resistance applied at the centroid (kN/m)

$\phi_b \ M_u$ = Section strength in bending at the F.R. condition (kN.m.)

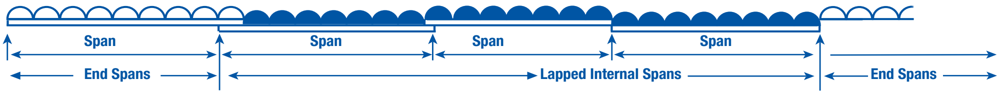
$\phi_v \ V_u$ = Section strength in shear (kN)

NOTE: 1. The tables are based on a total lap length between bolt centres being equal to 10% of the span or 600mm whichever is the greater.
2. Tables assume one flange continuously restrained by roof or wall cladding.

MSS STRENGTH LOAD SPAN TABLE

UNIFORMLY DISTRIBUTED LOAD = $\phi_b w_u$ (kN/m)

LAPPED INTERNAL SPAN



Span	MSS 275/15					MSS 275/18					MSS 300/15					MSS 300/18				
	$\phi_b w_u$ (kN/m)				w_s kN/m	$\phi_b w_u$ (kN/m)				w_s kN/m	$\phi_b w_u$ (kN/m)				w_s kN/m	$\phi_b w_u$ (kN/m)				w_s kN/m
m	1B	2B	3B	FR		1B	2B	3B	FR		1B	2B	3B	FR		1B	2B	3B	FR	
3.0																				
3.5																				
4.0											24.3	24.3	24.3	24.3	65.3	29.3	29.3	29.3	29.3	88.1
4.5	16.8	16.8	16.8	16.8	40.1	20.5	20.5	20.5	20.5	51.4	19.2	19.2	19.2	19.2	48.1	23.2	23.2	23.2	23.2	64.3
5.0	13.6	13.6	13.6	13.6	29.8	16.6	16.6	16.6	16.6	37.7	15.6	15.6	15.6	15.6	36.6	18.8	18.8	18.8	18.8	47.5
5.5	11.3	11.3	11.3	11.3	22.7	13.7	13.7	13.7	13.7	28.5	12.9	12.9	12.9	12.9	28.0	15.5	15.5	15.5	15.5	36.0
6.0	9.45	9.45	9.45	9.45	17.6	11.5	11.5	11.5	11.5	22.0	10.8	10.8	10.8	10.8	22.0	13.0	13.0	13.0	13.0	28.0
6.5	8.06	8.06	8.06	8.06	14.0	9.81	9.81	9.81	9.81	17.4	9.20	9.20	9.20	9.20	17.5	11.1	11.1	11.1	11.1	22.2
7.0	6.84	6.95	6.95	6.95	11.3	8.45	8.46	8.46	8.46	13.9	7.94	7.94	7.94	7.94	14.2	9.6	9.6	9.6	9.6	17.8
7.5	5.82	6.05	6.05	6.05	9.20	7.21	7.37	7.37	7.37	11.3	6.88	6.91	6.91	6.91	11.7	8.34	8.34	8.34	8.34	14.6
8.0	4.99	5.32	5.32	5.32	7.62	6.19	6.48	6.48	6.48	9.32	5.93	6.08	6.08	6.08	9.67	7.25	7.33	7.33	7.33	12.1
8.5	4.30	4.71	4.71	4.71	6.37	5.34	5.74	5.74	5.74	7.77	5.14	5.38	5.38	5.38	8.12	6.30	6.49	6.49	6.49	10.1
9.0	3.71	4.20	4.20	4.20	5.39	4.63	5.12	5.12	5.12	6.55	4.48	4.80	4.80	4.80	6.88	5.50	5.79	5.79	5.79	8.51
9.5	3.22	3.77	3.77	3.77	4.59	4.02	4.59	4.59	4.59	5.57	3.92	4.31	4.31	4.31	5.88	4.83	5.20	5.20	5.20	7.24
10.0	2.80	3.40	3.40	3.40	3.95	3.50	4.15	4.15	4.15	4.77	3.44	3.89	3.89	3.89	5.07	4.25	4.69	4.69	4.69	6.21
10.5	2.43	3.06	3.09	3.09	3.41	3.05	3.76	3.76	3.76	4.12	3.02	3.53	3.53	3.53	4.40	3.75	4.25	4.25	4.25	5.37
11.0	2.12	2.75	2.81	2.81	2.97	2.66	3.40	3.43	3.43	3.59	2.66	3.21	3.21	3.21	3.84	3.32	3.87	3.87	3.87	4.67
11.5	1.84	2.48	2.57	2.57	2.60	2.32	3.07	3.14	3.14	3.14	2.35	2.93	2.94	2.94	3.37	2.94	3.55	3.55	3.55	4.09
12.0	1.59	2.24	2.36	2.36	2.29	2.03	2.77	2.88	2.88	2.76	2.07	2.65	2.70	2.70	2.98	2.60	3.24	3.26	3.26	3.60
12.5	1.38	2.03	2.18	2.18	2.03	1.76	2.52	2.65	2.65	2.44	1.83	2.41	2.49	2.49	2.64	2.30	2.95	3.00	3.00	3.18
13.0	1.19	1.84	2.00	2.01	1.80	1.53	2.29	2.45	2.45	2.17	1.61	2.20	2.30	2.30	2.36	203	2.70	2.77	2.77	2.83
13.5	1.04	1.67	1.84	1.87	1.61	1.33	2.08	2.27	2.28	1.94	1.41	2.01	2.13	2.13	2.11	1.79	2.47	2.57	2.57	2.53
14.0	0.91	1.52	1.69	1.74	1.44	1.17	1.90	2.09	2.12	1.74	1.24	1.84	1.98	1.98	1.90	1.58	2.26	2.39	2.39	2.26
14.5	0.80	1.39	1.55	1.62	1.30	1.03	1.73	1.92	1.97	1.57	1.10	1.68	1.84	1.85	1.71	1.39	2.08	2.23	2.23	2.04
15.0	0.71	1.26	1.43	1.51	1.17	0.91	1.58	1.78	1.84	1.41	0.97	1.55	1.70	1.73	1.54	1.23	1.91	2.08	2.08	1.84
15.5	0.63	1.15	1.32	1.42	1.06	0.80	1.44	1.64	1.73	1.28	0.86	1.42	1.57	1.62	1.40	1.09	1.76	1.93	1.95	1.67
16.0	0.56	1.05	1.22	1.33	0.97	0.71	1.32	1.52	1.62	1.17	0.77	1.31	1.46	1.52	1.27	0.97	1.62	1.79	1.83	1.52
16.5	0.50	0.96	1.13	1.25	0.88	0.64	1.21	1.41	1.52	1.06	0.69	1.20	1.36	1.43	1.16	0.87	1.50	1.67	1.72	1.38
17.0	0.45	0.88	1.05	1.18	0.81	0.57	1.11	1.31	1.43	0.97	0.62	1.11	1.26	1.35	1.06	0.78	1.38	1.55	1.62	1.26
17.5	0.40	0.80	0.97	1.11	0.74	0.51	1.01	1.21	1.35	0.89	0.55	1.02	1.18	1.27	0.97	0.70	1.28	1.45	1.53	1.16
18.0	0.36	0.73	0.90	1.05	0.68	0.46	0.93	1.13	1.28	0.82	0.50	0.94	1.10	1.20	0.89	0.63	1.18	1.35	1.45	1.07

1B = One brace mid span

2B = Two braces within the span

3B = Three braces within the span

FR = Assumes compression flange fully restrained

ws = Uniformly distributed serviceability load for deflection limit = Span/150 (kN/m)

$\phi_b w_u$ = Strength load resistance applied at the centroid (kN/m)

$\phi_b M_u$ = Section strength in bending at the F.R. condition (kN.m.)

$\phi_v V_u$ = Section strength in shear (kN)

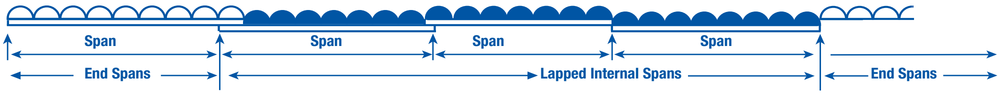
NOTE: 1. The tables are based on a total lap length between bolt centres being equal to 10% of the span or 600mm whichever is the greater.
2. Tables assume one flange continuously restrained by roof or wall cladding.

Metalcraft ROOFING

MSS STRENGTH LOAD SPAN TABLE

UNIFORMLY DISTRIBUTED LOAD = $\phi_b\, w_u$ (kN/m)

LAPPED INTERNAL SPAN



Span	MSS 325/15					MSS 325/18					MSS 350/18					MSS 400/20				
	$\phi_b w_u$ (kN/m)				w_s kN/m	$\phi_b w_u$ (kN/m)				w_s kN/m	$\phi_b w_u$ (kN/m)				w_s kN/m	$\phi_b w_u$ (kN/m)				w_s kN/m
m	1B	2B	3B	FR		1B	2B	3B	FR		1B	2B	3B	FR		1B	2B	3B	FR	
3.0																				
3.5																				
4.0											36.4	36.4	36.4	36.4	119	52.0	52.0	52.0	52.0	189
4.5	20.9	20.9	20.9	20.9	54.4	25.5	25.5	25.5	25.5	74.6	28.8	28.8	28.8	28.8	88.0	41.0	41.0	41.0	41.0	139
5.0	16.9	16.9	16.9	16.9	41.4	20.7	20.7	20.7	20.7	56.4	23.3	23.3	23.3	23.3	67.0	33.2	33.2	33.2	33.2	105
5.5	14.0	14.0	14.0	14.0	32.4	17.1	17.1	17.1	17.1	43.1	19.3	19.3	19.3	19.3	52.0	27.5	27.5	27.5	27.5	81.0
6.0	11.7	11.7	11.7	11.7	25.4	14.4	14.4	14.4	14.4	33.7	16.2	16.2	16.2	16.2	40.0	23.1	23.1	23.1	23.1	63.0
6.5	10.0	10.0	10.0	10.0	20.3	12.2	12.2	12.2	12.2	26.8	13.8	13.8	13.8	13.8	32.0	19.7	19.7	19.7	19.7	50.0
7.0	8.63	8.63	8.63	8.63	16.5	10.6	10.6	10.6	10.6	21.6	11.9	11.9	11.9	11.9	26.0	17.0	17.0	17.0	17.0	40.0
7.5	7.48	7.51	7.51	7.51	13.6	9.19	9.19	9.19	9.19	17.6	10.4	10.4	10.4	10.4	21.0	14.8	14.8	14.8	14.8	33.0
8.0	6.44	6.60	6.60	6.60	11.4	8.00	8.08	8.08	8.08	14.6	9.06	9.10	9.10	9.10	17.0	12.9	13.0	13.0	13.0	27.0
8.5	5.58	5.85	5.85	5.85	9.57	6.95	7.15	7.15	7.15	12.2	7.88	8.06	8.06	8.06	15.0	11.2	11.5	11.5	11.5	23.0
9.0	4.86	5.22	5.22	5.22	8.15	6.07	6.38	6.38	6.38	10.3	6.88	7.19	7.19	7.19	12.0	9.82	10.3	10.3	10.3	19.0
9.5	4.25	4.68	4.68	4.68	6.99	5.32	5.73	5.73	5.73	8.79	6.04	6.46	6.46	6.46	10.5	8.62	9.21	9.21	9.21	16.0
10.0	3.73	4.23	4.23	4.23	6.05	4.69	5.17	5.17	5.17	7.55	5.33	5.83	5.83	5.83	9.10	7.60	8.31	8.31	8.31	14.0
10.5	3.28	3.83	3.83	3.83	5.26	4.14	4.69	4.69	4.69	6.53	4.71	5.28	5.28	5.28	7.80	6.71	7.54	7.54	7.54	12.0
11.0	2.89	3.49	3.49	3.49	4.59	3.66	4.27	4.27	4.27	5.68	4.17	4.81	4.81	4.81	6.82	5.94	6.87	6.87	6.87	10.5
11.5	2.55	3.18	3.20	3.20	4.03	3.24	3.91	3.91	3.91	4.97	3.70	4.41	4.41	4.41	5.98	5.27	6.28	6.28	6.28	9.22
12.0	2.25	2.88	2.94	2.94	3.56	2.88	3.58	3.59	3.59	4.38	3.29	4.05	4.05	4.05	5.26	4.68	5.77	5.77	5.77	8.12
12.5	1.98	2.62	2.71	2.71	3.16	2.55	3.26	3.31	3.31	3.87	2.92	3.69	3.73	3.73	4.66	4.16	5.26	5.32	5.32	7.18
13.0	1.74	2.39	2.50	2.50	2.82	2.26	2.97	3.06	3.06	3.44	2.59	3.37	3.45	3.45	4.14	3.69	4.81	4.92	4.92	6.38
13.5	1.53	2.18	2.32	2.32	2.52	2.00	2.72	2.84	2.84	3.07	2.30	3.08	3.20	3.20	3.70	3.27	4.40	4.56	4.56	5.70
14.0	1.35	1.99	2.16	2.16	2.27	1.77	2.49	2.64	2.64	2.76	2.04	2.83	2.97	2.97	3.31	2.88	4.03	4.24	4.24	5.11
14.5	1.19	1.83	2.00	2.01	2.05	1.56	2.29	2.46	2.46	2.48	1.80	2.60	2.77	2.77	2.98	2.54	3.71	3.95	3.95	4.60
15.0	1.06	1.68	1.85	1.88	1.85	1.38	2.10	2.29	2.30	2.24	1.59	2.39	2.59	2.59	2.69	2.24	3.41	3.69	3.69	4.16
15.5	0.94	1.54	1.71	1.76	1.68	1.22	1.94	2.12	2.15	2.03	1.41	2.20	2.41	2.42	2.44	1.98	3.14	3.43	3.46	3.77
16.0	0.84	1.42	1.59	1.65	1.53	1.09	1.79	1.97	2.02	1.85	1.25	2.03	2.24	2.28	2.22	1.76	2.90	3.19	3.25	3.42
16.5	0.76	1.30	1.47	1.55	1.40	0.97	1.65	1.84	1.90	1.68	1.12	1.88	2.08	2.14	2.02	1.57	2.68	2.97	3.05	3.12
17.0	0.68	1.20	1.37	1.46	1.28	0.87	1.52	1.71	1.79	1.54	1.00	1.74	1.94	2.02	1.85	1.41	2.47	2.77	2.87	2.86
17.5	0.61	1.11	1.28	1.38	1.17	0.78	1.41	1.60	1.69	1.41	0.90	1.61	1.81	1.90	1.70	1.26	2.29	2.58	2.71	2.62
18.0	0.55	1.02	1.19	1.30	1.08	0.71	1.30	1.49	1.60	1.30	0.81	1.49	1.69	1.80	1.56	1.14	2.12	2.41	2.56	2.41

1B = One brace mid span
2B = Two braces within the span
3B = Three braces within the span
FR = Assumes compression flange fully restrained

ws = Uniformly distributed serviceability load for deflection limit = Span/150 (kN/m)
$\phi_b\, w_u$ = Strength load resistance applied at the centroid (kN/m)
$\phi_b\, M_u$ = Section strength in bending at the F.R. condition (kN.m.)
$\phi_v\, V_u$ = Section strength in shear (kN)

NOTE: 1. The tables are based on a total lap length between bolt centres being equal to 10% of the span or 600mm whichever is the greater.
2. Tables assume one flange continuously restrained by roof or wall cladding.

MSS STRENGTH LOAD SPAN TABLE

AXIAL LOAD (kN) = $\phi_c N_{uc}$

SINGLE SPAN

Span	MSS 150/12				MSS 150/15				MSS 150/18				MSS 200/12				MSS 200/15			
	$\phi_c N_{uc}$			N_e	$\phi_c N_{uc}$			N_e	$\phi_c N_{uc}$			N_e	$\phi_c N_{uc}$			N_e	$\phi_c N_{uc}$			N_e
m	1B	2B	FR		1B	2B	FR		1B	2B	FR		1B	2B	FR		1B	2B	FR	
3.0	74.4	86.7	102	305	96.6	115	138	377	113.3	135.0	175	447	102	113	124	651	140	157	172	807
3.5	59.3	74.0	94.4	224	74.3	96.2	128	277	89.0	113	160	329	89.3	103	119	479	122	142	165	593
4.0	46.6	61.0	86.4	172	57.1	76.8	116	212	68.6	91.4	145	252	76.4	92.0	113	366	102	126	157	454
4.5	37.0	49.3	78.0	135	45.3	60.8	104	168	54.6	72.7	129	199	63.9	81.0	107	289	82.5	109	149	359
5.0	30.0	40.2	69.7	110	36.9	49.4	91.3	136	44.6	59.1	113	161	53.3	70.1	101	235	67.1	92.0	140	291
5.5	24.9	33.3	61.3	90.7	30.7	40.9	79.0	112	37.1	49.0	97.7	133	44.9	60.1	94.0	194	55.6	76.8	130	240
6.0	21.1	28.0	52.5	76.2	25.9	34.5	66.3	94.3	31.5	41.4	83.2	112	38.1	51.5	87.6	163	46.9	64.7	121	202
6.5	17.9	23.9	45.4	64.9	22.2	29.5	56.0	80.4	27.1	35.4	70.9	95.3	32.5	44.6	80.8	139	40.0	55.2	111	172
7.0	15.5	20.7	39.3	56.0	19.3	25.5	48.7	69.3	23.6	30.7	61.2	82.2	28.1	38.7	74.0	120	34.7	47.7	100	148
7.5	13.6	18.0	34.2	48.8	16.9	22.3	42.4	60.4	20.8	26.9	53.3	71.6	24.5	33.8	67.2	104	30.3	41.6	89.5	129
8.0	12.0	15.9	30.0	42.9	15.0	19.7	37.2	53.1	18.4	23.8	46.8	62.9	21.6	29.7	60.7	91.6	26.8	36.7	79.5	114
8.5	10.7	14.1	26.6	38.0	13.4	17.5	33.0	47.0	16.5	21.1	41.5	55.7	19.2	26.4	54.8	81.1	23.8	32.6	70.5	101
9.0	9.6	12.6	23.8	33.9	12.0	15.7	29.4	41.9	14.9	19.0	37.0	49.7	17.2	23.6	49.5	72.4	21.4	29.1	63.0	89.7
9.5	8.6	11.4	21.3	30.4	10.9	14.1	26.4	37.6	13.6	17.2	33.2	44.6	15.5	21.2	44.8	65.0	19.3	26.2	57.0	80.5
10.0					9.92	12.8	23.9	34.0	12.4	15.6	30.0	40.3	14.0	19.1	40.8	58.6	17.5	23.7	50.9	72.6
10.5					9.08	11.7	21.6	30.8	11.4	14.2	27.2	36.5	12.8	17.4	37.2	53.2	15.9	21.6	46.2	65.9
11.0					8.35	10.7	19.7	28.1	10.5	13.1	24.8	33.3	11.7	15.9	33.9	48.5	14.6	19.7	42.1	60.0
11.5									9.7	12.0	22.7	30.4	10.7	14.6	31.0	44.3	13.4	18.1	38.5	54.9
12.0									9.1	11.1	20.8	28.0	9.87	13.4	28.5	40.7	12.4	16.7	35.3	50.4
12.5																	11.5	15.4	32.6	46.5
13.0																	10.7	14.3	30.1	43.0
13.5																				
14.0																				
14.5																				
15.0																				
15.5																				
16.0																				
16.5																				
17.0																				
17.5																				
18.0																				

FR — Assumes both flanges fully restrained and using r_x

OFR — Assumes compression flange only fully restrained. Refer to AS/NZS 4600, 3.4.7

Ne — Euler buckling capacity about the X-X axis of symmetry (kN)

Φ_C — = .85

N_{uc} — Strength resistance axial compressive load (kN)

Metalcraft ROOFING

MSS STRENGTH LOAD SPAN TABLE

AXIAL LOAD (kN) = $\phi_c N_{uc}$

SINGLE SPAN

Span	MSS 200/18				MSS 250/13					MSS 250/15					MSS 250/18				
	$\phi_c N_{uc}$			N_e	$\phi_c N_{uc}$				N_e	$\phi_c N_{uc}$				N_e	$\phi_c N_{uc}$				N_e
m	1B	2B	FR		1B	2B	3B	FR		1B	2B	3B	FR		1B	2B	3B	FR	
3.0	168	188	208	961	142	153	159	159	1300										
3.5	145	170	200	706	130	143	151	155	957										
4.0	120	150	190	540	117	133	143	150	733	144	164	177	186	843	178	203	218	227	1010
4.5	97.5	129	180	427	104	122	134	145	597	128	151	165	179	666	158	186	205	220	793
5.0	79.3	109	168	346	91.1	111	124	139	469	111	137	153	172	539	138	169	190	212	643
5.5	65.8	90.8	156	286	78.7	99.9	115	133	388	94.7	123	141	165	446	117	152	175	204	531
6.0	55.6	76.5	144	240	68.3	88.9	105	127	326	81.7	108	129	157	375	99.4	135	160	195	446
6.5	47.6	65.3	132	205	59.6	78.6	95.1	120	278	70.8	94.6	117	149	319	85.5	117	144	184	380
7.0	41.3	56.5	119	176	52.6	69.7	85.4	114	239	61.7	83.4	104	141	275	73.9	102	129	175	328
7.5	36.2	49.3	106	154	46.6	62.0	76.7	107	208	54.2	74.0	92.3	132	240	64.6	89.3	114	164	286
8.0	32.0	43.5	94.7	135	41.3	55.5	69.0	100	183	48.0	65.5	82.6	124	211	56.9	78.7	101	153	251
8.5	28.5	38.7	83.8	120	36.9	50.0	62.2	93.3	162	42.6	58.5	74.3	115	187	50.6	70.0	90.0	143	222
9.0	25.6	34.6	74.8	107	33.1	45.1	56.5	86.6	145	38.1	52.5	66.8	106	166	45.3	62.4	80.3	133	198
9.5	23.2	31.2	67.1	95.8	29.8	40.8	51.5	79.8	130	34.2	47.3	60.3	97.0	149	40.8	56.1	72.1	122	178
10.0	21.1	28.3	60.5	86.5	27.0	37.0	47.0	73.7	117	31.0	42.7	54.7	89.1	135	37.0	50.8	65.2	110	161
10.5	19.3	25.7	54.9	78.4	24.5	33.8	42.9	68.1	106	28.2	38.8	49.9	82.0	122	33.7	46.1	59.2	102	146
11.0	17.7	23.6	50.0	71.5	22.4	30.9	39.3	63.0	96.9	25.8	35.4	45.5	75.7	111	30.8	42.1	54.0	92.5	133
11.5	16.3	21.6	45.8	65.4	20.5	28.3	36.1	58.4	88.7	23.6	32.5	41.6	70.0	102	28.3	38.6	49.5	85.1	122
12.0	15.1	20.0	42.0	60.0	19.0	26.0	33.3	54.2	81.4	21.8	29.9	38.3	64.6	93.6	26.1	35.6	45.5	78.2	112
12.5	14.1	18.5	38.7	55.3	17.5	24.0	30.8	50.6	75.0	20.1	27.6	35.3	59.8	86.3	24.2	32.9	42.0	72.1	103
13.0	13.1	17.2	35.8	51.2	16.2	22.2	28.5	47.3	69.4	18.7	25.5	32.7	55.5	79.8	22.5	30.5	38.8	66.6	95.1
13.5	12.3	16.0	34.7	47.4	15.0	20.6	26.4	46.1	64.3	17.4	23.7	30.3	53.8	74.0	21.0	28.3	36.1	64.5	88.2
14.0	11.5	15.0	32.2	44.1	14.0	19.2	24.6	43.6	59.8	16.2	22.1	28.2	50.3	68.8	19.6	26.4	33.6	59.9	82.0
14.5					13.1	17.9	23.0	40.2	55.8	15.2	20.6	26.3	46.8	64.1	18.4	24.7	31.3	55.5	76.4
15.0					12.3	16.8	21.4	37.7	52.1	14.2	19.3	24.6	43.8	59.9	17.3	23.1	29.3	52.1	71.4
15.5										13.4	18.1	23.1	41.1	56.1	16.3	21.7	27.5	49.0	66.9
16.0										12.6	17.0	21.7	38.5	52.7	15.3	20.5	25.9	45.9	62.8
16.5															14.5	19.3	24.4	43.1	59.0
17.0																			
17.5																			
18.0																			

FR Assumes both flanges fully restrained and using r_x

OFR Assumes compression flange only fully restrained. Refer to AS/NZS 4600, 3.4.7

Ne Euler buckling capacity about the X-X axis of symmetry (kN)

ϕ_c = .85

N_{uc} Strength resistance axial compressive load (kN)

Metalcraft ROOFING

Date: February 2011

MSS STRENGTH LOAD SPAN TABLE

AXIAL LOAD (kN) = $\phi_c N_{uc}$

SINGLE SPAN

Span	MSS 275/15					MSS 275/18					MSS 300/15					MSS 300/18				
	$\phi_c N_{uc}$				N_e	$\phi_c N_{uc}$				N_e	$\phi_c N_{uc}$				N_e	$\phi_c N_{uc}$				N_e
m	1B	2B	3B	FR		1B	2B	3B	FR		1B	2B	3B	FR		1B	2B	3B	FR	
3.0																				
3.5																				
4.0																				
4.5	140	162	176	200	863	177	205	221	249	1040										
5.0	125	149	165	194	699	157	188	208	241	843	145	167	181	194	926	183	209	226	254	1100
5.5	109	136	154	187	577	138	172	194	233	697	130	155	171	188	763	164	195	214	247	907
6.0	93.9	123	143	179	485	119	155	180	225	586	116	143	161	181	641	146	180	202	240	762
6.5	82.1	109	131	172	413	103	139	165	216	499	102	131	150	176	546	129	165	190	232	649
7.0	72.5	96.6	120	164	357	89.8	123	151	207	430	90.3	119	140	168	471	114	150	176	224	560
7.5	64.1	86.0	108	156	311	79.1	108	137	197	375	80.5	107	129	162	411	101	135	163	215	488
8.0	56.9	77.2	96.5	147	273	70.2	96.1	123	186	329	72.3	95.9	118	154	360	89.6	121	149	207	428
8.5	50.8	69.6	87.2	139	242	62.8	85.9	110	176	292	65.3	86.6	108	147	320	80.7	109	136	198	380
9.0	45.8	62.6	79.1	130	216	56.3	77.3	98.8	165	260	59.3	78.8	98.0	140	285	72.2	98.6	124	189	339
9.5	41.4	56.7	72.2	122	194	50.7	69.9	89.4	155	234	53.7	72.0	89.6	133	256	65.4	89.2	113	179	304
10.0	37.7	51.5	65.9	114	175	45.9	63.6	81.2	144	211	48.8	66.0	82.2	125	231	59.5	81.1	104	169	274
10.5	34.4	47.1	60.2	105	158	41.8	57.9	74.2	134	191	44.6	60.8	75.8	118	210	54.4	74.1	94.5	159	249
11.0	31.5	43.2	55.2	96.9	144	38.2	52.9	68.0	124	174	41.0	56.1	70.1	110	191	49.9	68.0	86.7	149	227
11.5	28.9	39.8	50.8	89.9	132	35.1	48.5	62.6	114	159	37.8	51.5	65.0	103	174	45.8	62.7	79.8	140	207
12.0	26.6	36.7	46.9	83.6	121	32.3	44.6	57.7	105	146	35.0	47.6	60.5	95.9	161	42.2	57.9	73.8	130	191
12.5	24.6	34.1	43.5	78.0	112	29.9	41.2	53.2	97.5	135	32.4	44.1	56.2	90.2	148	39.0	53.7	68.4	121	176
13.0	22.8	31.5	40.4	73.0	103	27.8	38.2	49.2	90.6	125	30.2	41.0	52.2	84.2	136	36.1	50.0	63.6	114	162
13.5	21.2	29.3	37.7	68.3	95.9	25.8	35.5	45.7	84.4	116	28.1	38.3	48.8	82.4	127	33.6	46.4	59.3	107	151
14.0	19.7	27.3	35.2	63.8	89.1	24.1	33.0	42.5	78.9	108	26.2	35.8	45.5	77.5	118	31.3	43.2	55.4	99.7	140
14.5	18.5	25.5	32.9	59.8	83.1	22.6	30.9	39.7	73.8	100	24.4	33.5	42.6	73.1	110	29.3	40.3	51.9	98.4	131
15.0	17.3	23.8	30.8	56.1	77.6	21.2	28.9	37.1	69.3	93.7	22.9	31.5	40.0	69.0	103	27.5	37.7	48.6	87.6	122
15.5	16.3	22.4	28.8	52.7	72.7	20.0	27.1	34.8	65.1	87.8	21.5	29.6	37.7	65.3	96	25.8	35.4	45.6	82.4	114
16.0	15.3	21.0	27.1	49.7	68.2	18.8	25.5	32.7	61.3	82.4	20.2	28.0	35.5	61.8	90	24.3	33.3	42.8	77.7	107
16.5	14.4	19.8	25.5	46.9	64.2	17.8	24.1	30.8	57.7	77.4	19.0	26.2	33.5	58.8	85	22.9	31.3	40.3	73.3	101
17.0	13.7	18.7	24.0	44.4	60.5	16.8	22.7	29.1	54.4	73.0	18.0	24.8	31.7	55.6	80	21.7	29.6	38.0	69.4	94.9
17.5	12.9	17.7	22.7	42.0	57.0	16.0	21.5	27.5	51.3	68.8	17.0	23.4	30.1	52.6	75	20.5	28.0	35.9	65.7	89.6
18.0	12.3	16.7	21.5	39.8	53.9	15.2	20.4	26.0	48.5	65.1	16.1	22.1	28.5	50.0	71	19.5	26.5	33.9	62.3	84.7

FR Assumes both flanges fully restrained and using r_x

OFR Assumes compression flange only fully restrained. Refer to AS/NZS 4600, 3.4.7

Ne Euler buckling capacity about the X-X axis of symmetry (kN)

Φ_C = .85

N_{UC} Strength resistance axial compressive load (kN)

MSS STRENGTH LOAD SPAN TABLE

AXIAL LOAD (kN) = $\phi_c N_{uc}$

SINGLE SPAN

Span	MSS 325/15					MSS 325/18					MSS 350/18					MSS 400/20				
	$\phi_c N_{uc}$				N_e	$\phi_c N_{uc}$				N_e	$\phi_c N_{uc}$				N_e	$\phi_c N_{uc}$				N_e
m	1B	2B	3B	FR		1B	2B	3B	FR		1B	2B	3B	FR		1B	2B	3B	FR	
3.0																				
3.5																				
4.0																				
4.5	183	198	205	217	1370	211	233	247	270	1650										
5.0	171	189	198	212	1110	194	220	237	265	1340	207	232	247	257	1610	261	289	306	316	2480
5.5	159	180	190	207	917	178	207	226	259	1100	191	219	237	251	1330	243	275	296	310	2050
6.0	147	170	182	201	770	161	193	215	252	928	175	206	227	246	1120	225	261	284	305	1720
6.5	135	160	173	195	656	144	180	203	245	791	159	193	215	240	950	206	247	272	299	1470
7.0	123	150	164	188	566	127	166	191	238	682	142	180	204	234	819	186	232	260	292	1260
7.5	111	140	155	182	493	113	151	179	230	594	126	166	193	227	714	167	216	248	286	1100
8.0	101	130	146	175	433	101	136	166	222	522	113	152	181	220	627	149	200	235	279	968
8.5	92.1	120	137	168	384	90.0	123	154	214	462	101	138	169	213	556	134	184	222	272	857
9.0	84.2	110	128	161	342	81.0	112	141	205	412	91.4	125	157	206	496	121	168	208	264	765
9.5	76.8	101	119	153	307	73.3	101	129	197	370	82.8	114	144	198	445	109	153	194	257	686
10.0	70.4	93.8	110	146	277	66.7	92.1	118	188	334	75.4	104	133	191	402	99.8	139	180	249	619
10.5	64.8	87.0	102	139	252	61.0	84.1	109	180	303	69.0	95.2	122	183	364	91.4	127	166	241	562
11.0	59.6	80.5	95.1	131	229	56.0	77.2	99.6	171	276	63.4	87.4	113	175	332	84.1	117	153	233	512
11.5	54.9	74.7	88.8	124	210	51.6	71.1	91.7	162	253	58.5	80.6	104	167	304	77.7	108	141	225	469
12.0	50.7	69.5	82.9	117	193	47.6	65.7	84.7	154	232	54.2	74.5	96.2	160	279	72.0	100	131	216	430
12.5	46.9	64.9	77.4	110	177	44.0	61.0	78.5	144	214	50.3	69.2	89.2	151	257	67.0	93.0	121	208	396
13.0	43.6	60.5	72.4	104	164	40.8	56.7	73.0	135	198	46.9	64.4	83.0	143	238	62.5	86.6	113	199	366
13.5	40.6	56.4	67.9	97.8	152	37.9	52.9	68.1	127	183	43.8	60.1	77.4	141	220	58.5	81.0	106	198	340
14.0	38.0	52.7	63.8	92.5	142	35.4	49.4	63.6	119	170	41.0	56.3	72.4	132	205	55.0	75.8	98.8	189	316
14.5	35.6	49.4	59.9	87.6	132	33.1	46.1	59.6	112	159	38.5	52.8	67.9	124	191	51.6	71.2	92.7	179	295
15.0	33.4	46.4	56.3	82.9	123	31.0	43.2	56.0	105	148	36.3	49.6	63.8	118	178	48.6	67.1	87.2	170	275
15.5	31.4	43.7	52.9	78.4	115	29.1	40.5	52.7	99.1	139	34.1	46.8	60.1	112	167	45.8	63.2	82.2	162	258
16.0	29.5	41.2	49.9	74.3	108	27.4	38.1	49.6	93.3	130	32.1	44.1	56.7	105	157	43.2	59.8	77.6	153	242
16.5	27.8	38.9	47.1	70.5	102	25.8	35.8	46.7	88.1	123	30.2	41.8	53.6	99.0	147	40.8	56.6	73.4	144	228
17.0	26.2	36.8	44.6	67.0	96.0	24.4	33.8	44.0	83.3	116	28.6	39.5	50.8	94.0	139	38.6	53.7	69.6	136	214
17.5	24.8	34.8	42.2	63.8	90.6	23.1	32.0	41.6	78.9	109	27.0	37.5	48.1	89.0	131	36.6	51.0	66.1	129	202
18.0	23.4	33.1	40.1	60.7	85.6	21.9	30.3	39.3	74.9	103	25.6	35.6	45.7	84.5	124	34.8	48.5	62.8	122	191

FR — Assumes both flanges fully restrained and using r_x

OFR — Assumes compression flange only fully restrained. Refer to AS/NZS 4600, 3.4.7

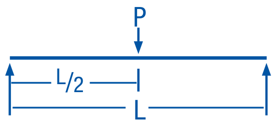
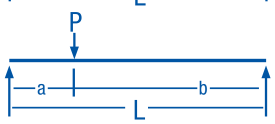
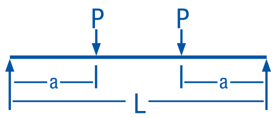
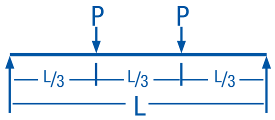
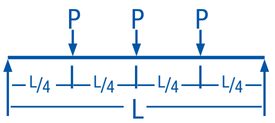
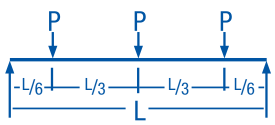
Ne — Euler buckling capacity about the X-X axis of symmetry (kN)

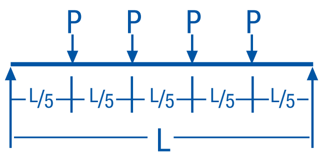
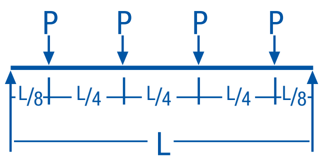
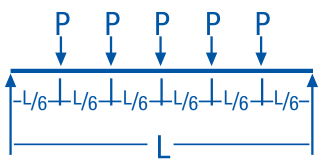
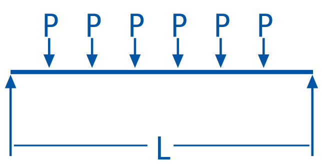
Φ_C — = .85

N_{uc} — Strength resistance axial compressive load (kN)

POINT LOAD EQUIVALENT FORMULAE

MSS UNIFORM LOADING EQUIVALENTS FOR POINT LOADS SINGLE SPAN PURLINS

Loading (kN)	Equivalent UDL w (kN/m)
	$\frac{2P}{L}$
	$\frac{8Pab}{L^3}$
	$\frac{8Pa}{L^2}$
	$\frac{8P}{3L}$
	$\frac{4P}{L}$
	$\frac{P}{0{\cdot}3L}$

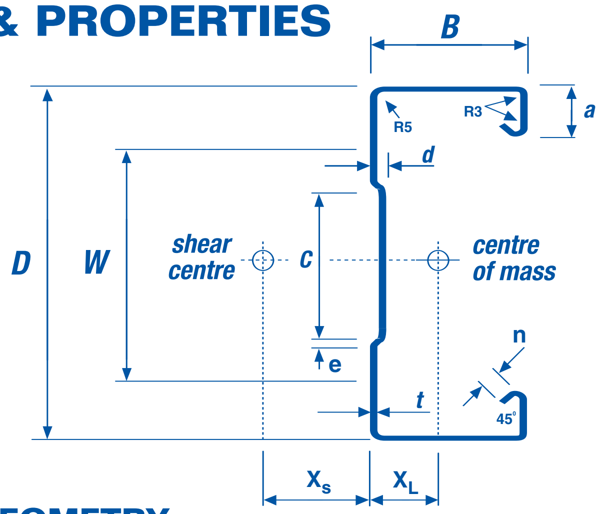
Loading (kN)	Equivalent UDL w (kN/m)
	$\frac{4{\cdot}8P}{L}$
	$\frac{4P}{L}$
	$\frac{6P}{L}$
	$\frac{6{\cdot}86P}{L}$

KEY

P = Point load kN
L = Span (metres)
w = Uniformly distributed load (kN/m)
a = Length in metres (as shown)
b = Length in metres (as shown)

NOTES

MSS SECTION GEOMETRY & PROPERTIES



MSS PURLINS & GIRTS – SECTION GEOMETRY

CODE	D X B mm	t mm	Mass kg/m	Area mm^2	a mm	n mm	c mm	d mm	e mm	X_S mm	X_L mm	W mm
MSS 150/12	150 x 65	1.15	3.00	382	24	11	32.5	4.00	6	39.4	25.6	80
150/15	150 x 65	1.45	3.79	475	24	11	32.5	4.00	6	38.9	25.5	80
150/18	150 x 65	1.75	4.60	587	24	11	32.5	4.00	6	38.4	24.4	80
MSS 200/12	200 x 75	1.15	3.68	469	25	12	69.5	4.80	6.5	44.1	26.9	120
200/15	200 x 75	1.45	4.64	584	25	12	69.5	4.80	6.5	43.7	26.7	120
200/18	200 x 75	1.75	5.61	697	25	12	69.5	4.80	6.5	43.1	26.6	120
MSS 250/13	250 x 85	1.25	4.80	624	33	12	107	6.55	8	50.5	29.9	160
250/15	250 x 85	1.45	5.58	719	33	12	107	6.55	8	50.2	29.8	160
250/18	250 x 85	1.75	6.73	860	33	12	107	6.55	8	49.7	29.6	160
MSS 275/15	275 x 90	1.45	6.08	775	33	12	130	7.00	8	52.0	30.6	180
275/18	275 x 90	1.75	7.36	937	33	12	130	7.00	8	50.8	30.7	180
MSS 300/15	300 x 100	1.45	6.60	853	37	12	146	7.55	9	57.3	34.0	200
300/18	300 x 100	1.75	7.96	1020	37	12	146	7.55	9	56.8	33.9	200
MSS 325/15	325 x 100	1.45	6.98	889	37	12	150	7.55	9	55.8	32.7	220
325/18	325 x 100	1.75	8.41	1070	37	12	150	7.55	9	54.8	32.7	220
MSS 350/18	350 x 100	1.75	8.91	1130	43	12	179	7.55	9	56.8	32.8	240
MSS 400/20	400 x 100	1.95	10.9	1390	48	12	227	7.55	9	56.5	31.5	280

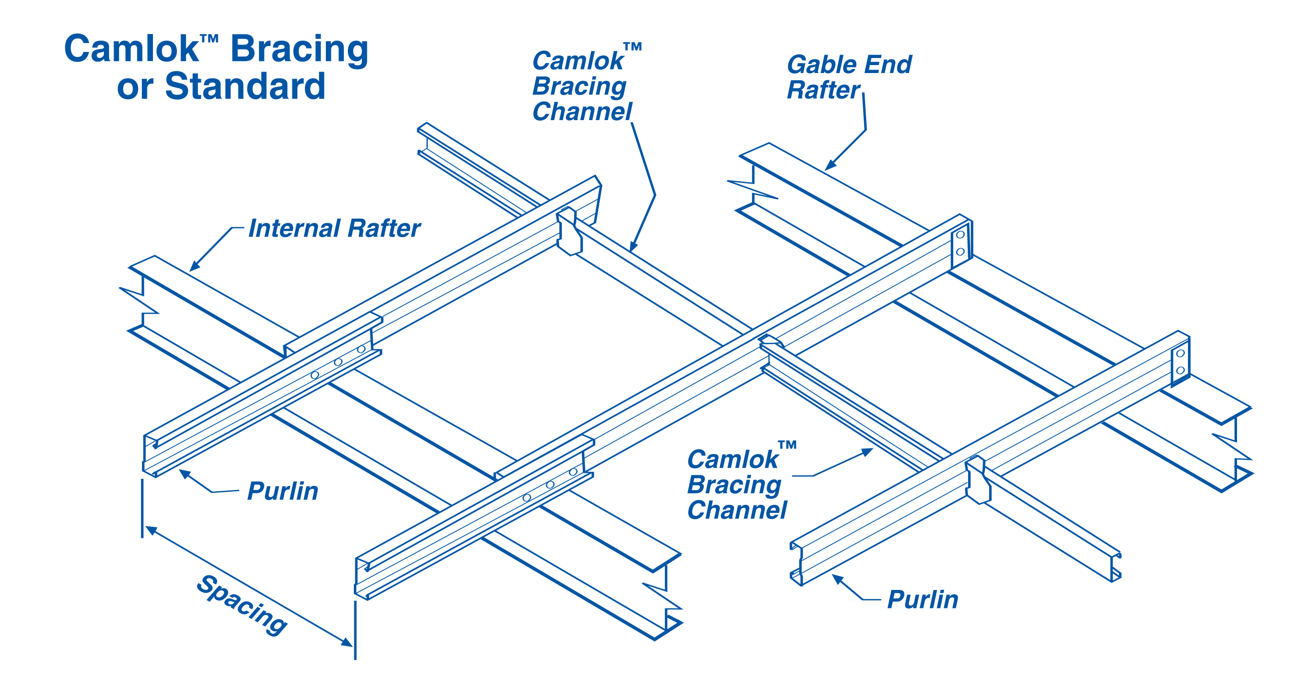
NOTES: 1. All dimensions are nominal within rolling tolerances 2. W = standard hole centres

MSS PURLINS & GIRTS – SECTION PROPERTIES

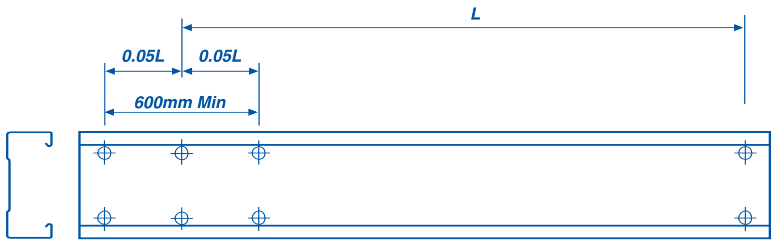
CODE	AREA	WEIGHT	SECOND MOMENT OF AREA		SECTION MODULUS		RADIUS OF GYRATION		TORSION CONSTANT	WARPING FACTOR
	mm^2	kN/m	I_x 10^6mm^4	I_y 10^6mm^4	Z_x 10^3mm^3	Z_y 10^3mm^3	r_x mm	r_y mm	J mm^4	Iw 10^9mm^6
MSS 150/12	382	0.030	1.39	0.25	18.6	6.32	60.3	25.5	169	1.66
150/15	475	0.037	1.72	0.31	23.0	7.73	60.2	25.3	334	1.97
150/18	587	0.046	2.04	0.38	27.2	9.30	58.9	25.3	599	2.24
MSS 200/12	469	0.036	2.97	0.39	29.7	8.12	79.5	28.9	207	4.04
200/15	584	0.046	3.68	0.48	36.8	9.97	79.4	28.7	410	4.84
200/18	697	0.055	4.38	0.57	43.8	11.7	79.3	28.5	711	5.57
MSS 250/13	624	0.047	5.94	0.67	47.5	12.1	97.6	32.7	325	10.9
250/15	719	0.055	6.83	0.76	54.7	13.8	97.5	32.6	504	12.3
250/18	860	0.066	8.14	0.90	65.2	16.3	97.3	32.4	878	14.3
MSS 275/15	776	0.061	8.85	0.91	64.4	15.3	107	34.4	543	17.0
275/18	937	0.074	10.7	1.10	77.7	18.6	107	34.3	956	20.0
MSS 300/15	853	0.065	11.7	1.23	77.6	18.6	117	37.9	598	27.8
MSS 300/18	1020	0.078	13.9	1.46	92.7	22.0	117	37.8	1040	32.4
MSS 325/15	888	0.070	14.1	1.29	86.5	19.1	126	38.1	623	32.4
325/18	1070	0.084	16.9	1.50	104	23.1	126	38.1	1090	38.2
MSS 350/18	1130	0.087	20.3	1.62	116	24.1	134	37.9	1150	49.5
MSS 400/20	1390	0.106	31.4	1.93	157	28.1	151	37.5	1740	77.6

NOTES: Section Properties (Based on full unreduced sections)

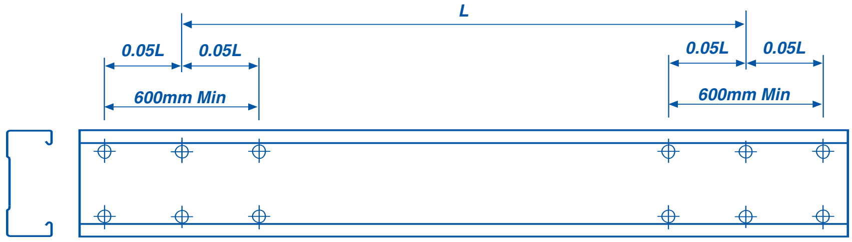
LAPPED MSS PURLINS WITH SINGLE BRACING



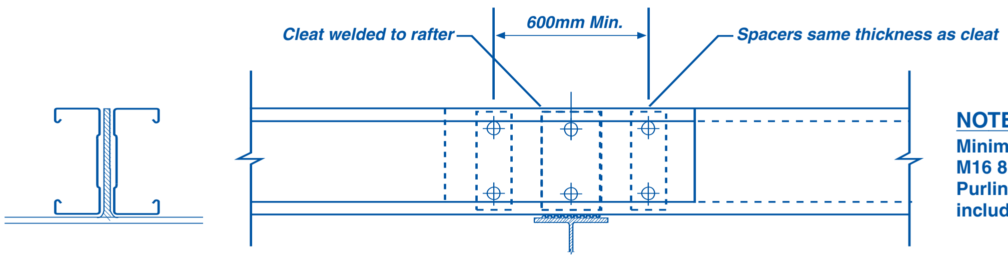
LAPPED MSS PURLINS BOLTING PROCEDURE



DOUBLE LAPPED PURLINS – END SPAN



LAPPED PURLINS – INTERNAL SPAN
Hole positions for intermediate braces as for the single span purlins



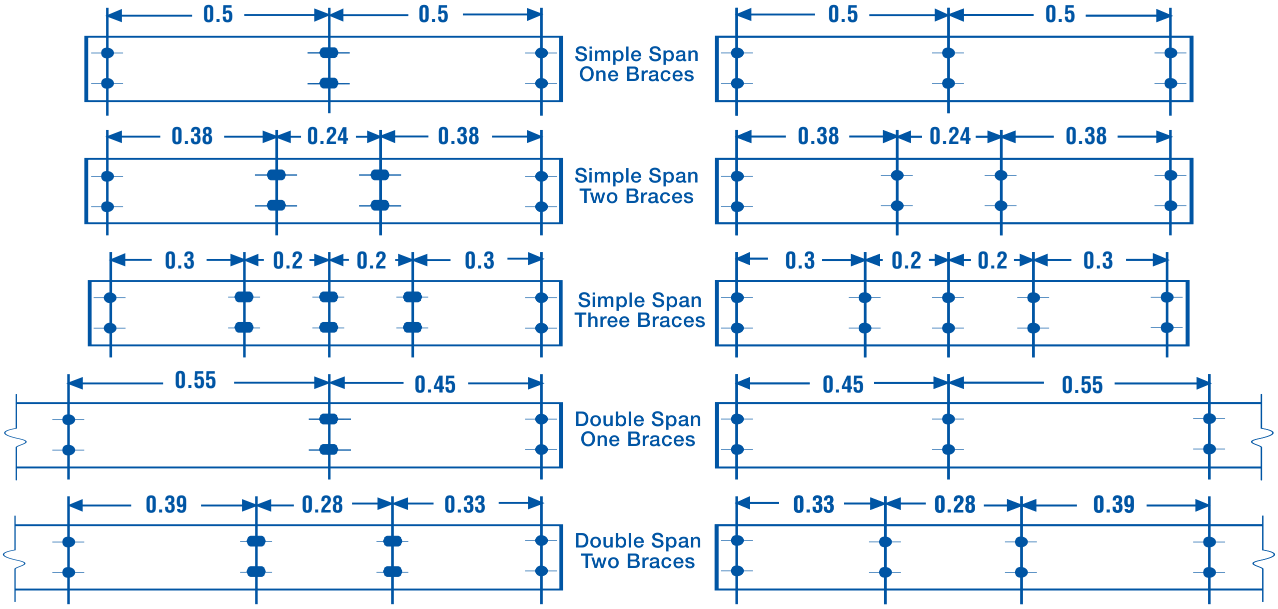
NOTE:
Minimum bolt size M16 8.8/S for Lapped Purlins. Threads included in shear plane.

Metalcraft ROOFING

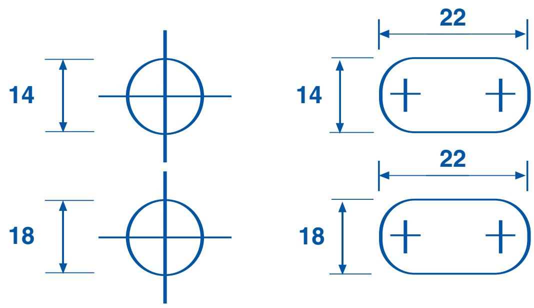
MSS PURLIN HOLE DETAILS

STANDARD HOLE PUNCHING

FOR CAMLOK ™ BRACING (SLOTTED HOLES) FOR STANDARD BRACING (ROUND HOLES)



PURLIN BRACING HOLE SIZES

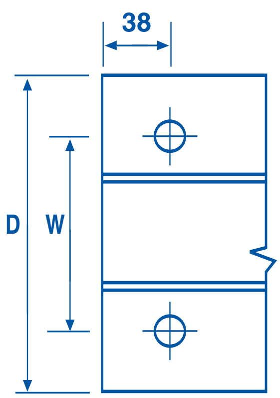


ROUND ELONGATED

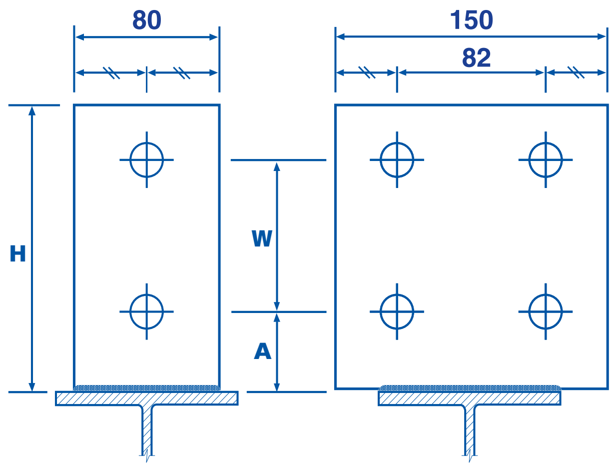
PURLIN BRACING STANDARD HOLE POSITIONS

HOLE CENTRES	
D	W
150	80
200	120
250	160
275	180
300	200
325	220
350	240
400	280

Dimensions in mm



PORTAL CLEAT RECOMMENDATIONS



MID SPAN CLEAT JOINING CLEAT

PURLIN	A	W	H
150	41	80	150
200	46	120	200
250	53	160	250
275	54	180	275
300	60	200	300
325	59	220	320
350	65	240	340
400	70	280	380

BRACING SYSTEMS

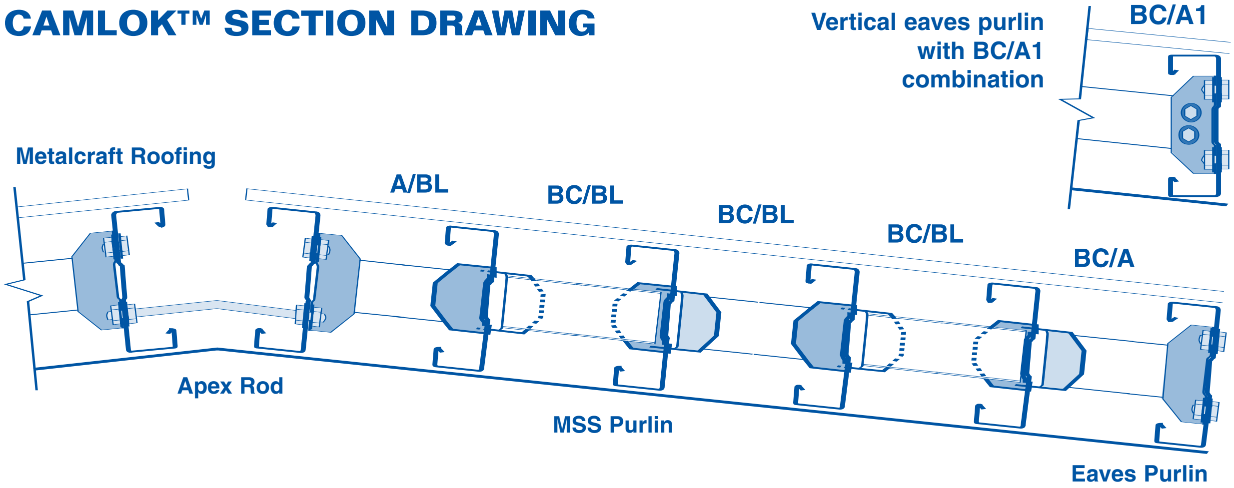
Metalcraft has two bracing systems, Camlok™ and Standard. All Purlins and Girts should be braced to maximize the design limit of the component. It is recommended that at least one row of bracing be used on any span, particularly if temporary loads may be experienced during construction. If the bracing is required to support super imposed dead loads (eg: lighting, sprinklers) specific design will be required.

Camlok™ is a solid bracing system that has no sag rods to place and no bolts or washers to fix. This has proven to save up to 75% of time in Bracing installation, giving considerable cost advantages.

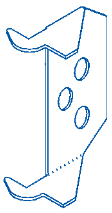
Metalcraft MSS Purlin and Girt system has been designed for bolting to cleats using the tables provided for hole and cleat dimensions. M12 or M16 Class 4.6 bolts and washers must be used. Design Engineers should give consideration to the bolt diameter, washer size and cleat material and thickness to be used also considering the reaction caused by double or continuous spans and high loads. The bracing systems are formed from galvanised Grade 250 steel.

CAMLOK™ BRACING SYSTEM

CAMLOK™ SECTION DRAWING

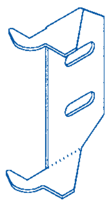


CAMLOK™ BRACING COMPONENTS



STANDARD CAMLOK™ CLAMP BRACKET

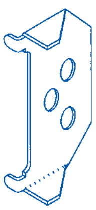
P/No. BC



ADJUSTABLE CLAMP BRACKET
Can be used midspan

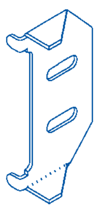
P/No. BC1

APEX ROD



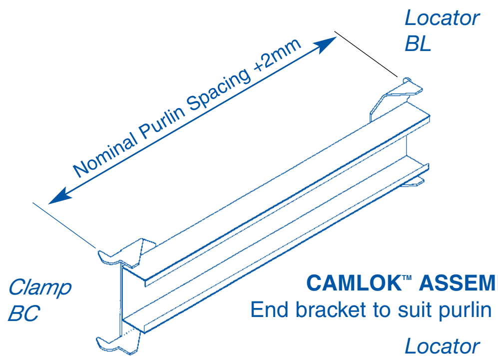
STANDARD CAMLOK™ LOCATOR BRACKET

P/No. BL

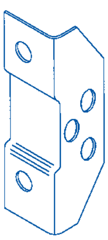


ADJUSTABLE LOCATOR BRACKET
Can be used midspan

P/No. BL1

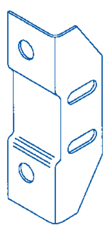


CAMLOK™ ASSEMBLY
End bracket to suit purlin size



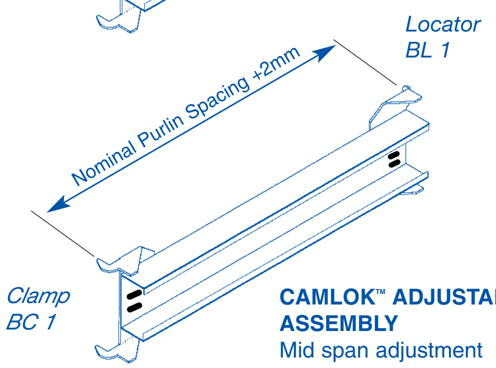
STANDARD BRACING BRACKET
Used when bolted connection preferred. ie. to PFC supports or concrete walls.

P/No. A



ADJUSTABLE STANDARD BRACKET
Generally used in fascia or girt length adjustment of ±10mm or angular of ±10°

P/No. A1

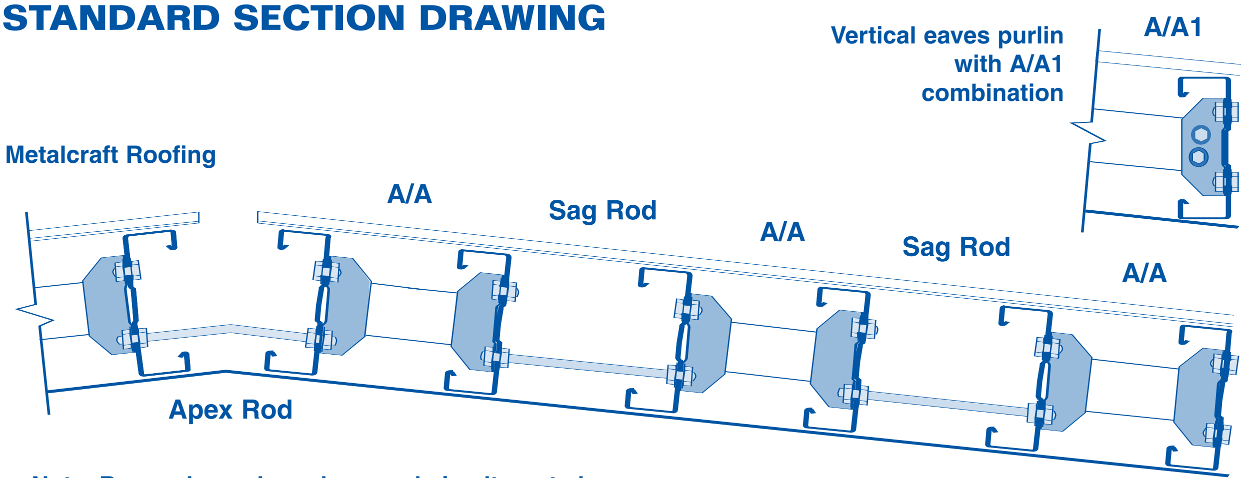


CAMLOK™ ADJUSTABLE ASSEMBLY
Mid span adjustment

STANDARD BRACING SYSTEM

Standard Bracing and Sag Rod's are fitted to alternate bays with the channel located adjacent to both the ridge and eave purlin. Sag Rod's are available in either 12dia or 16dia and are provided Zinc or Hot Dip Galvanized. They should be installed in the lower pre-punched fixing hole.

STANDARD SECTION DRAWING

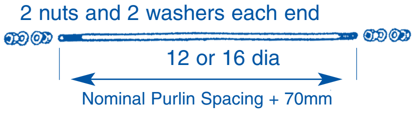


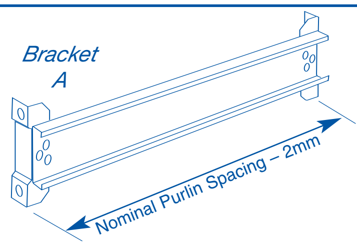
Note: Brace channels and sag rods in alternate bays

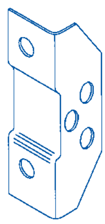
STANDARD BRACING COMPONENTS

APEX ROD

SAG ROD
2 nuts and 2 washers each end

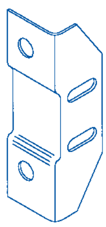






P/No. A

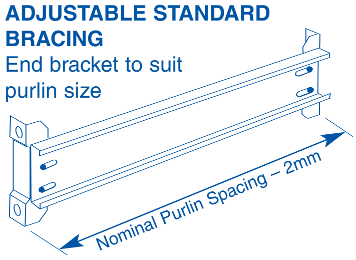
STANDARD BRACING BRACKET
Used when bolted connection preferred. ie. to PFC supports or concrete walls.



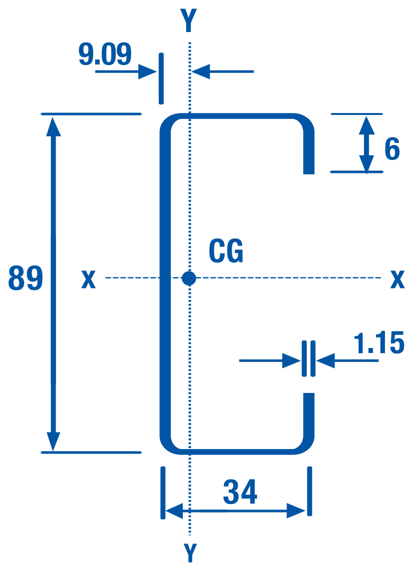
P/No. A1

ADJUSTABLE STANDARD BRACKET
Generally used in fascia or girt length adjustment of ±10mm or angular of ±10° can be used midspan

ADJUSTABLE STANDARD BRACING
End bracket to suit purlin size



BRACE CHANNEL



BRACE CHANNEL PROPERTIES

Tabulated section properties are based on full unreduced sections.

Mass kg/m	Weight kN/m	Area mm^2	Ixx 10^6mm^4	Iyy 10^6mm^4	Zxx 10^3mm^3	Column Properties	
						J mm^4	Iw 10^9mm^6
1.44	0.014	184	0.22	0.02	4.99	81.0	0.04

BRACE CHANNEL SELECTION for MSS Purlin spacings up to 3.0m
Maximum DESIGN LINEAR LOAD CAPACITY occuring on Purlin (kN/m), $Ø_b$ W_b

MSS Purlin	1 Brace	2 Braces	3 Braces
150	7.6		
200	4.6	9.1	
250	3.1	6.1	9.1
275	2.5	5.0	7.5
300	2.1	4.2	6.2
325	2.0	3.9	5.8
350	2.0	3.7	5.5
400	*	3.3	4.6

* NOT RECOMMENDED
Brace specifications outside the brace channel selection guidelines will require specific design.

MSS Purlins & Girts

Metalcraft ROOFING
Structural Products Division

CLIENT: ____________________

DELIVER TO: ____________________

____

____________________ DATE REQ: __________ INT REF No: __________

DATE: __________

O/No.: __________

HOLE POSITIONS – RUNNING DIMENSIONS FROM LEFT HAND END

MARK: NO. OFF: LENGTH: METRES:

MARK: NO. OFF: LENGTH: METRES:

MARK: NO. OFF: LENGTH: METRES:

MARK: NO. OFF: LENGTH: METRES:

PURLINS SIZE

HOLES: ☐ 14 ☐ 18

ROUND ☐ SLOT ☐

BRACING

☐ STANDARD

☐ CAMLOK™
(requires slotted holes)

SAG ROD

SIZE: ☐ 12 ☐ 16

RIDGE TIES

SIZE: ☐ 12 ☐ 16

PITCH __________

NOTES

PACKING SLIP No.

SIGNATURE

TOTAL METRES

FORM No.:

North Island Fax: 09-274 0251
South Island Fax: 03-962 7286

WHITE: CUSTOMER COPY
YELLOW: BOOK COPY

Bracing for MSS Purlins & Girts

Metalcraft ROOFING
Structural Products Division

CLIENT: ____________________

DELIVER TO: ____________________

____

____

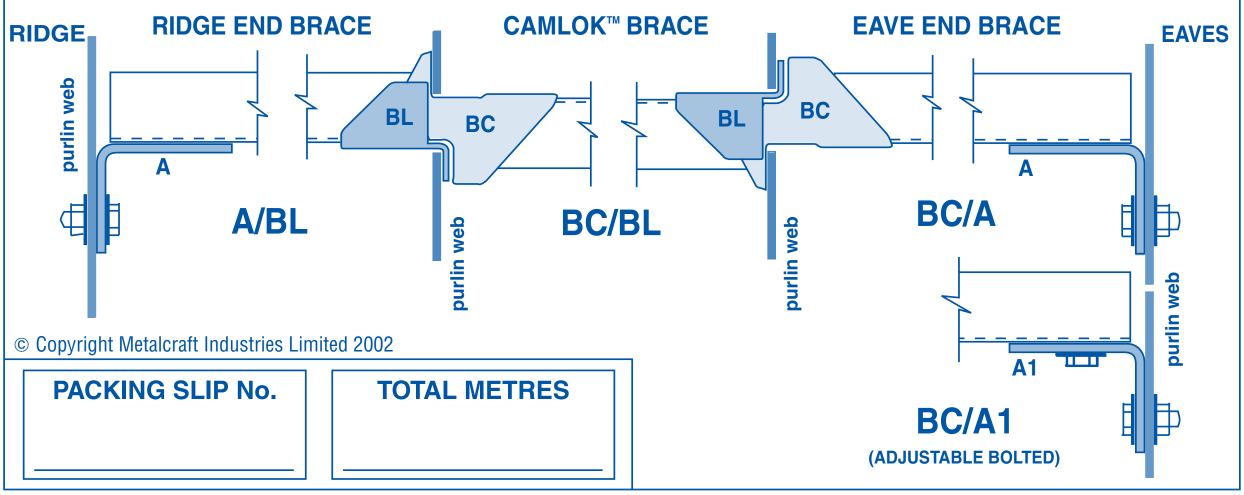
ORDER NO: ____________ DATE: ____________ DATE REQ: ____________

PURLIN SIZE:

150	200	250	275	300	325	350	400

CAMLOK™ ☐ **Length Required (Nominal plus 2mm)** | **STANDARD** ☐ **Length Required (Nominal minus 2mm)**

METALCRAFT PART No.	CUSTOMER I.D. MARK	No. REQD	No. MADE	NOMINAL SPACING	LENGTH REQUIRED	METALCRAFT CUT LENGTH
	TOTAL:					



PACKING SLIP No.	TOTAL METRES

North Island Fax: 09-274 0251
South Island Fax: 03-962 7286

WHITE: FACTORY OFFICE COPY
YELLOW: SALES OFFICE COPY

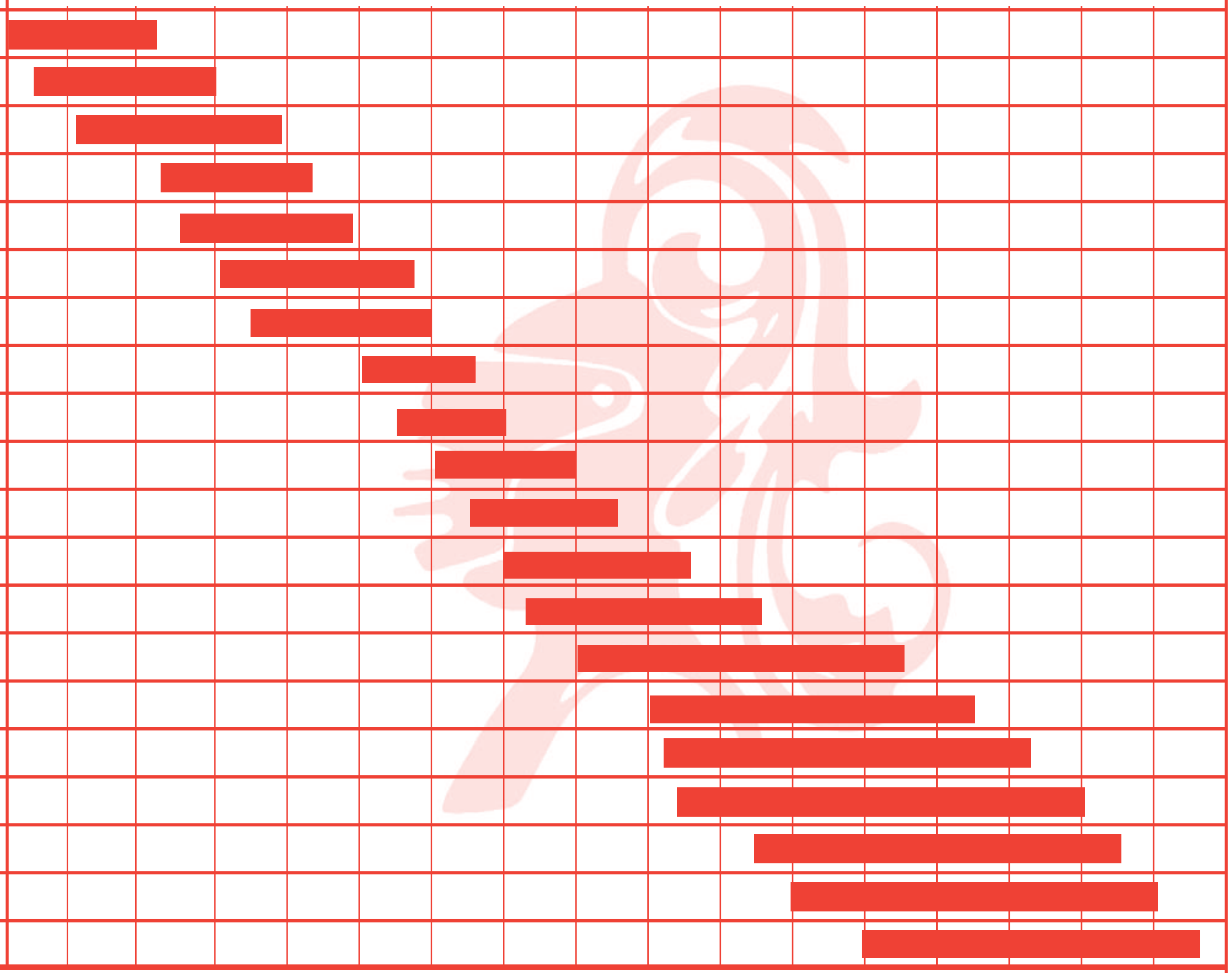
FORM No.:

Metalcraft ROOFING

MC Section Typical Economic Usage Span Chart Guide

Size	D X B (mm)	t (mm)	Mass (kg/m)
MC 100/10	100 x 50	1.0	
MC 100/12	100 x 50	1.2	
MC100/16	100 x 50	1.6	
MC 100/19	100 x 50	1.85	
MC 150/12	150 x 65	1.15	2.72
MC 150/15	150 x 65	1.45	3.4
MC 150/19	150 x 65	1.85	4.29
MC 150/24	150 x 65	2.4	5.48
MC 200/15	200 x 75	1.45	4.35
MC 200/19	200 x 75	1.85	5.51
MC 200/24	200 x 75	2.4	7.06
MC 250/15	250 x 85	1.45	5.1
MC 250/19	250 x 85	1.85	6.47
MC 250/24	250 x 85	2.4	8.32
MC 300/24	300 x 90	2.4	9.42
MC 300/24	300 x 100	2.4	9.82
MC 300/30	300 x 90	3.0	11.7
MC 300/30	300 x 100	3.0	12.3
MC 400/24	400 x 100	2.4	12.0
MC 400/30	400 x 100	3.0	15.0

TYPICAL SPANS (m) (Based on Deflection Limitation only)



NOTE: This chart is a quick reference only. Each situation should be considered separately and designed using standard procedures

FOR FURTHER INFORMATION AND ORDERS CONTACT METALCRAFT ROOFING.

Metalcraft ROOFING

USE OF MC SECTION AS FLOOR JOISTS

The MC Section purlin single span charts can be readily adapted for floor joist design.

STRENGTH DESIGN

With screwed down sheet flooring the fully restrained condition would apply otherwise lateral braces are required. The purlin load span charts will apply for the calculated linear loadings on each joist.

Refer Page 3 for Producer Information.

Refer Pages 4 & 5 for Design Considerations

Refer Page 23 for Purlin Bracing Hole Sizes and Purlin Bracing Standard Hole Positions.

DEFLECTION DESIGN

The Ws value in the purlin charts is for a deflection limit of L/150 for serviceability loads. For floor joists this will require modification by the designer to a selected limit usually in the range $\frac{L}{250}$ to $\frac{L}{360}$

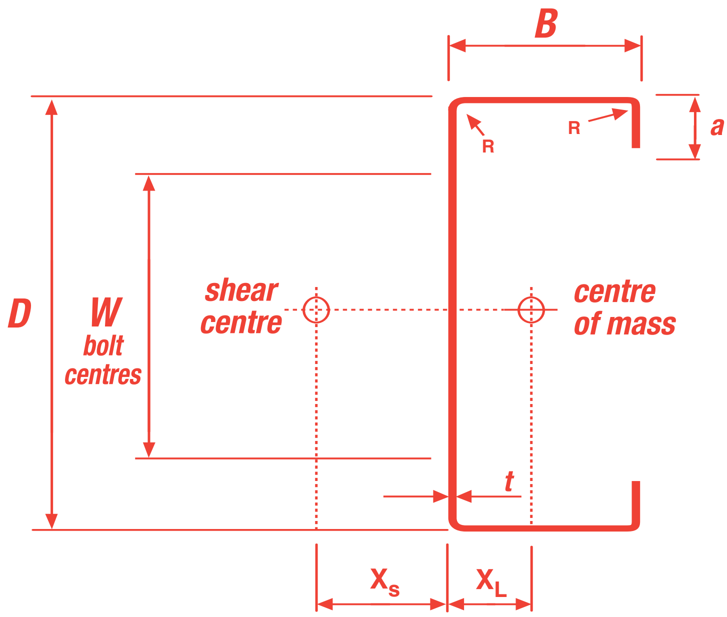
For example if a deflection limit of L/300 is required, then the Ws (serviceability linear loading) value in the chart (for L/150 deflection limit) would need to be halved.

CONTINUOUS SPANS

For continuity over two or more spans specific calculations would be required.

NOTES

MC SECTION PURLINS & GIRTS – SECTION GEOMETRY



MC SECTION PURLINS & GIRTS – SECTION GEOMETRY

CODE	D X B mm	t mm	Mass kg/m	Area mm^2	a mm	R mm	X_S mm	X_L mm	W mm
100/10	100 x 50	1.0	1.69	216	14	4	31.1	16.9	N/A
100/12	100 x 50	1.2	2.02	258	14	4	30.1	16.8	N/A
100/16	100 x 50	1.6	2.68	342	14	4	28.8	16.8	N/A
100/19	100 x 50	1.85	3.07	391	14	4	28.4	16.8	N/A
150/12	150 x 65	1.15	2.72	346	16	4	35.5	20.0	80
150/15	150 x 65	1.45	3.40	433	16	4	34.8	19.9	80
150/19	150 x 65	1.85	4.29	546	16	4	33.8	19.9	80
150/24	150 x 65	2.4	5.48	698	16	4	32.5	19.8	80
200/15	200 x 75	1.45	4.35	554	23	4	39.6	22.7	120
200/19	200 x 75	1.85	5.51	702	23	4	38.6	22.6	120
200/24	200 x 75	2.4	7.06	900	23	4	37.3	22.6	120
250/15	250 x 85	1.45	5.10	650	21	4	41.3	23.1	160
250/19	250 x 85	1.85	6.47	824	21	4	40.4	23.1	160
250/24	250 x 85	2.4	8.32	1060	21	4	39.0	23.0	160
300/24 (90)	300 x 90	2.4	9.42	1200	21	4	39.1	22.4	200
300/24 (100)	300 x 100	2.4	9.82	1254	21	4	43.7	25.9	200
300/30 (90)	300 x 90	3.0	11.7	1490	21	4	37.7	22.4	200
300/30 (100)	300 x 100	3.0	12.3	1566	21	4	41.7	26.0	200
400/24	400 x 100	2.4	12.0	1530	30	5	43.0	23.9	280
400/30	400 x 100	3.0	15.0	1910	30	5	41.2	24.1	280

NOTES:
1. All dimensions are nominal, (rolling tolerances to be considered).
2. W = standard hole centres
3. 300 x 90 not manufactured in South Island, (available ex Auckland)

Metalcraft ROOFING

MC SECTION PURLINS & GIRTS – SECTION PROPERTIES

CODE	AREA	WEIGHT	SECOND MOMENT OF AREA		SECTION MODULUS		RADIUS OF GYRATION		TORSION CONSTANT	WARPING FACTOR
	mm^2	kN/m	I_x 10^6mm^4	I_y 10^6mm^4	Z_x 10^3mm^3	Z_y 10^3mm^3	r_x mm	r_y mm	J mm^4	Iw 10^9mm^6
MC 100/10	216	0.017	0.350	0.080	7.03	2.29	40.3	18.7	188	0.206
MC 100/12	258	0.020	0.420	0.090	8.35	2.71	40.2	18.6	269	0.240
MC 100/16	342	0.027	0.550	0.120	10.9	3.50	40.0	18.4	598	0.294
MC 100/19	391	0.030	0.620	0.130	12.4	3.96	39.9	18.4	446	0.315
MC 150/12	346	0.027	1.25	0.200	16.6	4.42	60.0	24.0	152	1.09
MC 150/15	433	0.033	1.55	0.240	20.6	5.44	59.8	23.8	303	1.30
MC 150/19	546	0.042	1.94	0.300	25.8	6.71	59.6	23.6	623	1.54
MC 150/24	698	0.054	2.44	0.380	32.6	8.30	59.2	23.2	1340	1.79
MC 200/15	554	0.043	3.44	0.440	34.4	8.34	78.8	28.1	389	4.23
MC 200/19	702	0.054	4.32	0.540	43.2	10.4	78.5	27.8	800	5.09
MC 200/24	900	0.069	5.49	0.680	54.9	13.0	78.1	27.5	1730	6.10
MC 250/15	650	0.050	6.19	0.610	49.5	9.85	97.6	30.6	456	8.48
MC 250/19	824	0.063	7.79	0.760	62.3	12.2	97.3	30.3	940	10.3
MC 250/24	1060	0.082	9.92	0.950	79.4	15.4	96.8	30.0	2030	12.4
MC 300/24 (90)	1200	0.092	15.8	1.16	105	17.1	115	31.0	2310	21.4
MC 300/24 (100)	1254	0.098	16.9	1.51	11.3	20.4	116	34.7	2890	27.6
MC 300/30 (90)	1490	0.115	19.4	1.40	129	20.6	114	30.6	4460	24.9
MC 300/30 (100)	1566	0.123	21.1	1.87	141	25.2	116	34.5	5430	32.7
MC 400/24	1530	0.118	34.5	1.86	173	24.4	150	34.9	2930	62.6
MC 400/30	1910	0.150	43.0	2.30	215	30.3	150	34.7	6550	74.7

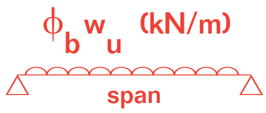
NOTES: Section Properties (Based on full unreduced sections)

NOTES

Metalcraft ROOFING

MC STRENGTH LOAD SPAN TABLE

UNIFORMLY DISTRIBUTED LOAD = $\phi_b w_u$ (kN/m)



SINGLE SPAN

Span	MC 100/10				MC 100/12				MC 100/16				MC 100/19				MC 150/12			
	$\phi_b w_u$ (kN/m)			w_s kN/m	$\phi_b w_u$ (kN/m)			w_s kN/m	$\phi_b w_u$ (kN/m)			w_s kN/m	$\phi_b w_u$ (kN/m)			w_s kN/m	$\phi_b w_u$ (kN/m)			w_s kN/m
m	1B	2B	FR		1B	2B	FR		1B	2B	FR		1B	2B	FR		1B	2B	FR	
2.0	5.77	5.77	5.77	4.59	7.35	7.35	7.35	5.51	9.63	9.63	9.63	7.22								
2.5	3.69	3.69	3.69	2.35	4.70	4.70	4.7	2.82	6.00	6.16	6.16	3.69								
3.0	2.56	2.56	2.56	1.36	2.92	3.27	3.27	1.63	3.94	4.28	4.28	2.14	11.3	11.3	11.3	8.13				
3.5	1.55	1.88	1.88	0.86	1.99	2.40	2.40	1.03	2.70	3.09	3.14	1.35	6.97	7.23	7.23	4.16				
4.0	1.09	1.44	1.44	0.57	1.39	1.69	1.84	0.69	1.90	2.28	2.41	0.90	4.53	5.02	5.02	2.41	5.35	5.35	5.35	4.86
4.5	0.77	1.00	1.14	0.40	0.98	1.28	1.45	0.48	1.36	1.73	1.90	0.63	3.06	3.59	3.69	1.52	3.93	3.93	3.93	3.06
5.0	0.54	0.77	0.92	0.29	0.69	0.99	1.18	0.35	0.97	1.33	1.54	0.46	2.12	2.64	2.82	1.02	3.01	3.01	3.01	2.05
5.5	0.39	0.60	0.76	0.22	0.49	0.77	0.97	0.26	0.69	1.04	1.27	0.35	1.47	1.98	2.23	0.71	1.90	2.38	2.38	1.44
6.0	0.29	0.47	0.64	0.17	0.36	0.60	0.82	0.20	0.50	0.82	1.07	0.27	1.01	1.52	1.81	0.52	1.43	1.93	1.93	1.05
6.5	0.22	0.37	0.55	0.13	0.27	0.47	0.70	0.16	0.37	0.65	0.91	0.21	0.69	1.17	1.49	0.39	1.09	1.59	1.59	0.79
7.0	0.17	0.29	0.47	0.11	0.21	0.37	0.60	0.13	0.28	0.51	0.79	0.17	0.49	0.91	1.26	0.30	0.82	1.12	1.34	0.61
7.5	0.13	0.23	0.41	0.09	0.16	0.29	0.52	0.10	0.22	0.40	0.68	0.14	0.35	0.70	1.07	0.24	0.62	0.92	1.14	0.48
8.0	0.10	0.18	0.36	0.07	0.13	0.23	0.46	0.09	0.17	0.32	0.60	0.11	0.26	0.54	0.92	0.19	0.48	0.75	0.98	0.38
8.5	0.08	0.15	0.32	0.06	0.10	0.18	0.41	0.07	0.14	0.25	0.53	0.09	0.20	0.41	0.80	0.15	0.38	0.62	0.86	0.31
9.0	0.07	0.12	0.28	0.05	0.08	0.15	0.36	0.06	0.11	0.20	0.48	0.08	0.15	0.32	0.71	0.13	0.30	0.51	0.75	0.26
9.5					0.07	0.12	0.33	0.05	0.09	0.16	0.43	0.07	0.12	0.25	0.63	0.11	0.24	0.42	0.67	0.21
10.0													0.10	0.20	0.56	0.09	0.20	0.35	0.59	0.18
10.5													0.08	0.16	0.50	0.08	0.16	0.29	0.53	0.15
11.0																	0.13	0.24	0.48	0.13
11.5																	0.11	0.20	0.44	0.11
12.0																				
12.5																				
13.0																				
13.5																				
14.0																				
14.5																				
15.0																				
15.5																				
16.0																				
16.5																				
17.0																				
17.5																				
18.0																				
$\phi_b M_u$	2.88				3.69				4.81				5.67				6.03			
$\phi_v V_u$	10.4				18.1				35.9				49.2				11.0			

1B = One brace mid span

2B = Two braces within the span

3B = Three braces within the span

FR = Assumes compression flange fully restrained

ws = Uniformly distributed serviceability load for deflection limit = Span/150 (kN/m)

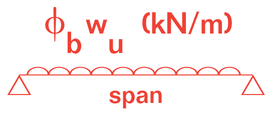
$\phi_b w_u$ = Strength load resistance applied at the centroid (kN/m)

$\phi_b M_u$ = Section strength in bending at the F.R. condition (kN.m.)

$\phi_v V_u$ = Section strength in shear (kN)

MC STRENGTH LOAD SPAN TABLE

UNIFORMLY DISTRIBUTED LOAD = $\phi_b\ w_u$ (kN/m)



SINGLE SPAN

Span	MC 150/15				MC 150/19				MC 150/24				MC 200/15				MC 200/19			
	$\phi_b w_u$ (kN/m)			w_s kN/m	$\phi_b w_u$ (kN/m)			w_s kN/m	$\phi_b w_u$ (kN/m)			w_s kN/m	$\phi_b w_u$ (kN/m)			w_s kN/m	$\phi_b w_u$ (kN/m)			w_s kN/m
m	1B	2B	FR		1B	2B	FR		1B	2B	FR		1B	2B	FR		1B	2B	FR	
2.0																				
2.5																				
3.0													11.2	11.2	11.2	13.4	14.9	14.9	14.9	16.8
3.5													8.23	8.23	8.23	8.42	10.9	10.9	10.9	10.6
4.0	7.56	7.56	7.56	6.03	9.40	9.66	9.66	7.54	12.7	13.1	13.1	9.49	6.30	6.30	6.30	5.64	7.86	8.37	8.37	7.08
4.5	5.55	5.55	5.55	3.79	6.61	7.10	7.10	4.75	8.89	9.60	9.60	5.97	4.98	4.98	4.98	3.96	6.00	6.61	6.61	4.98
5.0	3.66	4.25	4.25	2.54	4.80	5.43	5.43	3.18	6.41	7.31	7.35	4.00	3.36	4.03	4.03	2.89	4.67	5.36	5.36	3.63
5.5	2.72	3.36	3.36	1.79	3.56	4.15	4.29	2.23	4.71	5.61	5.81	2.81	2.64	3.33	3.33	2.17	3.67	4.43	4.43	2.73
6.0	2.05	2.72	2.72	1.30	2.67	3.26	3.48	1.63	3.50	4.39	4.70	2.05	2.08	2.80	2.80	1.67	2.92	3.47	3.72	2.10
6.5	1.52	1.98	2.25	0.98	2.01	2.61	2.87	1.22	2.60	3.49	3.89	1.54	1.65	2.39	2.39	1.31	2.31	2.89	3.17	1.65
7.0	1.13	1.61	1.89	0.75	1.50	2.11	2.41	0.94	1.92	2.80	3.27	1.19	1.30	1.75	2.06	1.05	1.82	2.42	2.73	1.32
7.5	0.85	1.31	1.61	0.59	1.12	1.72	2.06	0.74	1.40	2.27	2.78	0.93	1.03	1.47	1.79	0.86	1.42	2.05	2.38	1.07
8.0	0.65	1.08	1.39	0.47	0.85	1.41	1.77	0.59	1.04	1.84	2.40	0.75	0.82	1.25	1.58	0.71	1.12	1.74	2.09	0.89
8.5	0.50	0.88	1.21	0.39	0.65	1.16	1.55	0.48	0.79	1.50	2.09	0.61	0.67	1.06	1.40	0.59	0.90	1.48	1.85	0.74
9.0	0.40	0.72	1.06	0.32	0.51	0.95	1.36	0.40	0.61	1.22	1.84	0.50	0.54	0.90	1.24	0.50	0.72	1.27	1.65	0.62
9.5	0.32	0.59	0.94	0.26	0.40	0.78	1.20	0.33	0.48	0.99	1.63	0.42	0.45	0.77	1.12	0.42	0.59	1.08	1.48	0.53
10.0	0.25	0.48	0.84	0.22	0.32	0.63	1.07	0.28	0.38	0.79	1.45	0.35	0.37	0.65	1.01	0.36	0.48	0.92	1.34	0.45
10.5	0.21	0.39	0.75	0.19	0.26	0.52	0.96	0.24	0.31	0.64	1.30	0.30	0.31	0.55	0.91	0.31	0.40	0.77	1.21	0.39
11.0	0.17	0.33	0.68	0.16	0.21	0.42	0.87	0.20	0.25	0.52	1.18	0.26	0.26	0.47	0.83	0.27	0.33	0.65	1.11	0.34
11.5		0.27	0.62	0.14	0.17	0.35	0.79	0.18	0.20	0.42	1.07	0.22								
12.0		0.23	0.56	0.12	0.14	0.29	0.72	0.15	0.17	0.35	0.97	0.19								
12.5																				
13.0																				
13.5																				
14.0																				
14.5																				
15.0																				
15.5																				
16.0																				
16.5																				
17.0																				
17.5																				
18.0																				
$\phi_b M_u$	8.51				10.8				14.7				12.6				16.7			
$\phi_v V_u$	22.2				46.5				82.8				16.4				34.1			

1B = One brace mid span

2B = Two braces within the span

3B = Three braces within the span

FR = Assumes compression flange fully restrained

ws = Uniformly distributed serviceability load for deflection limit = Span/150 (kN/m)

$\phi_b\ w_u$ = Strength load resistance applied at the centroid (kN/m)

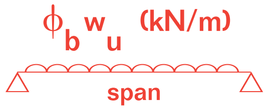
$\phi_b\ M_u$ = Section strength in bending at the F.R. condition (kN.m.)

$\phi_v\ V_u$ = Section strength in shear (kN)

Metalcraft ROOFING

MC STRENGTH LOAD SPAN TABLE

UNIFORMLY DISTRIBUTED LOAD = $\phi_b w_u$ (kN/m)



SINGLE SPAN

Span	MC 200/24				MC 250/15					MC 250/19					MC 250/24					MC 300/24(90)				
	$\phi_b w_u$ (kN/m)			w_s kN/m	$\phi_b w_u$ (kN/m)				w_s kN/m	$\phi_b w_u$ (kN/m)				w_s kN/m	$\phi_b w_u$ (kN/m)				w_s kN/m	$\phi_b w_u$ (kN/m)				w_s kN/m
m	1B	2B	FR		1B	2B	3B	FR		1B	2B	3B	FR		1B	2B	3B	FR		1B	2B	3B	FR	
2.0																								
2.5																								
3.0	21.1	21.1	21.1	21.3	14.4	14.4	14.4	14.4	24.1	19.3	19.3	19.3	19.3	30.3	28.4	28.4	28.4	28.4	38.6	35.3	35.3	35.3	35.3	61.4
3.5	15.2	15.5	15.5	13.4	10.6	10.6	10.6	10.6	15.1	14.2	14.2	14.2	14.2	19.1	20.9	20.9	20.9	20.9	24.3	25.9	25.9	25.9	25.9	38.7
4.0	11.2	11.9	11.9	9.00	8.10	8.10	8.10	8.10	10.1	10.9	10.9	10.9	10.9	12.8	15.4	16.0	16.0	16.0	16.3	19.8	19.8	19.8	19.8	25.9
4.5	8.50	9.41	9.41	6.32	6.40	6.40	6.40	6.40	7.10	8.60	8.60	8.60	8.60	8.97	11.8	12.6	12.6	12.6	11.4	14.7	15.7	15.7	15.7	18.2
5.0	6.54	7.49	7.61	4.61	5.20	5.20	5.20	5.20	5.20	6.17	6.95	6.95	6.95	6.54	9.22	10.2	10.2	10.2	8.30	11.6	12.7	12.7	12.7	13.3
5.5	5.09	6.05	6.29	3.46	3.48	4.28	4.28	4.28	3.90	4.91	5.74	5.74	5.74	4.91	1.31	8.24	8.45	8.45	6.26	9.23	10.5	10.5	10.5	9.97
6.0	3.98	4.95	5.28	2.67	2.78	3.59	3.59	3.59	3.00	3.95	4.83	4.83	4.83	3.79	5.85	6.80	7.10	7.10	4.82	7.43	8.82	8.82	8.82	7.68
6.5	3.12	4.09	4.50	2.10	2.24	3.06	3.06	3.06	2.37	3.20	4.11	4.11	4.11	2.98	4.70	5.67	6.05	6.05	3.79	6.03	7.09	7.51	7.51	6.04
7.0	2.43	3.41	3.88	1.68	1.80	2.64	2.64	2.64	1.89	2.59	3.19	3.55	3.55	2.38	3.76	4.78	5.22	5.22	3.04	4.91	5.99	6.48	6.48	4.83
7.5	1.88	2.86	3.38	1.37	1.45	2.30	2.30	2.30	1.54	2.10	2.72	3.09	3.09	1.94	2.99	4.05	4.55	4.55	2.47	3.99	5.10	5.64	5.64	3.93
8.0	1.46	2.41	2.97	1.13	1.17	1.65	2.02	2.02	1.27	1.70	2.32	2.71	2.71	1.60	2.36	3.46	3.99	3.99	2.03	3.23	4.37	4.96	4.96	3.24
8.5	1.15	2.03	2.63	0.94	0.95	1.41	1.79	1.79	1.06	1.38	2.00	2.40	2.40	1.33	1.88	2.96	3.43	3.54	1.70	2.62	3.76	4.39	4.39	2.70
9.0	0.92	1.72	2.35	0.79	0.79	1.21	1.60	1.60	0.89	1.13	1.73	2.14	2.14	1.12	1.51	2.55	3.02	3.16	1.43	2.11	3.25	3.92	3.92	2.27
9.5		1.45	2.11	0.67	0.66	1.05	1.43	1.43	0.76	0.93	1.49	1.93	1.93	0.95	1.23	2.19	2.67	2.83	1.21	1.72	2.82	3.34	3.52	1.93
10.0	0.74	1.22	1.90	0.58	0.55	0.90	1.29	1.29	0.65	0.77	1.29	1.74	1.74	0.82	1.01	1.88	2.38	2.56	1.04	1.42	2.45	2.98	3.17	1.66
10.5		1.02	1.73	0.50	0.47	0.78	1.17	1.17	0.56	0.64	1.12	1.42	1.58	0.71	0.83	1.61	2.12	2.32	0.90	1.17	2.12	2.66	2.88	1.43
11.0		0.85	1.57	0.43	0.40	0.67	1.07	1.07	0.49	0.54	0.97	1.27	1.44	0.61	0.69	1.37	1.90	2.11	0.78	0.98	1.84	2.39	2.62	1.25
11.5		0.72	1.44	0.38	0.34	0.58	0.98	0.98	0.43	0.46	0.84	1.15	1.31	0.54	0.58	1.16	1.71	1.93	0.68	0.82	1.59	2.15	2.40	1.09
12.0		0.61	1.32	0.33	0.29	0.50	0.73	0.90	0.38	0.39	0.72	1.03	1.21	0.47	0.49	0.99	1.54	1.78	0.60	0.69	1.38	1.94	2.20	0.96
12.5					0.25	0.44	0.66	0.83	0.33	0.33	0.63	0.93	1.11	0.42	0.41	0.85	1.39	1.64	0.53	0.59	1.19	1.76	2.03	0.85
13.0					0.22	0.38	0.60	0.77	0.30	0.28	0.55	0.85	1.03	0.37	0.35	0.73	1.25	1.51	0.47	0.50	1.03	1.59	1.88	0.75
13.5					0.19	0.34	0.54	0.71	0.26	0.25	0.48	0.77	0.95	0.33	0.30	0.63	1.13	1.40	0.42	0.43	0.89	1.44	1.74	0.67
14.0					0.17	0.30	0.49	0.66	0.24	0.21	0.42	0.70	0.89	0.30	0.26	0.55	1.03	1.30	0.38	0.37	0.77	1.31	1.62	0.60
14.5															0.22	0.48	0.93	1.22	0.34	0.32	0.68	1.19	1.51	0.54
15.0															0.19	0.42	0.84	1.14	0.31	0.28	0.59	1.09	1.41	0.49
15.5															0.17	0.37	0.75	1.06	0.28	0.24	0.52	0.99	1.32	0.45
16.0															0.15	0.32	0.68	1.00	0.25	0.21	0.46	0.90	1.24	0.40
16.5															0.13	0.28	0.61	0.94	0.23	0.19	0.41	0.82	1.17	0.37
17.0															0.12	0.25	0.55	0.88	0.21	0.16	0.36	0.74	1.10	0.34
17.5															0.11	0.22	0.49	0.83	0.15	0.15	0.32	0.67	1.04	0.31
18.0															0.09	0.20	0.44	0.79	0.18	0.13	0.29	0.61	0.98	0.28
$\phi_b M_u$	23.8				16.2					21.7					32.0					39.7				
$\phi_v V_u$	74.9				12.9					27.0					59.1					48.8				

1B = One brace mid span

2B = Two braces within the span

3B = Three braces within the span

FR = Assumes compression flange fully restrained

ws = Uniformly distributed serviceability load for deflection limit = Span/150 (kN/m)

$\phi_b w_u$ = Strength load resistance applied at the centroid (kN/m)

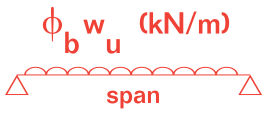
$\phi_b M_u$ = Section strength in bending at the F.R. condition (kN.m.)

$\phi_v V_u$ = Section strength in shear (kN)

Metalcraft ROOFING

MC STRENGTH LOAD SPAN TABLE

UNIFORMLY DISTRIBUTED LOAD = $\phi_b w_u$ (kN/m)



SINGLE SPAN

Span	MC 300/24(100)					MC 300/30(90)					MC 300/30(100)					MC 400/24					MC 400/30				
	$\phi_b w_u$ (kN/m)				w_s kN/m	$\phi_b w_u$ (kN/m)				w_s kN/m	$\phi_b w_u$ (kN/m)				w_s kN/m	$\phi_b w_u$ (kN/m)				w_s kN/m	$\phi_b w_u$ (kN/m)				w_s kN/m
m	1B	2B	3B	FR		1B	2B	3B	FR		1B	2B	3B	FR		1B	2B	3B	FR		1B	2B	3B	FR	
2.0																									
2.5																									
3.0	36.3	36.3	36.3	36.3	65.8	48.6	48.6	48.6	48.6	75.4	51.3	51.3	51.3	51.3	82.0	51.6	51.6	51.6	51.6	134	72.7	72.7	72.7	72.7	167
3.5	26.6	26.6	26.6	26.6	41.5	35.7	35.7	35.7	35.7	47.5	37.7	37.7	37.7	37.7	51.6	37.9	37.9	37.9	37.9	84.5	53.4	53.4	53.4	53.4	105
4.0	20.4	20.4	20.4	20.4	27.8	26.8	27.3	27.3	27.3	31.8	28.8	28.8	28.8	28.8	34.6	29.0	29.0	29.0	29.0	56.6	40.9	40.9	40.9	40.9	70.6
4.5	16.1	16.1	16.1	16.1	19.5	20.5	21.6	21.6	21.6	22.3	22.1	22.8	22.8	22.8	24.3	22.9	22.9	22.9	22.9	39.7	31.6	32.3	32.3	32.3	49.6
5.0	13.1	13.1	13.1	13.1	14.2	16.0	17.6	17.6	17.6	16.3	17.4	18.4	18.4	18.4	17.7	18.6	18.6	18.6	18.6	29.0	25.0	26.2	26.2	26.2	36.1
5.5	10.8	10.8	10.8	10.8	10.7	12.7	14.3	14.5	14.5	12.2	14.0	15.2	15.2	15.2	13.3	14.1	15.4	15.4	15.4	21.8	20.1	21.6	21.6	21.6	27.2
6.0	7.94	9.07	9.07	9.07	8.23	10.2	11.8	12.2	12.2	9.42	11.3	12.6	12.8	12.8	10.2	11.5	12.9	12.9	12.9	16.8	16.3	18.2	18.2	18.2	20.9
6.5	6.53	7.73	7.73	7.73	6.47	8.15	9.86	10.4	10.4	7.41	9.27	10.6	10.9	10.9	8.06	9.47	11.0	11.0	11.0	13.2	13.4	15.2	15.5	15.5	16.4
7.0	5.40	6.66	6.66	6.66	5.18	6.52	8.31	8.97	8.97	5.93	7.63	8.98	9.41	9.41	6.46	7.86	9.48	9.48	9.48	10.6	11.1	12.9	13.4	13.4	13.2
7.5	4.49	5.35	5.80	5.80	4.21	5.20	7.05	7.78	7.78	4.82	6.26	7.67	8.20	8.20	5.25	6.55	8.26	8.26	8.26	8.60	9.23	11.0	11.6	11.6	10.7
8.0	3.74	4.61	5.10	5.10	3.47	4.11	6.02	6.81	6.84	3.97	5.14	6.60	7.21	7.21	4.33	5.48	6.66	7.26	7.26	7.07	7.68	9.50	10.2	10.2	8.83
8.5	3.11	4.00	4.52	4.52	2.90	3.24	5.16	5.96	6.06	3.31	4.20	5.71	6.39	6.39	3.61	4.58	5.79	6.43	6.43	5.90	6.39	8.24	9.06	9.06	7.36
9.0	2.57	3.49	4.03	4.03	2.44	2.59	4.43	5.25	5.40	2.79	3.41	4.96	5.61	5.70	3.04	3.82	5.05	5.74	5.74	4.97	5.29	7.18	8.08	8.08	6.2
9.5	2.14	3.05	3.62	3.62	2.07	2.09	3.80	4.65	4.85	2.37	2.78	4.33	4.99	5.11	2.58	3.18	4.43	5.15	5.15	4.22	4.37	6.28	7.14	7.26	5.27
10.0	1.78	2.68	3.26	3.26	1.78	1.70	3.26	4.14	4.37	2.04	2.29	3.79	4.45	4.61	2.21	2.67	3.90	4.65	4.65	3.62	3.62	5.51	6.38	6.55	4.52
10.5	1.49	2.36	2.96	2.96	1.54	1.39	2.79	3.69	3.97	1.76	1.90	3.31	3.99	4.18	1.91	2.25	3.44	4.21	4.21	3.13	3.03	4.85	5.72	5.94	3.90
11.0	1.25	2.08	2.70	2.70	1.34	1.15	2.38	3.31	3.62	1.53	1.58	2.89	3.59	3.81	1.66	1.91	3.04	3.84	3.84	2.72	2.53	4.27	5.15	5.41	3.39
11.5	1.06	1.83	2.26	2.47	1.17	0.95	2.03	2.97	3.31	1.34	1.33	2.52	3.24	3.49	1.46	1.63	2.68	3.26	3.51	2.38	2.12	3.77	4.66	4.95	2.97
12.0	0.90	1.61	2.05	2.27	1.03	0.80	1.72	2.67	3.04	1.18	1.13	2.19	2.93	3.20	1.28	1.40	2.38	2.96	3.23	2.10	1.79	3.32	4.22	4.55	2.61
12.5	0.77	1.42	1.86	2.09	0.91	0.67	1.46	2.41	2.80	1.04	0.96	1.90	2.66	2.95	1.13	1.21	2.10	2.69	2.97	1.85	1.52	2.92	3.84	4.19	2.31
13.0	0.67	1.25	1.70	1.93	0.81	0.57	1.25	2.18	2.59	0.93	0.82	1.65	2.42	2.73	1.01	1.05	1.86	2.46	2.75	1.65	1.30	2.56	3.56	3.87	2.06
13.5	0.58	1.10	1.55	1.79	0.72	0.49	1.08	1.97	2.40	0.83	0.70	1.43	2.21	2.53	0.90	0.91	1.64	2.25	2.55	1.47	1.11	2.25	3.19	3.59	1.84
14.0	0.50	0.97	1.42	1.67	0.65	0.42	0.93	1.78	2.23	0.74	0.61	1.24	2.01	2.35	0.81	0.79	1.44	2.06	2.37	1.32	0.96	1.97	2.92	3.34	1.65
14.5	0.44	0.85	1.30	1.55	0.58	0.37	0.80	1.60	2.03	0.67	0.52	1.09	1.84	2.19	0.73	0.69	1.28	1.89	2.21	1.19	0.83	1.73	2.67	3.11	1.48
15.0	0.38	0.75	1.19	1.45	0.53	0.32	0.70	1.45	1.94	0.60	0.46	0.95	1.68	2.05	0.66	0.60	1.14	1.73	2.06	1.07	0.72	1.53	2.45	2.91	1.34
15.5	0.34	0.66	1.09	1.36	0.48	0.27	0.61	1.31	1.82	0.55	0.40	0.84	1.54	1.92	0.59	0.53	1.01	1.59	1.93	0.97	0.63	1.35	2.25	2.73	1.21
16.0	0.30	0.59	1.00	1.28	0.43	0.24	0.53	1.18	1.71	0.50	0.35	0.74	1.40	1.80	0.54	0.46	0.91	1.46	1.81	0.88	0.55	1.19	2.07	2.56	1.10
16.5	0.26	0.52	0.92	1.20	0.40	0.22	0.47	1.06	1.61	0.45	0.31	0.66	1.28	1.69	0.49	0.41	0.81	1.35	1.71	0.81	0.48	1.06	1.90	2.41	1.01
17.0	0.23	0.47	0.85	1.13	0.36	0.19	0.41	0.95	1.51	0.41	0.27	0.58	1.17	1.60	0.45	0.36	0.73	1.24	1.61	0.74	0.43	0.94	1.75	2.27	0.92
17.5	0.21	0.42	0.78	1.07	0.33	0.17	0.37	0.85	1.43	0.38	0.24	0.52	1.07	1.51	0.41	0.32	0.66	1.15	1.52	0.68	0.38	0.83	1.60	2.14	0.84
18.0	0.18	0.38	0.72	1.01	0.30	0.15	0.33	0.76	1.35	0.35	0.22	0.46	0.97	1.42	0.38	0.29	0.59	1.06	1.43	0.62	0.34	0.74	1.47	2.02	0.77
$\phi_b M_u$	40.8					54.7					57.7					58.1					81.8				
$\phi_v V_u$	46.2					95.8					90.4					36.4					67.3				

1B = One brace mid span

2B = Two braces within the span

3B = Three braces within the span

FR = Assumes compression flange fully restrained

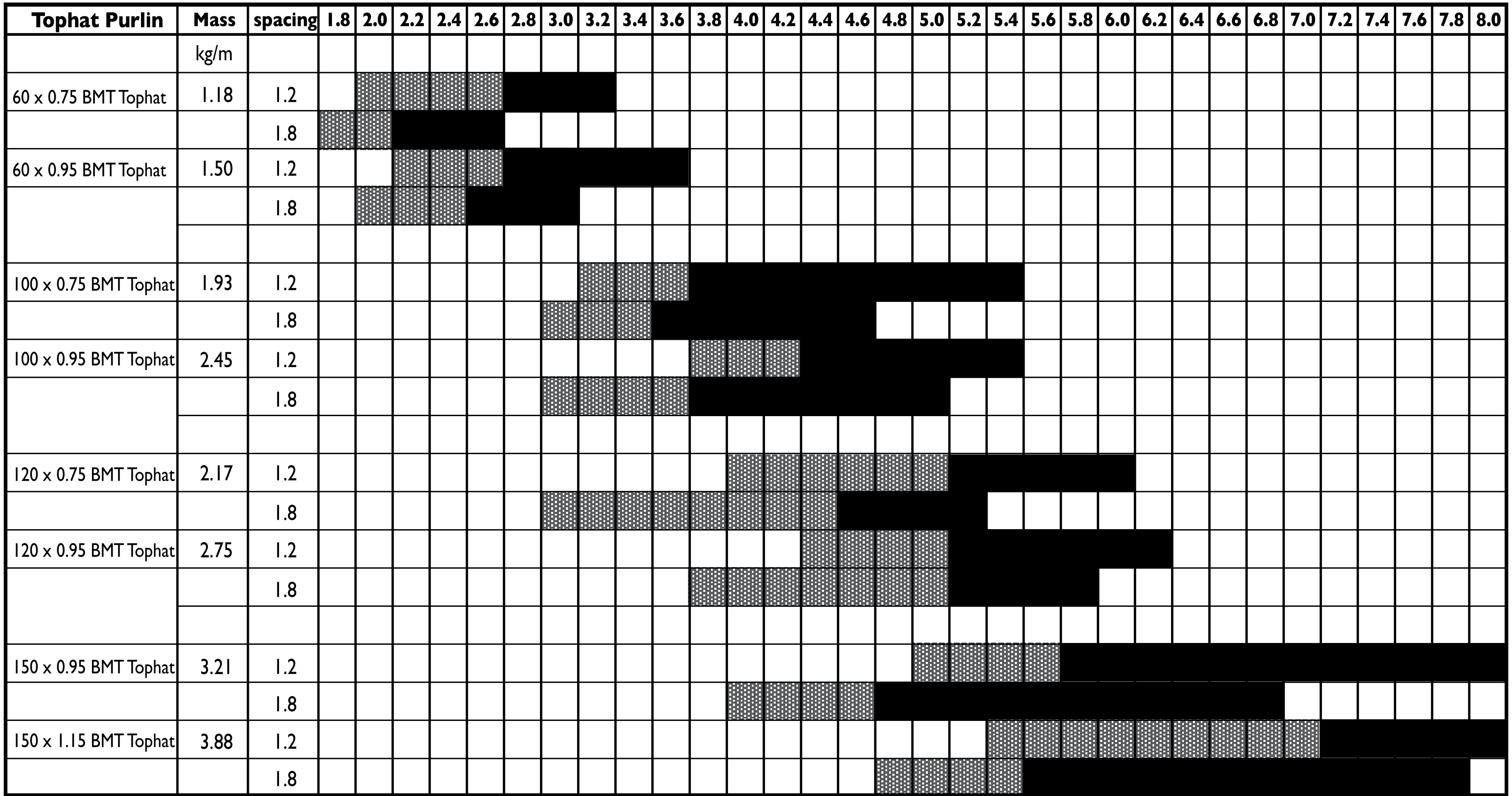
ws = Uniformly distributed serviceability load for deflection limit = Span/150 (kN/m)

$\phi_b w_u$ = Strength load resistance applied at the centroid (kN/m)

$\phi_b M_u$ = Section strength in bending at the F.R. condition (kN.m.)

$\phi_v V_u$ = Section strength in shear (kN)

MS Tophats Section Typical Economic Usage Span Chart Guide



Simple spans **Lapped spans**

NOTE: This chart is a quick reference only. Each situation should be considered separately and designed using standard procedures

FOR FURTHER INFORMATION AND ORDERS CONTACT METALCRAFT ROOFING.

MS TOPHATS
TECHNICAL DESIGN GUIDE

INTRODUCTION

MS Tophat can be used for roof purlins, wall girts and floor joists, and are an economic option for these and other applications including carports and fencing. They are an economical alternative to timber and C section purlins for spans up to 7 meters.

Easy to use they fasten directly to their supports which eliminates the requirements for cleats. Being symmetrical there is no require-ments for braces or nogs to prevent twisting and allows the profile to be easily lapped for maximum performance.

MS Tophats are manufactured from high strength galvanised steel coil, the Z275 min coating provides good protection in most exposed internal environments. Consideration should be given when used in a lined exterior dwelling; thermal breaks are required between the tophat and cladding to avoid thermal bridging. Contact with materials not compatible with zinc should be avoided.

MS Tophats comply with the New Zealand Building Code, and are designed to AS/NZS 4600: 1996 Cold formed steel structures.

HANDLING AND STORAGE

Care should be taken to ensure MS Tophats are kept dry during transportation and storage. The presence of water between the stacked sections will create premature corrosion, it is recom-mended the tophats are separated and dried if this situation occurs. Cutting if required should be done with hacksaws or snips, use of abrasive disc blades is not recommended.

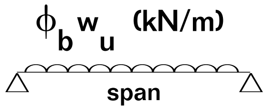
DISCLAIMER

This publication is intended to provide accurate information to the best of our knowledge in regards to MS Tophats Sections. It does not constitute a complete description of the goods nor an express statement about their suitability for any particular purpose. All data is provided as a guide only and Metalcraft Roofing do not accept any liability for loss or damage suffered from the use of this data.

NOTES

MS TOPHATS STRENGTH LOAD SPAN TABLE

UNIFORMLY DISTRIBUTED LOAD = $\phi_b w_u$ (kN/m)



SINGLE SPAN

Span (m)	60 x 0.75			60 x 0.95			100 x 0.75			100 x 0.95			120 x 0.75		
	$\phi_b w_u$ (kN/m)		w_s kN/m	$\phi_b w_u$ (kN/m)		w_s kN/m	$\phi_b w_u$ (kN/m)		w_s kN/m	$\phi_b w_u$ (kN/m)		w_s kN/m	$\phi_b w_u$ (kN/m)		w_s kN/m
Load	Inward	Outward	Defl	Inward	Outward	Defl	Inward	Outward	Defl	Inward	Outward	Defl	Inward	Outward	Defl
2.0	2.30	1.56	0.88	3.08	2.11	1.16	4.54	3.10	3.90						
2.2	1.90	1.29	0.66	2.55	1.75	0.87	3.76	2.66	2.93						
2.4	1.60	1.08	0.51	2.14	1.47	0.67	3.16	2.24	2.26	4.72	2.58	3.08	3.82	2.67	3.34
2.6	1.36	0.92	0.40	1.83	1.25	0.53	2.69	1.91	1.78	4.02	2.38	2.42	3.26	2.27	2.62
2.8	1.18	0.80	0.32	1.57	1.08	0.42	2.32	1.64	1.42	3.47	2.21	1.94	2.81	1.96	2.10
3.0				1.37	0.94	0.34	2.02	1.43	1.16	3.02	2.00	1.58	2.45	1.71	1.71
3.2				1.20	0.83	0.28	1.78	1.26	0.95	2.66	1.76	1.30	2.15	1.50	1.41
3.4							1.57	1.11	0.79	2.35	1.56	1.08	1.90	1.33	1.17
3.6							1.40	0.99	0.67	2.10	1.39	0.91	1.70	1.19	0.99
3.8							1.26	0.89	0.57	1.88	1.25	0.78	1.52	1.06	0.84
4.0							1.14	0.81	0.49	1.70	1.13	0.67	1.38	0.96	0.72
4.2							1.03	0.73	0.42	1.54	1.02	0.58	1.25	0.87	0.62
4.4							0.94	0.67	0.37	1.40	0.93	0.50	1.14	0.79	0.54
4.6							0.86	0.61	0.32	1.28	0.85	0.44	1.04	0.73	0.47
4.8							0.79	0.56	0.28	1.18	0.78	0.39	0.96	0.67	0.42
5.0										1.09	0.72	0.34	0.88	0.61	0.37
5.2										1.01	0.67	0.30	0.81	0.57	0.33
5.4										0.93	0.62	0.27	0.75	0.53	0.29
5.6												0.24	0.70	0.49	0.26
5.8															
6.0															
6.2															
6.4															
6.6															
6.8															
7.0															
7.2															
7.4															
7.6															
7.8															
8.0															
8.2															
8.4															
8.6															
8.8															
9.0															
Fixings Steel/Timber Cold Formed	2/12 g 2/12 g / 1.2 mm			2/12 g 2/12 g / 1.2 mm			4/12 g 2/12 g / 1.5 mm			4/12 g 2/12 g / 1.5 mm			4/14 g 2/14 g / 1.5 mm		

Steel/ Timber Fixings = Number and gauge of Tek screws fixing to G300 hot rolled steel a minimum of 3mm thick or type T17 tek screws a minimum of 37mm into timber.

Cold Formed Fixings = Number and gauge of screws and minimum thickness of G450 cold formed support member.

Outward Loads = Must be adjusted if support member thickness or grades are lower.

The above loads assume the Top Flange is fully restained by the sheeting.

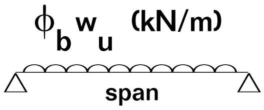
ws = Uniformly distributed serviceability load for deflection limit

= $\frac{\text{Span (kN/m)}}{150}$

ϕb wu = Dependable strength load resistance applied at the centroid (kN/m)

MS TOPHATS STRENGTH LOAD SPAN TABLE

UNIFORMLY DISTRIBUTED LOAD = $\phi_b\ w_u$ (kN/m)



SINGLE SPAN

	120 x 0.95			150 x 0.95			150 x 1.15			150 x 1.55		
Span (m)	$\phi_b w_u$ (kN/m)		w_s kN/m	$\phi_b w_u$ (kN/m)		w_s kN/m	$\phi_b w_u$ (kN/m)		w_s kN/m	$\phi_b w_u$ (kN/m)		w_s kN/m
Load	Inward	Outward	Defl	Inward	Outward	Defl	Inward	Outward	Defl	Inward	Outward	Defl
2.0												
2.2												
2.4												
2.6	4.85	3.43	3.73									
2.8	4.18	2.96	2.99									
3.0	3.64	2.58	2.43	4.57	3.07	3.91						
3.2	3.20	2.26	2.00	4.02	2.78	3.22						
3.4	2.84	2.01	1.67	3.56	2.46	2.69	4.93	2.71	3.73			
3.6	2.53	1.79	1.41	3.18	2.20	2.26	4.39	2.56	3.01			
3.8	2.27	1.61	1.19	2.85	1.97	1.93	3.94	2.42	2.56	6.41	3.93	3.51
4.0	2.05	1.45	1.02	2.57	1.78	1.65	3.56	2.30	2.19	5.78	3.55	3.01
4.2	1.86	1.31	0.88	2.33	1.62	1.43	3.23	2.19	1.90	5.24	3.22	2.60
4.4	1.69	1.20	0.77	2.13	1.47	1.24	2.94	2.09	1.65	4.78	2.93	2.26
4.6	1.55	1.10	0.67	1.95	1.35	1.09	2.69	1.91	1.44	4.37	2.68	1.98
4.8	1.42	1.01	0.59	1.79	1.24	0.96	2.47	1.75	1.27	4.02	2.46	1.74
5.0	1.31	0.93	0.52	1.65	1.14	0.85	2.28	1.62	1.12	3.70	2.27	1.54
5.2	1.21	0.86	0.47	1.52	1.05	0.75	2.11	1.50	1.00	3.42	2.10	1.37
5.4	1.12	0.79	0.42	1.41	0.98	0.67	1.95	1.39	0.89	3.17	1.95	1.22
5.6	1.05	0.74	0.37	1.31	0.91	0.60	1.82	1.29	0.80	2.95	1.81	1.10
5.8	0.97	0.69	0.34	1.22	0.85	0.54	1.69	1.20	0.72	2.75	1.69	0.99
6.0	0.91	0.64	0.30	1.14	0.79	0.49	1.58	1.12	0.65	2.57	1.58	0.89
6.2	0.85	0.60	0.28	1.07	0.74	0.44	1.48	1.05	0.59	2.41	1.48	0.81
6.4				1.00	0.70	0.40	1.39	0.99	0.54	2.26	1.39	0.74
6.6				0.94	0.65	0.37	1.31	0.93	0.49	2.12	1.30	0.67
6.8				0.89	0.62	0.34	1.23	0.87	0.45	2.00	1.23	0.61
7.0				0.84	0.58	0.31	1.16	0.83	0.41	1.89	1.16	0.56
7.2				0.79	0.55	0.28	1.10	0.78	0.38	1.78	1.09	0.52
7.4							1.04	0.74	0.35	1.69	1.04	0.48
7.6							0.99	0.70	0.32	1.60	0.98	0.44
7.8							0.94	0.66	0.30	1.52	0.93	0.41
8.0							0.89	0.63	0.27	1.45	0.89	0.38
8.2										1.38	0.84	0.35
8.4										1.31	0.80	0.33
8.6										1.25	0.77	0.30
8.8												
9.0												
Fixings Steel/Timber Cold Formed	2/14 g 2/14 g / 1.5 mm			2/14 g 2/14 g / 1.5 mm			2/14 g 2/14 g / 1.5 mm			2/14 g 4/14 g / 1.5 mm		

Steel/ Timber Fixings = Number and gauge of Tek screws fixing to G300 hot rolled steel a minimum of 3mm thick or type T17 tek screws a minimum of 37mm into timber.

Cold Formed Fixings = Number and gauge of screws and minimum thickness of G450 cold formed support member.

Outward Loads = Must be adjusted if support member thickness or grades are lower.

The above loads assume the Top Flange is fully restained by the sheeting.

ws = Uniformly distributed serviceability load for deflection limit

= Span (kN/m)
150

ϕb wu = Dependable strength load resistance applied at the centroid (kN/m)

MS TOPHATS STRENGTH LOAD SPAN TABLE

UNIFORMLY DISTRIBUTED LOAD = $\phi_b w_u$ (kN/m)

LAPPED SPAN

$\phi_b w_u$ (kN/m)

Span (m)	60 x 0.75			60 x 0.95			100 x 0.75			100 x 0.95			120 x 0.75		
	$\phi_b w_u$ (kN/m)		w_s kN/m	$\phi_b w_u$ (kN/m)		w_s kN/m	$\phi_b w_u$ (kN/m)		w_s kN/m	$\phi_b w_u$ (kN/m)		w_s kN/m	$\phi_b w_u$ (kN/m)		w_s kN/m
Load	Inward	Outward	Defl	Inward	Outward	Defl	Inward	Outward	Defl	Inward	Outward	Defl	Inward	Outward	Defl
2.0	3.37	2.40	1.89	4.58	2.48	2.46	7.38	3.36	8.27						
2.2	2.69	2.10	1.42	3.65	2.25	1.85	6.10	3.05	8.22						
2.4	2.16	1.76	1.09	2.94	2.07	1.43	5.13	2.80	4.79	7.67	4.20	6.43	5.14	4.60	7.26
2.6	1.76	1.50	0.86	2.39	1.19	1.12	4.37	2.58	3.77	6.54	3.88	5.06	4.74	4.5	5.71
2.8	1.44	1.29	0.69	1.96	1.75	0.90	3.77	2.40	3.02	5.64	3.60	4.05	4.41	3.94	4.57
3.0	1.19	1.13	0.56	1.61	1.53	0.73	3.28	2.24	2.45	4.91	3.36	3.29	3.97	3.68	3.72
3.2	1.05	0.99	0.46	1.42	1.34	0.60	2.88	2.10	2.02	4.31	3.15	2.71	3.49	3.45	3.06
3.4	0.93	0.88	0.38	1.26	1.19	0.50	2.56	1.98	1.68	3.82	2.96	2.26	3.09	3.24	2.55
3.6	0.83	0.78	0.32	1.12	1.06	0.42	2.28	1.87	1.42	3.41	2.80	1.90	2.76	2.89	2.15
3.8				1.01	0.95	0.36	2.05	1.77	1.21	3.06	2.65	1.62	2.48	2.59	1.83
4.0				0.91	0.86	0.31	1.85	1.68	1.03	2.76	2.52	1.39	2.24	2.34	1.57
4.2							1.67	1.60	0.89	2.50	2.40	1.20	2.03	2.12	1.36
4.4							1.53	1.53	0.78	2.28	2.27	1.04	1.85	1.93	1.18
4.6							1.40	1.46	0.68	2.09	2.07	0.91	1.69	1.77	1.03
4.8							1.28	1.36	0.60	1.92	1.90	0.80	1.55	1.63	0.91
5.0							1.18	1.25	0.53	1.77	1.76	0.71	1.43	1.50	0.80
5.2							1.09	1.16	0.47	1.63	1.62	0.63	1.32	1.39	0.71
5.4							1.01	1.07	0.42	1.52	1.50	0.56	1.23	1.28	0.64
5.6							0.94	1.00	0.38	1.41	1.40	0.51	1.14	1.19	0.57
5.8							0.88	0.93	0.34	1.31	1.30	0.46	1.06	1.11	0.51
6.0							0.82	0.87	0.31	1.23	1.22	0.41	0.99	1.04	0.46
6.2										1.15	1.14	0.37	0.93	0.97	0.42
6.4										1.08	1.07	0.34	0.87	0.91	0.38
6.6										1.01	1.01	0.31	0.82	0.86	0.35
6.8										0.96	0.95	0.28	0.77	0.81	0.32
7.0													0.73	0.76	0.29
7.2													0.69	0.72	0.27
7.4															
7.6															
7.8															
8.0															
8.2															
8.4															
8.6															
8.8															
9.0															
Fixings Steel/Timber Cold Formed	2/12 g 4/12 g / 1.2 mm			2/12 g 4/12 g / 1.2 mm			4/12 g 4/12 g / 1.5 mm			4/12 g 6/12 g / 1.5 mm			4/14 g 6/14 g / 1.5 mm		

Steel/ Timber Fixings = Number and gauge of Tek screws fixing to G300 hot rolled steel a minimum of 3mm thick or type T17 tek screws a minimum of 37mm into timber.

Cold Formed Fixings = Number and gauge of screws and minimum thickness of G450 cold formed support member.

Outward Loads = Must be adjusted if support member thickness or grades are lower.

The above loads assume the Top Flange is fully restained by the sheeting.

Total lap length shall be 15% of the maximum adjacent span.

60 MS Tophat Lap ends to be fixed with 2 Tek screws (one in each web)

100/120/150 MS Tophat Lap ends to be fixed with 4 Tek screws (one in each web and flange).

w_s = Uniformly distributed serviceability load for deflection limit

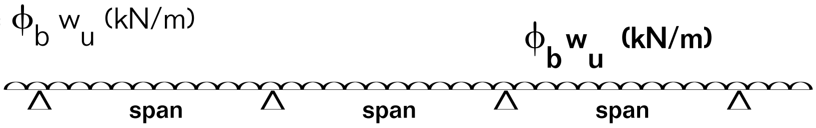
= $\frac{\text{Span}}{150}$ (kN/m)

$\phi_b w_u$ = Dependable strength load resistance applied at the centroid (kN/m)

MS TOPHATS STRENGTH LOAD SPAN TABLE

UNIFORMLY DISTRIBUTED LOAD = $\phi_b \, w_u$ (kN/m)

LAPPED SPAN



	120 x 0.95			150 x 0.95			150 x 1.15			150 x 1.55		
Span (m)	$\phi_b w_u$ (kN/m)		w_s kN/m	$\phi_b w_u$ (kN/m)		w_s kN/m	$\phi_b w_u$ (kN/m)		w_s kN/m	$\phi_b w_u$ (kN/m)		w_s kN/m
Load	Inward	Outward	Defl	Inward	Outward	Defl	Inward	Outward	Defl	Inward	Outward	Defl
2.0												
2.2												
2.4												
2.6	4.85	3.43	3.73									
2.8	4.18	2.96	2.99									
3.0	3.64	2.58	2.43	4.57	3.07	3.91						
3.2	3.20	2.26	2.00	4.02	2.78	3.22						
3.4	2.84	2.01	1.67	3.56	2.46	2.69	4.93	2.71	3.73			
3.6	2.53	1.79	1.41	3.18	2.20	2.26	4.39	2.56	3.01			
3.8	2.27	1.61	1.19	2.85	1.97	1.93	3.94	2.42	2.56	6.41	3.93	3.51
4.0	2.05	1.45	1.02	2.57	1.78	1.65	3.56	2.30	2.19	5.78	3.55	3.01
4.2	1.86	1.31	0.88	2.33	1.62	1.43	3.23	2.19	1.90	5.24	3.22	2.60
4.4	1.69	1.20	0.77	2.13	1.47	1.24	2.94	2.09	1.65	4.78	2.93	2.26
4.6	1.55	1.10	0.67	1.95	1.35	1.09	2.69	1.91	1.44	4.37	2.68	1.98
4.8	1.42	1.01	0.59	1.79	1.24	0.96	2.47	1.75	1.27	4.02	2.46	1.74
5.0	1.31	0.93	0.52	1.65	1.14	0.85	2.28	1.62	1.12	3.70	2.27	1.54
5.2	1.21	0.86	0.47	1.52	1.05	0.75	2.11	1.50	1.00	3.42	2.10	1.37
5.4	1.12	0.79	0.42	1.41	0.98	0.67	1.95	1.39	0.89	3.17	1.95	1.22
5.6	1.05	0.74	0.37	1.31	0.91	0.60	1.82	1.29	0.80	2.95	1.81	1.10
5.8	0.97	0.69	0.34	1.22	0.85	0.54	1.69	1.20	0.72	2.75	1.69	0.99
6.0	0.91	0.64	0.30	1.14	0.79	0.49	1.58	1.12	0.65	2.57	1.58	0.89
6.2	0.85	0.60	0.28	1.07	0.74	0.44	1.48	1.05	0.59	2.41	1.48	0.81
6.4				1.00	0.70	0.40	1.39	0.99	0.54	2.26	1.39	0.74
6.6				0.94	0.65	0.37	1.31	0.93	0.49	2.12	1.30	0.67
6.8				0.89	0.62	0.34	1.23	0.87	0.45	2.00	1.23	0.61
7.0				0.84	0.58	0.31	1.16	0.83	0.41	1.89	1.16	0.56
7.2				0.79	0.55	0.28	1.10	0.78	0.38	1.78	1.09	0.52
7.4							1.04	0.74	0.35	1.69	1.04	0.48
7.6							0.99	0.70	0.32	1.60	0.98	0.44
7.8							0.94	0.66	0.30	1.52	0.93	0.41
8.0							0.89	0.63	0.27	1.45	0.89	0.38
8.2										1.38	0.84	0.35
8.4										1.31	0.80	0.33
8.6										1.25	0.77	0.30
8.8												
9.0												
Fixings Steel/Timber Cold Formed	2/14 g 2/14 g / 1.5 mm			2/14 g 2/14 g / 1.5 mm			2/14 g 2/14 g / 1.5 mm			2/14 g 4/14 g / 1.5 mm		

Steel/ Timber Fixings = Number and gauge of Tek screws fixing to G300 hot rolled steel a minimum of 3mm thick or type T17 tek screws a minimum of 37mm into timber.

Cold Formed Fixings = Number and gauge of screws and minimum thickness of G450 cold formed support member.

Outward Loads = Must be adjusted if support member thickness or grades are lower.

The above loads assume the Top Flange is fully restained by the sheeting.

Total lap length shall be 15% of the maximum adjacent span.

60 MS Tophat Lap ends to be fixed with 2 Tek screws (one in each web)

100/120/150 MS Tophat Lap ends to be fixed with 4 Tek screws (one in each web and flange).

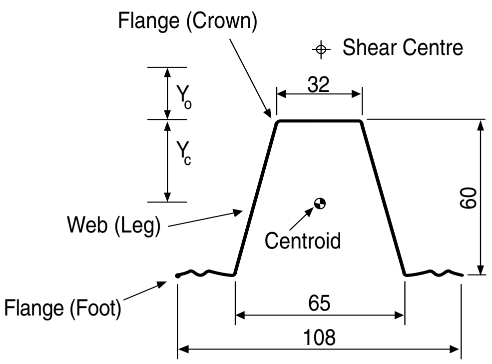
w_s = Uniformly distributed serviceability load for deflection limit

= $\frac{\text{Span}}{150}$ (kN/m)

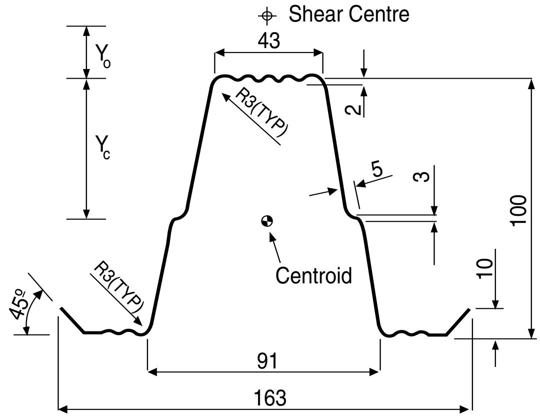
$\phi_b \, w_u$ = Dependable strength load resistance applied at the centroid (kN/m)

MS TOPHATS SECTION GEOMETRY & PROPERTIES

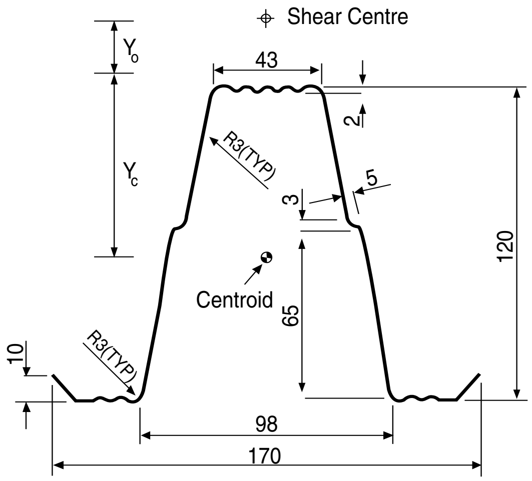
MS TOPHATS SECTION GEOMETRY



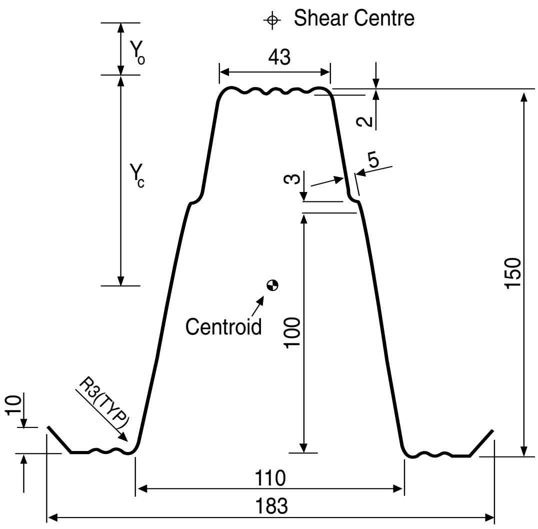
MS 60 TOPHAT



MS 100 TOPHAT



MS 120 TOPHAT



MS 150 TOPHAT

MS TOPHATS SECTION PROPERTIES

Code	Thickness	Area	Mass	Second Moment Area (Full)		Section Modulus		Radius of Gyration		Centre of Gravity	Shear Centre	Torsion Constant	Warping Constant	Mono-Symmetry Constant
	t(BMT) mm	mm^2	kg/m	I_x 10^2mm^4	I_y 10^6mm^4	z_x 10^3mm^3	z_y 10^3mm^3	r_x mm	r_y mm	y_c mm	y_o mm	J mm^4	I_w 10^9mm^6	β_x mm
60 MS Tophat 0.75 BMT	0.75	150	1.18	0.078	0.119	2.45	2.20	22.8	28.1	31.7	44.2	28.2	16.05	110
60 MS Tophat 0.95 BMT	0.95	190	1.50	0.098	0.151	3.09	2.78	22.8	28.1	31.7	44.2	57.3	20.33	110
100 MS Tophat 0.75 BMT	0.75	248	1.93	0.388	0.439	6.30	5.39	37.1	42.2	55.2	67.4	46.5	238.61	158
100 MS Tophat 0.95 BMT	0.95	314	2.45	0.428	0.556	7.75	6.83	37.0	42.2	55.2	67.4	94.5	302.24	158
120 MS Tophat 0.75 BMT	0.75	278	2.17	0.527	0.519	8.03	6.13	43.7	43.3	65.6	82.3	52.1	363.31	184
120 MS Tophat 0.95 BMT	0.95	352	2.75	0.667	0.657	10.16	7.76	43.6	43.3	65.6	82.3	105.9	460.20	184
150 MS Tophat 0.95 BMT	0.95	410	3.21	1.160	0.878	14.30	9.60	53.3	46.3	81.1	103.9	123.5	758.37	225
150 MS Tophat 1.15 BMT	1.15	497	3.88	1.400	1.060	17.30	11.62	53.2	46.3	81.1	103.9	219.1	918.02	225
150 MS Tophat 1.55 BMT	1.55	670	5.23	1.890	1.430	23.32	15.66	53.2	46.3	81.1	103.9	536.5	1237.33	225

MS TOPHATS FLOOR JOIST SPANS

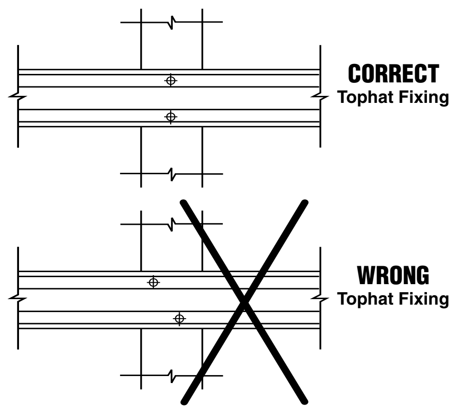
SINGLE SPAN AND DOUBLE SPAN

Code	Spacing					
	400		450		600	
	Single	Double	Single	Double	Single	Double
60 MS Tophat 0.75 BMT	1.05	1.25	1.00	1.20	0.95	1.10
60 MS Tophat 0.95 BMT	1.15	1.35	1.10	1.30	1.05	1.20
100 MS Tophat 0.75 BMT	1.80	2.20	1.75	2.05	1.65	1.90
100 MS Tophat 0.95 BMT	2.00	2.40	1.90	2.25	1.80	2.05
120 MS Tophat 0.75 BMT	2.20	2.60	2.10	2.45	1.90	2.20
120 MS Tophat 0.95 BMT	2.40	2.90	2.30	2.70	2.10	2.40
150 MS Tophat 0.95 BMT	2.90	3.60	2.80	3.30	2.50	2.90
150 MS Tophat 1.15 BMT	3.20	3.90	3.00	3.60	2.70	3.20
150 MS Tophat 1.55 BMT	3.60	4.30	3.40	4.10	3.00	3.60

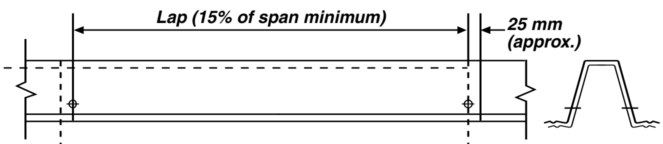
Spans are based on limiting floor vibrations and are capable of carrying live loads of at least 4kPa

FIXING DETAILS & ASSEMBLY EXAMPLES

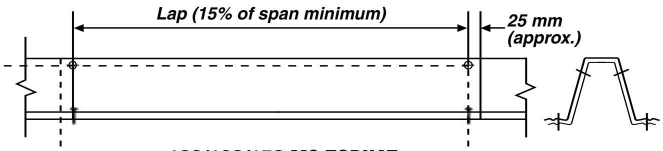
FIXING TO SUPPORT DETAIL



TYPICAL FIXING – LAPPED SECTION

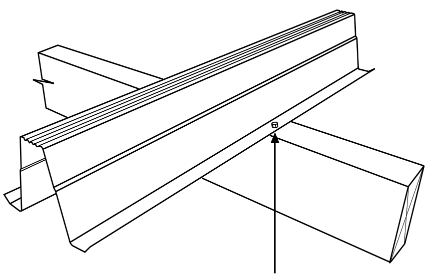


60 MS TOPHAT



100/120/150 MS TOPHAT

TIMBER/STEEL TYPICAL SCREWED FIXINGS

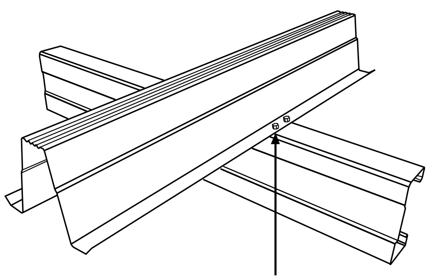


Screw each side

Refer tables for specific fixing requirements

COLD FORMED TYPICAL SCREWED FIXINGS

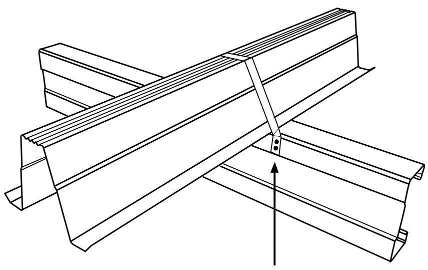
(Steel /Timber and Cold Formed)



Screws each side

Refer tables for specific fixing requirements

STRAPPED FIXING



2 x 14g – 10 x 20 fasteners each side of strap

Fasten strap to web of support each side – Total 4 Fastenings

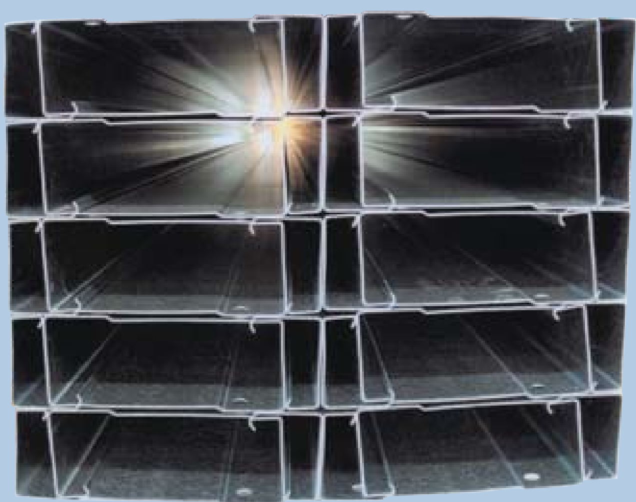
Metalcraft is one of New Zealand's largest manufacturers and distributors of steel roofing, cladding, rainwater systems, insulated panels and structural steel products. With the latest roll-forming facilities and nine distribution centres stretching the length of the country, Metalcraft is increasingly looked to as the industry leader.

Metalcraft structural division is the premiere manufacturer and supplier of MSS purlins & girts, MC sections and MS tophats, all complimented with a choice of Camlok™ or Standard bracing systems.

Metalcraft roofing division has a wide range of quality rollformed and folded COLORSTEEL® & ZINCALUME® products with profiles for Roofing and Cladding to suit all applications.

Metalcrafts insulated panel division specialises in the manufacture, supply and installation of EPS, Mineral Wool and PIR core panels to all industry types.

Metalcraft offer both commercial and residential customers premium quality products and unrivalled service, at a competitive price.



Factfile:

- Structural purlins
- Steel framed buildings
- Corrugated profiles
- Ribbed profiles
- Wall claddings
- Metal Tiles
- Flashing
- Ridging
- Rain Water systems
- Coloursteel and Zincalume
- Insulated panel systems

Metalcraft ROOFING
Structural Products Division
AUCKLAND
PO Box 51-286 Pakuranga
24 Trugood Drive, East Tamaki, Auckland
Ph: (09) 273 2820
Fax: (09) 274 0251
Email: metalcraft_structural@xtra.co.nz

CHRISTCHURCH
PO Box 33-056 Barrington
85 Columbia Ave, Hornby, Christchurch
Ph: (03) 962 7275
Fax: (03) 962 7727
Email: aaron@metalcraftchch.co.nz

Metalcraft ROOFING
Roofing & Cladding Division
AUCKLAND
PO Box 51-286 Pakuranga
26 Trugood Drive, East Tamaki, Auckland
Ph: (09) 273 2820
Fax: (09) 274 0251
Email: metalcraftorders@xtra.co.nz

NORTH SHORE
4 Silverfields Rd, Wairau Park
Ph: (09) 486 1402
Fax: (09) 444 9799

HASTINGS
1454A Omahu Rd, Hastings
Ph: (06) 873 9020
Fax: (06) 879 8284

HAMILTON
PO Box 10-113 Hamilton
25 Sheffield Street, Te Rapa, Hamilton
Ph: (07) 849 3807
Fax: (07) 849 6889
Freephone: 0508 493 807

TAURANGA
PO Box 6100 Tauranga
143Totara St, Mount Maunganui
Ph: (07) 575 7032
Fax: (07) 575 7031

ROTORUA
PO Box 388 Rotorua
15 Monakai Street, Rotorua
Ph: (07) 350 1138
Fax: (07) 350 1148

WHANGAREI
PO Box 5054 Whangarei
42-44 Rewa Rewa Rd
Ph: (09 430 1070
Fax: (09) 430 1071

NEW PLYMOUTH
PO Box 3064 Fitzroy
New Plymouth
218 De Havilland Dr, New Plymouth
Ph: (06) 755 2113
Fax: (06) 755 0021

PALMERSTON NORTH
Private Bag 11-026
Palmerston North
76 Malden Street , Palmerston North
Ph: (06) 358 9149
Fax: (06) 358 7967
Freephone: 0508 589 145

WELLINGTON
PO Box 38-509
Wellington Mail Centre
201 Gracefield Rd, Seaview, Lower Hutt
Ph: (04) 566 2253
Fax: (04) 566 2256

CHRISTCHURCH
PO Box 33-056 Barrington
85 Columbia Ave,Hornby
Christchurch
Ph: (03) 962 7280
Fax: (03) 962 7286
Freephone: 0800 333 056

CROMWELL
20 McNulty Road, Cromwell
Ph: (03) 445 4180
Fax: (03) 445 3581

www.metalcraftroofing.co.nz