Structural Products & Systems
UK & Ireland

Multibeam
Technical Handbook

Purlin & Cladding Rail Systems

Kingspan®

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Introduction

Structural Products & Systems, a sub-division of Kingspan Insulated Panels, is one of Britain's leading designers and manufacturers of structural steel components for the construction industry. Based in Sherburn, North Yorkshire, we operate one of the largest and most advanced production complexes in Europe, manufacturing over 50,000 tonnes of steel products each year. In over five decades of trading, we have become an established market leader, renowned for our quality products and innovative designs.

Our comprehensive range of cold-rolled structural products includes composite steel floordecks, purlin and rail systems and a range of ancillary products:

- Multibeam is a range of purlin and cladding rail systems that are suitable for all types of modern roof construction with bay sizes up to 15m. Multibeam cladding rail systems are designed specifically to support metal-clad walls in horizontal or vertical orientation;
- Multichannel is a range of pre-engineered, structural channel sections designed to complement the Multibeam purlin and rail systems. Multichannel is an ideal solution for vertically or horizontally-laid cladding and can be an effective substitute for conventional hot-rolled sections and timber;
- Multideck is a high-performance, profiled, galvanised steel floor decking for use in the construction of composite floor slabs.

Kingspan Benefits

Quality & Durability

All products are manufactured from the highest quality materials using state-of-the-art production equipment to rigorous quality control standards; ensuring long-term reliability and service life. All products are fully compliant with ISO 9001 (Quality), ISO 14001 (Environmental), ISO 50001 (Energy) and OHSAS 18001 (Health & Safety). This simple coherent business management system enables the organisation to successfully achieve its purpose and mission to ensure that quality; safety and the environment are considered in all aspects of the business process. Further information on these certifications can be found on our website **www.kingspanstructural.co.uk**

Environmental

The Multibeam system has been engineered to ensure maximum performance whilst minimising the material content. Individual sections are packed together using low carbon mild steel, blued and waxed banding which is wholly recyclable. Identification of the bundles is by paper labels which are biodegradable and can be recycled. Any wood products, used to support the bundles in transport, are sourced from either UK FSC forests or sustainable European forests with management systems in place to ensure that trees are replaced and processes meet the criteria of the Kingspan Group Forest Disclosure policy.

Steel does not lose its strength or stiffness over time so remains a viable product for reuse. Assembly joints between components can be easily dismantled at any time to facilitate reuse. Sections can be recut to length and reholed to suit a revised use.

Steel is one of the world's most recycled materials with over 40% of 'new' steel made from recycled steel. Kingspan's suppliers encourage, promote and assist in the return of steel for recycling.

SCILGA Accreditation

The Multibeam purlin and rail system has SCILGA accreditation.

Gold Standard

Kingspan Structural Products & Systems have been awarded the Gold Standard under the Steel Construction Sustainability Charter (SCSC).

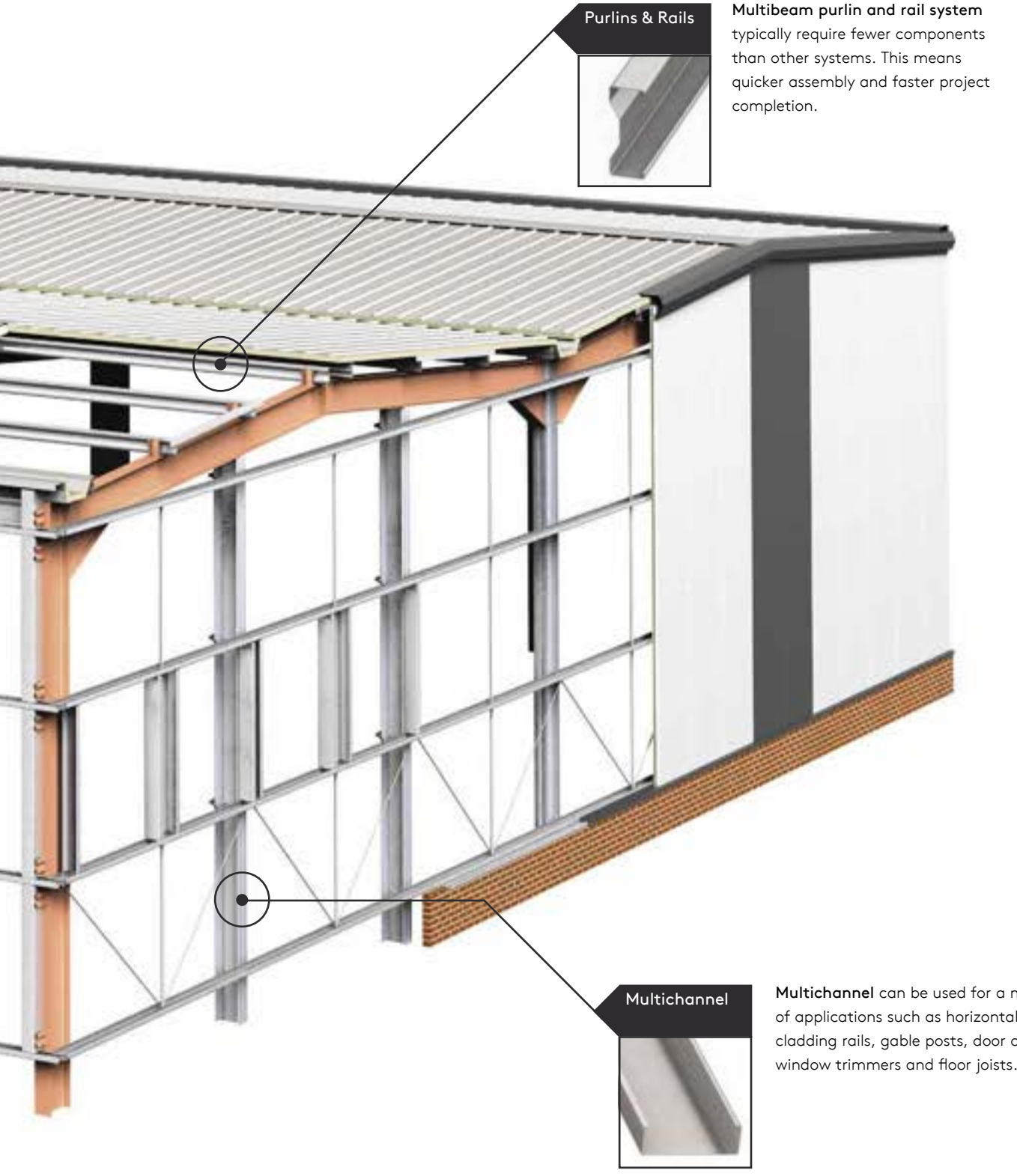
CE Mark

Kingspan Structural Products have CE accreditation; please visit our website to view the relevant certification. The accreditation was carried out by the Steel Construction Certification Scheme (SCCS).

Product Overview

With simple connections and economical sections, **Eaves Beam** is compatible with all types of cladding in modern roof construction.

You can't get it wrong with Multibeam purlins; The unique sigma shape is 'non-handed', making it the most versatile purlin on the market today.



Multibeam purlin and rail system typically require fewer components than other systems. This means quicker assembly and faster project completion.

Multichannel can be used for a myriad of applications such as horizontally laid cladding rails, gable posts, door and window trimmers and floor joists.

Roof Purlins

Product Overview

Multibeam purlins are suitable for all types of modern roof construction with bay sizes up to 15m.

Multibeam is designed to create a structure with fewer components than other systems and is lighter for easier site handling, stiffer for straighter cladding lines, stronger for longer spans and greener due to reduced steel content. This means that it saves you time, lowers your costs and provides greater sustainability.

Applications

- All types of roof cladding
- Pitched, mansard, curved or flat roof applications
- Roof slopes from 0°to 60°
- Bay widths up to 15m

Material Specification

Hot dip galvanised steel to BS EN 10346 and BS EN 10143 'specifications for continuously hot dip zinc /metal coated structural steel strip'. The minimum grade of steel used is S450GD, with Z275 zinc coating, giving an average coating thickness of 0.02mm to each side. Other coatings maybe available (G600 / Magnelis).
Please contact our Sales Team for advice.

The sigma shape of Multibeam makes it stiffer than other common shapes of purlin so it can be handled practically on larger spans.

Range

- Section heights from 145mm to 350mm
- Flange standard widths from 65mm to 90mm, up to 95mm also available (see page 26)
- Gauges from 1.2mm to 2.7mm

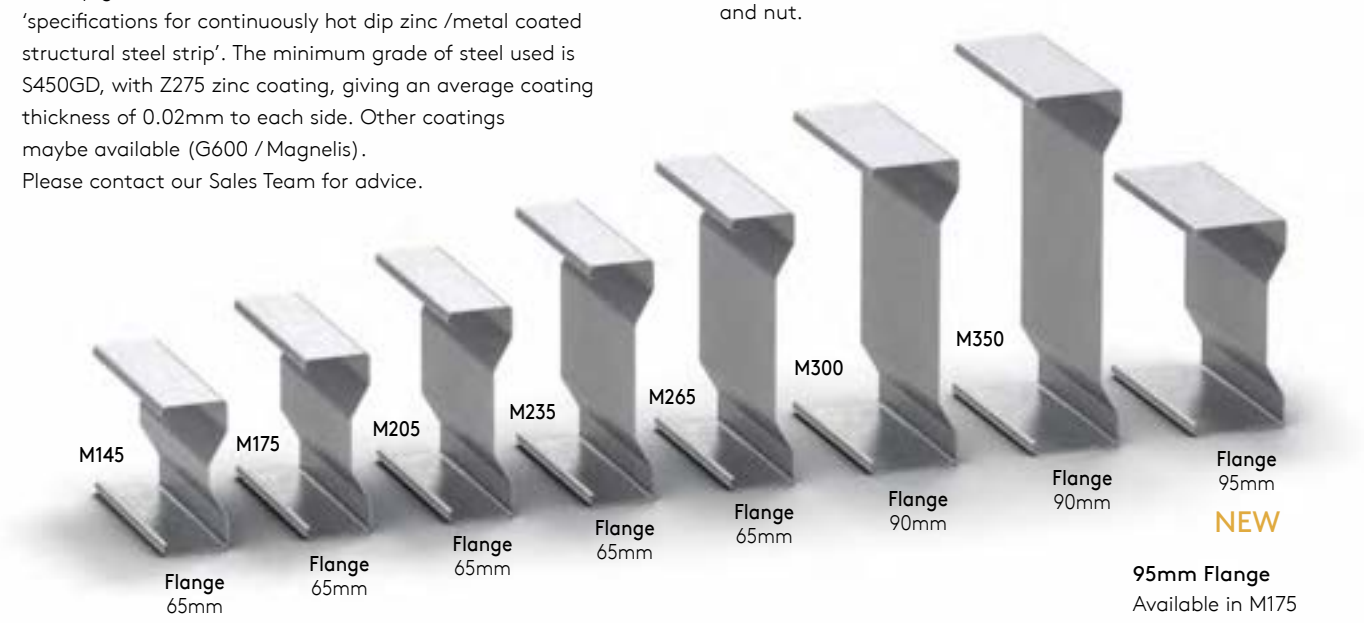
For full product dimensions see page 18. Other sizes may be available on specific request. Please contact our Technical Department for advice.

Lengths

All lengths are catered for; requirements in excess of 18m, please contact our Sales Department.

Connections

We recomend washers are fitted under both the bolt head and nut.



95mm Flange
Available in M175 through M265 sections

Spanning Systems

Multibeam can be used in all the popular and economic purlin spanning systems. The enhanced stiffness of the Multibeam shape makes it ideal for all span dimensions from the very short to the very long with purlin bar lengths of 18m or more, making it practical for both handling and structural performance.

Sleeves

Sleeves are used to provide continuity at the joints between members and are available in three gauges (see page 22). When joining two sections of different gauges (as in a HEB system) use the heaviest gauge purlin to select the sleeve for that joint.

Double Span

Double span lengths of Multibeam section span across three frame supports and provide design economy and speed of erection. This spanning system always results in the lowest component count. To ensure equal load distribution across the supporting steel work the joints are staggered, typically requiring only one sleeve per run of purlins.

Most double span bar lengths can be provided, although bays over 9m generally use single span lengths and are sleeved at every other joint to maintain continuity.

Use double span system where possible
- fewer components!
- quicker to erect!

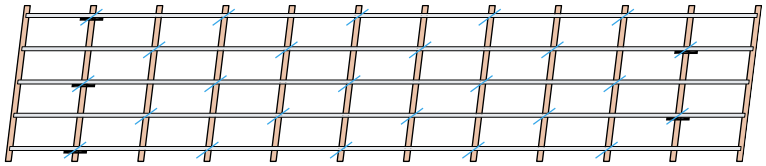
Multibeam can be supplied in various lengths, please check with our Sales Department for lengths over 18m.

Continuous Span - Heavy End Bay

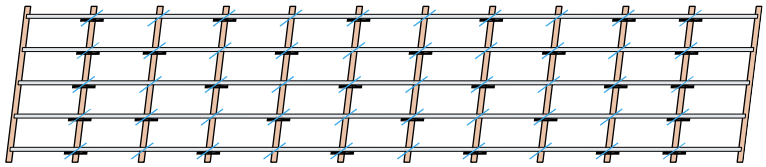
This system is often referred to as Heavy End Bay because a thicker gauge of section is required in the end bays of the building, although all internal bays are a lighter gauge. With this system all purlin joints are sleeved although double span bar lengths may be used to reduce sleeve numbers. The continuous system when used on larger buildings with bays larger than 6.5m may result in lower material cost, but more complex and costly erection.

System Types

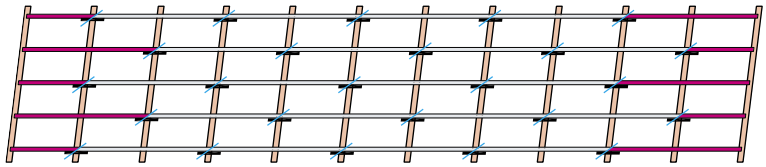
Double Span
- Most popular system.
- Ideal for all bay centres up to and including 9m.
- Lowest component count.
- Quicker erection and programme completion.



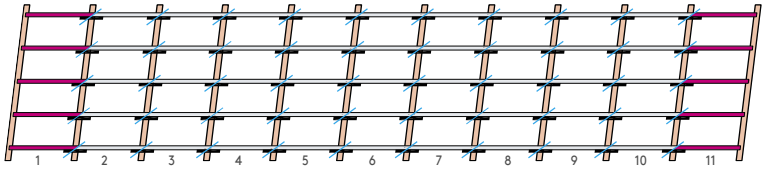
Single Span Sleeved Joints
- Option for all bay sizes particularly those with bay centres greater than 9m.
- Where site restrictions (access, weight, cranage etc.) dictates use of single span length.
- High component count.
- Normal double span load tables can be used. (Refer to Load Tables on page 29)



Double Span – Continuous Span (Heavy End Bay)
- Suitable alternative to double span system, for bay centres between 6.5m and 9m.
- Appropriate for buildings of 5 bays or more.
- Efficient material usage.
- Moderate component count. (Refer to Load Tables on page 34)



Single Span - Continuous Span (Heavy End Bay)
- Suitable alternative to single span sleeved system, for bay centres greater than 9m.
- Where site restrictions (access, weight, cranage etc.) dictates use of single length.
- Highest component count.
- Appropriate for buildings of 5 bays or more. (Refer to Load Tables on page 39)



Note: diagrams shown above are as plan view on the roof slope.

Heavier end sections indicated Joint Sleeve

Anti-Sag Requirements

Multibeam purlins on popular spans do not generally require anti-sag ties. In certain circumstances such as wind reversal conditions, large bay sizes or cladding systems that do not provide lateral restraint, then anti-sag ties may be required. Please refer to Table 1:1 or the Kingspan Toolkit Software.

Multibeam purlins do not require anti-sag ties on popular spans (up to 6.1m and roof slopes 10° or less).

Table 1:1 Anti-Sag requirements for differing bay centres at varying roof slopes

<table>
<tr><th rowspan="2">Roof Slope</th><th rowspan="2">Multibeam Purlin Section Depth (mm)</th><th colspan="8">Bay Centres</th></tr>
<tr><th><3.0</th><th>>3 - 5.1m</th><th>>5.1 - 6.1m</th><th>>6.1 - 7.0m</th><th>>7.0 - 8.2m</th><th>>8.2 - 9.1m</th><th>>9.1 - 10.5m</th><th>>10.5 - 12m</th></tr>
<tr><td>< 3°</td><td>All</td><td colspan="8">See flat roofs page 17.</td></tr>
<tr><td rowspan="3">3°-10°</td><td>145
175
205</td><td colspan="4" rowspan="2">NO ANTI-SAG TIES REQUIRED</td><td>1 Multilok</td><td>2 Multilok</td><td>N/A</td><td>N/A</td></tr>
<tr><td>235
265</td><td>1 Tubular</td><td>1 Tubular</td><td>2 Tubular</td><td>3 Tubular</td><td rowspan="2">3 SW Angle Struts</td></tr>
<tr><td>300
350</td><td>N/A</td><td>N/A</td><td>N/A</td><td>N/A</td><td>N/A</td><td>2 SW Angle Struts</td><td>3 SW Angle Struts</td></tr>
<tr><td rowspan="3">>10°-15°</td><td>145
175
205</td><td colspan="3" rowspan="2">NO ANTI-SAG TIES REQUIRED</td><td>1 Multilok</td><td>1 Multilok</td><td>2 Multilok</td><td>N/A</td><td>N/A</td></tr>
<tr><td>235
265</td><td>1 Tubular</td><td>1 Tubular</td><td>1 Tubular</td><td>1 Tubular</td><td>2 Tubular</td><td>3 Tubular</td><td rowspan="2">3 SW Angle Struts</td></tr>
<tr><td>300
350</td><td>N/A</td><td>N/A</td><td>N/A</td><td>N/A</td><td>N/A</td><td>2 SW Angle Struts</td><td>3 SW Angle Struts</td></tr>
<tr><td rowspan="3">>15°-18°</td><td>145
175
205</td><td rowspan="2">NO ANTI-SAG TIES REQUIRED</td><td>1 Multilok</td><td>1 Multilok</td><td>1 Multilok</td><td>1 Multilok</td><td>2 Multilok</td><td>N/A</td><td>N/A</td></tr>
<tr><td>235
265</td><td>1 Tubular</td><td>1 Tubular</td><td>1 Tubular</td><td>1 Tubular</td><td>2 Tubular</td><td>3 Tubular</td><td rowspan="2">3 SW Angle Struts</td></tr>
<tr><td>300
350</td><td>N/A</td><td>N/A</td><td>N/A</td><td>N/A</td><td>N/A</td><td>2 SW Angle Struts</td><td>3 SW Angle Struts</td></tr>
<tr><td>> 18°</td><td>All</td><td colspan="8">Consult Kingspan</td></tr>
</table>

Note: for roof slopes of 30° and over consider using stiffened purlin cleats.
The information in the table above can be affected by the types of roof cladding used. Please see page 14 for more info.
N/A = Section size not practical for span shown.

Roof Slopes Over 18°

For roof slopes outside those shown above consult our Technical Department. Stiffened purlin cleats should always be used for roof slopes over 30°.

Long Roof Slopes

For roof slopes exceeding 20m long, diagonal wires may be required to support the downslope component of the load.

Multilok Ties

Multilok ties are generally used on purlin sections up to 205mm deep.

Temporary Propping

When no anti-sag ties are used temporary spacers and propping may be required during sheeting of the roof.

Mono Pitch

Diagonal wires generally required to support downslope load. Contact our Technical Department for further information.

Apex Ties

Apex ties must be used in all cases where anti-sag ties are required. On bays >6.1m when no anti-sag ties are used we recommend that apex ties are used, to provide stability during sheeting of the roof.

Anti-sag

Anti-sag requirements assume that there are two slopes with a central ridge. On roof slopes of 6° or more, over 20m in length, we recommend that wire ropes are considered within the slope length to limit the load applied to the apex tie.

Load Tables and Structural Properties

For best results please use the Toolkit Design Software. Alternatively the ultimate design loads can be found from page 29 onwards.

Spans

Multibeam sections can be used on spans up to 15m.
Please consult our Technical Department for more information.

Roof Cladding Attachment

The roof cladding must be mechanical fixed to all purlins it passes over, sufficient fixings should be placed to provide the level of restraint required.

Typical Tubular Tie Arrangement

Ties installed in line

Typical Angle Strut Arrangement

Typical Multilok Tie Arrangement

M145 Purlin sections

Typical Multilok Tie Arrangement

M175 and M205 Purlins

Ties staggered

For details on hole groups please go to pages 136 and 137.

Purlin Restraint

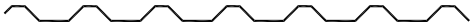
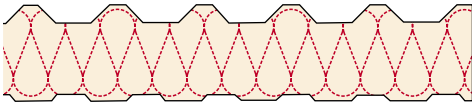
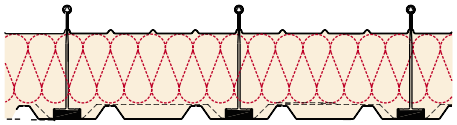
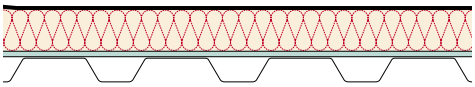
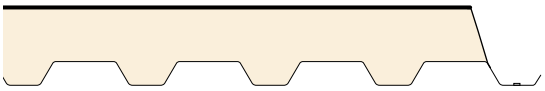
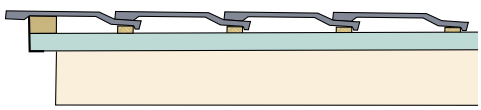
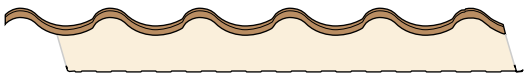
Multibeam purlins can be used with all types of modern roof cladding systems including metal composite panels, standing seam, insulated membrane panels, and traditional tiles.

However, it should be noted that certain types of roof cladding do not give the necessary lateral restraint to purlins and additional restraints may be required. Please consult Table 1:2 for guidance.

Roof Cladding Attachment

The roof cladding must be mechanical fixed to all purlins it passes over, sufficient fixings should be placed to provide the level of restraint required.

Table 1:2 Restraint Requirements for Various Types of Roof Cladding

Type of Roof Cladding	Provides Lateral Restraint	Load Table
 Trapezoidal Single Skin	Yes	Use normal load tables
 Trapezoidal Twin Skin (with through-fixed liner)	Yes	Use normal load tables
 Composite Clip Fixed Standing Seam (eg. Kingspan KS1000 KingZip IP)	Yes	Use normal load tables with restraints as Table 1:3 opposite
 Twin Skin Clip Fixed Standing Seam (with through-fixed liner) Kingzip SF	Yes	Use normal load tables (check liner provides lateral restraint)
 Composite Panel through-fix (eg. Kingspan KS1000 RW Trapezoidal Roof Panel)	Yes	Use normal load tables
 Built Up Flat Roof	Yes (if through-fix deck used) (see page 17)	Use normal load tables
 Composite Membrane Panel (eg. Kingspan KS1000 TD Topdek)	Yes (see page 17)	Use normal load tables
 Tiles	No (see page 16)	(see page 33)
 Tiles on Metal Cladding through-fixed (eg. Kingspan KS1000 TS Tile Support)	Consult Kingspan	Consult Kingspan
 Roof Tile Insulated Panel (eg. Kingspan KS1000 RT Roof Tile)	Consult Kingspan	Consult Kingspan

Note: this table is for guidance only. Please consult individual cladding manufacturer's recommendations and your cladding supplier for suitability of lateral restraints.

Roofing Systems – Through-fix (Duo Pitch Slopes 3 - 18˚)

Built-up Roofing

Generally comprises of a trapezoidal outer weather sheet, insulation, spacers and an inner liner sheet all assembled on site.

Where the profiled liner sheet is steel with a minimum gauge of 0.4mm using self-tapping screws at maximum cross centres of 350mm, then adequate restraint is provided to the Multibeam purlins to enable the published load tables to be supported. Restraints as Table 1:1, page 12.

Insulated Panels

A factory manufactured composite panel, comprising of steel and insulation eg. Trapezoidal Roof. When these panels are fixed to the purlin top flange using through fix self tap, self-drilling screws, three number per panel, then adequate restraint is provided to the Multibeam purlins to enable the published load tables to be supported. Restraints as Table 1:1, page 12.

Roofing Systems – Secret and Clip Fix

A specialised form of built up roofing system where the outer weather sheet has a side seam that stands above the water trough. These systems will have a weather sheet, halters, spacer, insulation and a profiled liner sheet.

Clip Fix

Where the outer sheet is free to move and through fixed steel liner minimum gauge 0.4 or 0.9mm aluminium liner using self-drill, self-tapping screws at a maximum cross centres of 350mm, then adequate restraint is provided to the Multibeam purlins to enable the published load tables to be supported. Restraints as Table 1:1, page 12.

Secret Fix Insulated Panels

Factory manufactured composite panel of steel and insulation eg. Lo-Pitch. Through fixed self-drill, self-tapping screws are placed on the raised shoulder at the edges of the panels and the fixing covered with a snap on cap. The two fixings placed each side of the panel will provide adequate restraint to the Multibeam purlins. Restraints to suit roof pitch and purlin span see Table 1:1 or 1:5.

Note: Restraint requirements for Built-Up Cladding without a Liner Panel

For any of the roofing system types above where the outer sheet is free to move and the liner does not adequately support the down slope load or there is no liner present the restraints should be as Table 1:3, with the down slope tie arrangement, shown on page 17, to enable the published load tables to be supported.

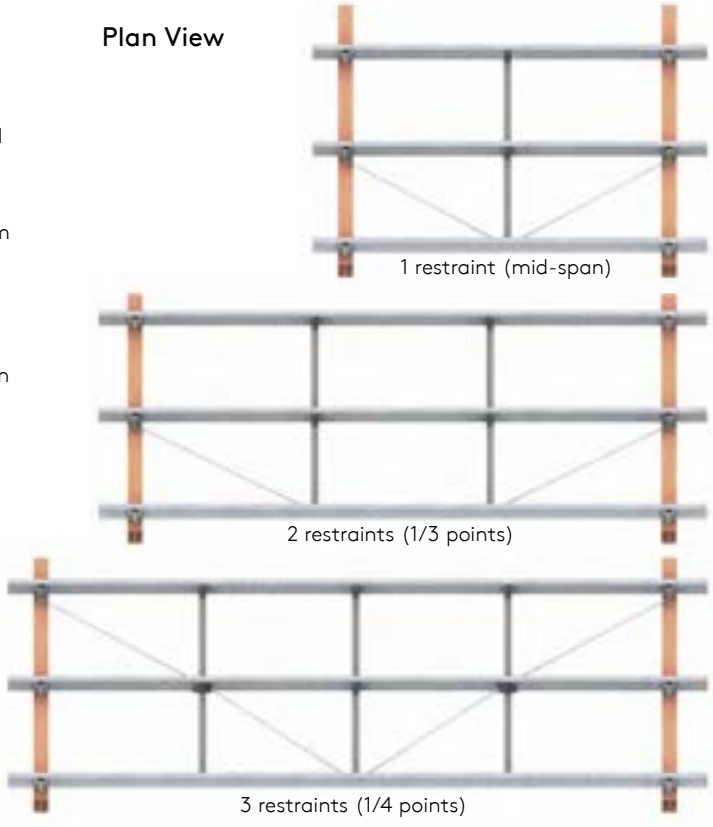
Table 1:3 Restraint Requirements for Built-up Cladding without a Liner Panel

Multibeam Purlin Section Depth (mm)	Purlin Span up to 6.1m	Purlin Span >6.1m – 8.1m	Purlin Span >8.2m – 9.1m	Purlin Span >9.1m – 11.1m
145	1 Tubular Tie	N/A	N/A	N/A
175	1 Tubular Tie	2 Tubular Ties	N/A	N/A
205	1 Tubular Tie	2 Tubular Ties	3 Tubular Ties	N/A
235	1 Tubular Tie	2 Tubular Ties	3 Tubular Ties	3 SW Angle Strut
265	1 Tubular Tie	2 Tubular Ties	3 Tubular Ties	3 SW Angle Strut
300	1 SW Angle Strut	2 SW Angle Strut	2 SW Angle Strut	3 SW Angle Strut
350	1 SW Angle Strut	2 SW Angle Strut	2 SW Angle Strut	3 SW Angle Strut

Note: N/A = Section size not practical for span shown.

Down Slope Ties

Plan View



Mono Pitch Slopes

Diagonal wires are generally required to support downslope load. Contact our Technical Department for further information.

Purlin Restraint

Tiled Roofs

The shape and strength of the Multibeam section is eminently suitable to sustain the greater loadings imposed by a tiled roof. However, due to the nature of the forces imposed upon the purlin sections by this form of roof construction, additional considerations are required in the design of the purlin.

Angle Strut Anti-Sag System

The angle strut brace system caters for the downslope force produced in the roof from dead and superimposed loads. The section capacities are based on using an anti-sag system with restraints at a minimum of 1/3 points and a minimum angle of 30˚ on the screwed rods. Table 1:4 shows the max spans achievable for this combination with the cross centres of purlins shown. Where the span is curtailed by the minimum 30˚ angle of the diagonal rods, place the restraints at 1/4 points as shown in Table 1:4. See layout opposite and page 50 for details.

One set of diagonals are required for every 6.0m length of roof slope. As long as this is complied with the roof slope can be any length. Stiffened cleats should also be used with tiled roof construction.

Anti-Sag Requirements with Metal Liner

When certain cassette metal liner profiles are fixed to the purlin top flange, enough restraint may be provided in order to use the standard load tables in conjunction with the anti-sag system. For further advice please contact our Technical Department.

Table 1:4 Max Purlin Spans for Tiled Roof Applications

Purlin Cross Centres (m)	Maximum Span of Purlin[1]	
	Restraints at 1/3 Points (m)	Restraints at 1/4 Points (m)
0.6	3.10	4.10
1.0	5.10	6.90
1.5	7.02[2]	7.02[2]
1.8	7.02[2]	7.02[2]

1. Span limited by minimum angle of diagonal of 30˚
2. Span limited by load maximum see page 33. For values outside of table please contact our Technical Department.

Roof Lights

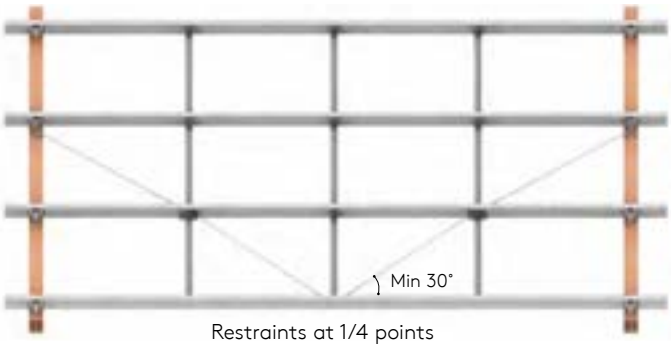
Where the roof lights are laid in scatter pattern between adequately fixed roofing then the restraints required are classed as for the roofing system.

Where domed roof lights are used in strips across the purlins, down slope framed on either side with full roof sheeting the restraints are classified as for the roof system.

Laying roof lights in continuing strips along the purlins should be avoided as this construction may not provide the required level of restraint to the purlin. Please contact our Technical Department for guidance.

Plan View

Restraints at 1/3 points



Restraints at 1/4 points

Low Pitch and Flat Roofing System (Roof slopes 3˚ or less)

For this application the term 'Flat Roof' generally means any roof with a roofslope no greater than 1:20 or 3°.

Built up Standing Seam Roofing Systems

A specialised form of built up roofing system where the outer weather sheet has a side seam that stands above the water trough. These systems will have a weather sheet, halters, spacers, insulation and a liner sheet. Typically this system can be classed as clip fixed where the outer sheet is free to move or is fixed.

Where the outer sheet is free to move and has a through fixed profiled steel liner minimum gauge 0.4mm fixed using self-drill, self-tapping screws at a maximum cross centres of 350mm, then adequate restraint is provided to the Multibeam purlins to enable the published load tables to be supported. Restraints as Table 1:5.

Clip fixed, where the outer sheet is free to move and no steel liner then restraints must be provided as shown in Table 1:3 on page 15 to enable the published load tables to be supported.

Down Slope Ties

Where the outer weather sheet is free to move and there is no liner sheet or the liner sheet is not adequate to support the down slope load, then the tie arrangement shown on the right must be adopted with restraints as Table 1:3.

Secret-Fix Insulated Panels (e.g. Lo-Pitch or Trapezoidal Secret-Fix)

Through fixed self-drill, self-tapping screws are placed on the raised upstands at the edges of the panels and the fixing covered with a snap on cap. The two fixings placed each side of the panel will provide adequate restraint to the Multibeam purlins. Restraints as Table 1:5.

Table 1:5 Restraint Requirements for Flat Roofs

Multibeam Purlin Section Depth (mm)	Purlin Span			
	up to 6.1m	>6.1m – 7.5m	>7.5m – 9.1m	>9.1m – 11.1m
145	Tie not required	N/A	N/A	N/A
175	Tie not required	1 Tubular Tie	2 Tubular Ties	N/A
205	Tie not required	1 Tubular Tie	2 Tubular Ties	N/A
235	1 Tubular Tie	1 Tubular Tie	2 Tubular Ties	3 SWF Angle Strut
265	1 Tubular Tie	1 Tubular Tie	2 Tubular Ties	3 SWF Angle Strut
300	1 SWF Angle Strut	1 SWF Angle Strut	2 SWF Angle Strut	3 SWF Angle Strut
350	1 SWF Angle Strut	1 SWF Angle Strut	2 SWF Angle Strut	3 SWF Angle Strut

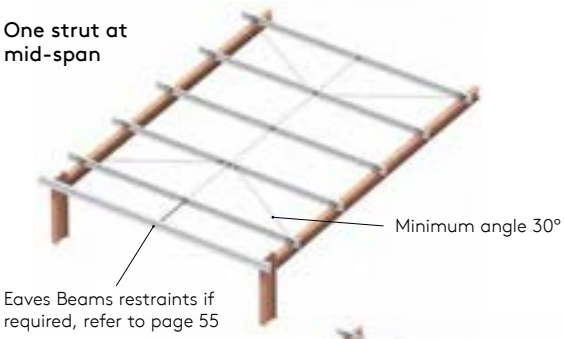
Note: Layout details on page 48.

N/A = Section size not practical for span shown.

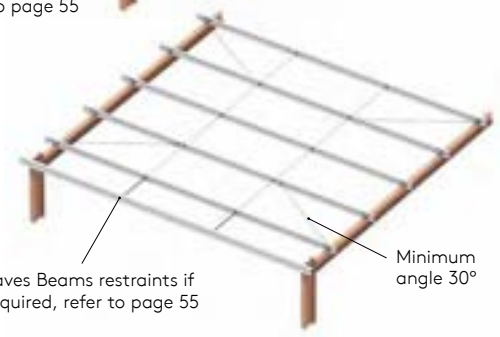
Down Slope Tie Arrangements

Restraints required between all members.

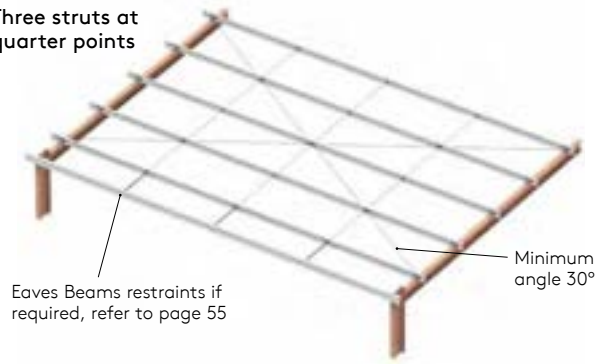
One strut at mid-span



Two struts at third points



Three struts at quarter points



Built-up Membrane Flat Roof System – Deck Based

A trapezoidal steel deck is fixed directly to the Multibeam purlins using self-drill, self-tapping screws. A layer of board insulation is placed on top of the deck and attached, plus an impermeable membrane is laid over the insulation and bonded or held in place by ballast. The deck is generally fixed at every trough to the purlin and will then provide sufficient restraint to support the published load tables if the secondary restraints are as shown in Table 1:5.

Kingspan Insulated Panel – Membrane Insulated Roof System (e.g. Topdek)

A special fixing technique allows the attachment screws to fix the inner steel deck profile directly to the purlin, providing adequate restraint to support the published load tables when the restraints are as shown in Table 1:5 are used.

Purlin Deflection Limits

Deflection limits are generally given greater attention on low pitched and flat roofs to avoid excessive ponding of water.

Dimensions & References

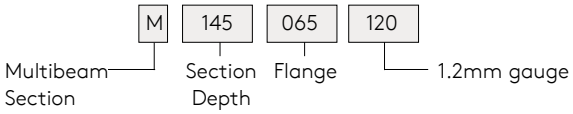
Product Dimensions and References

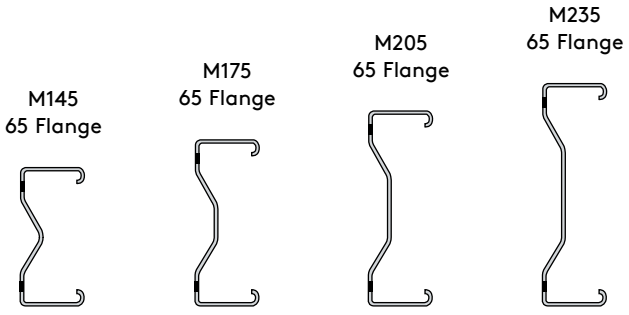
Table 1:6 Multibeam References

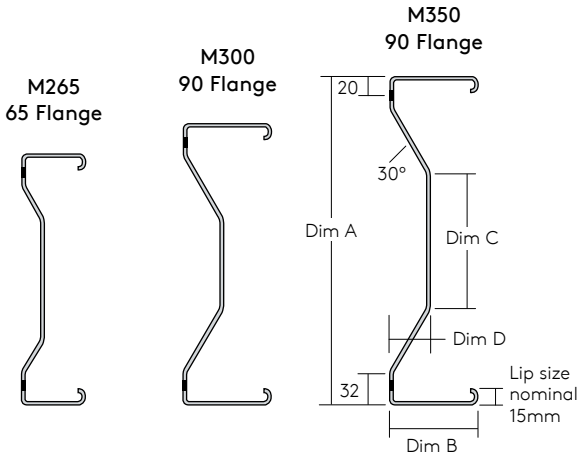
References	Weight (kg/m)	Dims (mm) A	B	C	D	Gauge (mm)
M145065120	2.75	145	65	8	20	1.20
M145065130	2.99	145	65	8	20	1.30
M145065140	3.21	145	65	8	20	1.40
M145065150	3.45	145	65	8	20	1.50
M145065160	3.69	145	65	8	20	1.60
M145065180	4.15	145	65	8	20	1.80
M145065200	4.63	145	65	8	20	2.00
M145065220	5.06	145	65	8	20	2.20
M175065120	3.02	175	65	38	20	1.20
M175065130	3.29	175	65	38	20	1.30
M175065140	3.52	175	65	38	20	1.40
M175065150	3.79	175	65	38	20	1.50
M175065160	4.05	175	65	38	20	1.60
M175065180	4.55	175	65	38	20	1.80
M175065200	5.08	175	65	38	20	2.00
M175065220	5.56	175	65	38	20	2.20
M175065250	6.35	175	65	38	20	2.50
M205065120	3.29	205	65	68	20	1.20
M205065130	3.58	205	65	68	20	1.30
M205065140	3.84	205	65	68	20	1.40
M205065150	4.13	205	65	68	20	1.50
M205065160	4.41	205	65	68	20	1.60
M205065170	4.67	205	65	68	20	1.70
M205065180	4.96	205	65	68	20	1.80
M205065200	5.53	205	65	68	20	2.00
M205065220	6.05	205	65	68	20	2.20
M205065250	6.91	205	65	68	20	2.50
M205065270	7.49	205	65	68	20	2.70

References	Weight (kg/m)	Dims (mm) A	B	C	D	Gauge (mm)
M235065130	3.86	235	65	98	20	1.30
M235065140	4.14	235	65	98	20	1.40
M235065150	4.45	235	65	98	20	1.50
M235065160	4.76	235	65	98	20	1.60
M235065170	5.04	235	65	98	20	1.70
M235065180	5.35	235	65	98	20	1.80
M235065200	5.97	235	65	98	20	2.00
M235065220	6.53	235	65	98	20	2.20
M235065250	7.46	235	65	98	20	2.50
M235065270	8.08	235	65	98	20	2.70
M265065140	4.46	265	65	128	20	1.40
M265065150	4.79	265	65	128	20	1.50
M265065160	5.13	265	65	128	20	1.60
M265065180	5.76	265	65	128	20	1.80
M265065200	6.43	265	65	128	20	2.00
M265065220	7.03	265	65	128	20	2.20
M265065250	8.03	265	65	128	20	2.50
M265065270	8.70	265	65	128	20	2.70
M300090150	5.86	300	90	94	40	1.50
M300090160	6.27	300	90	94	40	1.60
M300090180	7.05	300	90	94	40	1.80
M300090200	7.86	300	90	94	40	2.00
M300090250	9.82	300	90	94	40	2.50
M300090270	10.64	300	90	94	40	2.70
M350090150	6.43	350	90	144	40	1.50
M350090160	6.87	350	90	144	40	1.60
M350090180	7.72	350	90	144	40	1.80
M350090200	8.62	350	90	144	40	2.00
M350090250	10.77	350	90	144	40	2.50
M350090270	11.66	350	90	144	40	2.70

Reference Key







95mm Flange for Multibeam Purlins

To complement the existing Kingspan Structural Products range we now offer 95mm flange sections for use where insulated panel butt joints are required in the roof. Please see page 26 for technical rules for use of the 95mm flange on M175 through M265 sections minimum gauge 1.5mm.

Multicleats

All multicleat holes shown are 14mm diameter.

Multicleats provide the most economical solution for stooled-off purlins.

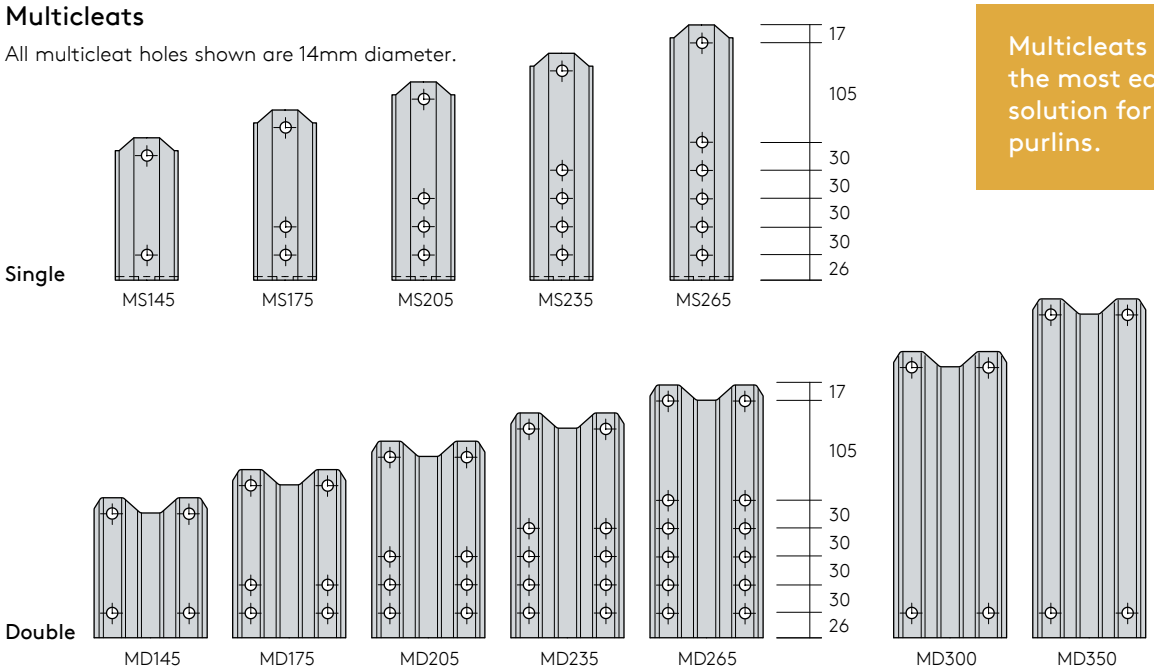


Table 1:7 Multicleat References (MD300 and MD350 cleats are not available as Multicleats)

Sheeting Line (mm)	Multibeam Section Depths (mm)	Cleat Type: Weld-On Double	Weld-On Single	Bolt-On Double	Bolt-On Single
151	145	MD145	MS145	MD145BB	MS145BB
181	up to 175	MD175	MS175	MD175BB	MS175BB
211	up to 205	MD205	MS205	MD205BB	MS205BB
241	up to 235	MD235	MS235	MD235BB	MS235BB
271	up to 265	MD265	MS265	MD265BB	MS265BB
306	300	MD300		MD300BB	
356	350	MD350		MD350BB	

All cleats are supplied in unpainted steel as standard. Powder coated or galvanised finishes are available if required.
Please note, for galvanised finish there is an extended lead time, please contact our Sales Department for more information.

Standard Single Cleat **Standard Double Cleat**

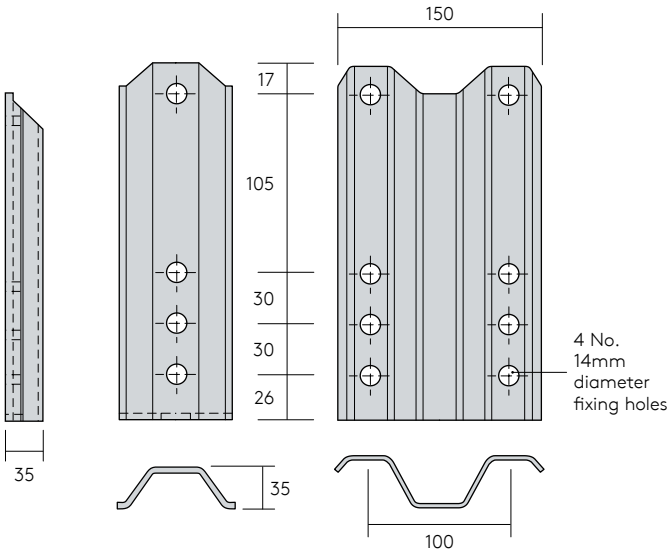


Table 1:8 Multicleat Options

Options	Suffix	Example
Bolt-on Black	BB	MD175BB
Bolt-on Powder coated	BE	MD175BE
Bolt-on Galvanised	BG	MD175BG
Stiffened	S	MD265S
Extended	X	MD265X300 (i.e. 300mm from rafter face)

MD300 and MD350 are supplied stiffened, see page 21 for details.

Dimensions & References

Bolt-on Purlin Multicleats

All Multicleats are available as bolt-on.

See Table 1:8 on page 19.

Table 1:9 Base Plate Thicknesses

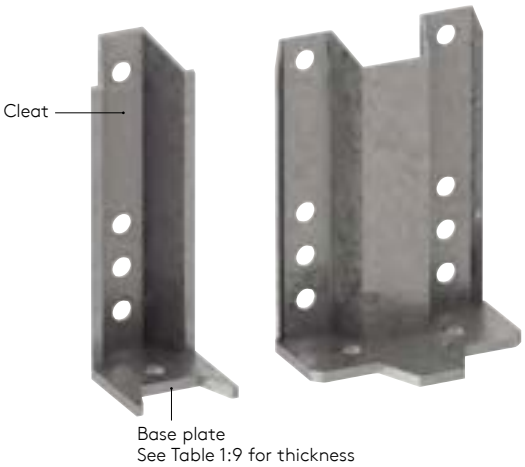
Purlin Depth	Cleat Base Plate Thickness (mm)
145	6
175	6
205	8
235	8
265	8
300	8
350	8

Table 1:10 Base Plate Holes Cross Centres

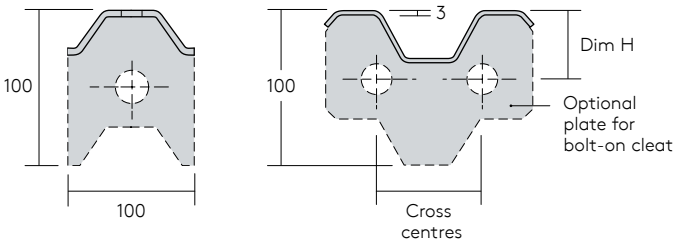
Base Plate Holes Cross Centres*	Dim H (mm)
50	55
60	55
70 (standard)	50
80	50
90	50
100	50

Multicleats allow differing section sizes to be used on any elevation, while maintaining a constant sheeting line.

Bolt-On Single Cleat **Bolt-On Double Cleat**



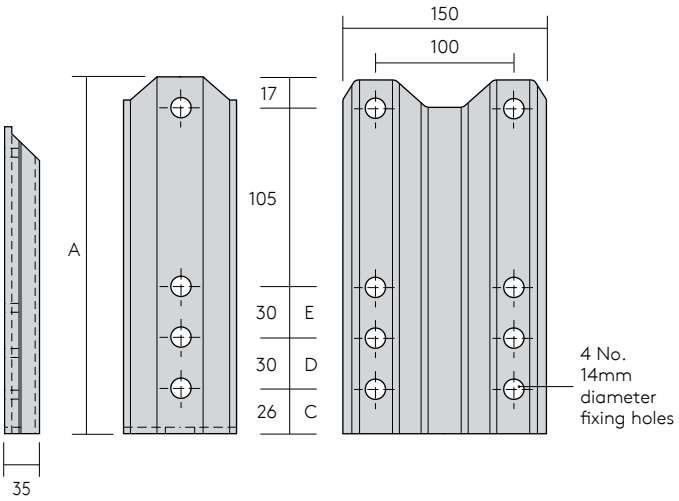
Bolt-On Single Cleat **Bolt-On Double Cleat**



All holes are 18 diameter.

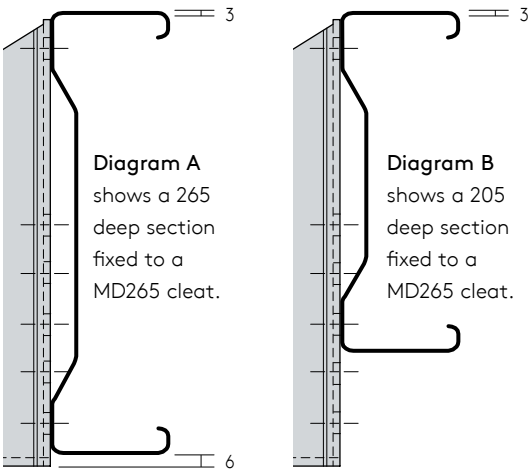
Note: All dimensions are in mm unless otherwise stated.

Standard Single Cleat **Standard Double Cleat**



Multicleat Arrangement

Multicleats allow differing section sizes to be used on any elevation, while maintaining a constant sheeting line.



Stiffened Purlin Multicleats

All Multicleats are available with stiffeners where required, e.g. tiled roof applications. Add 'stiffened' to Multicleat reference when ordering.

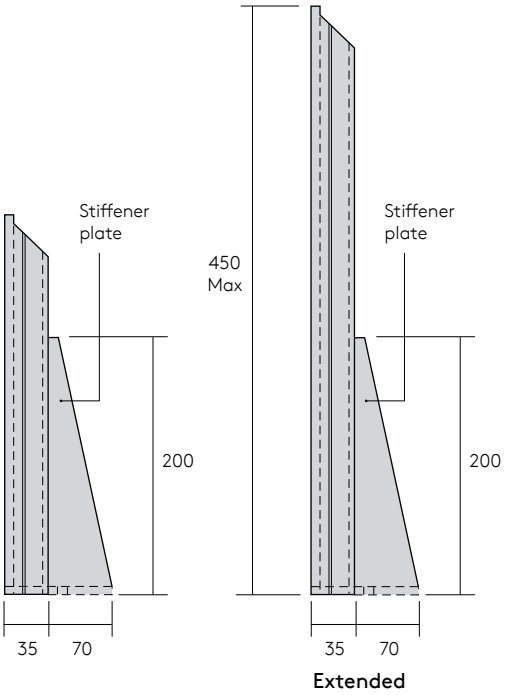
Note: Generally single cleats are supplied unstiffened.

Extended Purlin Cleats

Extended cleats can be manufactured to meet your specific requirements. These are manufactured to order and will be at an additional cost.

Note: Add 'extended' to cleat reference when ordering.

Extended double cleats over 270mm long are supplied complete with stiffeners. **These are not available with single cleats.**



Dimensions & References

Purlin Sleeves

Used to provide continuity at a purlin joint normally at a single span to a double, or a single to a single span, or at all joints in heavy end bay layout.

All bolts to be M12.

Please specify sleeve reference as below.

For application details see page 11.

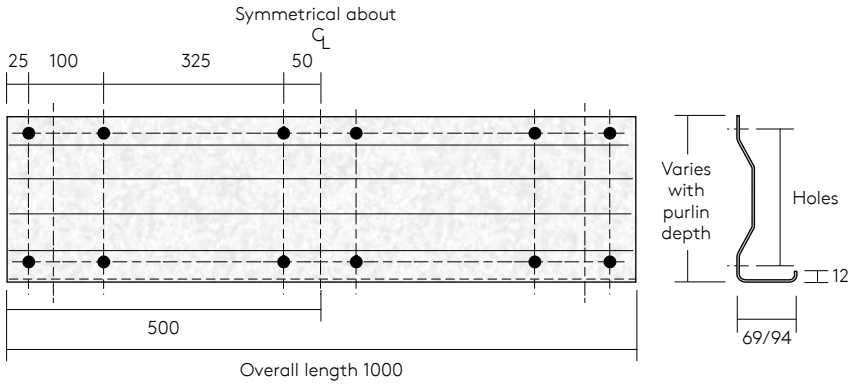
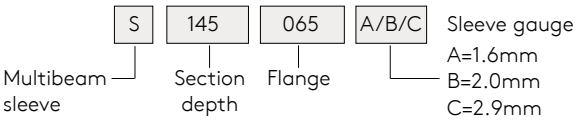


Table 1:11 Multibeam Sleeve Product References

Multibeam Part Reference	Sleeve Part Reference	Nominal Sleeve Gauge (mm)
M145065120 M145065130 M145065140 M145065150	S145065A	1.6
M145065160 M145065180	S145065B	2.0
M145065200 M145065220	S145065C	2.9
M175065120 M175065130 M175065140 M175065150	S175065A	1.6
M175065160 M175065180	S175065B	2.0
M175065200 M175065220 M175065250	S175065C	2.9
M205065120 M205065130 M205065140 M205065150	S205065A	1.6
M205065160 M205065170 M205065180	S205065B	2.0
M205065200 M205065220 M205065250 M205065270	S205065C	2.9

Multibeam Part Reference	Sleeve Part Reference	Nominal Sleeve Gauge (mm)
M235065130 M235065140 M235065150	S235065A	1.6
M235065160 M235065170 M235065180	S235065B	2.0
M235065200 M235065220 M235065250 M235065270	S235065C	2.9
M265065140 M265065150	S265065A	1.6
M265065160 M265065180	S265065B	2.0
M265065200 M265065220 M265065250 M265065270	S265065C	2.9
M300090150	S300090A	1.6
M300090160 M300090180	S300090B	2.0
M300090200 M300090250 M300090270	S300090C	2.9
M350090150	S350090A	1.6
M350090160 M350090180	S350090B	2.0
M350090200 M350090250 M350090270	S350090C	2.9

Sleeve Reference Key



For the special 95mm Flange Sleeves please refer to page 26.

Tube Strut TSA

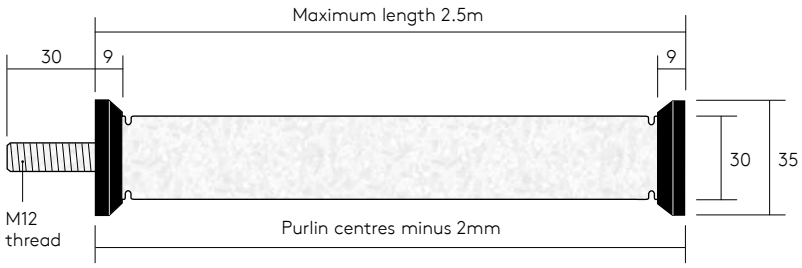
Used to restrain purlins (exc. M145).

Part reference: TSA0000.

Where 0000 = purlin centres
e.g: TSA1000 (purlin centres = 1000mm).

Minimum length 150mm.

For application see page 13.



Tube Strut TS14

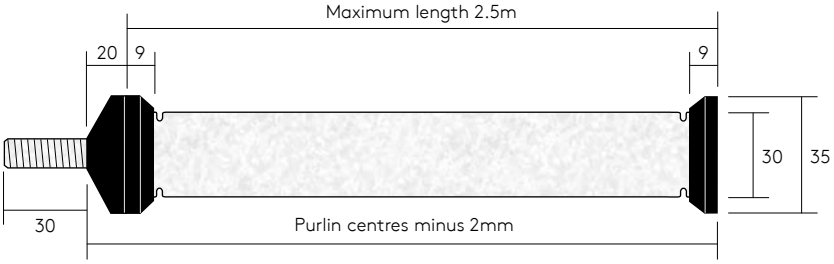
Used to restrain M145 purlins.

Part reference: TS140000.

Where 0000 = purlin centres
e.g: TS141000 (purlin centres = 1000mm).

Minimum length 150mm.

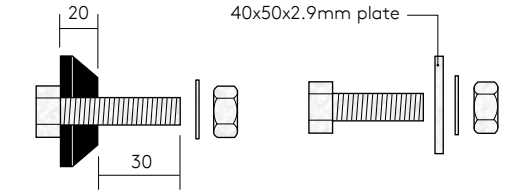
For application see page 13.



Clamp Plates

Used to fix and complete a run of tube struts, CA145 used with M145 purlins.

Part reference: CA145 / CA.



CA 145
(Used for M145 sections only)

CA
(for all sizes except M145)

Multilok Ties

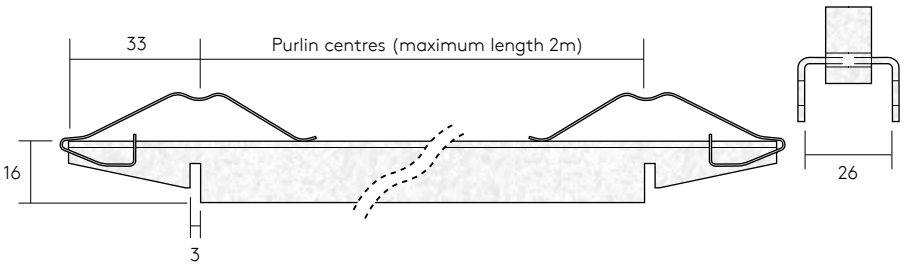
Used to restrain purlins.

Part reference: TM0000.

Where 0000 = purlin centres
e.g: TM1600 (purlin centres = 1600mm).

Minimum length 150mm.

For application see page 13.

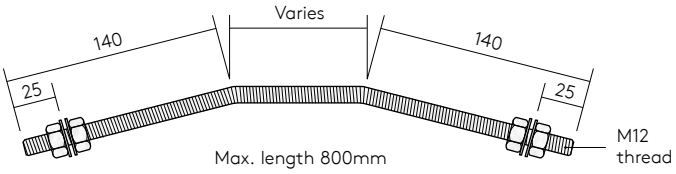


Apex Ties

Used to tie the apex purlins together on duo pitch roofs.

Part reference: AT0000/XX.

Where 0000 = length between bends and XX is roof slope e.g: AT0250/15
e.g: ridge to purlin 250mm, roof Slope 15°.



Heavy Duty Flat Roof Restraint SWF

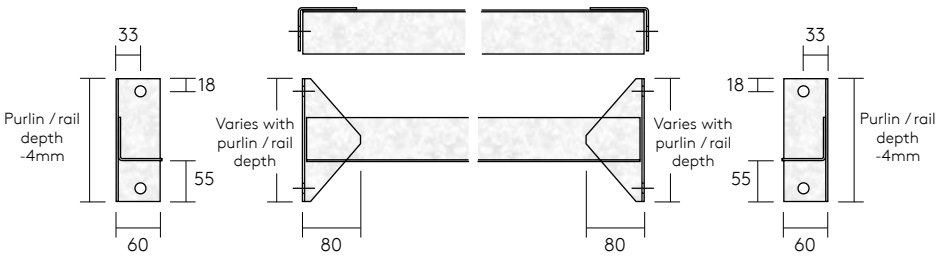
Angle strut used to restrain the larger sections on flat roof applications.

Part reference: SWF0000.

Where 0000 = overall length
e.g: SWF1500 (overall length = 1500mm).

Purlin section size must be specified.

Minimum length = 275mm.



Dimensions & References

Tiled Roof Struts / Angle Struts

Angle strut used to restrain the larger sections on longer spans and as the primary restraint member for the support of tiled roofs.

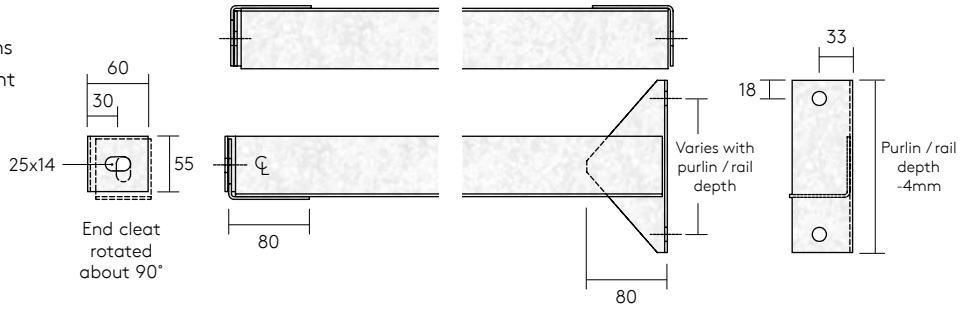
Part reference: SW0000.

Where 0000 = purlin centres
e.g: SW1500 (purlin centres = 1500mm).

Purlin section size must be specified.

Min. Length = 275mm.

For design details see page 16.



Tiled Roof Struts / Angle Struts

Angle strut used to terminate a run of SW struts at mid span and provide the attachment of the screwed rod diagonal.

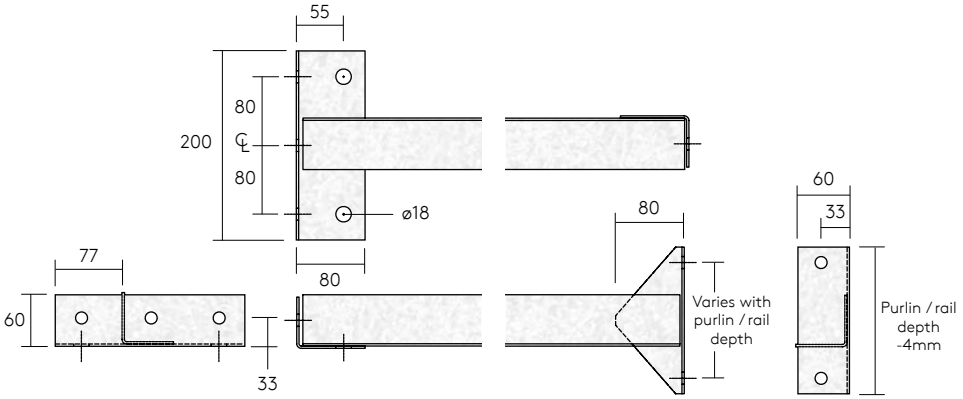
Part reference: SX0000.

Where 0000 = purlin centres
e.g: SX1500 (purlin centres = 1500mm).

Purlin section size must be specified.

Min. Length = 275mm.

For design details see page 16.



Tiled Roof Struts / Angle Struts

Angle strut used to terminate a run of SW struts at the 1/4 point position.

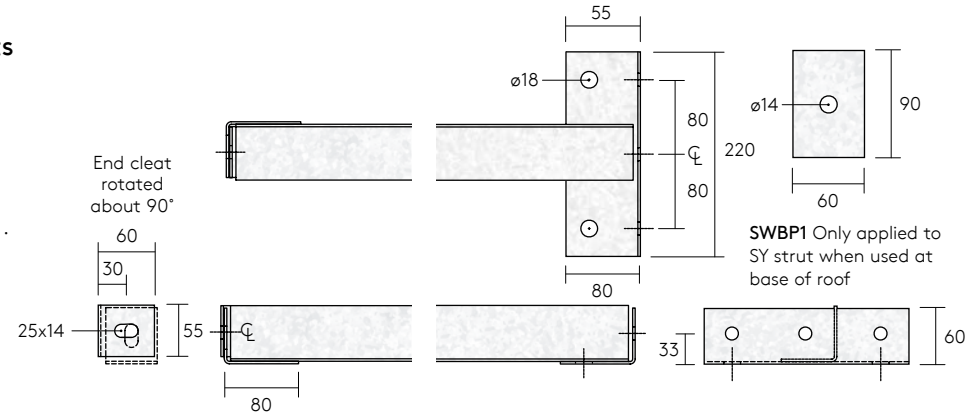
Part reference: SY0000.

Where 0000 = purlin centres
e.g: SY1500 (purlin centres = 1500mm).

Purlin section size must be specified.

Min. Length = 275mm.

For design details see page 16.

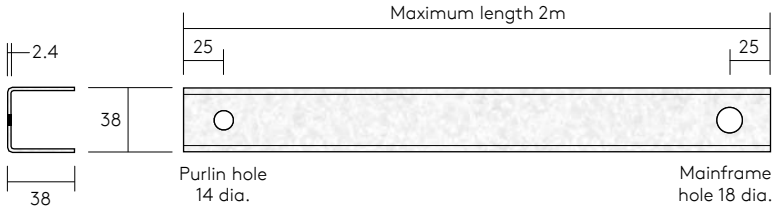


Rafter Restraint RNA

Channel stay to provide compression and tension restraint from the purlin to the inner flange of the main frame.

Part reference: RNA0000.

Where 0000 = length between hole centres
e.g: RNA1000 (hole centres = 1000mm).

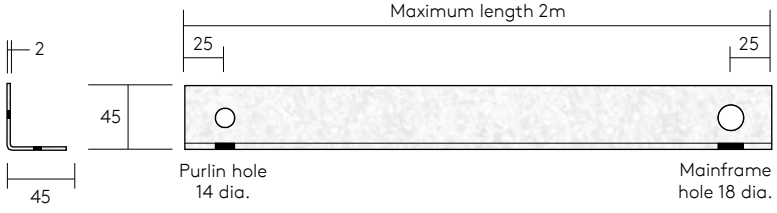


Rafter Restraint RNB

Angle stay to provide compression and tension restraint from the purlin to the inner flange of the main frame. Suitable for smaller main frame sections.

Part reference: RNB0000.

Where 0000 = length between hole centres
e.g: RNB1000 (hole centres = 1000mm).



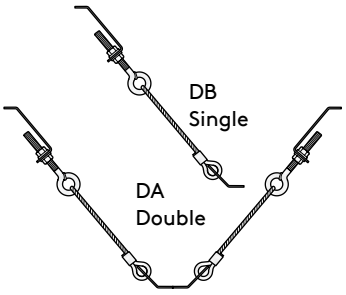
Diagonal Tie Wire

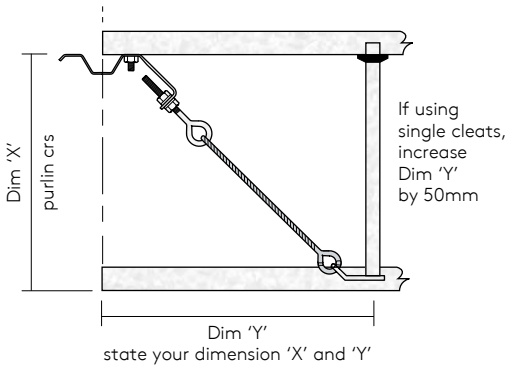
Used on some long purlin slopes to support the self weight of the cladding and transfer it to the rafters.

Part reference: DB / DA.

Please state your dimension 'X' and 'Y'.

For application see page 51.





Multibracket

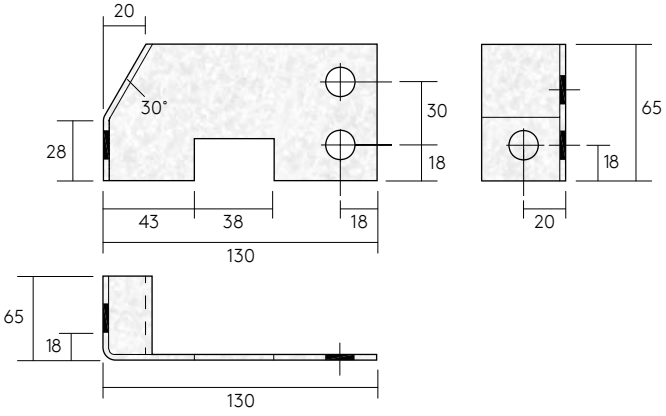
Multibrackets are used to make connections between Multichannels and Multibeam.

Part reference: MB1B as shown / MB1A opposite hand.

Material 3.0mm galvanised steel. All holes 14 diameter.

For application see pages 72-73.

Note: Multibrackets are not suitable for connecting sections to a 90 or 95mm flange.



Cleader Angles

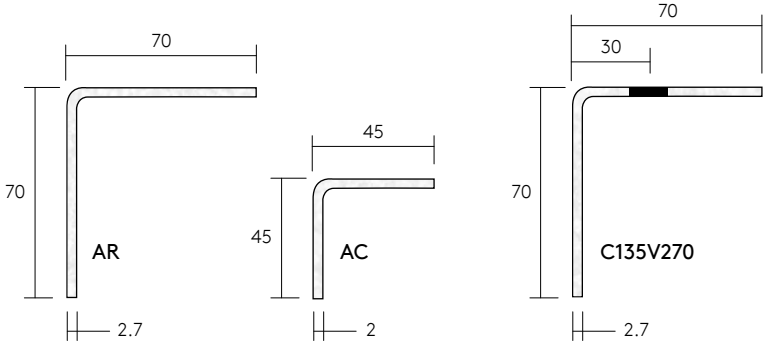
Cleader angles are used to provide a cladding attachment at the ends of the purlin overhang.

Part reference: AC / AR.

Standard 4m lengths. Supplied in standard finish galvanised steel. Plain lengths (i.e. no holes).

C135V270

Supplied in standard finish galvanised steel. Custom made. Max length 8m. Please specify hole position along the length. Hole = 18mm diameter.



Rod Diagonals

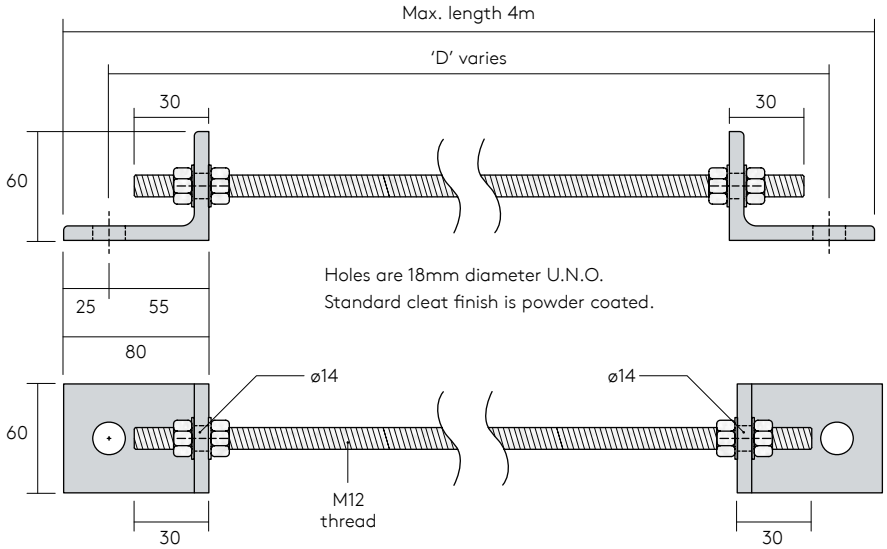
The diagonal used with the purlins supporting tiled roofs to transfer the down slope load to the main frame.

Part reference: TRSP0000.

Where 0000 = length between hole centres

e.g: TRSP1000 (hole centres = 1000mm).

For design details see page 16.



95mm Flange Multibeam

95mm Flange for Multibeam Purlins

To complement the existing Kingspan Structural Products range we now offer 95mm flange sections minimum gauge 1.5mm for use where an insulated panel butt joint is required in the roof. Please see below technical rules for use of the 95mm flange on M175 through M265 sections.

Structural performance

The structural capacity of the wide flange purlin is to be taken as that shown in the load tables or from the software for the regular flange width of 65mm sections.

There is no increase in capacity due to the wider flange or additional material content.

Restraint systems

Where the 95mm wide flange purlin is only used at the insulated panel joint see diagram below and table on page 27.

Where the 95mm flange purlin is used throughout please see tables on page 27 for restraints required for varying cladding systems. The restraints shown in the tables are required to both sides of the 95mm flange section.

Sleeve

Sleeves require a wider-bottomed flange to accommodate the wider flanges to the purlin section.

All bolts to be M12.

Note: This is only available in a C type sleeve (2.9mm).

Multibeam Cleats

The standard range of Multicleats can be used with the 95mm flange – apply the selection and limitations as shown in this technical handbook.

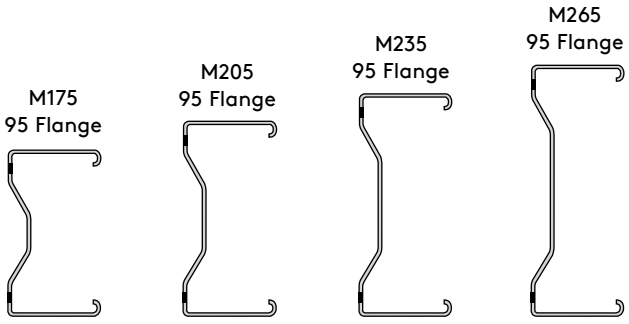
Multibrackets MB1A and MB1B are not suitable for use with 90mm or 95mm flange sections.

Material

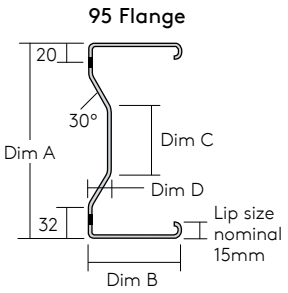
See page 18.

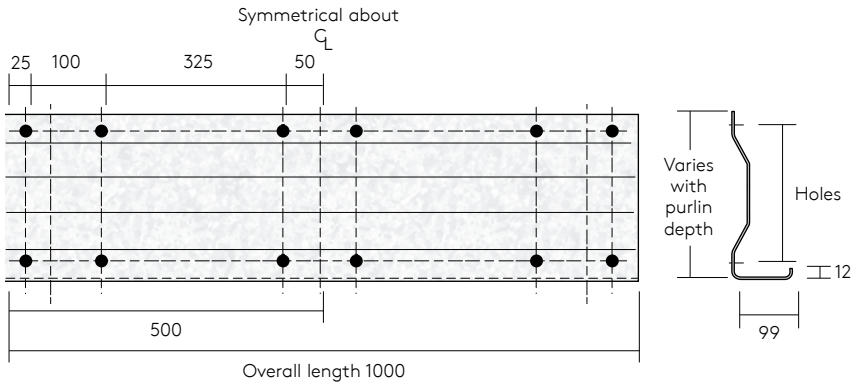
Connection & Bolt Grade

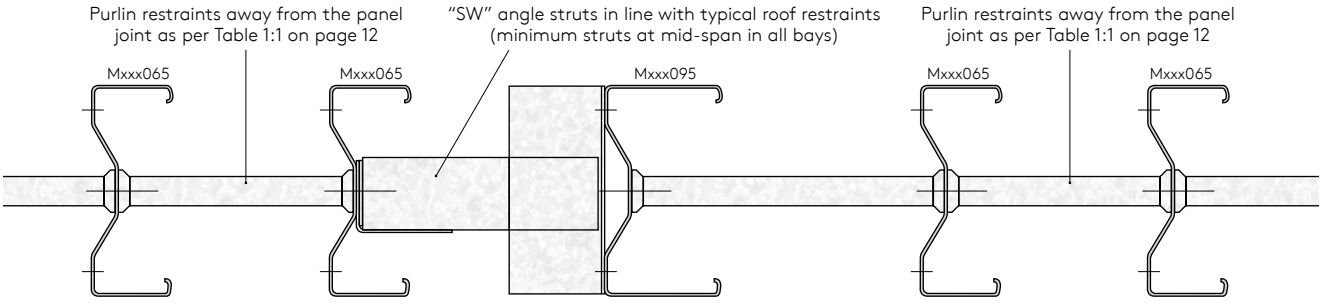
When using 95mm flange Multibeams, we recommend fitting with grade 8.8 bolts. We recommend washers are fitted under both the bolt head and nut.



Notes: Dims A, C & D as Table 1:6 page 20.







Restraints to wide flange Multibeam purlins - roof slopes 3-18°. Cladding restraining composite panel joint on the wide flange.

95mm Flange Multibeam Restraints

Table 1:1a Restraining Cladding fixed to 95mm Purlin Flange

Roof slope	Purlin depth (mm)	Bay Centres (m)				
		<3.0	>3.0 – 8.2	>8.2 – 9.1	>9.1 -10.5	>10.5 – 12.0
3° to 18°	175	No restraints are required	1 SW angle strut	2 SW angle strut	3 SW angle strut	3 SW angle strut
	205		1 SW angle strut	2 SW angle strut	3 SW angle strut	3 SW angle strut
	235		1 SW angle strut	2 SW angle strut	3 SW angle strut	3 SW angle strut
	265		1 SW angle strut	2 SW angle strut	3 SW angle strut	3 SW angle strut

For roof slopes over 18° consult the Structural Products Technical Department.
Section size must be suitable for the span and loading applied taking account of deflection.

Table 1:3a Restraint Requirements for Built-up Cladding without a Liner Panel

Purlin depth (mm)	Bay Centres (m)				
	<2.0	>2.0 – 6.1	>6.1 – 8.1	>8.1 – 9.1	>9.1 – 11.1
175	No restraints are required	1 SW angle strut	2 SW angle strut	3 SW angle strut	3 SW angle strut
205		1 SW angle strut	2 SW angle strut	3 SW angle strut	3 SW angle strut
235		1 SW angle strut	2 SW angle strut	3 SW angle strut	3 SW angle strut
265		1 SW angle strut	2 SW angle strut	3 SW angle strut	3 SW angle strut

Maximum roof slope 10° for steeper roof slopes consult the Structural Products Technical Department.
Section size must be suitable for the span and loading applied taking account of deflection.

Table 1:5a Restraining cladding fixed to 95mm purlin flange for flat roofs

Purlin depth (mm)	Bay Centres (m)				
	<2.0	>2.0 – 6.1	>6.1 – 7.5	>7.5 – 9.1	>9.1 -11.1
175	No restraints are required	1 SWF / SW angle strut	1 SWF / SW angle strut	2 SWF / SW angle strut	3 SWF / SW angle strut
205		1 SWF / SW angle strut	1 SWF / SW angle strut	2 SWF / SW angle strut	3 SWF / SW angle strut
235		1 SWF / SW angle strut	1 SWF / SW angle strut	2 SWF / SW angle strut	3 SWF / SW angle strut
265		1 SWF / SW angle strut	1 SWF / SW angle strut	2 SWF / SW angle strut	3 SWF / SW angle strut

Maximum roof slope 3° for steeper roof slopes consult Table 1.1a.
Section size must be suitable for the span and loading applied taking account of deflection.

Note: When using the 95mm flange to support the insulated panel butt joint only the restraints should be as shown in Table 1:1a, 1:3a and 1:5a and installed as shown on the arrangement on page 26. Please contact our technical department for purlin arrangement on flat roof (3° or less).

If the 95mm flange sections are used throughout the restraints shown in Table 1:1a, 1:3a and 1:5a they are required to both sides of the 95mm flange section.

Section Properties

Table 1:12 Multibeam Eurocode Section Properties

Section	Gauge	Area	Weight	Major Axis		Minor Axis		Radius of Gyration	
	t_{nom} (mm)	A_0 (cm^2)	(kg/m)	Iyy (cm^4)	$W_{el}yy$ (cm^3)	Izz (cm^4)	$W_{el}zz$ (cm^3)	iyy (cm)	izz (cm)
M145065120	1.20	3.68	2.75	121.15	16.72	19.24	4.56	5.74	2.29
M145065130	1.30	3.99	2.99	131.11	18.09	20.74	4.91	5.73	2.28
M145065140	1.40	4.30	3.21	140.99	19.45	22.21	5.26	5.73	2.27
M145065150	1.50	4.60	3.45	150.77	20.80	23.66	5.60	5.72	2.27
M145065160	1.60	4.91	3.69	160.48	22.14	25.08	5.94	5.72	2.26
M145065180	1.80	5.51	4.15	179.69	24.79	27.86	6.60	5.71	2.25
M145065200	2.00	6.11	4.63	198.62	27.40	30.54	7.23	5.70	2.24
M145065220	2.20	6.71	5.06	217.21	29.97	33.12	7.84	5.69	2.22
M175065120	1.20	4.03	3.02	187.92	21.48	19.28	4.53	6.83	2.19
M175065130	1.30	4.37	3.29	203.42	23.25	20.79	4.89	6.82	2.18
M175065140	1.40	4.71	3.52	218.82	25.01	22.26	5.23	6.82	2.17
M175065150	1.50	5.04	3.79	234.07	26.76	23.71	5.57	6.81	2.17
M175065160	1.60	5.38	4.05	249.21	28.49	25.13	5.91	6.81	2.16
M175065180	1.80	6.04	4.55	279.21	31.92	27.91	6.56	6.80	2.15
M175065200	2.00	6.70	5.08	308.79	35.30	30.60	7.19	6.79	2.14
M175065220	2.20	7.36	5.56	337.89	38.62	33.18	7.80	6.78	2.12
M175065250	2.50	8.33	6.35	380.74	43.52	36.89	8.68	6.76	2.10
M205065120	1.20	4.38	3.29	272.82	26.62	19.32	4.51	7.89	2.10
M205065130	1.30	4.75	3.58	295.39	28.83	20.83	4.86	7.89	2.09
M205065140	1.40	5.11	3.84	317.82	31.01	22.30	5.21	7.88	2.09
M205065150	1.50	5.48	4.13	340.05	33.18	23.75	5.55	7.88	2.08
M205065160	1.60	5.84	4.41	362.13	35.34	25.18	5.88	7.87	2.08
M205065170	1.70	6.21	4.67	384.50	37.52	26.63	6.22	7.87	2.07
M205065180	1.80	6.57	4.96	405.91	39.61	27.96	6.54	7.86	2.06
M205065200	2.00	7.29	5.53	449.12	43.82	30.64	7.17	7.85	2.05
M205065220	2.20	8.00	6.05	491.68	47.98	33.23	7.77	7.84	2.04
M205065250	2.50	9.06	6.91	554.41	54.10	36.94	8.64	7.82	2.02
M205065270	2.70	9.76	7.49	595.41	58.10	39.29	9.20	7.81	2.01
M235065130	1.30	5.12	3.86	408.72	34.79	20.86	4.85	8.93	2.02
M235065140	1.40	5.52	4.14	439.84	37.44	22.34	5.19	8.92	2.01
M235065150	1.50	5.92	4.45	470.70	40.07	23.79	5.53	8.92	2.01
M235065160	1.60	6.31	4.76	501.35	42.68	25.21	5.86	8.91	2.00
M235065170	1.70	6.70	5.04	531.67	45.26	26.59	6.18	8.91	1.99
M235065180	1.80	7.10	5.35	562.18	47.85	28.00	6.51	8.90	1.99
M235065200	2.00	7.88	5.97	622.25	52.97	30.69	7.14	8.89	1.97
M235065220	2.20	8.65	6.53	681.48	58.01	33.27	7.75	8.88	1.96
M235065250	2.50	9.80	7.46	768.88	65.45	36.98	8.62	8.86	1.94
M235065270	2.70	10.56	8.08	826.07	70.32	39.33	9.17	8.84	1.93
M265065140	1.40	5.93	4.46	586.70	44.29	22.37	5.17	9.95	1.94
M265065150	1.50	6.36	4.79	627.97	47.40	23.82	5.51	9.94	1.94
M265065160	1.60	6.78	5.13	668.97	50.50	25.25	5.84	9.93	1.93
M265065180	1.80	7.63	5.76	750.38	56.64	28.04	6.49	9.92	1.92
M265065200	2.00	8.47	6.43	830.83	62.71	30.72	7.12	9.91	1.91
M265065220	2.20	9.30	7.03	910.21	68.71	33.31	7.72	9.89	1.89
M265065250	2.50	10.54	8.03	1027.46	77.56	37.01	8.59	9.87	1.87
M265065270	2.70	11.36	8.70	1104.27	83.36	39.36	9.14	9.86	1.86
M300090150	1.50	7.75	5.86	1017.30	67.83	54.24	9.60	11.45	2.64
M300090160	1.60	8.27	6.27	1084.30	72.30	57.60	10.20	11.45	2.64
M300090180	1.80	9.31	7.05	1217.51	81.18	64.22	11.37	11.44	2.63
M300090200	2.00	10.34	7.86	1349.43	89.97	70.67	12.52	11.42	2.61
M300090250	2.50	12.89	9.82	1673.13	111.56	86.07	15.27	11.39	2.58
M300090270	2.70	13.91	10.64	1800.32	120.04	91.94	16.32	11.38	2.57
M350090150	1.50	8.48	6.43	1470.17	84.02	54.45	9.72	13.16	2.53
M350090160	1.60	9.05	6.87	1567.25	89.57	57.83	10.33	13.16	2.53
M350090180	1.80	10.19	7.72	1760.37	100.61	64.50	11.52	13.14	2.52
M350090200	2.00	11.32	8.62	1951.76	111.54	70.99	12.69	13.13	2.50
M350090250	2.50	14.12	10.77	2422.01	138.42	86.50	15.49	13.09	2.47
M350090270	2.70	15.24	11.66	2607.02	148.99	92.42	16.57	13.08	2.46

Cleader Angle Eurocode Section Properties

Section	Weight (kg/m)	A_0 (cm^2)	Iyy/Izz (cm^4)	Ivv (cm^4)	Iuu (cm^4)	$W_{el}xx/zz$ (cm^3)	$W_{el}vv$ (cm^3)	$W_{el}uu$ (cm^3)	ixx/iyy (cm)	ivv (cm)	iuu (cm)
AR (70x70)	3.02	3.84	18.83	7.53	30.13	3.56	2.94	6.04	2.21	1.40	2.80
AC (45x45)	1.33	1.70	3.44	1.38	5.90	1.02	0.84	1.80	1.42	0.88	1.81

Load / Span Tables

Use the toolkit design software for quick and accurate selection of sections for specific conditions.

Purlin Ultimate Loads: Eurocode Design

The following load / span tables show the ultimate load capacity for the Multibeam section used as a purlin.

Pages 29-33, Table 1:13, are for double span design using either double span bar lengths or sleeved joint single span sections – in terms of a total UDL per span.

Pages 34-43, Tables 1:15 and 1:16, are for a continuous purlin system where all joints are sleeved and can use either double or single span bar lengths in any combination as long as all joints are sleeved.

For single span design capacities use the Kingspan Toolkit software available from the Kingspan Structural products web site.

Section self-weight has not been subtracted in the loads shown. Loadings have also been tabulated that will produce the noted deflection ratio.

Defection limits only apply up to the un-factored load combination – use of Toolkit software for the design shows the actual deflection achieved.

When using M265, M300 and M350 Multibeams we recommend fitting with grade 8.8 bolts.

Load Type	Eurocode Load Factor
Dead load	1.35
Dead load restraining uplift or overturning	1.0
Service load	1.35
Imposed load	1.5
Wind load	1.5
Imposed Snow	1.5
Accidental snow (drift)	1.0

Note: The following load / span tables show the ultimate loads to comply with Eurocode BS EN 1993-1-3 + UK NAD.

Multibeam Purlins

Table 1:13 Double Span and Single Span Sleeved

Span (m)	Section	Weight (kg/m)	Ultimate Total UDL kN		Working Load to Produce Deflection Span/180 kN
			Gravity	Suction	
4.5	M145065120	2.75	11.95	9.33	-
	M145065130	2.99	14.04	11.23	13.64
	M145065140	3.21	16.21	12.96	14.67
	M145065150	3.45	18.40	14.72	15.69
	M145065160	3.69	20.61	16.49	16.70
	M145065180	4.15	24.96	19.97	18.70
	M145065200	4.63	29.10	23.28	20.67
	M145065220	5.06	33.02	26.42	22.60
	M175065120	3.02	14.66	11.73	-
	M175065130	3.29	17.29	13.83	-
	M175065140	3.52	19.98	15.99	-
	M175065150	3.79	22.45	17.96	-
	M175065160	4.05	24.52	19.61	-
	M175065180	4.55	29.74	23.34	29.05
	M175065200	5.08	34.07	27.25	32.13
	M175065220	5.56	38.74	31.00	35.16
	M175065250	6.35	45.42	36.34	39.62
	M205065120	3.29	16.44	13.02	-
	M205065130	3.58	19.44	14.98	-
	M205065140	3.84	22.53	17.40	
	M205065150	4.13	25.67	19.89	-
	M205065160	4.41	28.82	22.40	-
	M205065170	4.67	31.97	24.55	-
	M205065180	4.96	33.90	26.47	-
	M205065200	5.53	39.16	30.69	-
	M205065220	6.05	44.66	35.08	-
	M205065250	6.91	52.52	41.37	-
	M205065270	7.49	57.57	45.42	-
	M235065130	3.86	22.89	17.58	-
	M235065140	4.14	26.61	20.35	-
	M235065150	4.45	30.38	23.35	-
	M235065160	4.76	34.07	26.73	-
	M235065170	5.04	37.23	28.82	-
	M235065180	5.35	40.75	31.47	-
	M235065200	5.97	46.89	36.54	-
	M235065220	6.53	53.69	44.28	-
	M235065250	7.46	63.30	52.41	-
5.0	M145065120	2.75	10.94	8.75	10.21
	M145065130	2.99	12.82	10.26	11.05
	M145065140	3.21	14.78	11.82	11.88
	M145065150	3.45	16.76	13.41	12.71
	M145065160	3.69	18.75	15.00	13.53
	M145065180	4.15	22.67	18.13	15.14
	M145065200	4.63	26.39	21.12	16.74
	M145065220	5.06	29.93	23.94	18.31
	M175065120	3.02	13.48	10.79	-
	M175065130	3.29	15.85	12.68	-
	M175065140	3.52	18.28	14.63	-
	M175065150	3.79	20.50	16.40	19.73
	M175065160	4.05	22.36	17.89	21.00
	M175065180	4.55	27.07	21.66	23.53
	M175065200	5.08	30.96	24.76	26.02
	M175065220	5.56	35.16	28.13	28.48
	M175065250	6.35	41.17	32.94	32.09
	M205065120	3.29	15.19	12.15	-
	M205065130	3.58	17.90	14.32	-
	M205065140	3.84	20.69	16.55	-
	M205065150	4.13	23.51	18.81	-
	M205065160	4.41	26.35	21.08	-
	M205065170	4.67	29.19	23.02	-
	M205065180	4.96	30.92	24.74	-
	M205065200	5.53	35.65	28.52	-
	M205065220	6.05	40.60	32.48	-
	M205065250	6.91	47.67	38.13	46.72
	M205065270	7.49	52.21	41.76	50.18
	M235065130	3.86	21.17	16.94	-
	M235065140	4.14	24.53	19.62	-
	M235065150	4.45	27.93	22.34	-
	M235065160	4.76	31.25	25.00	-
	M235065170	5.04	34.09	27.27	-
	M235065180	5.35	37.26	29.65	-
	M235065200	5.97	42.78	34.20	-
	M235065220	6.53	48.89	41.25	-
	M235065250	7.46	57.54	48.54	-
	M235065270	8.08	63.13	53.26	-
5.5	M145065120	2.75	10.08	8.06	8.44
	M145065130	2.99	11.79	9.44	9.13
	M145065140	3.21	13.58	10.86	9.82
	M145065150	3.45	15.38	12.30	10.50
	M145065160	3.69	17.19	13.75	11.18
	M145065180	4.15	20.76	16.60	12.52
	M145065200	4.63	24.15	19.32	13.83
	M145065220	5.06	27.36	21.89	15.13
	M175065120	3.02	12.47	9.97	-
	M175065130	3.29	14.62	11.70	14.17
	M175065140	3.52	16.84	13.47	15.24
	M175065150	3.79	18.86	15.09	16.30
	M175065160	4.05	20.55	16.44	17.36

- indicates the load to produce a deflection of span / 180 exceeds ultimate UDL capacity

Load / Span Tables

Note: The following load / span tables show the ultimate loads to comply with Eurocode BS EN 1993-1-3 + UK NAD.

Table 1:13 (continued)

Span (m)	Section	Weight (kg/m)	Ultimate Total UDL kN		Working Load to Produce Deflection Span/180 kN
			Gravity	Suction	
	M175065180	4.55	24.83	19.87	19.45
	M175065200	5.08	28.36	22.69	21.51
	M175065220	5.56	32.19	25.75	23.53
	M175065250	6.35	37.65	30.12	26.52
	M205065120	3.29	14.10	11.28	-
	M205065130	3.58	16.57	13.25	-
	M205065140	3.84	19.11	15.29	-
	M205065150	4.13	21.68	17.35	-
	M205065160	4.41	24.27	19.41	-
	M205065170	4.67	26.85	21.17	26.78
	M205065180	4.96	28.42	22.73	28.27
	M205065200	5.53	32.71	26.17	31.28
	M205065220	6.05	37.21	29.77	34.25
	M205065250	6.91	43.63	34.90	38.62
	M205065270	7.49	47.76	38.20	41.47
	M235065130	3.86	19.67	15.73	-
	M235065140	4.14	22.72	18.18	-
	M235065150	4.45	25.82	20.66	-
	M235065160	4.76	28.85	23.08	-
	M235065170	5.04	31.42	25.14	-
	M235065180	5.35	34.30	27.44	-
	M235065200	5.97	39.31	31.43	-
	M235065220	6.53	44.87	37.86	-
	M235065250	7.46	52.72	44.48	-
	M235065270	8.08	57.80	48.77	57.54
	M265065140	4.46	25.63	20.49	-
	M265065150	4.79	30.24	23.32	-
	M265065160	5.13	32.74	24.86	-
	M265065180	5.76	39.93	29.51	-
	M265065200	6.43	46.30	35.06	-
	M265065220	7.03	52.50	41.61	-
	M265065250	8.03	63.76	49.32	-
	M265065270	8.70	69.99	54.32	-
6.0	M145065120	2.75	9.34	7.47	7.09
	M145065130	2.99	10.92	8.73	7.67
	M145065140	3.21	12.55	10.04	8.25
	M145065150	3.45	14.21	11.37	8.82
	M145065160	3.69	15.87	12.70	9.39
	M145065180	4.15	19.14	15.31	10.52
	M145065200	4.63	22.25	17.80	11.62
	M145065220	5.06	25.19	20.15	12.71
	M175065120	3.02	11.59	9.27	11.00
	M175065130	3.29	13.57	10.85	11.91
	M175065140	3.52	15.60	12.48	12.81
	M175065150	3.79	17.46	13.97	13.70
	M175065160	4.05	19.00	15.20	14.59
	M175065180	4.55	22.93	18.35	16.34
	M175065200	5.08	26.16	20.93	18.07
	M175065220	5.56	29.67	23.74	19.78
	M175065250	6.35	34.67	27.74	22.28
	M205065120	3.29	13.14	10.52	-
	M205065130	3.58	15.41	12.33	-
	M205065140	3.84	17.74	14.20	-
	M205065150	4.13	20.11	16.09	19.90
	M205065160	4.41	22.48	17.99	21.19
	M205065170	4.67	24.85	19.59	22.50
	M205065180	4.96	26.28	21.02	23.76
	M205065200	5.53	30.22	24.17	26.29
	M205065220	6.05	34.34	27.47	28.78
	M205065250	6.91	40.22	32.17	32.45
	M205065270	7.49	44.00	35.20	34.85
	M235065130	3.86	18.35	14.67	-
	M235065140	4.14	21.15	16.92	-
	M235065150	4.45	24.00	19.20	-
	M235065160	4.76	26.77	21.42	-
	M235065170	5.04	29.13	23.30	-
	M235065180	5.35	31.77	25.42	-
	M235065200	5.97	36.36	29.07	-
	M235065220	6.53	41.46	34.97	39.88
	M235065250	7.46	48.65	41.04	45.00
	M235065270	8.08	53.30	44.97	48.35
	M265065140	4.46	23.92	19.12	-
	M265065150	4.79	28.17	22.29	-
	M265065160	5.13	30.45	23.74	-
	M265065180	5.76	37.04	28.00	-
	M265065200	6.43	42.88	33.11	-
	M265065220	7.03	48.56	39.15	-
	M265065250	8.03	58.89	46.22	-
	M265065270	8.70	64.59	50.80	-
6.5	M175065120	3.02	10.82	8.66	9.37
	M175065130	3.29	12.65	10.12	10.14
	M175065140	3.52	14.53	11.63	10.91
	M175065150	3.79	16.25	13.00	11.67
	M175065160	4.05	17.67	14.13	12.43
	M175065180	4.55	21.30	17.04	13.92
	M175065200	5.08	24.28	19.43	15.40
	M175065220	5.56	27.52	22.02	16.85
	M175065250	6.35	32.14	25.71	18.99
	M205065120	3.29	12.30	9.84	-
	M205065130	3.58	14.40	11.52	-
	M205065140	3.84	16.56	13.25	15.85
	M205065150	4.13	18.74	14.99	16.96
	M205065160	4.41	20.94	16.75	18.06
	M205065170	4.67	23.13	18.23	19.17
	M205065180	4.96	24.44	19.55	20.24
	M205065200	5.53	28.07	22.46	22.40
	M205065220	6.05	31.88	25.50	24.52
	M205065250	6.91	37.30	29.84	27.65
	M205065270	7.49	40.79	32.63	29.69
	M235065130	3.86	17.18	13.74	-
	M235065140	4.14	19.78	15.82	-
	M235065150	4.45	22.40	17.93	-
	M235065160	4.76	24.89	19.98	-
	M235065170	5.04	27.14	21.71	26.51
	M235065180	5.35	29.58	23.67	28.04
	M235065200	5.97	33.81	27.04	31.03
	M235065220	6.53	38.52	32.50	33.98
	M235065250	7.46	45.16	38.10	38.34
	M235065270	8.08	49.45	41.72	41.20
	M265065140	4.46	22.41	17.91	-
	M265065150	4.79	26.34	20.85	-
	M265065160	5.13	28.44	22.65	-
	M265065180	5.76	34.53	26.59	-
	M265065200	6.43	39.92	31.32	-
	M265065220	7.03	45.16	36.72	-
	M265065250	8.03	54.70	43.12	51.24
	M265065270	8.70	59.96	47.27	55.07
	M300090150	5.86	27.41	20.99	-
	M300090160	6.27	31.68	24.38	-
	M300090180	7.05	41.69	31.45	-

- indicates the load to produce a deflection of span/180 exceeds ultimate UDL capacity

Note: The following load / span tables show the ultimate loads to comply with Eurocode BS EN 1993-1-3 + UK NAD.

Table 1:13 (continued)

Span (m)	Section	Weight (kg/m)	Ultimate Total UDL kN		Working Load to Produce Deflection Span/180 kN
			Gravity	Suction	
	M300090200	7.86	49.40	37.25	-
	M300090250	9.82	71.53	57.47	-
	M300090270	10.64	80.43	55.40	-
	M350090150	6.43	33.70	24.97	-
	M350090160	6.87	39.19	28.94	-
	M350090180	7.72	50.59	36.98	-
	M350090200	8.62	60.16	44.00	-
	M350090250	10.77	81.46	60.90	-
	M350090270	11.66	90.78	68.44	-
7.0	M175065120	3.02	10.15	8.12	8.08
	M175065130	3.29	11.85	9.48	8.75
	M175065140	3.52	13.60	10.88	9.41
	M175065150	3.79	15.19	12.15	10.07
	M175065160	4.05	16.51	13.21	10.72
	M175065180	4.55	19.88	15.91	12.01
	M175065200	5.08	22.65	18.12	13.28
	M175065220	5.56	25.66	20.53	14.53
	M175065250	6.35	29.94	23.95	16.37
	M205065120	3.29	11.56	9.25	-
	M205065130	3.58	13.51	10.81	12.70
	M205065140	3.84	15.52	12.41	13.67
	M205065150	4.13	17.55	14.04	14.62
	M205065160	4.41	19.59	15.67	15.57
	M205065170	4.67	21.62	17.05	16.53
	M205065180	4.96	22.84	18.27	17.45
	M205065200	5.53	26.21	20.97	19.31
	M205065220	6.05	29.74	23.79	21.14
	M205065250	6.91	34.78	27.82	23.84
	M205065270	7.49	38.02	30.41	25.60
	M235065130	3.86	16.15	12.92	-
	M235065140	4.14	18.56	14.85	-
	M235065150	4.45	21.01	16.81	20.24
	M235065160	4.76	23.11	18.71	21.56
	M235065170	5.04	25.41	20.32	22.86
	M235065180	5.35	27.67	22.14	24.17
	M235065200	5.97	31.60	25.27	26.76
	M235065220	6.53	35.97	30.34	29.30
	M235065250	7.46	42.13	35.54	33.06
	M235065270	8.08	46.11	38.90	35.52
	M265065140	4.46	21.07	16.84	-
	M265065150	4.79	24.74	19.58	-
	M265065160	5.13	26.68	21.32	-
	M265065180	5.76	32.34	25.27	32.27
	M265065200	6.43	37.34	29.69	35.73
	M265065220	7.03	42.20	34.31	39.14
	M265065250	8.03	51.07	40.26	44.18
	M265065270	8.70	55.95	44.11	47.48
	M300090150	5.86	26.05	20.84	-
	M300090160	6.27	30.02	24.02	-
	M300090180	7.05	39.35	30.65	-
	M300090200	7.86	46.50	36.04	-
	M300090250	9.82	67.06	54.98	-
	M300090270	10.64	75.33	52.84	-
	M350090150	6.43	32.22	24.65	-
	M350090160	6.87	37.33	28.55	-
	M350090180	7.72	47.93	36.66	-
	M350090200	8.62	56.80	43.13	-
	M350090250	10.77	76.52	58.75	-
	M350090270	11.66	85.17	65.76	-
7.5	M175065120	3.02	9.47	7.64	7.04
	M175065130	3.29	11.06	8.91	7.62
	M175065140	3.52	12.69	10.22	8.20
	M175065150	3.79	14.18	11.41	8.77
	M175065160	4.05	15.41	12.39	9.34
	M175065180	4.55	18.56	14.91	10.46
	M175065200	5.08	21.14	16.98	11.57
	M175065220	5.56	23.94	19.22	12.66
	M175065250	6.35	27.95	22.42	14.26
	M205065120	3.29	10.90	8.72	10.22
	M205065130	3.58	12.72	10.18	11.06
	M205065140	3.84	14.60	11.68	11.91
	M205065150	4.13	16.49	13.20	12.74
	M205065160	4.41	18.40	14.72	13.56
	M205065170	4.67	20.30	16.00	14.40
	M205065180	4.96	21.43	17.14	15.20
	M205065200	5.53	24.58	19.66	16.82
	M205065220	6.05	27.87	22.30	18.42
	M205065250	6.91	32.58	26.06	20.77
	M205065270	7.49	35.60	28.47	22.30
	M235065130	3.86	15.23	12.18	-
	M235065140	4.14	17.48	13.99	16.48
	M235065150	4.45	19.77	15.82	17.63
	M235065160	4.76	21.57	17.60	18.78
	M235065170	5.04	23.87	19.10	19.92
	M235065180	5.35	25.93	20.79	21.06
	M235065200	5.97	29.65	23.71	23.31
	M235065220	6.53	33.73	28.46	25.53
	M235065250	7.46	39.48	33.31	28.80
	M235065270	8.08	43.20	36.44	30.94
	M265065140	4.46	19.87	15.88	-
	M265065150	4.79	23.31	18.45	-
	M265065160	5.13	25.11	20.07	25.06
	M265065180	5.76	30.40	24.06	28.11
	M265065200	6.43	35.07	27.88	31.12
	M265065220	7.03	39.60	32.20	34.09
	M265065250	8.03	47.88	37.75	38.49
	M265065270	8.70	52.44	41.34	41.36
	M300090150	5.86	24.79	19.83	-
	M300090160	6.27	28.50	22.80	-
	M300090180	7.05	37.24	29.01	-
	M300090200	7.86	43.91	34.03	-
	M300090250	9.82	63.11	51.74	62.67
	M300090270	10.64	70.83	50.44	67.43
	M350090150	6.43	30.82	23.57	-
	M350090160	6.87	35.59	27.22	-
	M350090180	7.72	45.50	34.80	-
	M350090200	8.62	53.76	40.83	-
	M350090250	10.77	72.13	56.61	-
	M350090270	11.66	80.20	63.15	-
8.0	M205065120	3.29	10.31	8.25	8.98
	M205065130	3.58	12.02	9.61	9.73
	M205065140	3.84	13.78	11.02	10.46
	M205065150	4.13	15.56	12.45	11.20
	M205065160	4.41	17.34	13.88	11.92
	M205065170	4.67	19.13	15.08	12.66
	M205065180	4.96	20.19	16.15	13.36

- indicates the load to produce a deflection of span/180 exceeds ultimate UDL capacity

Load / Span Tables

Note: The following load / span tables show the ultimate loads to comply with Eurocode BS EN 1993-1-3 + UK NAD.

Table 1:13 (continued)

Span (m)	Section	Weight (kg/m)	Ultimate Total UDL kN		Working Load to Produce Deflection Span/180 kN
			Gravity	Suction	
	M205065200	5.53	23.14	18.51	14.79
	M205065220	6.05	26.23	20.98	16.19
	M205065250	6.91	30.63	24.50	18.25
	M205065270	7.49	33.47	26.77	19.60
	M235065130	3.86	14.41	11.52	13.46
	M235065140	4.14	16.52	13.22	14.48
	M235065150	4.45	18.66	14.93	15.50
	M235065160	4.76	20.22	16.60	16.51
	M235065170	5.04	22.52	18.01	17.50
	M235065180	5.35	24.31	19.60	18.51
	M235065200	5.97	27.93	22.33	20.49
	M235065220	6.53	31.75	26.79	22.44
	M235065250	7.46	37.14	31.33	25.31
	M235065270	8.08	40.63	34.27	27.20
	M265065140	4.46	18.80	15.03	-
	M265065150	4.79	22.03	17.44	20.67
	M265065160	5.13	23.72	18.96	22.02
	M265065180	5.76	28.68	22.95	24.70
	M265065200	6.43	33.05	26.28	27.35
	M265065220	7.03	37.31	30.33	29.97
	M265065250	8.03	45.07	35.53	33.83
	M265065270	8.70	49.34	38.90	36.35
	M300090150	5.86	23.63	18.91	-
	M300090160	6.27	27.12	21.69	-
	M300090180	7.05	35.33	27.52	-
	M300090200	7.86	41.58	32.23	-
	M300090250	9.82	59.59	48.85	55.08
	M300090270	10.64	66.83	48.21	59.27
	M350090150	6.43	29.50	22.56	-
	M350090160	6.87	33.98	25.98	-
	M350090180	7.72	43.29	33.11	-
	M350090200	8.62	51.02	38.74	-
	M350090250	10.77	68.21	54.52	-
	M350090270	11.66	75.76	60.66	-
8.5	M205065120	3.29	9.77	7.82	7.96
	M205065130	3.58	11.39	9.11	8.61
	M205065140	3.84	13.04	10.43	9.27
	M205065150	4.13	14.72	11.78	9.92
	M205065160	4.41	16.40	13.12	10.56
	M205065170	4.67	18.08	14.26	11.21
	M205065180	4.96	19.08	15.26	11.84
	M205065200	5.53	21.85	17.48	13.10
	M205065220	6.05	24.76	19.81	14.34
	M205065250	6.91	28.91	23.12	16.17
	M205065270	7.49	31.57	25.26	17.36
	M235065130	3.86	13.66	10.93	11.92
	M235065140	4.14	15.66	12.53	12.83
	M235065150	4.45	17.68	14.14	13.73
	M235065160	4.76	19.03	15.72	14.62
	M235065170	5.04	21.30	17.04	15.50
	M235065180	5.35	22.88	18.54	16.39
	M235065200	5.97	26.40	21.11	18.15
	M235065220	6.53	29.99	25.31	19.87
	M235065250	7.46	35.07	29.58	22.42
	M235065270	8.08	38.34	32.35	24.09
	M265065140	4.46	17.84	14.26	17.11
	M265065150	4.79	20.88	16.53	18.31
	M265065160	5.13	22.47	17.96	19.51
	M265065180	5.76	27.14	21.89	21.88
	M265065200	6.43	31.26	24.85	24.23
	M265065220	7.03	35.26	28.66	26.54
	M265065250	8.03	42.57	33.56	29.96
	M265065270	8.70	46.59	36.73	32.20
	M300090150	5.86	22.56	18.05	-
	M300090160	6.27	25.85	20.68	-
	M300090180	7.05	33.60	26.17	-
	M300090200	7.86	39.48	30.60	39.35
	M300090250	9.82	56.43	46.27	48.79
	M300090270	10.64	63.25	46.14	52.50
	M350090150	6.43	28.26	21.61	-
	M350090160	6.87	32.48	24.84	-
	M350090180	7.72	41.25	31.55	-
	M350090200	8.62	48.52	36.85	-
	M350090250	10.77	64.67	52.52	-
	M350090270	11.66	71.78	58.30	-
9.0	M205065120	3.29	9.29	7.44	7.10
	M205065130	3.58	10.82	8.65	7.68
	M205065140	3.84	12.38	9.91	8.27
	M205065150	4.13	13.97	11.18	8.85
	M205065160	4.41	15.56	12.45	9.42
	M205065170	4.67	17.15	13.52	10.00
	M205065180	4.96	18.08	14.47	10.56
	M205065200	5.53	20.70	16.56	11.68
	M205065220	6.05	23.45	18.76	12.79
	M205065250	6.91	27.37	21.89	14.42
	M205065270	7.49	29.88	23.90	15.49
	M235065130	3.86	12.99	10.39	10.63
	M235065140	4.14	14.88	11.90	11.44
	M235065150	4.45	16.79	13.43	12.24
	M235065160	4.76	17.98	14.92	13.04
	M235065170	5.04	20.21	16.17	13.83
	M235065180	5.35	21.61	17.58	14.62
	M235065200	5.97	25.02	20.01	16.19
	M235065220	6.53	28.42	23.98	17.73
	M235065250	7.46	33.21	28.02	20.00
	M235065270	8.08	36.30	30.63	21.49
	M265065140	4.46	16.97	13.56	15.26
	M265065150	4.79	19.85	15.71	16.34
	M265065160	5.13	21.34	17.06	17.40
	M265065180	5.76	25.76	20.78	19.52
	M265065200	6.43	29.64	23.57	21.61
	M265065220	7.03	33.42	27.17	23.68
	M265065250	8.03	40.33	31.79	26.73
	M265065270	8.70	44.12	34.78	28.72
	M300090150	5.86	21.58	17.26	-
	M300090160	6.27	24.69	19.75	-
	M300090180	7.05	32.02	24.94	31.67
	M300090200	7.86	37.57	29.12	35.10
	M300090250	9.82	53.59	43.94	43.52
	M300090270	10.64	60.03	44.22	46.83
	M350090150	6.43	27.10	20.73	-
	M350090160	6.87	31.10	23.78	-
	M350090180	7.72	39.39	30.13	-
	M350090200	8.62	46.25	35.13	-
	M350090250	10.77	61.48	50.61	-
	M350090270	11.66	68.20	56.08	67.81

- indicates the load to produce a deflection of span/180 exceeds ultimate UDL capacity

Note: The following load / span tables show the ultimate loads to comply with Eurocode BS EN 1993-1-3 + UK NAD.

Table 1:13 (continued)

Span (m)	Section	Weight (kg/m)	Ultimate Total UDL kN		Working Load to Produce Deflection Span/180 kN
			Gravity	Suction	
9.5	M235065130	3.86	12.31	9.91	9.54
	M235065140	4.14	14.10	11.34	10.27
	M235065150	4.45	15.90	12.79	10.99
	M235065160	4.76	17.03	14.20	11.70
	M235065170	5.04	19.14	15.38	12.41
	M235065180	5.35	20.47	16.72	13.12
	M235065200	5.97	23.70	19.02	14.53
	M235065220	6.53	26.92	22.78	15.91
	M235065250	7.46	31.46	26.61	17.95
	M235065270	8.08	34.39	29.08	19.29
	M265065140	4.46	16.07	12.93	13.70
	M265065150	4.79	18.81	14.97	14.66
	M265065160	5.13	20.22	16.24	15.62
	M265065180	5.76	24.41	19.77	17.52
	M265065200	6.43	28.08	22.41	19.40
	M265065220	7.03	31.66	25.83	21.25
	M265065250	8.03	38.21	30.20	23.99
	M265065270	8.70	41.80	33.04	25.78
	M300090150	5.86	20.44	16.54	-
	M300090160	6.27	23.39	18.90	-
	M300090180	7.05	30.33	23.82	28.42
	M300090200	7.86	35.59	27.77	31.50
	M300090250	9.82	50.77	41.83	39.06
	M300090270	10.64	56.87	42.44	42.03
	M350090150	6.43	26.03	19.91	-
	M350090160	6.87	29.81	22.80	-
	M350090180	7.72	37.32	28.82	-
	M350090200	8.62	43.82	33.55	-
	M350090250	10.77	58.25	48.80	56.54
	M350090270	11.66	64.61	53.98	60.86
10.0	M235065130	3.86	11.69	9.46	8.61
	M235065140	4.14	13.39	10.82	9.27
	M235065150	4.45	15.11	12.20	9.92
	M235065160	4.76	16.18	13.54	10.56
	M235065170	5.04	18.19	14.66	11.20
	M235065180	5.35	19.45	15.94	11.85
	M235065200	5.97	22.52	18.12	13.11
	M235065220	6.53	25.58	21.70	14.36
	M235065250	7.46	29.89	25.33	16.20
	M235065270	8.08	32.68	27.68	17.41
	M265065140	4.46	15.27	12.35	12.36
	M265065150	4.79	17.87	14.29	13.23
	M265065160	5.13	19.21	15.50	14.10
	M265065180	5.76	23.19	18.85	15.81
	M265065200	6.43	26.68	21.36	17.51
	M265065220	7.03	30.08	24.61	19.18
	M265065250	8.03	36.30	28.77	21.65
	M265065270	8.70	39.71	31.46	23.27
	M300090150	5.86	19.42	15.86	-
	M300090160	6.27	22.22	18.11	-
	M300090180	7.05	28.82	22.79	25.65
	M300090200	7.86	33.82	26.55	28.43
	M300090250	9.82	48.23	39.91	35.25
	M300090270	10.64	54.03	40.78	37.93
	M350090150	6.43	25.02	19.14	-
	M350090160	6.87	28.62	21.89	-
	M350090180	7.72	35.45	27.62	-
	M350090200	8.62	41.63	32.11	41.12
	M350090250	10.77	55.34	47.09	51.03
	M350090270	11.66	61.38	52.02	54.93

- indicates the load to produce a deflection of span/180 exceeds ultimate UDL capacity

Multibeam Purlins Tiled Roofs

Loads are Ultimate vertical (on slope) and in kN and kN/m^2.

The designer should not resolve the loadings into normal and downslope components as they have been taken into account when compiling this table. Loads are based on the utilisation of an anti-sag system comprising angle struts at 1/3 span with diagonal rod ties at a minimum slope to the purlins of 30° and stiffened cleats. In order to maintain 30° on larger bays, struts should be positioned at 1/4 intervals as shown on page 16.

One set of diagonal rods are required per 6m length of roof slope.

The load / spans shown in Table 1:14 are applicable to roof slopes not exceeding 30° and purlin spacings not exceeding 1.8m.

Timber rafters must be securely fixed to the purlins at centres not exceeding 600mm. Where metal decking is used with tiles consult our Technical Department.

Table 1:14 Tiled Roof Double Span Load Tables (Ultimate)

Span (m)	Section	Total UDL kN	Purlin Centres m				
			1.2	1.375	1.5	1.675	1.8
			kN/m²				
5.0	M205065150	20.85	3.48	3.03	2.78	2.49	2.32
	M205065160	23.06	3.84	3.35	3.08	2.75	2.56
	M205065180	24.14	4.02	3.51	3.22	2.88	2.68
	M235065160	24.14	4.02	3.51	3.22	2.88	2.68
5.5	M205065150	19.17	2.90	2.53	2.32	2.08	2.08
	M205065160	21.17	3.21	2.80	2.57	2.30	2.14
	M235065160	23.04	3.49	3.05	2.79	2.50	2.33
	M235065180	23.04	3.49	3.05	2.79	2.50	2.33
6.0	M235065160	21.65	3.01	2.62	2.41	2.15	2.00
	M235065180	22.00	3.06	2.67	2.44	2.19	2.04
	M235065200	22.00	3.06	2.67	2.44	2.19	2.04
6.5	M235065160	20.13	2.58	2.25	2.07	1.85	1.72
	M235065180	21.02	2.69	2.35	2.16	1.93	1.80
	M235065200	21.02	2.69	2.35	2.16	1.93	1.80
7.0	M235065160	18.81	2.24	1.95	1.79	1.60	1.49
	M235065180	20.10	2.39	2.09	1.91	1.71	1.60
	M235065200	20.10	2.39	2.09	1.91	1.71	1.60

Cleader Angle Wind Loadings (Ultimate)

Maximum horizontal wind loading which can be carried by the Kingspan 70x70x2.7mm cleader angle.

Span Between Purlins (m)	Total UDL (wind) (kN)
1.0	3.78
1.2	3.17
1.4	2.73
1.6	2.38
1.8	2.11
2.0	1.90

Rafter and Stanchion Stays

Length Between c/c Holes (mm)	RNB Angle 45 x 45 Ultimate Compression (kN)	RNA Channel 38 x 38 x 38 Ultimate Compression (kN)
500	17.54	31.4
600	17.05	31.4
700	16.55	31.4
800	16.1	31.4
900	15.75	31.4
1000	15.55	31.4
1500	–	21
2000	–	15.5

Note: stay attaches to Multichannel / Multibeam with an M12 (8.8 grade) bolt and to the hot-rolled steel with a M16 bolt.

Load / Span Tables

Note: The following load / span tables show the ultimate loads to comply with Eurocode BS EN 1993-1-3 + UK NAD.

Multibeam Purlins Continuous System (Heavy End Bay) - all joints sleeved

Table 1:15 Double Span Bar Length

			External Bay					Internal Bay				
				Ultimate Total UDL kN Uplift Restraint(s)					Ultimate Total UDL kN Uplift Restraint(s)			
Span (m)	Section	Weight (kg/m)	Ultimate Total UDL kN Gravity	No	One	Two	Working Load to Produce Deflection Span/180 kN	Ultimate Total UDL kN Gravity	No	One	Two	Working Load to Produce Deflection Span/180 kN
6.0	M175065120	3.02	11.93	11.93	11.93	11.93	8.69	15.64	15.64	15.64	15.64	18.11
	M175065130	3.29	13.99	13.99	13.99	13.99	9.37	18.32	18.32	18.32	18.32	19.54
	M175065140	3.52	16.10	16.10	16.10	16.10	10.05	21.09	21.09	21.09	21.09	20.95
	M175065150	3.79	18.15	18.15	18.15	18.15	10.71	23.75	23.75	23.75	23.75	22.33
	M175065160	4.05	20.04	20.04	20.04	20.04	11.37	26.22	26.22	26.22	26.22	23.69
	M175065180	4.55	24.22	24.22	24.22	24.22	12.65	31.66	31.66	31.66	31.66	26.37
	M175065200	5.08	27.94	27.94	27.94	27.94	13.89	36.51	36.51	36.51	36.51	28.96
	M175065220	5.56	31.70	31.70	31.70	31.70	15.11	41.41	41.41	41.41	41.41	31.49
	M175065250	6.35	37.06	37.06	37.06	37.06	16.85	48.39	48.39	48.39	48.39	35.13
	M205605120	3.29	14.08	14.08	14.08	14.08	12.57	18.10	18.10	18.10	18.10	26.20
	M205605130	3.58	16.54	16.54	16.54	16.54	13.56	21.28	21.28	21.28	21.28	28.26
	M205605140	3.84	19.06	19.06	19.06	19.06	14.53	24.57	24.57	24.57	24.57	30.30
	M205605150	4.13	21.62	21.62	21.62	21.62	15.49	27.89	27.89	27.89	27.89	32.30
	M205605160	4.41	24.19	24.19	24.19	24.19	16.44	31.24	31.24	31.24	31.24	34.26
	M205605170	4.67	26.76	26.76	26.76	26.76	17.39	34.58	34.58	34.58	34.58	36.26
	M205605180	4.96	28.82	28.82	28.82	28.82	18.29	37.27	37.27	37.27	37.27	38.13
	M205605200	5.53	33.41	33.41	33.41	33.41	20.09	43.24	43.24	43.24	43.24	41.87
	M205605220	6.05	37.96	37.96	37.96	37.96	21.84	49.18	49.18	49.18	49.18	45.53
	M205605250	6.91	44.48	44.48	44.48	44.48	24.36	57.67	57.67	57.67	57.67	50.78
	M205605270	7.49	48.67	48.67	48.67	48.67	25.97	63.13	63.13	63.13	63.13	54.14
	M235065130	3.86	19.69	17.11	19.69	19.69	18.69	24.86	21.61	24.86	24.86	38.95
	M235065140	4.14	22.73	19.72	22.73	22.73	20.03	28.80	24.98	28.80	28.80	41.76
	M235065150	4.45	25.81	22.31	25.81	25.81	21.35	32.79	28.36	32.79	32.79	44.51
	M235065160	4.76	28.85	24.94	28.85	28.85	22.65	36.76	31.78	36.76	36.76	47.22
	M235065170	5.04	31.69	27.31	31.69	31.69	23.93	40.44	34.85	40.44	40.44	49.89
	M235065180	5.35	34.64	29.83	34.64	34.64	25.20	44.28	38.13	44.28	44.28	52.54
	M235065200	5.97	40.09	34.49	40.09	40.09	27.67	51.38	44.21	51.38	51.38	57.68
	M235065220	6.53	45.66	41.26	45.66	45.66	30.09	58.64	52.99	58.64	58.64	62.72
	M235065250	7.46	53.60	48.37	53.60	53.60	33.55	68.99	62.26	68.99	68.99	69.93
	M235065270	8.08	58.74	53.00	58.74	58.74	35.76	75.68	68.29	75.68	75.68	74.55
6.5	M175065120	3.02	11.10	11.10	11.10	11.10	7.40	14.70	14.70	14.70	14.70	15.43
	M175065130	3.29	13.00	13.00	13.00	13.00	7.99	17.18	17.18	17.18	17.18	16.65
	M175065140	3.52	14.96	14.96	14.96	14.96	8.56	19.73	19.73	19.73	19.73	17.85
	M175065150	3.79	16.84	16.84	16.84	16.84	9.13	22.19	22.19	22.19	22.19	19.03
	M175065160	4.05	18.58	18.58	18.58	18.58	9.68	24.47	24.47	24.47	24.47	20.19
	M175065180	4.55	22.44	22.44	22.44	22.44	10.78	29.48	29.48	29.48	29.48	22.47
	M175065200	5.08	25.86	25.86	25.86	25.86	11.84	33.96	33.96	33.96	33.96	24.68
	M175065220	5.56	29.33	29.33	29.33	29.33	12.87	38.47	38.47	38.47	38.47	26.83
	M175065250	6.35	34.26	34.26	34.26	34.26	14.36	44.90	44.90	44.90	44.90	29.93
	M205605120	3.29	13.14	13.14	13.14	13.14	10.71	17.08	17.08	17.08	17.08	22.33
	M205605130	3.58	15.41	15.41	15.41	15.41	11.55	20.03	20.03	20.03	20.03	24.08
	M205605140	3.84	17.75	17.75	17.75	17.75	12.38	23.07	23.07	23.07	23.07	25.82
	M205605150	4.13	20.10	20.10	20.10	20.10	13.20	26.14	26.14	26.14	26.14	27.52
	M205605160	4.41	22.47	22.47	22.47	22.47	14.00	29.23	29.23	29.23	29.23	29.19
	M205605170	4.67	24.84	24.84	24.84	24.84	14.82	32.32	32.32	32.32	32.32	30.89
	M205605180	4.96	26.74	26.74	26.74	26.74	15.58	34.79	34.79	34.79	34.79	32.49
	M205605200	5.53	30.97	30.95	30.97	30.97	17.12	40.29	40.27	40.29	40.29	35.68
	M205605220	6.05	35.17	34.67	35.17	35.17	18.61	45.77	45.13	45.77	45.77	38.80
	M205605250	6.91	41.16	39.91	41.16	41.16	20.76	53.59	51.96	53.59	53.59	43.27
	M205605270	7.49	45.03	43.24	45.03	45.03	22.13	58.62	56.30	58.62	58.62	46.13
	M235065130	3.86	18.40	12.64	18.40	18.40	15.92	23.50	16.16	23.50	23.50	33.19
	M235065140	4.14	21.20	14.57	21.20	21.20	17.07	27.14	18.67	27.14	27.14	35.59
	M235065150	4.45	24.04	16.50	24.04	24.04	18.19	30.84	21.17	30.84	30.84	37.93
	M235065160	4.76	26.85	18.46	26.85	26.85	19.30	34.50	23.72	34.50	34.50	40.23
	M235065170	5.04	29.46	20.22	29.46	29.46	20.39	37.90	26.01	37.90	37.90	42.51
	M235065180	5.35	32.19	22.10	32.19	32.19	21.47	41.44	28.46	41.44	41.44	44.77
	M235065200	5.97	37.21	25.59	37.21	37.21	23.58	47.98	33.00	47.98	47.98	49.15
	M235065220	6.53	42.34	30.82	42.34	42.34	25.64	54.67	39.79	54.67	54.67	53.44
	M235065250	7.46	49.66	36.21	49.66	49.66	28.58	64.21	46.83	64.21	64.21	59.58
	M235065270	8.08	54.39	39.74	54.39	54.39	30.47	70.38	51.43	70.38	70.38	63.52

Note: The following load / span tables show the ultimate loads to comply with Eurocode BS EN 1993-1-3 + UK NAD.

Multibeam Purlins Continuous System (Heavy End Bay) - all joints sleeved

Table 1:15 Double Span Bar Length (continued)

			External Bay					Internal Bay				
			Ultimate Total UDL kN Gravity	Ultimate Total UDL kN Uplift Restraint(s)			Working Load to Produce Deflection	Ultimate Total UDL kN Gravity	Ultimate Total UDL kN Uplift Restraint(s)			Working Load to Produce Deflection
Span (m)	Section	Weight (kg/m)		No	One	Two	Span/180 kN		No	One	Two	Span/180 kN
7.0	M175065120	3.02	10.37	8.76	10.37	10.37	6.38	13.85	11.70	13.85	13.85	13.31
	M175065130	3.29	12.13	10.21	12.13	12.13	6.88	16.16	13.60	16.16	16.16	14.35
	M175065140	3.52	13.95	11.70	13.95	13.95	7.38	18.53	15.55	18.53	18.53	15.39
	M175065150	3.79	15.69	13.16	15.69	15.69	7.87	20.81	17.44	20.81	20.81	16.41
	M175065160	4.05	17.31	14.49	17.31	17.31	8.35	22.92	19.18	22.92	22.92	17.41
	M175065180	4.55	20.89	17.45	20.89	20.89	9.29	27.58	23.04	27.58	27.58	19.37
	M175065200	5.08	24.06	20.05	24.06	24.06	10.21	31.72	26.43	31.72	31.72	21.28
	M175065220	5.56	27.27	22.72	27.27	27.27	11.10	35.90	29.90	35.90	35.90	23.14
	M175065250	6.35	31.84	26.51	31.84	31.84	12.38	41.86	34.85	41.86	41.86	25.81
	M205605120	3.29	12.31	10.38	12.31	12.31	9.23	16.16	13.63	16.16	16.16	19.25
	M205605130	3.58	14.41	12.10	14.41	14.41	9.96	18.90	15.86	18.90	18.90	20.76
	M205605140	3.84	16.58	13.90	16.58	16.58	10.68	21.72	18.22	21.72	21.72	22.26
	M205605150	4.13	18.77	15.69	18.77	18.77	11.38	24.58	20.55	24.58	24.58	23.73
	M205605160	4.41	20.97	17.51	20.97	20.97	12.08	27.45	22.92	27.45	27.45	25.17
	M205605170	4.67	23.17	19.03	23.17	23.17	12.78	30.31	24.89	30.31	30.31	26.64
	M205605180	4.96	24.93	20.76	24.93	24.93	13.44	32.61	27.16	32.61	32.61	28.01
	M205605200	5.53	28.84	23.48	28.84	28.84	14.76	37.71	30.70	37.71	37.71	30.76
	M205605220	6.05	32.73	26.34	32.73	32.73	16.05	42.78	34.43	42.78	42.78	33.45
	M205605250	6.91	38.29	30.39	38.29	38.29	17.90	50.03	39.70	50.03	50.03	37.31
	M205605270	7.49	41.86	32.96	41.86	41.86	19.08	54.69	43.06	54.69	54.69	39.77
	M235065130	3.86	17.24	9.53	14.43	17.24	13.73	22.25	12.31	18.63	22.25	28.62
	M235065140	4.14	19.85	10.99	16.54	19.85	14.72	25.64	14.20	21.37	25.64	30.68
	M235065150	4.45	22.48	12.45	18.73	22.48	15.69	29.07	16.09	24.21	29.07	32.70
	M235065160	4.76	25.10	13.92	21.11	25.10	16.64	32.47	18.02	27.32	32.47	34.69
	M235065170	5.04	27.52	15.26	22.84	27.52	17.58	35.63	19.75	29.58	35.63	36.65
	M235065180	5.35	30.04	16.68	24.93	30.04	18.52	38.92	21.61	32.29	38.92	38.60
	M235065200	5.97	34.69	19.33	28.74	34.69	20.33	44.98	25.06	37.26	44.98	42.38
	M235065220	6.53	39.45	23.35	34.42	39.45	22.10	51.19	30.30	44.65	51.19	46.08
	M235065250	7.46	46.24	27.50	40.31	46.24	24.65	60.03	35.70	52.33	60.03	51.38
	M235065270	8.08	50.62	30.21	44.10	50.62	26.27	65.74	39.24	57.28	65.74	54.77
7.5	M175065120	3.02	9.72	6.73	9.72	9.72	5.56	13.08	9.05	13.08	13.08	11.59
	M175065130	3.29	11.37	7.85	11.37	11.37	6.00	15.23	10.52	15.23	15.23	12.50
	M175065140	3.52	13.06	9.01	13.06	13.06	6.43	17.45	12.03	17.45	17.45	13.41
	M175065150	3.79	14.69	10.13	14.69	14.69	6.86	19.58	13.51	19.58	19.58	14.29
	M175065160	4.05	16.19	11.17	16.19	16.19	7.27	21.54	14.86	21.54	21.54	15.16
	M175065180	4.55	19.52	13.47	19.52	19.52	8.10	25.89	17.87	25.89	25.89	16.88
	M175065200	5.08	22.48	15.50	22.48	22.48	8.89	29.75	20.51	29.75	29.75	18.54
	M175065220	5.56	25.47	17.58	25.47	25.47	9.67	33.65	23.23	33.65	33.65	20.16
	M175065250	6.35	29.72	20.55	29.72	29.72	10.78	39.20	27.11	39.20	39.20	22.48
	M205605120	3.29	11.57	7.97	11.57	11.57	8.04	15.31	10.55	15.31	15.31	16.77
	M205605130	3.58	13.53	9.29	13.53	13.53	8.68	17.87	12.29	17.87	17.87	18.09
	M205605140	3.84	15.55	10.70	15.55	15.55	9.30	20.51	14.11	20.51	20.51	19.39
	M205605150	4.13	17.59	12.08	17.59	17.59	9.91	23.18	15.91	23.18	23.18	20.67
	M205605160	4.41	19.64	13.49	19.64	19.64	10.52	25.85	17.75	25.85	25.85	21.93
	M205605170	4.67	21.69	14.65	21.69	21.69	11.13	28.52	19.27	28.52	28.52	23.21
	M205605180	4.96	23.33	15.94	23.33	23.33	11.70	30.66	20.96	30.66	30.66	24.40
	M205605200	5.53	26.97	18.04	26.97	26.97	12.86	35.42	23.68	35.42	35.42	26.80
	M205605220	6.05	30.60	20.26	30.60	30.60	13.98	40.14	26.57	40.14	40.14	29.14
	M205605250	6.91	35.78	23.42	35.78	35.78	15.59	46.89	30.69	46.89	46.89	32.50
	M205605270	7.49	39.10	25.43	39.10	39.10	16.62	51.23	33.32	51.23	51.23	34.65
	M235065130	3.86	16.22	7.34	16.22	16.22	11.96	21.11	9.55	21.11	21.11	24.93
	M235065140	4.14	18.65	8.45	18.65	18.65	12.82	24.28	11.00	24.28	24.28	26.73
	M235065150	4.45	21.10	9.57	21.10	21.10	13.66	27.48	12.47	27.48	27.48	28.49
	M235065160	4.76	23.54	10.71	23.54	23.54	14.50	30.65	13.94	30.65	30.65	30.22
	M235065170	5.04	25.79	11.73	25.79	25.79	15.32	33.59	15.28	33.59	33.59	31.93
	M235065180	5.35	28.15	12.83	28.15	28.15	16.13	36.66	16.71	36.66	36.66	33.62
	M235065200	5.97	32.48	14.87	32.48	32.48	17.71	42.32	19.37	42.32	42.32	36.92
	M235065220	6.53	36.92	17.98	36.92	36.92	19.26	48.10	23.42	48.10	48.10	40.14
	M235065250	7.46	43.23	21.20	43.23	43.23	21.47	56.33	27.62	56.33	56.33	44.76
	M235065270	8.08	47.31	23.31	47.31	47.31	22.89	61.65	30.38	61.65	61.65	47.71

Load / Span Tables

Note: The following load / span tables show the ultimate loads to comply with Eurocode BS EN 1993-1-3 + UK NAD.

Multibeam Purlins Continuous System (Heavy End Bay) - all joints sleeved

Table 1:15 Double Span Bar Length (continued)

			External Bay					Internal Bay				
			Ultimate Total UDL kN	Ultimate Total UDL kN Uplift Restraint(s)			Working Load to Produce Deflection	Ultimate Total UDL kN	Ultimate Total UDL kN Uplift Restraint(s)			Working Load to Produce Deflection
Span (m)	Section	Weight (kg/m)	Gravity	No	One	Two	Span/180 kN	Gravity	No	One	Two	Span/180 kN
8.0	M175065120	3.02	9.14	-	8.61	9.14	4.89	12.38	-	11.65	12.38	10.19
	M175065130	3.29	10.68	-	9.98	10.68	5.27	14.39	-	13.46	14.39	10.99
	M175065140	3.52	12.27	-	11.38	12.27	5.65	16.47	-	15.29	16.47	11.78
	M175065150	3.79	13.79	-	12.74	13.79	6.03	18.46	-	17.06	18.46	12.56
	M175065160	4.05	15.20	-	14.01	15.20	6.39	20.30	-	18.71	20.30	13.33
	M175065180	4.55	18.32	-	16.75	18.32	7.12	24.38	-	22.30	24.38	14.83
	M175065200	5.08	21.08	-	19.23	21.08	7.82	27.98	-	25.53	27.98	16.29
	M175065220	5.56	23.88	-	21.70	23.88	8.50	31.64	-	28.75	31.64	17.71
	M175065250	6.35	27.86	-	25.24	27.86	9.48	36.82	-	33.37	36.82	19.76
	M205605120	3.29	10.90	-	10.06	10.90	7.07	14.54	-	13.41	14.54	14.74
	M205605130	3.58	12.74	-	11.68	12.74	7.63	16.94	-	15.53	16.94	15.89
	M205605140	3.84	14.62	-	13.34	14.62	8.18	19.41	-	17.71	19.41	17.04
	M205605150	4.13	16.54	-	15.04	16.54	8.71	21.91	-	19.92	21.91	18.17
	M205605160	4.41	18.46	-	16.74	18.46	9.25	24.42	-	22.14	24.42	19.27
	M205605170	4.67	20.38	-	18.18	20.38	9.78	26.92	-	24.02	26.92	20.39
	M205605180	4.96	21.91	-	19.65	21.91	10.29	28.92	-	25.94	28.92	21.45
	M205605200	5.53	25.32	-	22.18	25.32	11.30	33.37	-	29.24	33.37	23.55
	M205605220	6.05	28.71	-	24.90	28.71	12.29	37.79	-	32.77	37.79	25.61
	M205605250	6.91	33.55	-	28.70	33.55	13.70	44.11	-	37.72	44.11	28.56
	M205605270	7.49	36.66	-	31.11	36.66	14.61	48.17	-	40.88	48.17	30.45
	M235065130	3.86	15.29	-	13.95	15.29	10.51	20.06	-	18.31	20.06	21.91
	M235065140	4.14	17.57	-	15.94	17.57	11.27	23.03	-	20.90	23.03	23.49
	M235065150	4.45	19.86	-	17.98	19.86	12.01	26.03	-	23.56	26.03	25.04
	M235065160	4.76	22.15	-	20.58	22.15	12.74	29.01	-	26.96	29.01	26.56
	M235065170	5.04	24.26	-	21.88	24.26	13.46	31.76	-	28.64	31.76	28.06
	M235065180	5.35	26.46	-	24.06	26.46	14.18	34.63	-	31.48	34.63	29.55
	M235065200	5.97	30.52	-	27.38	30.52	15.56	39.93	-	35.82	39.93	32.45
	M235065220	6.53	34.67	-	32.65	34.67	16.92	45.34	-	42.70	45.34	35.28
	M235065250	7.46	40.58	-	38.10	40.58	18.87	53.04	-	49.80	53.04	39.34
	M235065270	8.08	44.39	-	41.63	44.39	20.11	58.02	-	54.42	58.02	41.93
8.5	M205605120	3.29	10.29	-	7.96	10.29	6.26	13.82	-	10.69	13.82	13.05
	M205605130	3.58	12.02	-	9.26	12.02	6.75	16.08	-	12.39	16.08	14.08
	M205605140	3.84	13.80	-	10.59	13.80	7.24	18.41	-	14.14	18.41	15.10
	M205605150	4.13	15.60	-	11.94	15.60	7.72	20.77	-	15.90	20.77	16.09
	M205605160	4.41	17.40	-	13.31	17.40	8.19	23.12	-	17.68	23.12	17.07
	M205605170	4.67	19.20	-	14.46	19.20	8.68	25.48	-	19.18	25.48	18.06
	M205605180	4.96	20.64	-	15.61	20.64	9.11	27.35	-	20.67	27.35	19.00
	M205605200	5.53	23.84	-	17.65	23.67	10.01	31.54	-	23.33	31.31	20.86
	M205605220	6.05	27.03	-	19.82	26.52	10.88	35.69	-	26.17	35.02	22.69
	M205605250	6.91	31.57	-	22.89	30.54	12.14	41.62	-	30.18	40.26	25.30
	M205605270	7.49	34.48	-	24.85	33.10	12.94	45.43	-	32.73	43.60	26.97
	M235065130	3.86	14.45	-	11.05	14.45	9.31	19.09	-	14.60	19.09	19.41
	M235065140	4.14	16.59	-	12.64	16.59	9.98	21.89	-	16.68	21.89	20.81
	M235065150	4.45	18.76	-	14.26	18.76	10.64	24.72	-	18.79	24.72	22.18
	M235065160	4.76	20.90	-	16.38	20.90	11.29	27.51	-	21.56	27.51	23.53
	M235065170	5.04	22.89	-	17.39	22.89	11.92	30.11	-	22.87	30.11	24.86
	M235065180	5.35	24.96	-	19.14	24.96	12.56	32.81	-	25.17	32.81	26.18
	M235065200	5.97	28.76	-	21.81	28.76	13.79	37.77	-	28.64	37.77	28.74
	M235065220	6.53	32.67	-	26.18	32.67	14.99	42.87	-	34.36	42.87	31.25
	M235065250	7.46	38.21	-	30.63	38.21	16.72	50.10	-	40.15	50.10	34.84
	M235065270	8.08	41.79	-	33.52	41.79	17.82	54.77	-	43.92	54.77	37.14
	M265065140	4.46	19.24	-	14.57	19.24	13.26	25.08	-	19.01	25.08	27.64
	M265065150	4.79	22.13	-	16.56	22.13	14.13	28.85	-	21.60	28.85	29.46
	M265065160	5.13	24.28	-	18.37	24.28	14.99	31.67	-	23.95	31.67	31.24
	M265065180	5.76	29.33	-	22.24	29.33	16.67	38.24	-	28.99	38.24	34.76
	M265065200	6.43	33.98	-	25.49	33.98	18.30	44.32	-	33.24	44.32	38.15
	M265065220	7.03	38.48	-	29.53	38.48	19.90	50.18	-	38.51	50.18	41.48
	M265065250	8.03	45.72	-	33.95	45.57	22.18	59.63	-	44.28	59.43	46.23
	M265065270	8.70	50.05	-	37.20	49.74	23.63	65.27	-	48.52	64.87	49.27

Note: The following load / span tables show the ultimate loads to comply with Eurocode BS EN 1993-1-3 + UK NAD.

Multibeam Purlins Continuous System (Heavy End Bay) - all joints sleeved

Table 1:15 Double Span Bar Length (continued)

			External Bay					Internal Bay				
Span (m)	Section	Weight (kg/m)	Ultimate Total UDL kN Gravity	Ultimate Total UDL kN Uplift Restraint(s) No	One	Two	Working Load to Produce Deflection Span/180 kN	Ultimate Total UDL kN Gravity	Ultimate Total UDL kN Uplift Restraint(s) No	One	Two	Working Load to Produce Deflection Span/180 kN
9.0	M205605120	3.29	9.75	-	6.37	8.78	5.59	13.17	-	8.61	11.86	11.64
	M205605130	3.58	11.38	-	7.42	10.18	6.02	15.30	-	9.98	13.70	12.56
	M205605140	3.84	13.05	-	8.50	11.62	6.46	17.50	-	11.39	15.58	13.47
	M205605150	4.13	14.75	-	9.59	13.08	6.88	19.72	-	12.82	17.49	14.35
	M205605160	4.41	16.45	-	10.68	14.55	7.30	21.95	-	14.26	19.41	15.23
	M205605170	4.67	18.15	-	11.61	15.79	7.73	24.17	-	15.46	21.02	16.11
	M205605180	4.96	19.50	-	12.51	16.97	8.13	25.94	-	16.63	22.57	16.95
	M205605200	5.53	22.52	-	14.17	19.16	8.93	29.87	-	18.79	25.43	18.61
	M205605220	6.05	25.52	-	15.93	21.50	9.71	33.80	-	21.09	28.48	20.24
	M205605250	6.91	29.80	-	18.42	24.80	10.83	39.38	-	24.35	32.79	22.57
	M205605270	7.49	32.54	-	20.03	26.92	11.54	42.97	-	26.44	35.54	24.06
	M235065130	3.86	13.70	-	8.86	12.18	8.31	18.20	-	11.76	16.18	17.31
	M235065140	4.14	15.71	-	10.13	13.91	8.90	20.84	-	13.44	18.45	18.56
	M235065150	4.45	17.76	-	11.44	15.67	9.49	23.52	-	15.15	20.75	19.78
	M235065160	4.76	19.78	-	13.15	18.06	10.07	26.15	-	17.40	23.88	20.99
	M235065170	5.04	21.65	-	13.96	19.00	10.64	28.60	-	18.44	25.09	22.17
	M235065180	5.35	23.61	-	15.39	21.03	11.20	31.15	-	20.30	27.76	23.35
	M235065200	5.97	27.19	-	17.54	23.76	12.30	35.83	-	23.11	31.31	25.64
	M235065220	6.53	30.87	-	21.15	28.34	13.37	40.63	-	27.85	37.31	27.88
	M235065250	7.46	36.09	-	24.79	33.07	14.91	47.45	-	32.59	43.47	31.08
	M235065270	8.08	39.47	-	27.16	36.11	15.89	51.85	-	35.69	47.45	33.13
	M265065140	4.46	18.24	-	11.67	16.07	11.83	23.93	-	15.32	21.09	24.66
	M265065150	4.79	20.97	-	13.28	18.21	12.60	27.50	-	17.41	23.87	26.27
	M265065160	5.13	23.00	-	14.73	20.13	13.37	30.15	-	19.31	26.39	27.87
	M265065180	5.76	27.77	-	17.86	24.40	14.87	36.36	-	23.38	31.95	31.00
	M265065200	6.43	32.15	-	20.48	27.82	16.32	42.08	-	26.82	36.41	34.03
	M265065220	7.03	36.39	-	23.77	32.12	17.75	47.61	-	31.10	42.03	37.00
	M265065250	8.03	43.21	-	27.33	36.91	19.78	56.52	-	35.75	48.28	41.24
	M265065270	8.70	47.29	-	29.86	40.33	21.08	61.84	-	39.05	52.74	43.95

			External Bay			Internal Bay		
Span (m)	Section	Weight (kg/m)	Ultimate Total UDL kN Gravity	Ultimate Total UDL kN Uplift Restraint(s) Three Restraints	Working Load to Produce Deflection Span/180 kN	Ultimate Total UDL kN Gravity	Ultimate Total UDL kN Uplift Restraint(s) Three Restraints	Working Load to Produce Deflection Span/180 kN
9.5	M235065130	3.86	13.01	11.16	7.46	17.39	14.67	15.54
	M235065140	4.14	14.92	12.75	7.99	19.88	16.72	16.66
	M235065150	4.45	16.85	14.36	8.52	22.41	18.81	17.76
	M235065160	4.76	18.76	15.95	9.03	24.91	20.87	18.83
	M235065170	5.04	20.53	17.42	9.55	27.23	22.77	19.90
	M235065180	5.35	22.37	18.96	10.05	29.63	24.77	20.96
	M235065200	5.97	25.76	21.78	11.04	34.07	28.42	23.01
	M235065220	6.53	29.24	25.27	12.00	38.60	32.95	25.02
	M235065250	7.46	34.17	29.50	13.38	45.05	38.41	27.89
	M235065270	8.08	37.36	32.23	14.26	49.21	41.95	29.74
	M265065140	4.46	17.33	14.74	10.61	22.87	19.17	22.13
	M265065150	4.79	19.91	16.80	11.31	26.24	21.84	23.58
	M265065160	5.13	21.84	18.48	12.00	28.76	24.01	25.01
	M265065180	5.76	26.34	22.29	13.35	34.64	28.95	27.83
	M265065200	6.43	30.49	25.59	14.65	40.05	33.22	30.54
	M265065220	7.03	34.49	29.19	15.93	45.28	37.88	33.21
	M265065250	8.03	40.95	34.12	17.75	53.70	44.26	37.01
	M265065270	8.70	44.79	37.32	18.92	58.73	48.38	39.45

Load / Span Tables

Note: The following load / span tables show the ultimate loads to comply with Eurocode BS EN 1993-1-3 + UK NAD.

Multibeam Purlins Continuous System (Heavy End Bay) - all joints sleeved

Table 1:15 Double Span Bar Length (continued)

			External Bay			Internal Bay		
Span (m)	Section	Weight (kg/m)	Ultimate Total UDL kN Gravity	Ultimate Total UDL kN Uplift Restraint(s) Three Restraints	Working Load to Produce Deflection Span/180 kN	Ultimate Total UDL kN Gravity	Ultimate Total UDL kN Uplift Restraint(s) Gravity	Working Load to Produce Deflection Span/180 kN
10.0	M235065130	3.86	12.37	10.70	6.73	16.62	14.10	14.02
	M235065140	4.14	14.19	12.21	7.21	19.00	16.06	15.03
	M235065150	4.45	16.02	13.74	7.69	21.40	18.05	16.02
	M235065160	4.76	17.83	15.26	8.16	23.77	20.01	17.00
	M235065170	5.04	19.51	16.66	8.61	25.97	21.82	17.96
	M235065180	5.35	21.26	18.12	9.07	28.25	23.71	18.91
	M235065200	5.97	24.47	20.81	9.96	32.45	27.20	20.77
	M235065220	6.53	27.76	24.13	10.83	36.75	31.50	22.58
	M235065250	7.46	32.44	28.16	12.08	42.86	36.70	25.18
	M235065270	8.08	35.46	30.76	12.87	46.81	40.06	26.84
	M265065140	4.46	16.50	14.12	9.58	21.88	18.42	19.97
	M265065150	4.79	18.95	16.08	10.21	25.09	20.97	21.28
	M265065160	5.13	20.78	17.68	10.83	27.47	23.04	22.58
	M265065180	5.76	25.04	21.31	12.05	33.05	27.74	25.11
	M265065200	6.43	28.98	24.45	13.22	38.19	31.80	27.56
	M265065220	7.03	32.77	27.88	14.38	43.15	36.24	29.97
	M265065250	8.03	38.89	32.57	16.02	51.14	42.30	33.40
	M265065270	8.70	42.54	35.61	17.08	55.91	46.23	35.60
10.5	M235065130	3.86	11.79	10.28	6.10	15.92	13.58	12.72
	M235065140	4.14	13.51	11.72	6.54	18.18	15.45	13.64
	M235065150	4.45	15.26	13.18	6.97	20.46	17.35	14.53
	M235065160	4.76	16.98	14.63	7.39	22.72	19.22	15.42
	M235065170	5.04	18.57	15.96	7.82	24.81	20.95	16.29
	M235065180	5.35	20.24	17.36	8.23	26.99	22.75	17.15
	M235065200	5.97	23.29	19.93	9.04	30.96	26.07	18.84
	M235065220	6.53	26.42	23.10	9.82	35.06	30.18	20.48
	M235065250	7.46	30.86	26.94	10.96	40.87	35.14	22.83
	M235065270	8.08	33.73	29.43	11.68	44.61	38.35	24.34
	M265065140	4.46	15.74	13.56	8.69	20.97	17.75	18.11
	M265065150	4.79	18.07	15.44	9.26	24.02	20.17	19.31
	M265065160	5.13	19.80	16.96	9.82	26.29	22.14	20.47
	M265065180	5.76	23.86	20.42	10.93	31.59	26.63	22.78
	M265065200	6.43	27.59	23.42	11.99	36.48	30.50	25.00
	M265065220	7.03	31.21	26.68	13.04	41.19	34.73	27.18
	M265065250	8.03	37.01	31.16	14.53	48.79	40.52	30.29
	M265065270	8.70	40.48	34.06	15.49	53.32	44.27	32.2
11.0	M265065140	4.46	15.04	13.04	7.92	20.12	17.11	16.50
	M265065150	4.79	17.26	14.83	8.44	23.03	19.44	17.59
	M265065160	5.13	18.91	16.29	8.95	25.19	21.32	18.66
	M265065180	5.76	22.77	19.60	9.95	30.25	25.61	20.76
	M265065200	6.43	26.32	22.47	10.93	34.90	29.32	22.78
	M265065220	7.03	29.77	25.60	11.88	39.39	33.36	24.77
	M265065250	8.03	35.30	29.89	13.24	46.64	38.90	27.60
	M265065270	8.70	38.60	32.66	14.11	50.95	42.47	29.42

Note: The following load / span tables show the ultimate loads to comply with Eurocode BS EN 1993-1-3 + UK NAD.

Multibeam Purlins Continuous System (Heavy End Bay) - all joints sleeved

Table 1:16 Single Span Bar Length

			External Bay					Internal Bay				
			Ultimate Total UDL kN	Ultimate Total UDL kN Uplift Restraint(s)			Working Load to Produce Deflection	Ultimate Total UDL kN	Ultimate Total UDL kN Uplift Restraint(s)			Working Load to Produce Deflection
Span (m)	Section	Weight (kg/m)	Gravity	No	One	Two	Span/180 kN	Gravity	No	One	Two	Span/180 kN
6.0	M175065120	3.02	12.52	12.52	12.52	12.52	8.69	16.41	16.41	16.41	16.41	18.11
	M175065130	3.29	14.67	14.67	14.67	14.67	9.37	19.22	19.22	19.22	19.22	19.54
	M175065140	3.52	16.90	16.90	16.90	16.90	10.05	22.12	22.12	22.12	22.12	20.95
	M175065150	3.79	19.15	19.15	19.15	19.15	10.71	25.06	25.06	25.06	25.06	22.33
	M175065160	4.05	21.42	21.42	21.42	21.42	11.37	28.01	28.01	28.01	28.01	23.69
	M175065180	4.55	25.88	25.88	25.88	25.88	12.65	33.82	33.82	33.82	33.82	26.37
	M175065200	5.08	30.13	30.13	30.13	30.13	13.89	39.36	39.36	39.36	39.36	28.96
	M175065220	5.56	34.18	34.18	34.18	34.18	15.11	44.64	44.64	44.64	44.64	31.49
	M175065250	6.35	39.96	39.96	39.96	39.96	16.85	52.17	52.17	52.17	52.17	35.13
	M205065120	3.29	15.30	15.30	15.30	15.30	12.57	19.65	19.65	19.65	19.65	26.20
	M205065130	3.58	17.96	17.96	17.96	17.96	13.56	23.11	23.11	23.11	23.11	28.26
	M205065140	3.84	20.70	20.70	20.70	20.70	14.53	26.67	26.67	26.67	26.67	30.30
	M205065150	4.13	23.48	23.48	23.48	23.48	15.49	30.28	30.28	30.28	30.28	32.30
	M205065160	4.41	26.27	26.27	26.27	26.27	16.44	33.91	33.91	33.91	33.91	34.26
	M205065170	4.67	29.05	29.05	29.05	29.05	17.39	37.53	37.53	37.53	37.53	36.26
	M205065180	4.96	31.78	31.78	31.78	31.78	18.29	41.08	41.08	41.08	41.08	38.13
	M205065200	5.53	37.05	37.05	37.05	37.05	20.09	47.94	47.94	47.94	47.94	41.87
	M205065220	6.05	42.08	42.08	42.08	42.08	21.84	54.50	54.50	54.50	54.50	45.53
	M205065250	6.91	49.31	49.31	49.31	49.31	24.36	63.91	63.91	63.91	63.91	50.78
	M205065270	7.49	53.95	53.95	53.95	53.95	25.97	69.96	69.96	69.96	69.96	54.14
	M235065130	3.86	21.35	18.56	21.35	21.35	18.69	26.96	23.43	26.96	26.96	38.95
	M235065140	4.14	24.65	21.38	24.65	24.65	20.03	31.22	27.09	31.22	31.22	41.76
	M235065150	4.45	27.98	24.19	27.98	27.98	21.35	35.55	30.74	35.55	35.55	44.51
	M235065160	4.76	31.33	27.08	31.33	31.33	22.65	39.90	34.49	39.90	39.90	47.22
	M235065170	5.04	34.67	29.87	34.67	34.67	23.93	44.23	38.12	44.23	44.23	49.89
	M235065180	5.35	37.95	32.68	37.95	37.95	25.20	48.50	41.77	48.50	48.50	52.54
	M235065200	5.97	44.31	38.13	44.31	44.31	27.67	56.78	48.86	56.78	56.78	57.68
	M235065220	6.53	50.41	45.55	50.41	50.41	30.09	64.72	58.48	64.72	64.72	62.72
	M235065250	7.46	59.17	53.40	59.17	59.17	33.55	76.14	68.71	76.14	76.14	69.93
	M235065270	8.08	64.84	58.51	64.84	64.84	35.76	83.53	75.37	83.53	83.53	74.55
6.5	M175065120	3.02	11.65	11.65	11.65	11.65	7.40	15.42	15.42	15.42	15.42	15.43
	M175065130	3.29	13.64	13.64	13.64	13.64	7.99	18.02	18.02	18.02	18.02	16.65
	M175065140	3.52	15.69	15.69	15.69	15.69	8.56	20.70	20.70	20.70	20.70	17.85
	M175065150	3.79	17.77	17.77	17.77	17.77	9.13	23.41	23.41	23.41	23.41	19.03
	M175065160	4.05	19.86	19.86	19.86	19.86	9.68	26.14	26.14	26.14	26.14	20.19
	M175065180	4.55	23.98	23.98	23.98	23.98	10.78	31.51	31.51	31.51	31.51	22.47
	M175065200	5.08	27.90	27.90	27.90	27.90	11.84	36.61	36.61	36.61	36.61	24.68
	M175065220	5.56	31.64	31.64	31.64	31.64	12.87	41.48	41.48	41.48	41.48	26.83
	M175065250	6.35	36.95	36.95	36.95	36.95	14.36	48.41	48.41	48.41	48.41	29.93
	M205065120	3.29	14.28	14.28	14.28	14.28	10.71	18.55	18.55	18.55	18.55	22.33
	M205065130	3.58	16.74	16.74	16.74	16.74	11.55	21.76	21.76	21.76	21.76	24.08
	M205065140	3.84	19.27	19.27	19.27	19.27	12.38	25.04	25.04	25.04	25.04	25.82
	M205065150	4.13	21.83	21.83	21.83	21.83	13.20	28.39	28.39	28.39	28.39	27.52
	M205065160	4.41	24.41	24.41	24.41	24.41	14.00	31.73	31.73	31.73	31.73	29.19
	M205065170	4.67	26.98	26.98	26.98	26.98	14.82	35.08	35.08	35.08	35.08	30.89
	M205065180	4.96	29.49	29.49	29.49	29.49	15.58	38.35	38.35	38.35	38.35	32.49
	M205065200	5.53	34.35	34.33	34.35	34.35	17.12	44.68	44.66	44.68	44.68	35.68
	M205065220	6.05	38.99	38.45	38.99	38.99	18.61	50.73	50.02	50.73	50.73	38.80
	M205065250	6.91	45.64	44.25	45.64	45.64	20.76	59.40	57.59	59.40	59.40	43.27
	M205065270	7.49	49.92	47.94	49.92	49.92	22.13	64.97	62.40	64.97	64.97	46.13
	M235065130	3.86	19.95	13.72	19.95	19.95	15.92	25.49	17.52	25.49	25.49	33.19
	M235065140	4.14	22.99	15.81	22.99	22.99	17.07	29.43	20.24	29.43	29.43	35.59
	M235065150	4.45	26.07	17.89	26.07	26.07	18.19	33.44	22.95	33.44	33.44	37.93
	M235065160	4.76	29.16	20.05	29.16	29.16	19.30	37.45	25.75	37.45	37.45	40.23
	M235065170	5.04	32.24	22.13	32.24	32.24	20.39	41.46	28.45	41.46	41.46	42.51
	M235065180	5.35	35.27	24.22	35.27	35.27	21.47	45.40	31.17	45.40	45.40	44.77
	M235065200	5.97	41.13	28.29	41.13	41.13	23.58	53.03	36.47	53.03	53.03	49.15
	M235065220	6.53	46.75	34.02	46.75	46.75	25.64	60.35	43.92	60.35	60.35	53.44
	M235065250	7.46	54.83	39.98	54.83	54.83	28.58	70.88	51.69	70.88	70.88	59.58
	M235065270	8.08	60.05	43.88	60.05	60.05	30.47	77.68	56.76	77.68	77.68	63.52

Load / Span Tables

Note: The following load / span tables show the ultimate loads to comply with Eurocode BS EN 1993-1-3 + UK NAD.

Multibeam Purlins Continuous System (Heavy End Bay) - all joints sleeved

Table 1:16 Single Span Bar Length (continued)

			External Bay					Internal Bay				
Span (m)	Section	Weight (kg/m)	Ultimate Total UDL kN Gravity	Ultimate Total UDL kN Uplift Restraint(s) No	One	Two	Working Load to Produce Deflection Span/180 kN	Ultimate Total UDL kN Gravity	Ultimate Total UDL kN Uplift Restraint(s) No	One	Two	Working Load to Produce Deflection Span/180 kN
7.0	M175065120	3.02	10.89	9.20	10.89	10.89	6.38	14.53	12.28	14.53	14.53	13.31
	M175065130	3.29	12.73	10.72	12.73	12.73	6.88	16.95	14.27	16.95	16.95	14.35
	M175065140	3.52	14.64	12.29	14.64	14.64	7.38	19.44	16.31	19.44	19.44	15.39
	M175065150	3.79	16.57	13.90	16.57	16.57	7.87	21.96	18.41	21.96	21.96	16.41
	M175065160	4.05	18.51	15.49	18.51	18.51	8.35	24.49	20.50	24.49	24.49	17.41
	M175065180	4.55	22.32	18.66	22.32	22.32	9.29	29.47	24.63	29.47	29.47	19.37
	M175065200	5.08	25.96	21.63	25.96	25.96	10.21	34.21	28.50	34.21	34.21	21.28
	M175065220	5.56	29.42	24.51	29.42	29.42	11.10	38.72	32.26	38.72	38.72	23.14
	M175065250	6.35	34.35	28.60	34.35	34.35	12.38	45.14	37.58	45.14	45.14	25.81
	M205065120	3.29	13.38	11.28	13.38	13.38	9.23	17.55	14.81	17.55	17.55	19.25
	M205065130	3.58	15.66	13.15	15.66	15.66	9.96	20.52	17.23	20.52	20.52	20.76
	M205065140	3.84	18.01	15.11	18.01	18.01	10.68	23.59	19.78	23.59	23.59	22.26
	M205065150	4.13	20.39	17.05	20.39	20.39	11.38	26.69	22.31	26.69	26.69	23.73
	M205065160	4.41	22.78	19.02	22.78	22.78	12.08	29.80	24.89	29.80	29.80	25.17
	M205065170	4.67	25.17	20.66	25.17	25.17	12.78	32.91	27.03	32.91	32.91	26.64
	M205065180	4.96	27.49	22.90	27.49	27.49	13.44	35.95	29.94	35.95	35.95	28.01
	M205065200	5.53	32.00	26.05	32.00	32.00	14.76	41.82	34.05	41.82	41.82	30.76
	M205065220	6.05	36.30	29.21	36.30	36.30	16.05	47.43	38.17	47.43	47.43	33.45
	M205065250	6.91	42.46	33.71	42.46	42.46	17.90	55.46	44.02	55.46	55.46	37.31
	M205065270	7.49	46.42	36.56	46.42	46.42	19.08	60.63	47.74	60.63	60.63	39.77
	M235065130	3.86	18.70	10.35	15.65	18.70	13.73	24.14	13.35	20.20	24.14	28.62
	M235065140	4.14	21.53	11.92	17.94	21.53	14.72	27.81	15.40	23.18	27.81	30.68
	M235065150	4.45	24.39	13.50	20.31	24.39	15.69	31.53	17.45	26.26	31.53	32.70
	M235065160	4.76	27.26	15.13	22.93	27.26	16.64	35.26	19.57	29.67	35.26	34.69
	M235065170	5.04	30.11	16.70	25.00	30.11	17.58	38.98	21.62	32.35	38.98	36.65
	M235065180	5.35	32.92	18.28	27.32	32.92	18.52	42.64	23.68	35.38	42.64	38.60
	M235065200	5.97	38.36	21.37	31.78	38.36	20.33	49.72	27.71	41.19	49.72	42.38
	M235065220	6.53	43.58	25.79	38.01	43.58	22.10	56.51	33.45	49.29	56.51	46.08
	M235065250	7.46	51.06	30.37	44.51	51.06	24.65	66.26	39.41	57.77	66.26	51.38
	M235065270	8.08	55.90	33.36	48.70	55.90	26.27	72.58	43.32	63.24	72.58	54.77
7.5	M175065120	3.02	10.21	7.07	10.21	10.21	5.56	13.73	9.50	13.73	13.73	11.59
	M175065130	3.29	11.93	8.24	11.93	11.93	6.00	15.98	11.04	15.98	15.98	12.50
	M175065140	3.52	13.71	9.46	13.71	13.71	6.43	18.31	12.62	18.31	18.31	13.41
	M175065150	3.79	15.51	10.70	15.51	15.51	6.86	20.66	14.26	20.66	20.66	14.29
	M175065160	4.05	17.32	11.94	17.32	17.32	7.27	23.03	15.88	23.03	23.03	15.16
	M175065180	4.55	20.87	14.40	20.87	20.87	8.10	27.67	19.09	27.67	27.67	16.88
	M175065200	5.08	24.26	16.73	24.26	24.26	8.89	32.09	22.12	32.09	32.09	18.54
	M175065220	5.56	27.48	18.98	27.48	27.48	9.67	36.29	25.05	36.29	36.29	20.16
	M175065250	6.35	32.07	22.18	32.07	32.07	10.78	42.27	29.23	42.27	42.27	22.48
	M205065120	3.29	12.57	8.66	12.57	12.57	8.04	16.64	11.47	16.64	16.64	16.77
	M205065130	3.58	14.70	10.10	14.70	14.70	8.68	19.19	13.34	19.41	19.41	18.09
	M205065140	3.84	16.89	11.62	16.89	16.89	9.30	22.28	15.32	22.28	22.28	19.39
	M205065150	4.13	19.11	13.12	19.11	19.11	9.91	25.17	17.27	25.17	25.17	20.67
	M205065160	4.41	21.34	14.65	21.34	21.34	10.52	28.07	19.28	28.07	28.07	21.93
	M205065170	4.67	23.57	15.92	23.57	23.57	11.13	30.98	20.93	30.98	30.98	23.21
	M205065180	4.96	25.73	17.59	25.73	25.73	11.70	33.81	23.11	33.81	33.81	24.40
	M205065200	5.53	29.93	20.02	29.93	29.93	12.86	39.29	26.27	39.29	39.29	26.80
	M205065220	6.05	33.95	22.47	33.95	33.95	13.98	44.51	29.47	44.51	44.51	29.14
	M205065250	6.91	39.68	25.97	39.68	39.68	15.59	52.00	34.04	52.00	52.00	32.50
	M205065270	7.49	43.37	28.21	43.37	43.37	16.62	56.81	36.95	56.81	56.81	34.65
	M235065130	3.86	17.60	7.96	17.60	17.60	11.96	22.90	10.36	22.90	22.90	24.93
	M235065140	4.14	20.23	9.17	20.23	20.23	12.82	26.33	11.93	26.33	26.33	26.73
	M235065150	4.45	22.89	10.38	22.89	22.89	13.66	29.80	13.52	29.80	29.80	28.49
	M235065160	4.76	25.57	11.63	25.57	25.57	14.50	33.29	15.14	33.29	33.29	30.22
	M235065170	5.04	28.24	12.84	28.24	28.24	15.32	36.76	16.72	36.76	36.76	31.93
	M235065180	5.35	30.86	14.06	30.86	30.86	16.13	40.18	18.31	40.18	40.18	33.62
	M235065200	5.97	35.93	16.45	35.93	35.93	17.71	46.78	21.41	46.78	46.78	36.92
	M235065220	6.53	40.78	19.86	40.78	40.78	19.26	53.11	25.86	53.11	53.11	40.14
	M235065250	7.46	47.75	23.41	47.75	47.75	21.47	62.20	30.50	62.20	62.20	44.76
	M235065270	8.08	52.25	25.75	52.25	52.25	22.89	68.07	33.54	68.07	68.07	47.71

Note: The following load / span tables show the ultimate loads to comply with Eurocode BS EN 1993-1-3 + UK NAD.

Multibeam Purlins Continuous System (Heavy End Bay) - all joints sleeved

Table 1:16 Single Span Bar Length (continued)

			External Bay					Internal Bay				
Span (m)	Section	Weight (kg/m)	Ultimate Total UDL kN Gravity	Ultimate Total UDL kN Uplift Restraint(s) No	One	Two	Working Load to Produce Deflection Span/180 kN	Ultimate Total UDL kN Gravity	Ultimate Total UDL kN Uplift Restraint(s) No	One	Two	Working Load to Produce Deflection Span/180 kN
8.0	M175065120	3.02	9.60	-	9.03	9.60	4.89	12.99	-	12.22	12.99	10.19
	M175065130	3.29	11.22	-	10.48	11.22	5.27	15.10	-	14.12	15.10	10.99
	M175065140	3.52	12.88	-	11.95	12.88	5.65	17.29	-	16.04	17.29	11.78
	M175065150	3.79	14.57	-	13.46	14.57	6.03	19.50	-	18.02	19.50	12.56
	M175065160	4.05	16.26	-	14.98	16.26	6.39	21.71	-	20.01	21.71	13.33
	M175065180	4.55	19.58	-	17.91	19.58	7.12	26.06	-	23.83	26.06	14.83
	M175065200	5.08	23.07	-	20.76	23.07	7.82	30.19	-	27.54	30.19	16.29
	M175065220	5.56	25.77	-	23.42	25.77	8.50	34.13	-	31.02	34.13	17.71
	M175065250	6.35	30.06	-	27.24	30.06	9.48	39.73	-	36.00	39.73	19.76
	M205065120	3.29	11.85	-	10.93	11.85	7.07	15.79	-	14.57	15.79	14.74
	M205065130	3.58	13.84	-	12.70	13.84	7.63	18.40	-	16.87	18.40	15.89
	M205065140	3.84	15.90	-	14.50	15.90	8.18	21.08	-	19.24	21.08	17.04
	M205065150	4.13	17.98	-	16.34	17.98	8.71	23.80	-	21.64	23.80	18.17
	M205065160	4.41	20.06	-	18.19	20.06	9.25	26.52	-	24.05	26.52	19.27
	M205065170	4.67	22.14	-	19.75	22.14	9.78	29.24	-	26.09	29.24	20.39
	M205065180	4.96	24.18	-	21.69	24.18	10.29	31.90	-	28.61	31.90	21.45
	M205065200	5.53	28.10	-	24.63	28.10	11.30	37.02	-	32.45	37.02	23.55
	M205065220	6.05	31.86	-	27.62	31.86	12.29	41.91	-	36.34	41.91	25.61
	M205065250	6.91	37.22	-	31.84	37.22	13.70	48.92	-	41.83	48.92	28.56
	M205065270	7.49	40.68	-	34.52	40.68	14.61	53.42	-	45.34	53.42	30.45
	M235065130	3.86	16.59	-	15.14	16.59	10.51	21.76	-	19.86	21.76	21.91
	M235065140	4.14	19.06	-	17.30	19.06	11.27	24.98	-	22.68	24.98	23.49
	M235065150	4.45	21.56	-	19.51	21.56	12.01	28.24	-	25.55	28.24	25.04
	M235065160	4.76	24.06	-	22.37	24.06	12.74	31.50	-	29.28	31.50	26.56
	M235065170	5.04	26.56	-	23.95	26.56	13.46	34.76	-	31.34	34.76	28.06
	M235065180	5.35	29.02	-	26.38	29.02	14.18	37.96	-	34.50	37.96	29.55
	M235065200	5.97	33.76	-	30.29	33.76	15.56	44.14	-	39.61	44.14	32.45
	M235065220	6.53	38.30	-	36.07	38.30	16.92	50.07	-	47.15	50.07	35.28
	M235065250	7.46	44.82	-	42.09	44.82	18.87	58.58	-	55.00	58.58	39.34
	M235065270	8.08	49.04	-	46.00	49.04	20.11	64.07	-	60.10	64.07	41.93
8.5	M205065120	3.29	11.19	-	11.19	11.19	6.26	15.02	-	15.02	15.02	13.05
	M205065130	3.58	13.07	-	10.07	13.07	6.75	17.48	-	13.46	17.48	14.08
	M205065140	3.84	15.00	-	11.52	15.00	7.24	20.00	-	15.36	20.00	15.10
	M205065150	4.13	16.96	-	12.99	16.96	7.72	22.56	-	17.28	22.56	16.09
	M205065160	4.41	18.91	-	14.47	18.91	8.19	25.12	-	19.21	25.12	17.07
	M205065170	4.67	20.88	-	15.71	20.88	8.67	27.68	-	20.83	27.68	18.06
	M205065180	4.96	22.79	-	17.22	22.79	9.11	30.18	-	22.81	30.18	19.00
	M205065200	5.53	26.48	-	19.59	26.28	10.01	34.99	-	25.90	34.74	20.86
	M205065220	6.05	30.00	-	22.00	29.44	10.88	39.59	-	29.04	38.85	22.69
	M205065250	6.91	35.04	-	25.41	33.90	12.14	46.16	-	33.47	44.66	25.30
	M205065270	7.49	38.28	-	27.58	36.73	12.94	50.39	-	36.31	48.36	26.97
	M235065130	3.86	15.69	-	12.00	15.69	9.31	20.71	-	15.84	20.71	19.41
	M235065140	4.14	18.01	-	13.73	18.01	9.98	23.75	-	18.10	23.75	20.81
	M235065150	4.45	20.37	-	15.49	20.37	10.64	26.82	-	20.39	26.82	22.18
	M235065160	4.76	22.72	-	17.80	22.72	11.29	29.89	-	23.42	29.89	23.53
	M235065170	5.04	25.07	-	19.04	25.07	11.92	32.95	-	25.03	32.95	24.86
	M235065180	5.35	27.37	-	21.00	27.37	12.56	35.96	-	27.59	35.96	26.18
	M235065200	5.97	31.83	-	24.13	31.83	13.79	41.78	-	31.67	41.78	28.74
	M235065220	6.53	36.10	-	28.93	36.10	14.99	47.35	-	37.94	47.35	31.25
	M235065250	7.46	42.22	-	33.84	42.22	16.72	55.34	-	44.34	55.34	34.84
	M235065270	8.08	46.18	-	37.03	46.18	17.82	60.49	-	48.51	60.49	37.14
	M265065140	4.46	21.16	-	16.02	21.16	13.26	27.57	-	20.88	27.57	27.64
	M265065150	4.79	23.93	-	17.91	23.93	14.13	31.19	-	23.34	31.19	29.46
	M265065160	5.13	26.71	-	20.20	26.71	14.99	34.81	-	26.32	34.81	31.24
	M265065180	5.76	32.19	-	24.40	32.19	16.67	41.96	-	31.81	41.96	34.76
	M265065200	6.43	37.46	-	28.11	37.46	18.30	48.83	-	36.64	48.83	38.15
	M265065220	7.03	42.53	-	32.63	42.53	19.90	55.43	-	42.54	55.43	41.48
	M265065250	8.03	49.81	-	36.99	49.65	22.18	64.93	-	48.22	64.72	46.23
	M265065270	8.70	54.53	-	40.53	54.19	23.63	71.09	-	52.84	70.65	49.27

Load / Span Tables

Note: The following load / span tables show the ultimate loads to comply with Eurocode BS EN 1993-1-3 + UK NAD.

Multibeam Purlins Continuous System (Heavy End Bay) - all joints sleeved

Table 1:16 Single Span Bar Length (continued)

			External Bay					Internal Bay				
Span (m)	Section	Weight (kg/m)	Ultimate Total UDL kN Gravity	Ultimate Total UDL kN Uplift Restraint(s) No	One	Two	Working Load to Produce Deflection Span/180 kN	Ultimate Total UDL kN Gravity	Ultimate Total UDL kN Uplift Restraint(s) No	One	Two	Working Load to Produce Deflection Span/180 kN
9.0	M205065120	3.29	10.60	-	6.94	9.55	5.59	14.31	-	9.36	12.90	11.64
	M205065130	3.58	12.38	-	8.07	11.08	6.02	16.63	-	10.85	14.89	12.56
	M205065140	3.84	14.19	-	9.23	12.64	6.46	19.02	-	12.38	16.93	13.47
	M205065150	4.13	16.04	-	10.42	14.22	6.88	21.43	-	13.92	19.01	14.35
	M205065160	4.41	17.88	-	11.62	15.82	7.30	23.85	-	15.49	21.10	15.23
	M205065170	4.67	19.73	-	12.62	17.15	7.73	26.26	-	16.79	22.83	16.11
	M205065180	4.96	21.54	-	13.82	18.74	8.13	28.62	-	18.36	24.90	16.95
	M205065200	5.53	25.01	-	15.73	21.29	8.93	33.17	-	20.86	28.22	18.61
	M205065220	6.05	28.33	-	17.69	23.88	9.71	37.49	-	23.40	31.59	20.24
	M205065250	6.91	33.08	-	20.46	27.54	10.83	43.70	-	27.02	36.38	22.57
	M205065270	7.49	36.14	-	22.23	29.88	11.54	47.67	-	29.33	39.43	24.06
	M235065130	3.86	14.88	-	9.61	13.22	8.31	19.76	-	12.77	17.56	17.31
	M235065140	4.14	17.06	-	11.01	15.10	8.90	22.62	-	14.58	20.02	18.56
	M235065150	4.45	19.28	-	12.42	17.01	9.49	25.52	-	16.43	22.51	19.78
	M235065160	4.76	21.50	-	14.30	19.63	10.07	28.42	-	18.90	25.95	20.99
	M235065170	5.04	23.72	-	15.29	20.81	10.64	31.31	-	20.19	27.48	22.17
	M235065180	5.35	25.89	-	16.88	23.08	11.20	34.15	-	22.27	30.44	23.35
	M235065200	5.97	30.10	-	19.41	26.30	12.30	39.64	-	25.57	34.64	25.64
	M235065220	6.53	34.12	-	23.38	31.33	13.37	44.88	-	30.76	41.21	27.88
	M235065250	7.46	39.89	-	27.41	36.55	14.91	52.42	-	36.01	48.02	31.08
	M235065270	8.08	43.61	-	30.02	39.91	15.89	57.28	-	39.43	52.42	33.13
	M265065140	4.46	20.06	-	12.84	17.68	11.83	26.31	-	16.84	23.18	24.66
	M265065150	4.79	22.68	-	14.36	19.69	12.60	29.72	-	18.82	25.80	26.27
	M265065160	5.13	25.30	-	16.20	22.14	13.37	33.14	-	21.22	29.01	27.87
	M265065180	5.76	30.47	-	19.60	26.78	14.87	39.89	-	25.65	35.06	31.00
	M265065200	6.43	35.45	-	22.59	30.67	16.32	46.38	-	29.56	40.13	34.03
	M265065220	7.03	40.22	-	26.28	35.51	17.75	52.61	-	34.37	46.44	37.00
	M265065250	8.03	47.09	-	29.78	40.22	19.78	61.56	-	38.94	52.59	41.24
	M265065270	8.70	51.53	-	32.54	43.95	21.08	67.36	-	42.53	57.45	43.95

			External Bay			Internal Bay		
Span (m)	Section	Weight (kg/m)	Ultimate Total UDL kN Gravity	Ultimate Total UDL kN Uplift Restraint(s) Three Restraints	Working Load to Produce Deflection Span/180 kN	Ultimate Total UDL kN Gravity	Ultimate Total UDL kN Uplift Restraint(s) Three Restraints	Working Load to Produce Deflection Span/180 kN
9.5	M205065130	3.58	11.73	10.10	5.41	15.86	13.40	11.27
	M205065140	3.84	13.46	11.52	5.80	18.12	15.25	12.09
	M205065150	4.13	15.20	12.98	6.18	20.40	17.14	12.88
	M205065160	4.41	16.95	14.43	6.56	22.69	19.02	13.67
	M205065170	4.67	18.70	15.88	6.94	24.98	20.90	14.46
	M205065180	4.96	20.41	17.30	7.30	27.20	22.74	15.21
	M205065200	5.53	23.69	20.05	8.01	31.50	26.30	16.70
	M205065220	6.05	26.83	22.66	8.71	35.60	29.68	18.16
	M205065250	6.91	31.31	26.42	9.72	41.46	34.53	20.25
	M205065270	7.49	34.20	28.84	10.36	45.22	37.66	21.59
	M235065130	3.86	14.13	12.07	7.46	18.87	15.86	15.54
	M235065140	4.14	16.20	13.78	7.99	21.58	18.09	16.66
	M235065150	4.45	18.30	15.52	8.52	24.32	20.34	17.76
	M235065160	4.76	20.41	17.26	9.03	27.08	22.60	18.83
	M235065170	5.04	22.50	18.99	9.55	29.81	24.84	19.90
	M235065180	5.35	24.56	20.70	10.05	32.50	27.06	20.96
	M235065200	5.97	28.53	24.01	11.04	37.69	31.33	23.01
	M235065220	6.53	32.33	27.15	12.00	42.66	35.42	25.02
	M235065250	7.46	37.78	31.70	13.38	49.77	41.29	27.89
	M235065270	8.08	41.31	34.65	14.26	54.37	45.10	29.74
	M265065140	4.46	19.07	16.14	10.61	25.15	21.00	22.13
	M265065150	4.79	21.55	18.18	11.31	28.38	23.65	23.58
	M265065160	5.13	24.03	20.24	12.00	31.62	26.31	25.01
	M265065180	5.76	28.92	24.27	13.35	38.01	31.54	27.83
	M265065200	6.43	33.62	28.17	14.65	44.15	36.58	30.54
	M265065220	7.03	38.13	31.90	15.93	50.03	41.41	33.21
	M265065250	8.03	44.63	37.29	17.75	58.50	48.39	37.01
	M265065270	8.70	48.82	40.77	18.92	63.98	52.91	39.45

Note: The following load / span tables show the ultimate loads to comply with Eurocode BS EN 1993-1-3 + UK NAD.

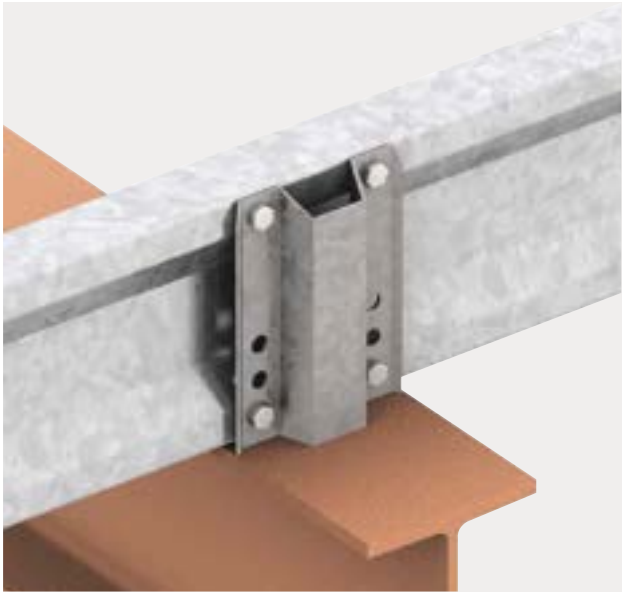
Multibeam Purlins Continuous System (Heavy End Bay) - all joints sleeved

Table 1:16 Single Span Bar Length (continued)

			External Bay			Internal Bay		
Span (m)	Section	Weight (kg/m)	Ultimate Total UDL kN Gravity	Ultimate Total UDL kN Uplift Restraint(s) Three Restraints	Working Load to Produce Deflection Span/180 kN	Ultimate Total UDL kN Gravity	Ultimate Total UDL kN Uplift Restraint(s) Three Restraints	Working Load to Produce Deflection Span/180 kN
10.0	M235065130	3.86	13.44	11.56	6.73	18.05	15.24	14.02
	M235065140	4.14	15.41	13.19	7.21	20.62	17.36	15.03
	M235065150	4.45	17.40	14.85	7.69	23.23	19.51	16.02
	M235065160	4.76	19.40	16.51	8.16	25.84	21.66	17.00
	M235065170	5.04	21.38	18.16	8.61	28.44	23.80	17.96
	M235065180	5.35	23.34	19.78	9.07	30.99	25.90	18.91
	M235065200	5.97	27.10	22.92	9.96	35.91	29.97	20.77
	M235065220	6.53	30.71	25.93	10.83	40.62	33.85	22.58
	M235065250	7.46	35.88	30.25	12.08	47.37	39.45	25.18
	M235065270	8.08	39.21	33.05	12.87	51.73	43.06	26.84
	M265065140	4.46	18.16	15.46	9.58	24.07	20.18	19.97
	M265065150	4.79	20.51	17.40	10.21	27.14	22.71	21.28
	M265065160	5.13	22.86	19.36	10.83	30.21	25.23	22.58
	M265065180	5.76	27.51	23.20	12.05	36.28	30.22	25.11
	M265065200	6.43	31.97	26.91	13.22	42.10	35.02	27.56
	M265065220	7.03	36.25	30.46	14.38	47.69	39.61	29.97
	M265065250	8.03	42.40	35.59	16.02	55.72	46.24	33.40
	M265065270	8.70	46.37	38.91	17.08	60.91	50.54	35.60
10.5	M235065130	3.86	12.82	11.10	6.10	17.28	14.67	12.72
	M235065140	4.14	14.69	12.65	6.54	19.74	16.70	13.64
	M235065150	4.45	16.58	14.24	6.97	22.22	18.74	14.53
	M235065160	4.76	18.48	15.82	7.39	24.71	20.80	15.42
	M235065170	5.04	20.37	17.40	7.82	27.17	22.84	16.29
	M235065180	5.35	22.22	18.94	8.23	29.60	24.85	17.15
	M235065200	5.97	25.80	21.95	9.04	34.28	28.73	18.84
	M235065220	6.53	29.23	24.81	9.82	38.76	32.43	20.48
	M235065250	7.46	34.14	28.94	10.96	45.17	37.77	22.83
	M235065270	8.08	37.31	31.61	11.68	49.32	41.21	24.34
	M265065140	4.46	17.33	14.84	8.69	23.07	19.43	18.11
	M265065150	4.79	19.56	16.70	9.26	25.99	21.84	19.31
	M265065160	5.13	21.80	18.55	9.82	28.92	24.26	20.47
	M265065180	5.76	26.22	22.23	10.93	34.69	29.01	22.78
	M265065200	6.43	30.45	25.77	11.99	40.23	33.58	25.00
	M265065220	7.03	34.52	29.15	13.04	45.54	37.96	27.18
	M265065250	8.03	40.36	34.04	14.53	53.17	44.29	30.29
	M265065270	8.70	44.14	37.21	15.49	58.11	48.38	32.29
11.0	M265065140	4.46	16.56	14.27	7.92	22.13	18.73	16.50
	M265065150	4.79	18.69	16.05	8.44	24.93	21.03	17.59
	M265065160	5.13	20.82	17.83	8.95	27.71	23.34	18.66
	M265065180	5.76	25.03	21.34	9.95	33.22	27.90	20.76
	M265065200	6.43	29.06	24.72	10.93	38.50	32.26	22.78
	M265065220	7.03	32.93	27.96	11.88	43.56	36.45	24.77
	M265065250	8.03	38.50	32.64	13.24	50.83	42.50	27.60
	M265065270	8.70	42.10	35.67	14.11	55.53	46.41	29.42

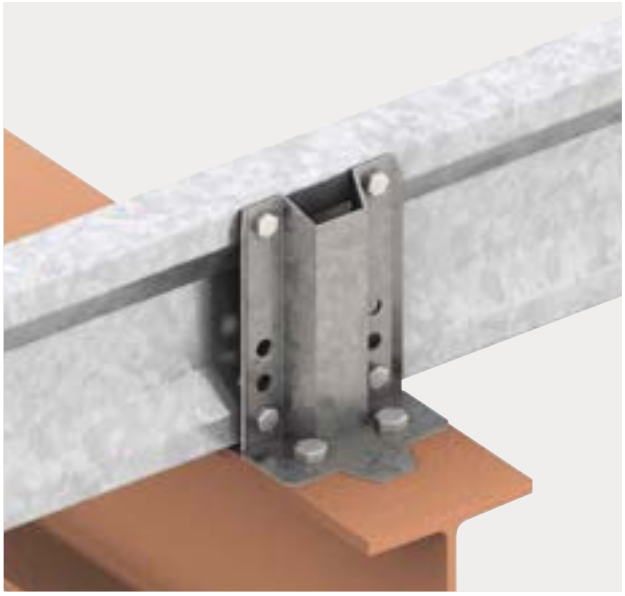
Construction Details

Weld-on Multicleat



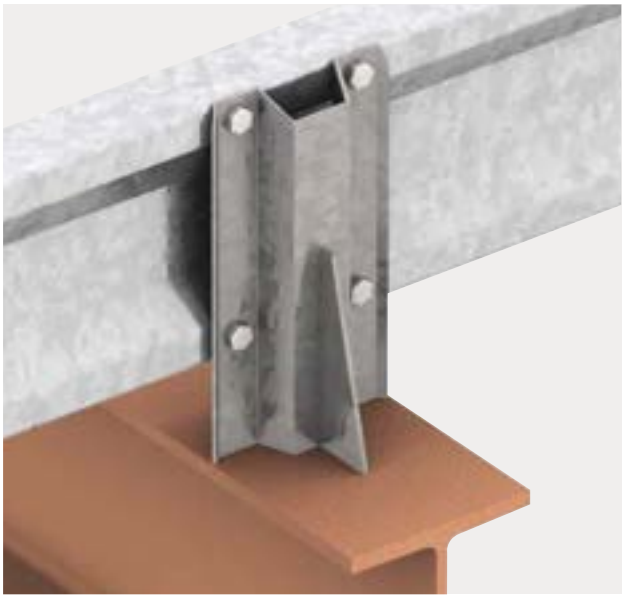
For product dimensions refer to page 19.

Bolt-on Multicleat



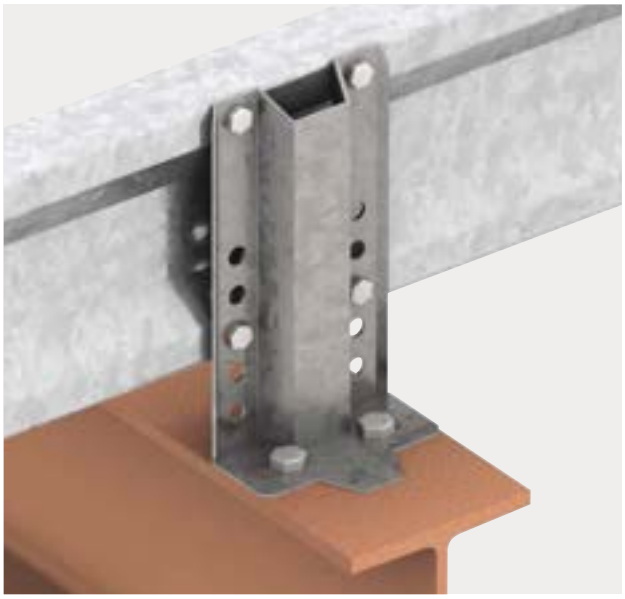
For product dimensions refer to page 20.

Stiffened Extended Cleat*



For product dimensions refer to page 21.

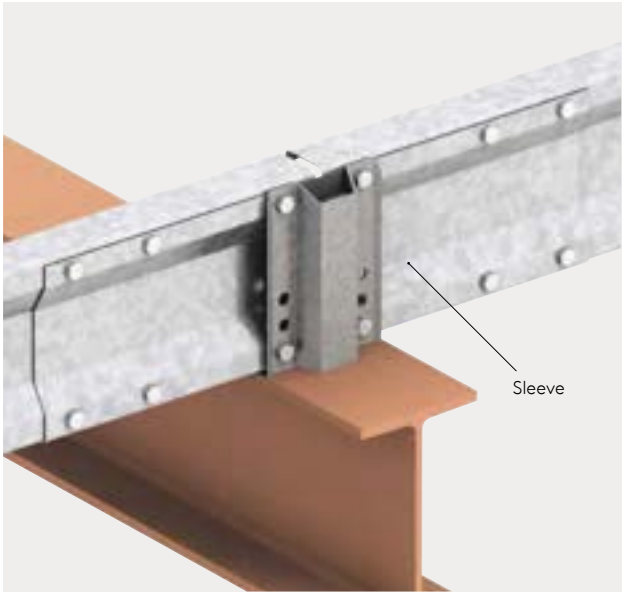
Multicleat with Raised Section*

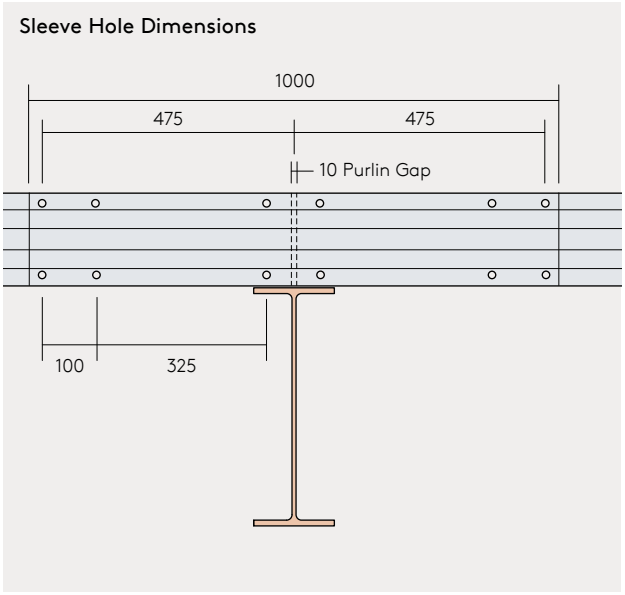


For product dimensions refer to page 20.

* Available in weld or bolt-on variations.

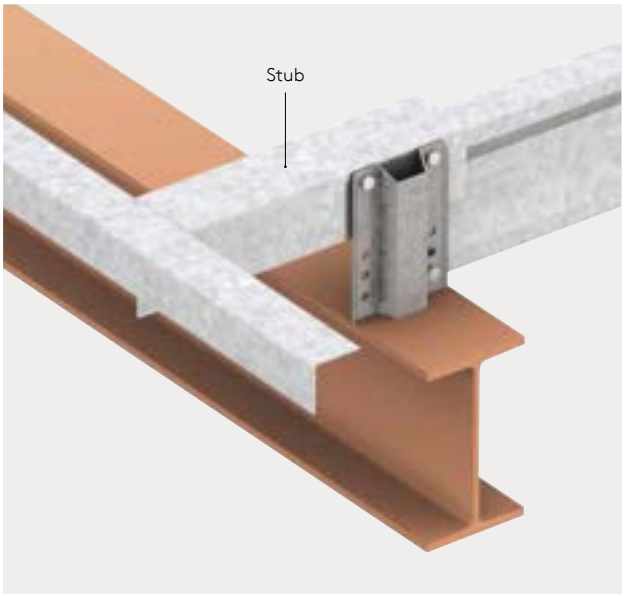
Purlin Sleeve

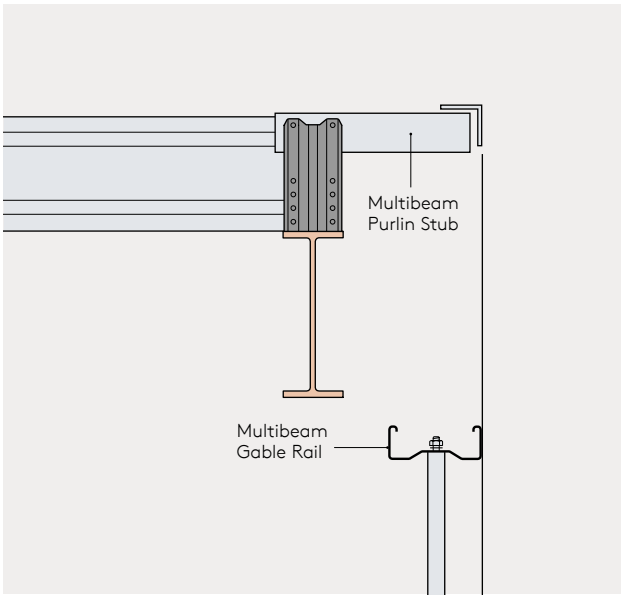




For product dimensions refer to page 22.

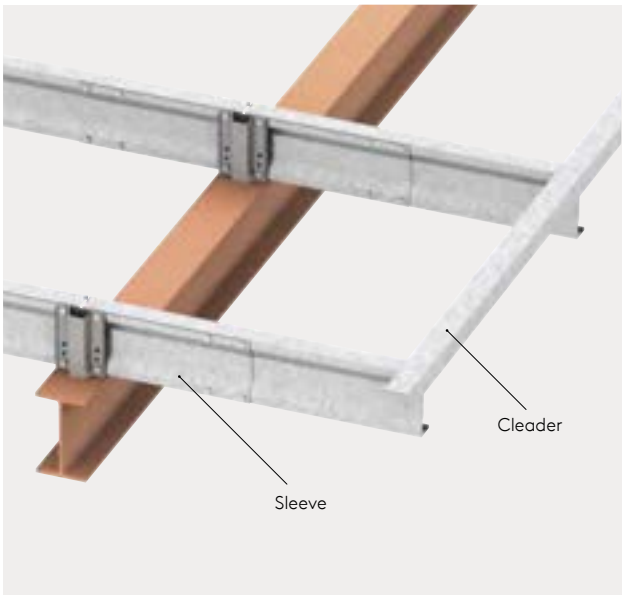
Cantilever with Stub



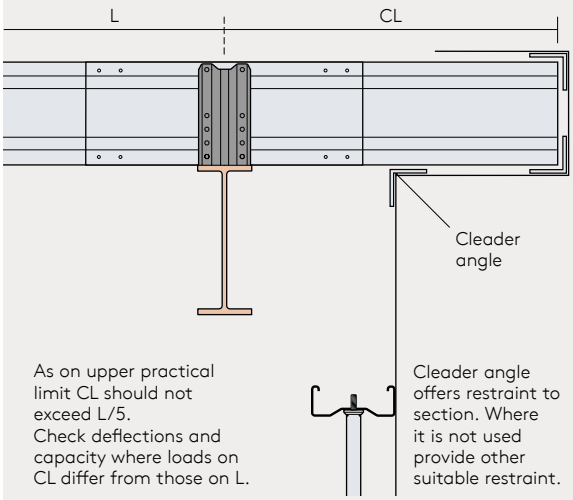


Construction Details

Cantilevered Purlin with Sleeve

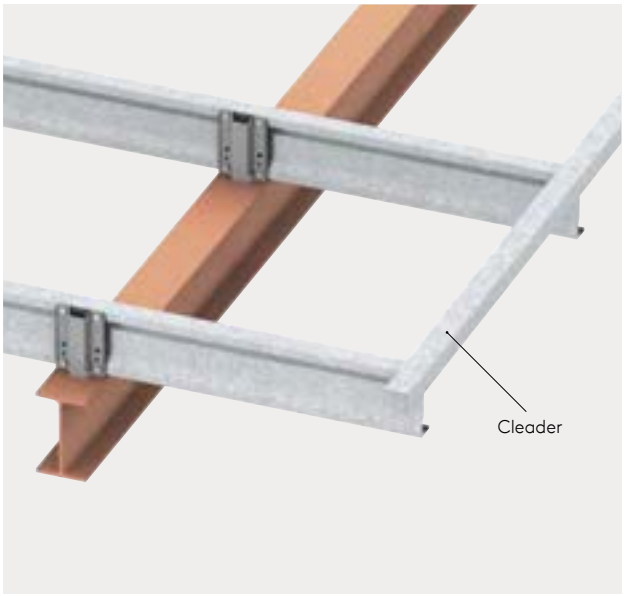


Cantilever sleeved to purlin

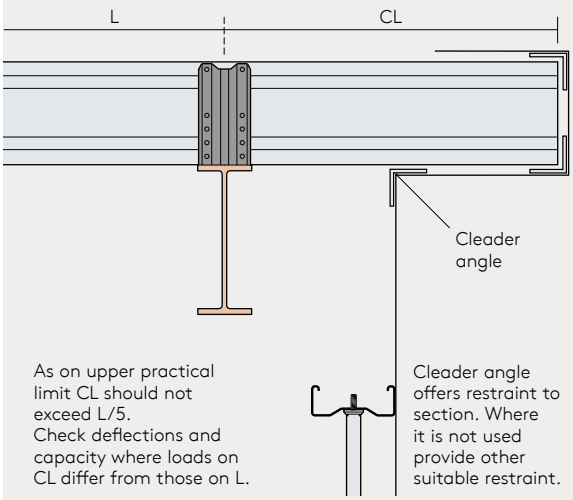


For product dimensions refer to pages 22 and 25.

Cantilevered Purlin without Sleeve

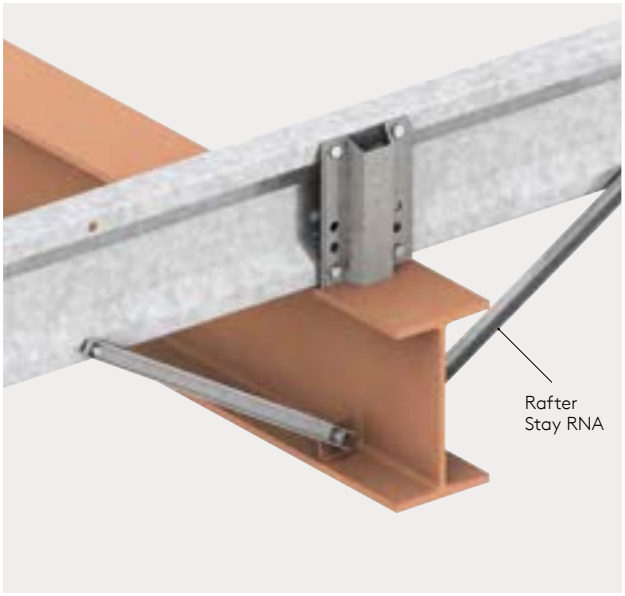


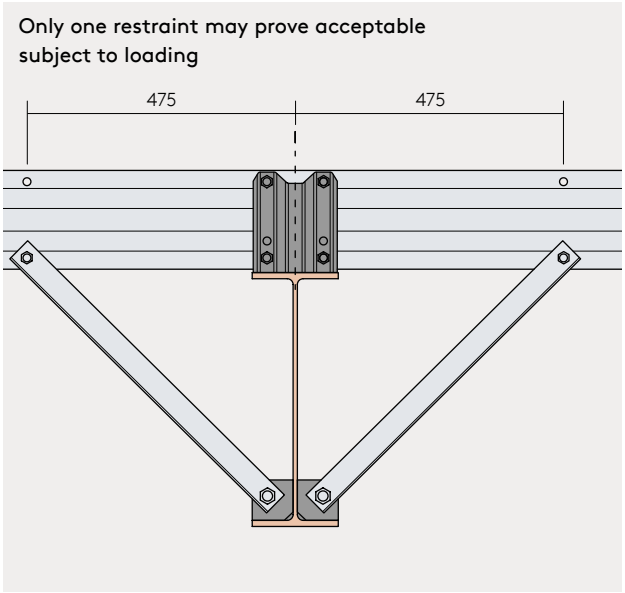
Purlin continuous onto cantilever



For product dimensions refer to page 25.

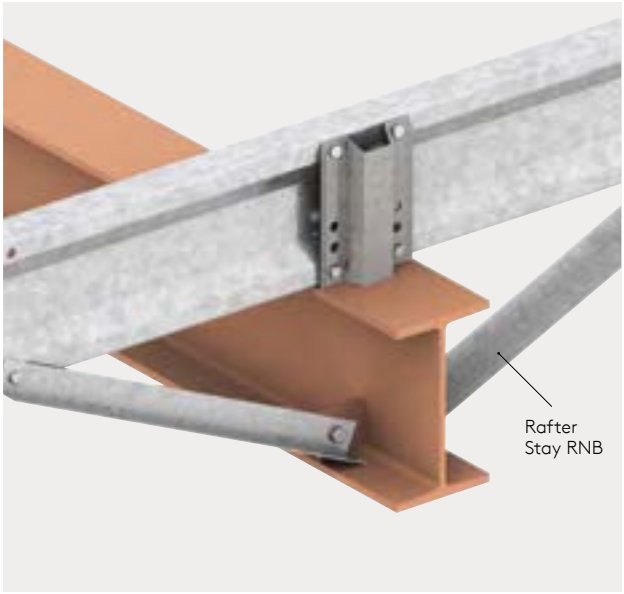
Rafter Stay Type RNA

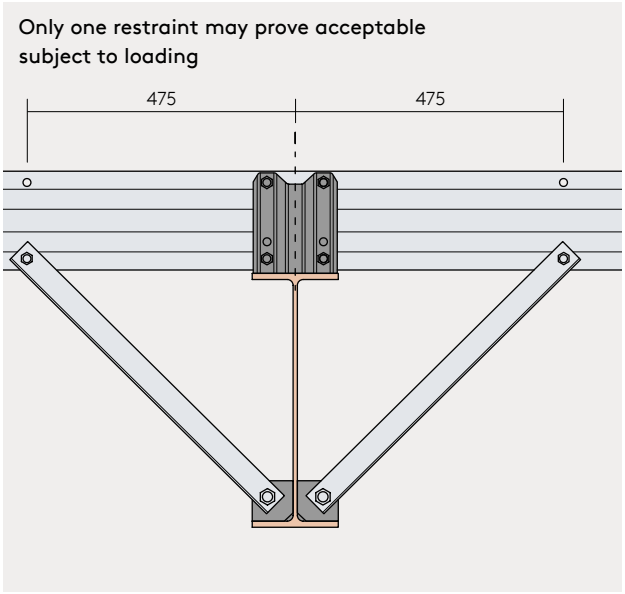




For product dimensions refer to page 24.

Rafter Stay Type RNB

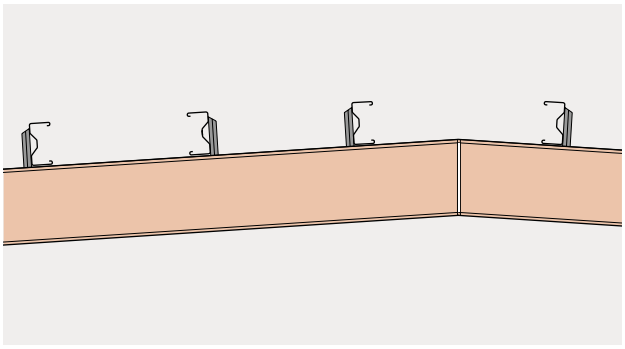




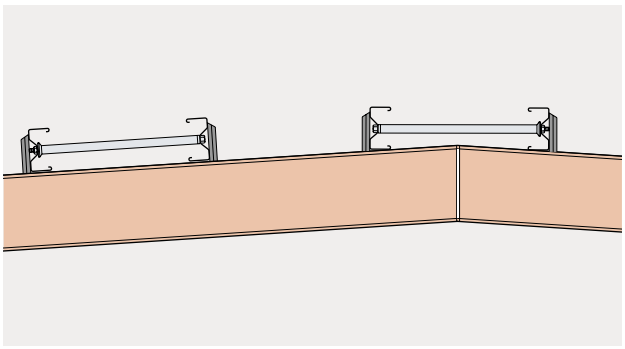
For product dimensions refer to page 24.

Construction Details

Flat Roof, Shallow Pitch Purlin Arrangement 3˚ or less Toe to Toe, No Restraints as Table 1:5 (Page 17)

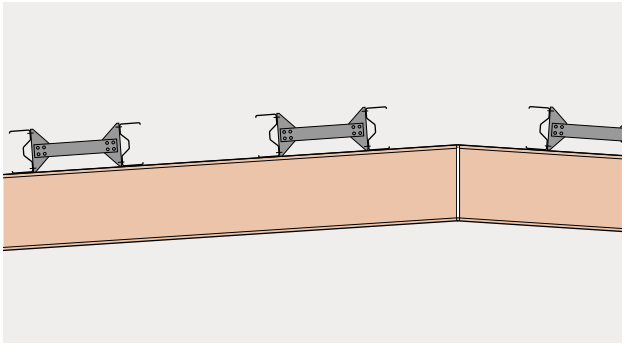


Toe to Toe, Restraints between Alternate Pairs (TSA Type) Restraints as Table 1:5



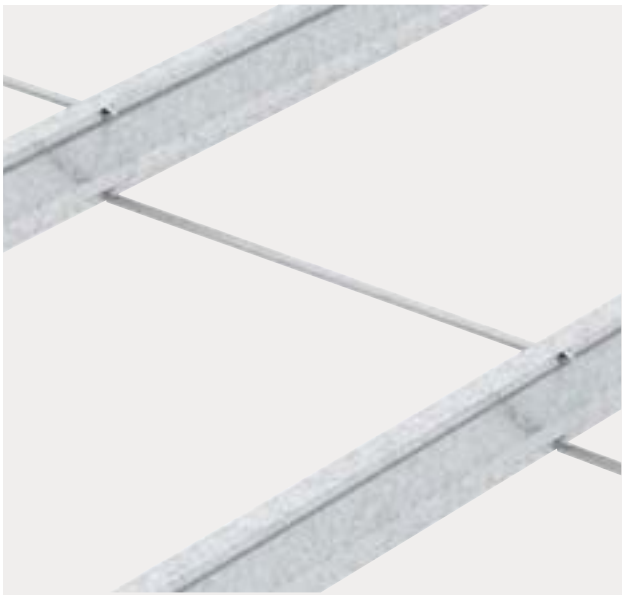
For product dimensions refer to page 23.

Heel to Heel, Restraints between Alternate Pairs (SWF Type) Restraints as Table 1:5



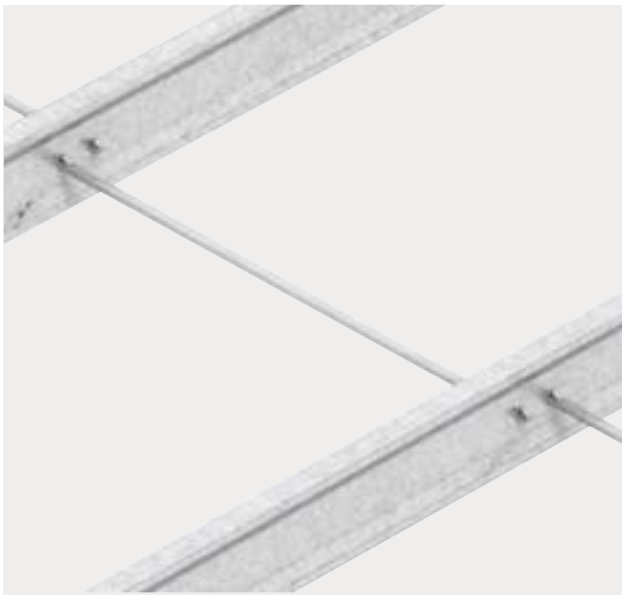
For product dimensions refer to page 23.

Multilok Tie for M145 Section



For product dimensions refer to page 23.

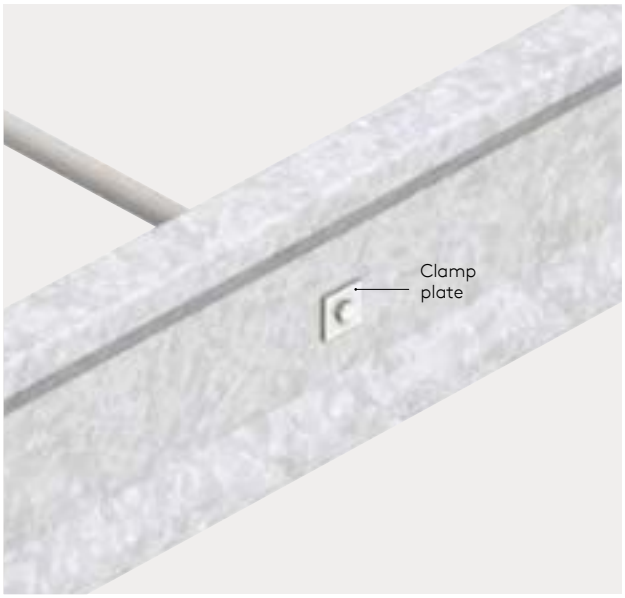
Multilok Tie for M175 and M205 Sections



Tubular Tie

For product dimensions refer to page 23.

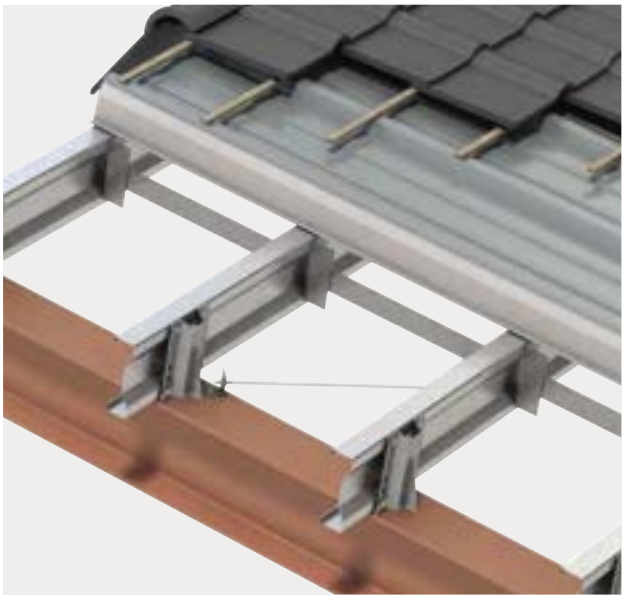
Tubular Tie Termination of Restraint



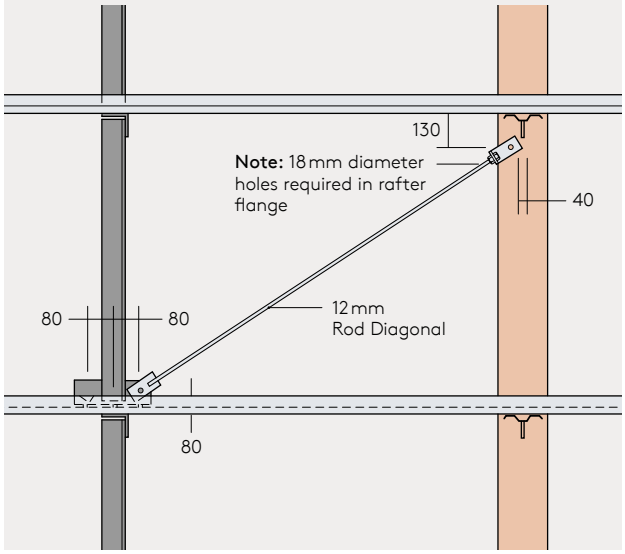
Clamp plate fixes and completes run of tube struts

Construction Details

Tiled Roofs



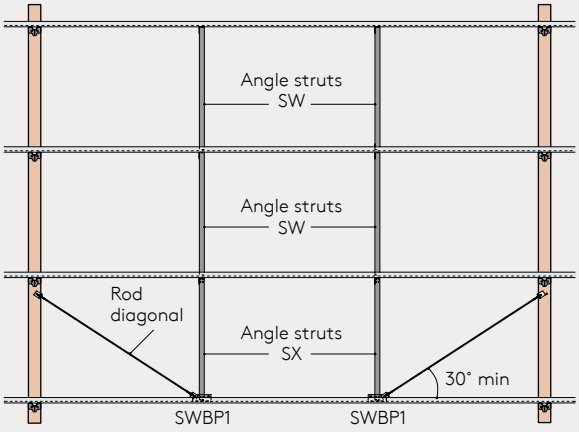
Rod Diagonal for Tiled Roof



For product dimensions refer to pages 24 and 25.
For system layout see page 16.

Tiled Roof System Layout

Tiled Roof – Restraints at 1/3 points

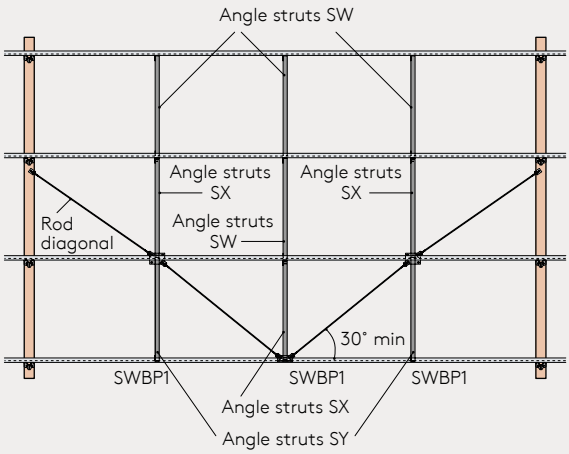


1 set of diagonals required per 6m length of roof slope.

For M205 sections and above adopt arrangement as shown. For M145 and M175 sections please consult our Technical Department.

For product dimensions refer to pages 24 and 25.

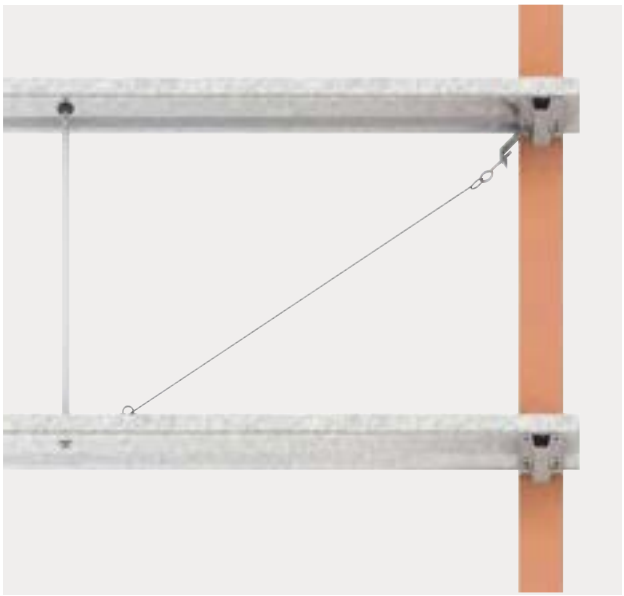
Tiled Roof – Restraints at 1/4 points

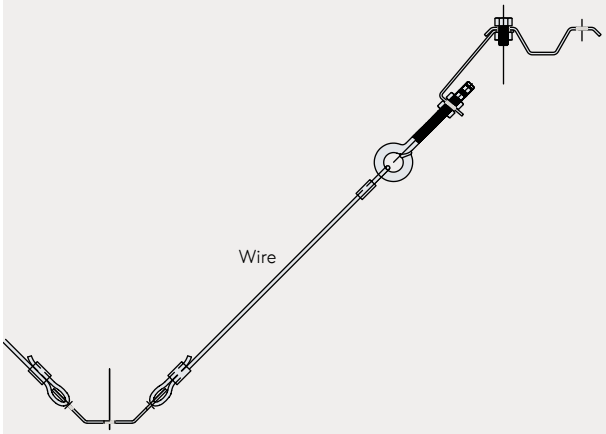


1 set of diagonals required per 6m length of roof slope.

For M205 sections and above adopt arrangement as shown. For M145 and M175 sections please consult our Technical Department.

Diagonal Tie Wire - Roof

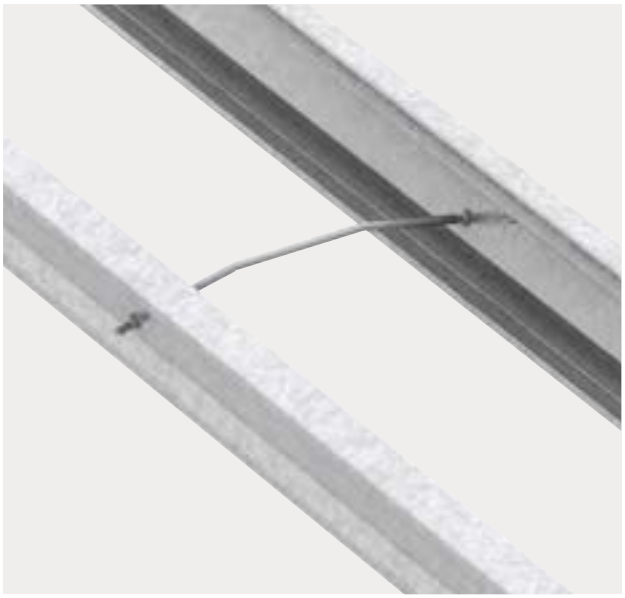




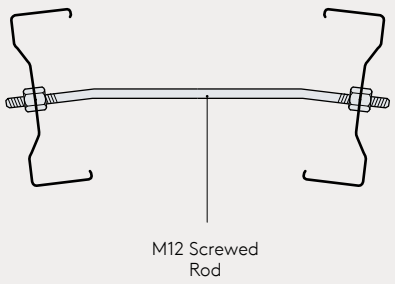
Diagonal Tie Wire Assembly

For product dimensions refer to page 25.

Apex Restraint



Screwed rod apex ties are used in conjunction with both Multilok and Tubular ties.



For product dimensions refer to page 23.

Eaves Beams


Haulotte

Product Overview

The Eaves Beam system incorporates a full range of cleats, brackets and struts providing solutions for all eave conditions. The economy and practicality of the Eaves Beam system complements Multibeam and Multichannel, providing a complete cladding support system.

Applications

- Intersection between roof and wall cladding
- Double, monopitch, mansard, curved or flat roof applications
- Roof Slopes from -6° to +30°
- Internal or external gutter arrangements

Material Specification

Hot dip galvanised steel to BS EN 10346 and BS EN 10143 'specifications for continuously hot dip zinc /metal coated structural steel strip'. The minimum grade of steel used is S450GD, with Z275 zinc coating, giving an average coating thickness of 0.02mm to each side. Other coatings maybe available (G600 / Magnelis).
Please contact our Sales Team for advice.

Connections

We recomend washers are fitted under both the bolt head and nut.

Simplify your eaves beam design - use the toolkit design software.

Range

- Section heights are available in 185mm, 215mm and 265mm
- Top flange 85mm, bottom flange 93mm
- Gauges from 1.63mm to 2.45mm

For full product dimensions see page 56.

Lengths

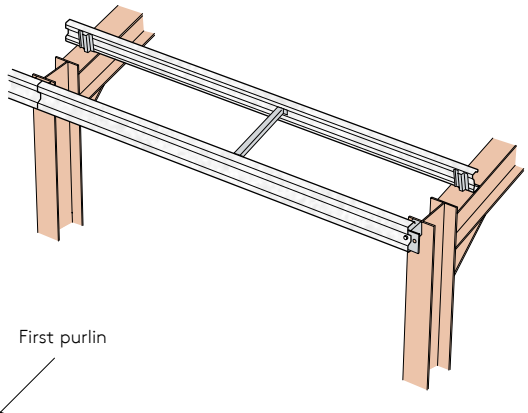
Bar lengths up to 12m in length are possible subject to minimum volumes, contact sales or customer service for further details.

Restraint Systems

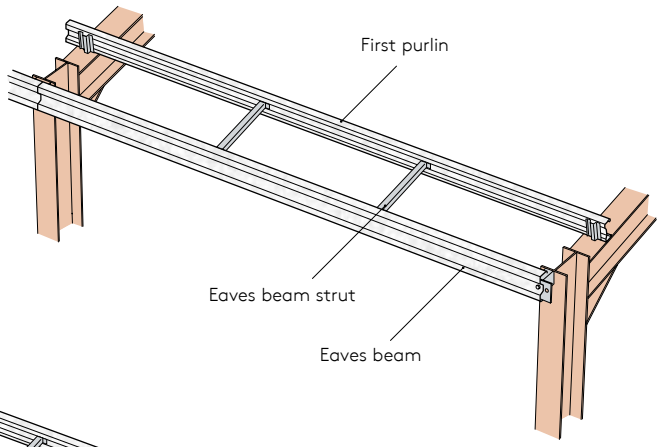
Eaves Beam Restraint Systems

The system incorporates a full range of cleats, brackets and struts providing solutions for all eaves conditions. The economy and practicality of the Eaves Beam System complements the Multibeam Purlin, Rail and Multichannel Systems providing a complete cladding support system.

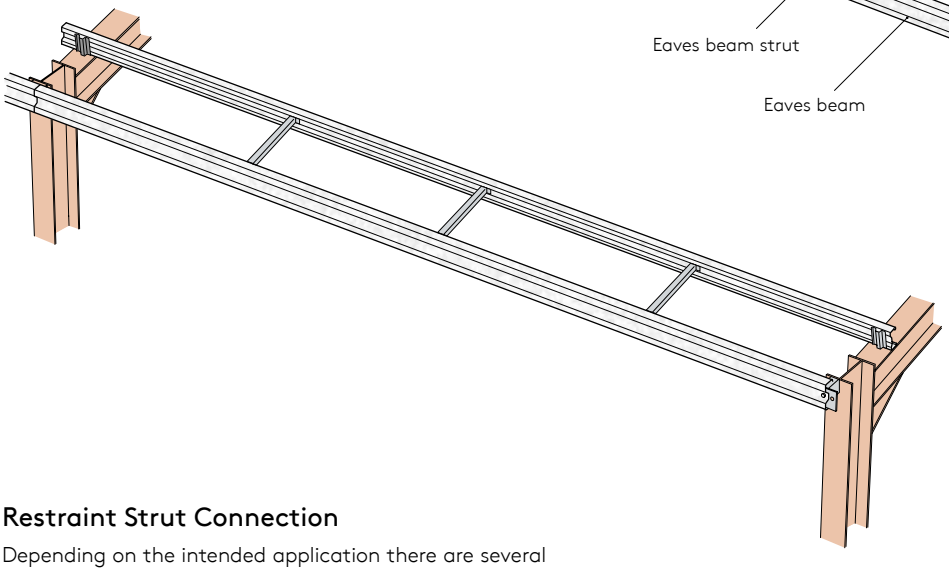
Bays up to 6.1m
Strut at Mid Span



Bays over 6.1 – 9.0m
Strut at 1/3 points



Bays over 9.0 – 12.0m
Strut at 1/4 Points



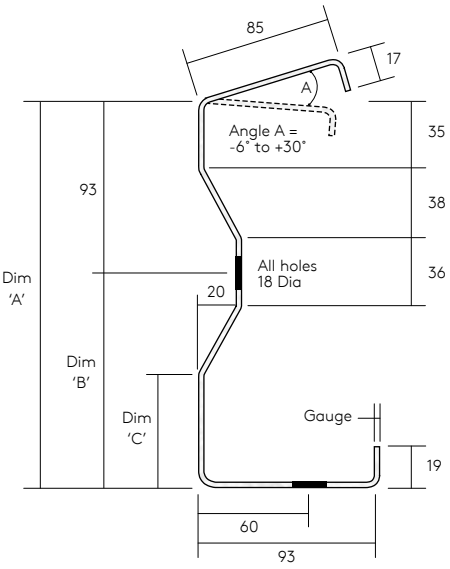
Restraint Strut Connection

Depending on the intended application there are several options available when connecting the strut from the eaves beam to the first purlin. For more detailed information see pages 63 and 64.

Dimensions & References

Eaves Beam Sections

Stooling distance – The standard stanchion attachment bracket is engineered for a maximum stooling distance of 271mm (from outer face of stanchion to outer face of eaves beam). In order to match the maximum Multibeam side rail dimension. For dimensions greater than 271mm adopt a hot rolled stub or similar.



Note: Angle A available in 3° increments, please select nearest to your requirement.

For an accurate and economic design use Toolkit.

Table 2:1 Eaves Beam Product Dimensions and References

References	Weight (kg/m)	Dims (mm) A	B	C	Gauge (mm)
E185/140	5.02	185	92	38	1.63
E215/170	5.68	215	122	68	1.73
E265/150	6.34	265	172	118	1.73
E265/200	9.05	265	172	118	2.45

Eaves Beam Fixing Brackets

Table 2:2 Bolt-On Bracket

Multibeam Rail Size	Stooling Dim	E185	E215	E 265
145	151	NC185/151B	NC215/151B	NC265/151B
175	181	NC185/181B	NC215/181B	NC265/181B
205	211	NC185/211B	NC215/211B	NC265/211B
235	241	NC185/241B	NC215/241B	NC265/241B
265	271	NC185/271B	NC215/271B	NC265/271B
Non-Standard		NC185/dimB	NC215/dimB	NC265/dimB

Note: All fixing brackets are supplied in unpainted black steel as standard.

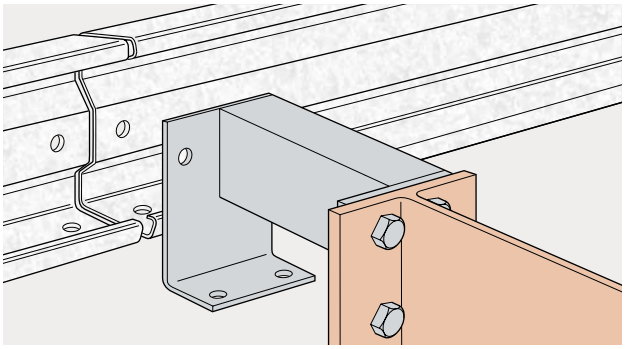
Table 2:3 Weld-On Bracket

Multibeam Rail Size	Stooling Dim	E185	E215	E 265
145	151	NC185/151	NC215/151	NC265/151
175	181	NC185/181	NC215/181	NC265/181
205	211	NC185/211	NC215/211	NC265/211
235	241	NC185/241	NC215/241	NC265/241
265	271	NC185/271	NC215/271	NC265/271
Non-Standard		NC185/dim	NC215/dim	NC265/dim

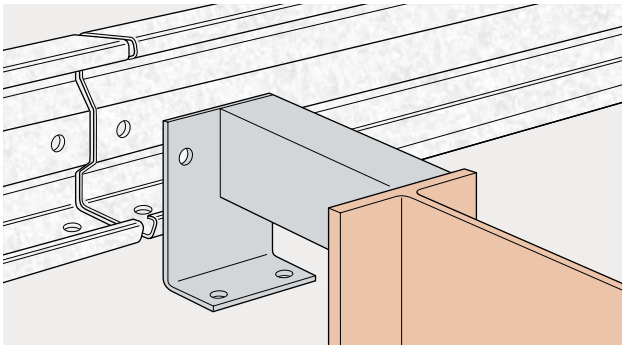
Table 2:4 Fixing Bracket Options

Options	Suffix	Example
Bolt-on cleat	BB	NC185/151BB
Bolt-on Powder coated	BE	NC185/151BE
Bolt-on Galvanised	BG	NC185/151BG

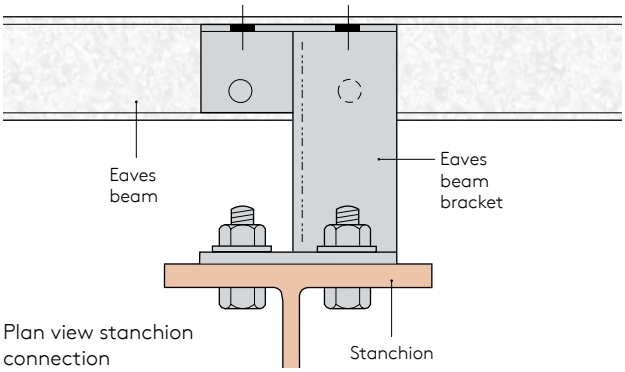
Eaves Beam Fixing Brackets



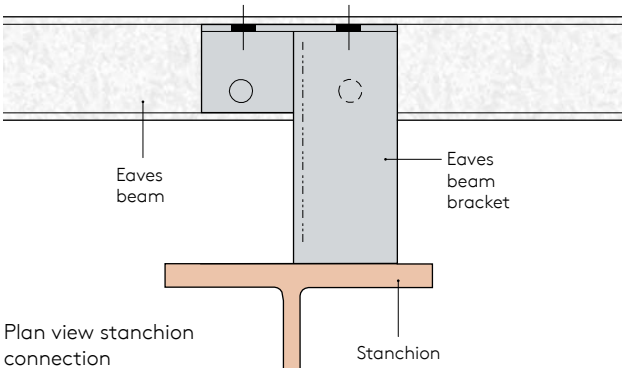
Stanchion connection bolt-on cleat



Stanchion connection weld-on cleat



Plan view stanchion connection



Plan view stanchion connection

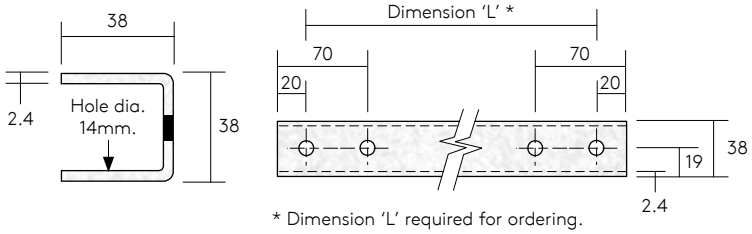
Eaves Beam Strut

Part reference: NS 0000.

Where 0000 = hole centres, eg: NS 2150. Used to brace the eaves beam against first purlin upslope.

For application see page 63.

Standard finish galvanised steel.



* Dimension 'L' required for ordering.

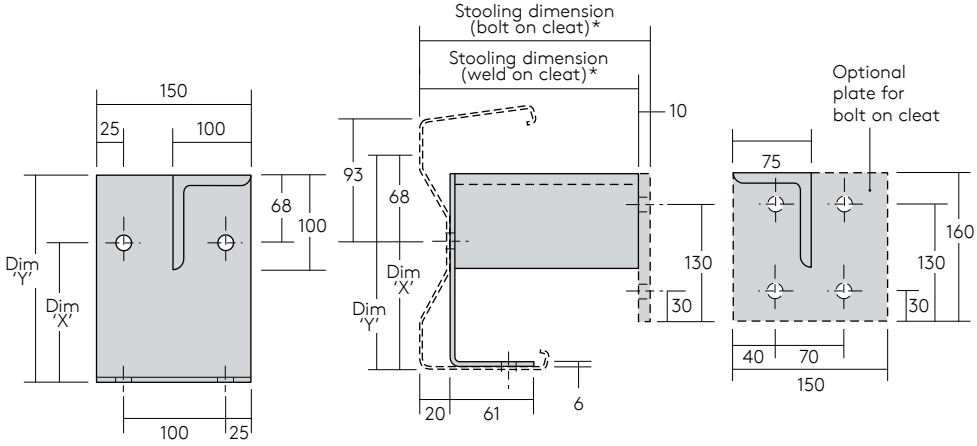
Fixing Brackets

Part Reference	Dim 'X'	Dim 'Y'
NC185	90	158
NC215	120	188
NC265	170	238

Note: Standard stooling dimension = Multibeam rail depth + 6mm

All holes 18mm diameter.

For application see page 62.

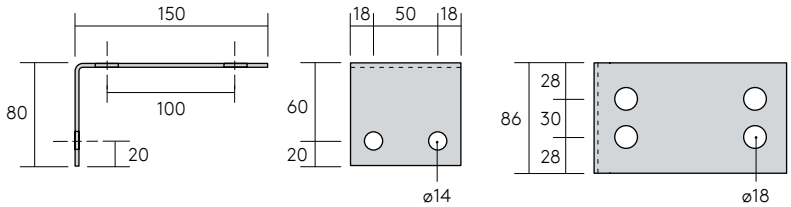


Eaves Beam Vertical Connection Cleat (EBC1)

Part reference: EBC1.

Material 2.5mm galvanised steel.

For application see pages 72 and 73.



Dimensions & References

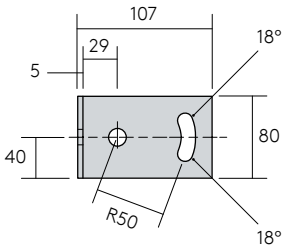
Eaves Beam Strut Cleat

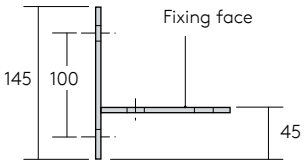
Part reference: NB1.

Cleat NB1 is for use where the roof cladding is fixed through to the top flange of the eaves beam and the gutter is an external cladding hung system.

For application see page 63.

Standard finish powder coated.





Max roofslope 18°.
Hole dia. 18mm connection to eaves beam
Hole dia. 14mm connection to eaves strut

Eaves Beam Strut Cleat

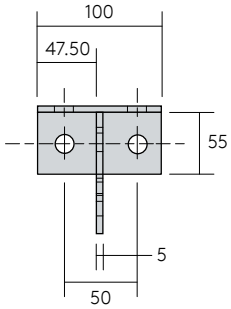
Part reference: NB2 000.

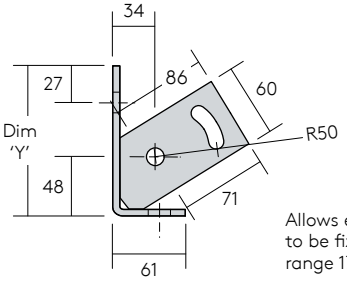
Where 000 = section depth, eg: NB2 215.

Cleat NB2 is for use where the roof cladding is not through fixed to the eaves beam, i.e. boundary wall gutter detail, parapet detail, clip fixed cladding.

For application see page 63.

Standard finish powder coated.





Allows eaves strut to be fixed, angle range 17° to 45°

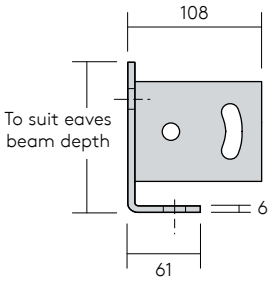
Extended Boundary Wall Strut - Eaves Beam Strut Cleat

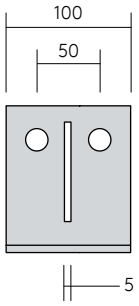
Part reference: NBW2.

Used to connect the NS strut to the eaves beam where the extended boundary wall strut arrangement is being adopted.

For application see page 64.

Standard finish powder coated.
Available as unfinished or galvanised.





Hole dia. 18mm connection to eaves beam

Hole dia. 14mm connection to eaves strut

Extended Boundary Wall Strut - Purlin Cleat

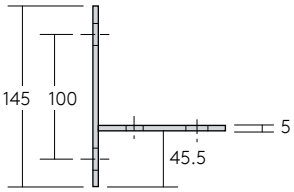
Part reference: NBW1.

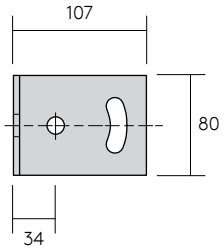
Used to connect the 2no. NS strut between eaves beam and purlin where the extended boundary wall strut arrangement is being adopted.

For application see page 64.

Hole dia. 14mm connection to purlin and eaves strut.

Standard finish powder coated.
Available as unfinished or galvanised.





Hole dia. 14mm connection to purlin and eaves strut

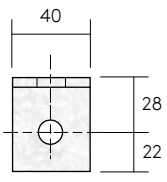
Eaves Beam Strut Cleat (Purlin bracket)

Part reference: NB3.

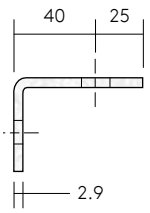
Used to attach the eaves strut to the purlin web.

For application see page 63.

Standard finish galvanised steel.



Hole dia. 14mm



Section Properties & Capacities

Section Properties

The eaves beam section range comprises 4 members in depths of 185mm, 215mm, and two at 265mm providing economy and performance in the important span range of 3.5 through 9.5m.

Table 2:5 Eaves Beam Eurocode Section Properties

Section	Depth	Gauge	Weight	Area	Major Axis		Minor Axis		Radius of Gyration	
	(mm)	^{t}nom (mm)	(kg/m)	A_0 (cm^2)	Iyy (cm^4)	W_{el}yy (cm^3)	Izz (cm^4)	W_{el}zz (cm^3)	iyy (cm)	izz (cm)
E185140	185	1.63	5.00	6.39	356.59	37.34	58.32	9.31	7.47	3.02
E215170	215	1.73	5.67	7.24	512.28	47.20	66.04	10.22	8.41	3.02
E265150	265	1.73	6.37	8.08	835.55	62.70	72.50	10.71	10.17	3.00
E265200	265	2.45	8.51	11.53	1191.52	89.18	103.39	15.20	10.17	3.00

Section Capacity

The eaves beam system is engineered to support both the roof and wall cladding and hence applied loading on both the primary and secondary axis of the member.

The loads applied to the primary axis are typically vertical roof loading due to dead, services, super, snow, wind pressure and wind suction. While the loads applied to the secondary axis are typically loads from attachment of the walls being wind pressure and wind suction.

The load tables below give ultimate capacities for the vertical gravity and suction component on the primary axis together with the horizontal pressure and suction capacity of the secondary axis. These capacities require that the eaves beam is restrained as shown on page 55. Restraints are required on all spans.

Tables 2:6 Eaves Beam Ultimate Loads: Eurocode Design

E185140

Span (m)	Ultimate Vertical Total UDL kN		Ultimate Horizontal Total UDL kN	
	Gravity	Uplift	Pressure	Suction
3.5	27.28	26.26	16.53	24.79
4	23.87	23.04	14.46	21.69
4.5	21.22	20.48	12.85	19.28
5	19.09	18.43	11.57	17.35
5.5	17.36	16.75	10.52	15.77
6	14.79	14.78	9.64	14.46
6.5	14.69	14.18	16.69	25.03
7	13.64	13.16	15.49	23.24
7.5	12.73	12.29	14.46	21.69
8	11.93	11.52	13.56	20.34
8.5	11.08	10.84	12.76	19.14

E215170

Span (m)	Ultimate Vertical Total UDL kN		Ultimate Horizontal Total UDL kN	
	Gravity	Uplift	Pressure	Suction
3.5	34.44	32.94	18.2	27.31
4	30.13	28.91	15.93	23.89
4.5	26.79	25.7	14.16	21.24
5	24.11	23.13	12.74	19.11
5.5	21.91	21.03	11.58	17.37
6	19.66	19.28	10.62	15.93
6.5	18.54	17.79	18.38	27.57
7	17.22	16.52	17.07	25.6
7.5	16.07	15.42	15.93	23.89
8	15.07	14.46	14.93	22.4
8.5	14.18	13.6	14.05	21.08
9	13.39	12.85	16.54	24.81
9.5	12.69	12.17	15.67	21.37

E265150

Span (m)	Ultimate Vertical Total UDL kN		Ultimate Horizontal Total UDL kN	
	Gravity	Uplift	Pressure	Suction
3.5				
4				
4.5				
5				
5.5				
6	25.02	23.71	11.13	16.69
6.5	23.09	21.89	19.26	28.89
7	21.44	20.32	17.89	26.83
7.5	20.01	18.97	16.69	25.04
8	18.76	17.78	15.65	23.47
8.5	17.66	16.74	14.73	22.09
9	16.68	15.81	17.33	26.00
9.5	15.80	14.98	16.42	24.63

E265200

Span (m)	Ultimate Vertical Total UDL kN		Ultimate Horizontal Total UDL kN	
	Gravity	Uplift	Pressure	Suction
3.5				
4				
4.5				
5				
5.5				
6	40.96	41.12	15.81	23.71
6.5	39.31	38.68	27.36	41.04
7	36.5	35.92	25.41	38.11
7.5	34.07	33.53	23.71	35.57
8	31.94	31.43	22.23	33.34
8.5	30.06	29.58	20.92	31.38
9	28.39	27.94	24.62	36.94
9.5	26.89	26.47	23.33	34.99

Note: Deflection values omitted deliberately.

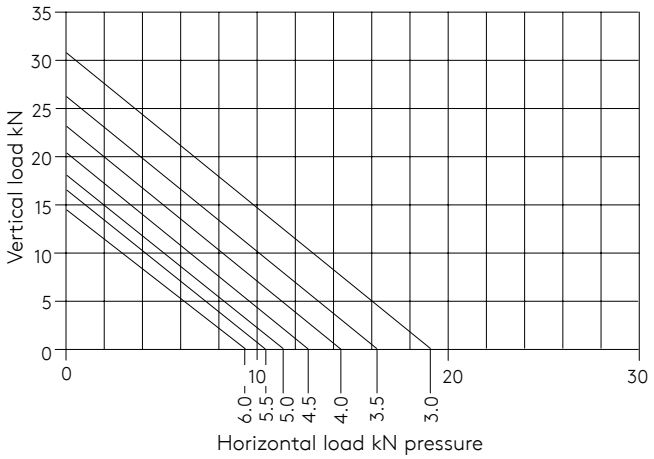
Load Charts

Use of the Load Charts

The vertical uplift capacity of the Eaves Beam is shown along the vertical axis and the horizontal capacity due to a positive pressure load along the horizontal axis. The diagonal lines marked with the span, show for each section how the vertical and horizontal loads interact.

The horizontal suction capacity for the Eaves Beam is higher than that shown for the pressure value so when comparing horizontal suction loads multiply the suction load by 0.67% and use this value in the table.

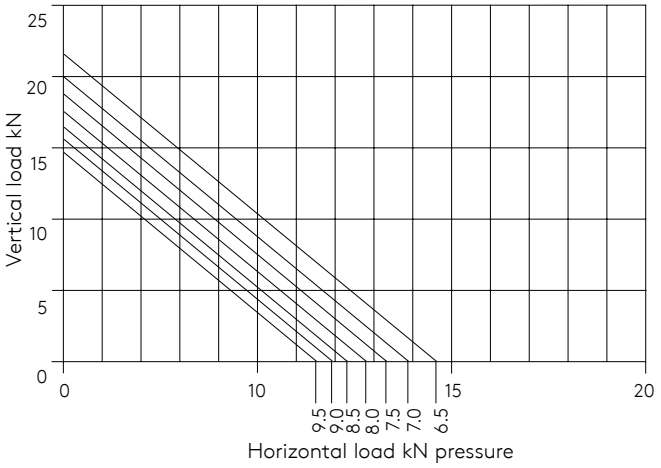
E185140 3.0m to 6.0m span



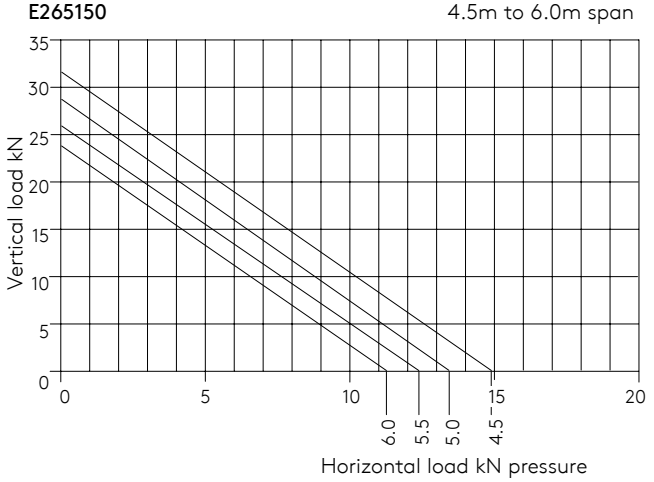
E215170 6.5m to 9.5m span

E215170 4.5m to 6.0m span

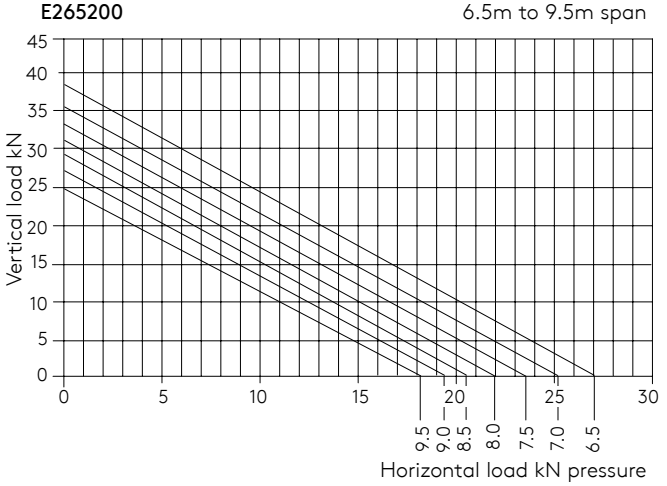
E265150 6.5m to 9.5m span



E265150 4.5m to 6.0m span



E265200 6.5m to 9.5m span



Loadings

Load Factors

Table 2:7

Load Type	Eurocode Load Factor
Dead load	1.35
Dead load restraining uplift or overturning	1.0
Service load	1.35
Imposed load	1.5
Wind load	1.5
Imposed Snow	1.5
Accidental snow (drift)	1.0

Eaves Beam Design

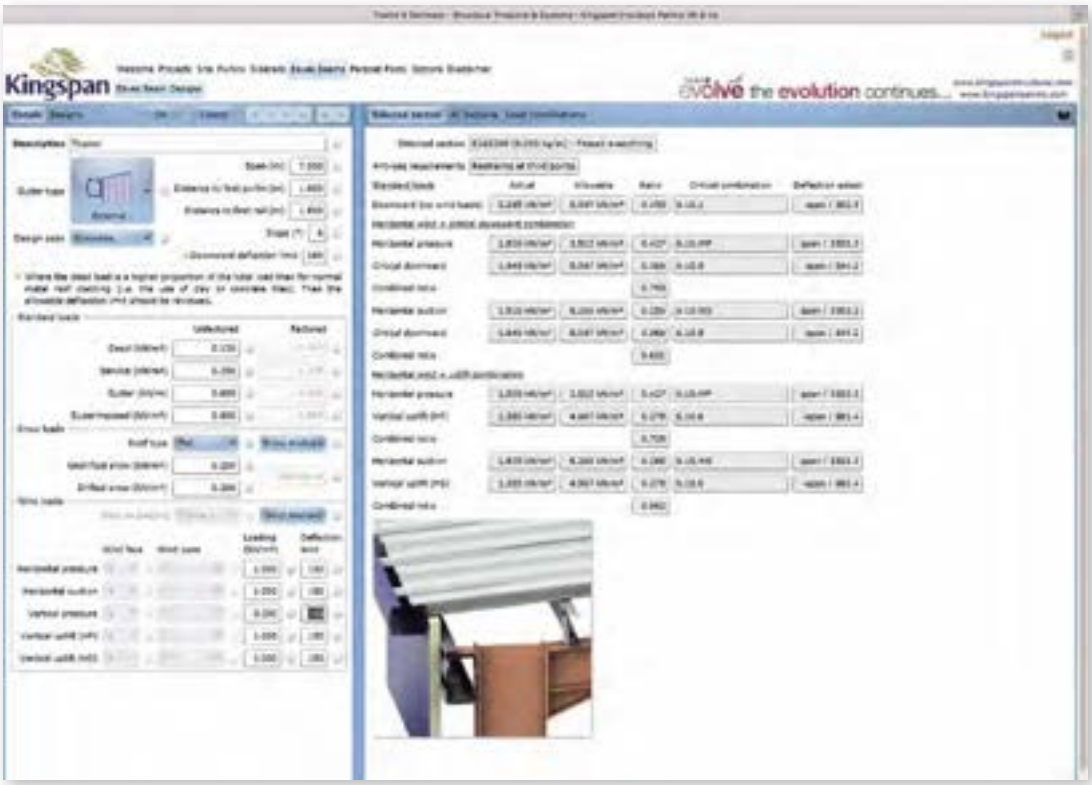
With loading about both axes and the number of load combinations to consider the manual design process for the eaves beam can be time consuming.

For an easy and comprehensive analysis applying all the relevant applied load combinations and factors it is recommended that the designer uses the Kingspan Toolkit software available from the Kingspan Structural products web site www.kingspanpanels.co.uk/structural

Deflection Limits

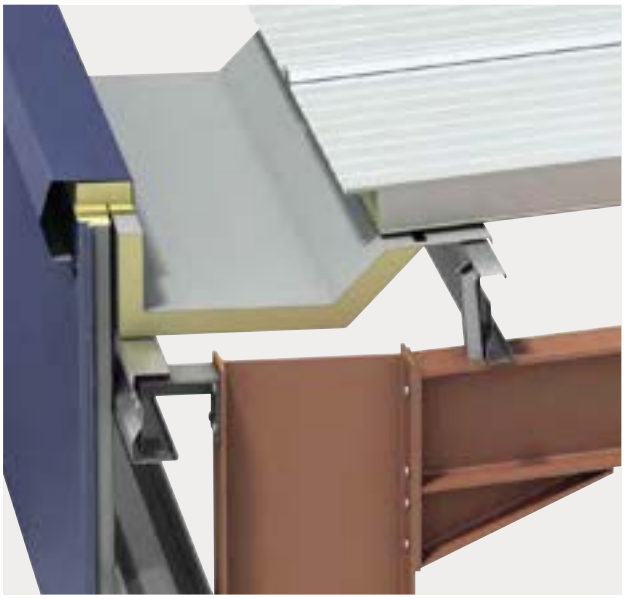
Industry accepted vertical deflection limits for typical light weight cladding are normally set to span /180 (as for a general purlin).

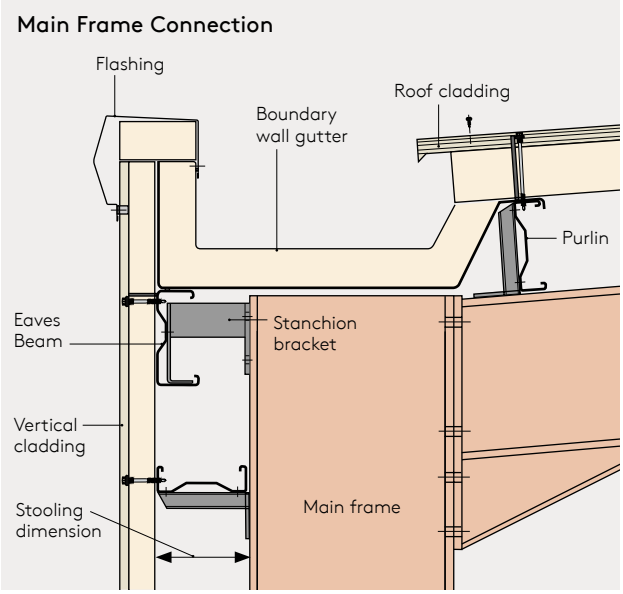
Where the applied dead load is a higher proportion of the total load than for normal roof weights (example would be using a concrete or clay tile roof) then consider using a higher deflection limit. This gives a more acceptable eaves sightline.



Construction Details

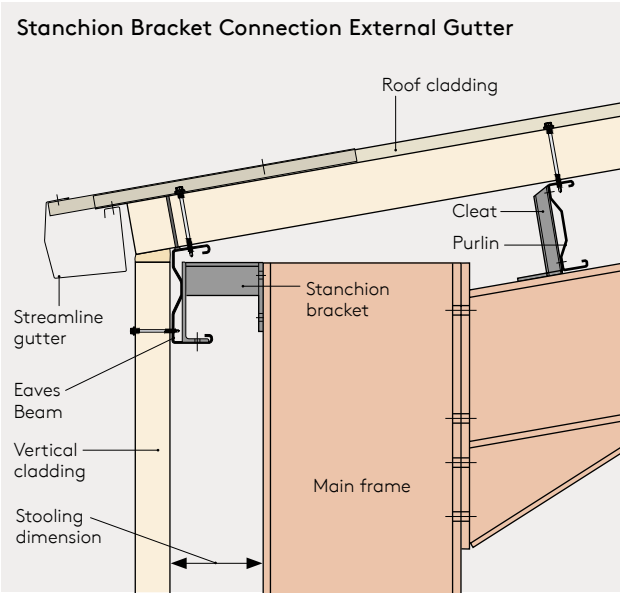
Connection to Main frame – Boundary Wall Gutter





For product dimensions refer to page 57.

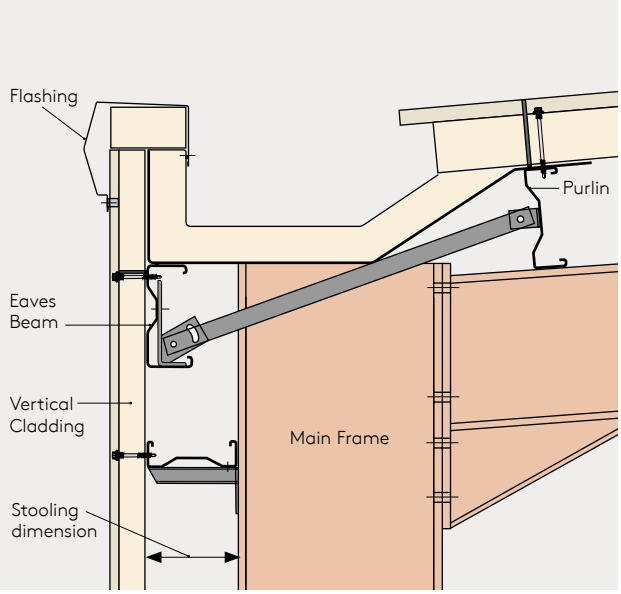
Connection to Main frame – External Gutter



For product dimensions refer to page 57.

Restraint Connection - Boundary Wall

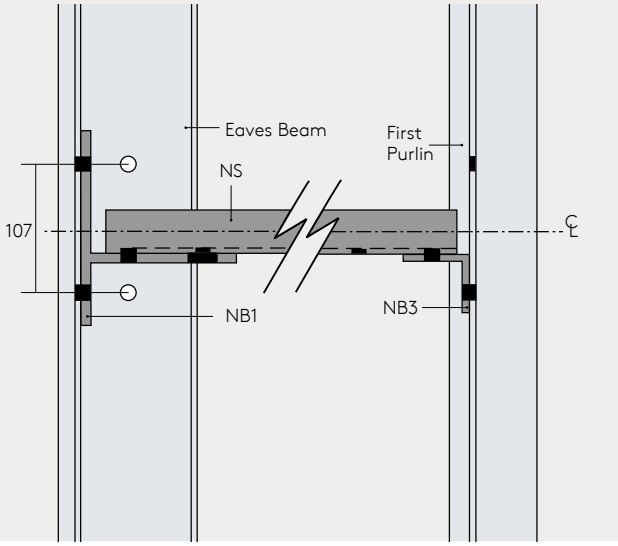
Strut Connection



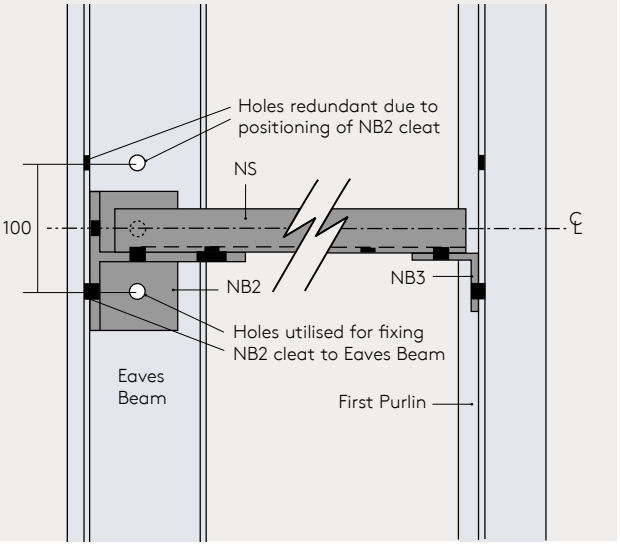
For product dimensions refer to page 58.

Boundary Wall

Strut Connection - External Gutter



Strut Connection - Boundary Wall



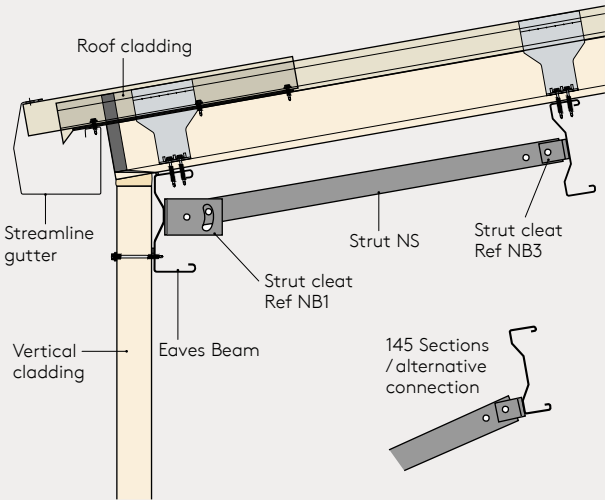
For product dimensions refer to page 58.

Construction Details

Restraint Connection – External Gutter

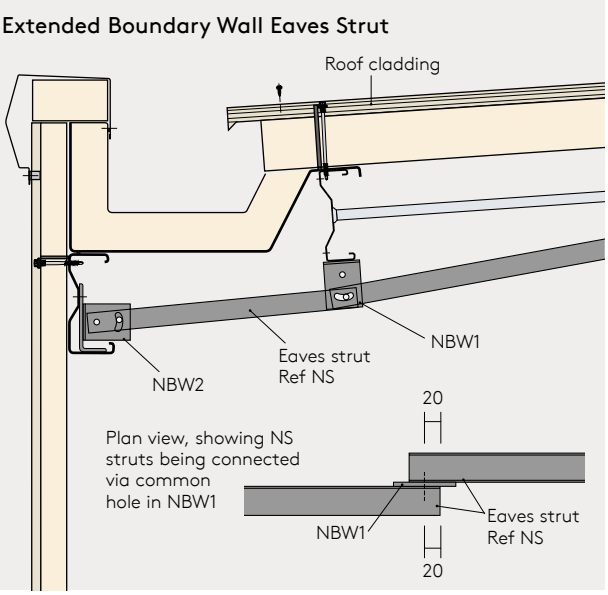
For product dimensions refer to page 58.

Restraints at Midspan



Extended Boundary Wall Eaves Strut

Extended Boundary Wall Eaves Strut



Extended Boundary Wall Eaves Strut

This strut arrangement should only be used when the standard boundary wall arrangement cannot be used due to geometric limitations.

The frequency of the struts are to be as page 55.

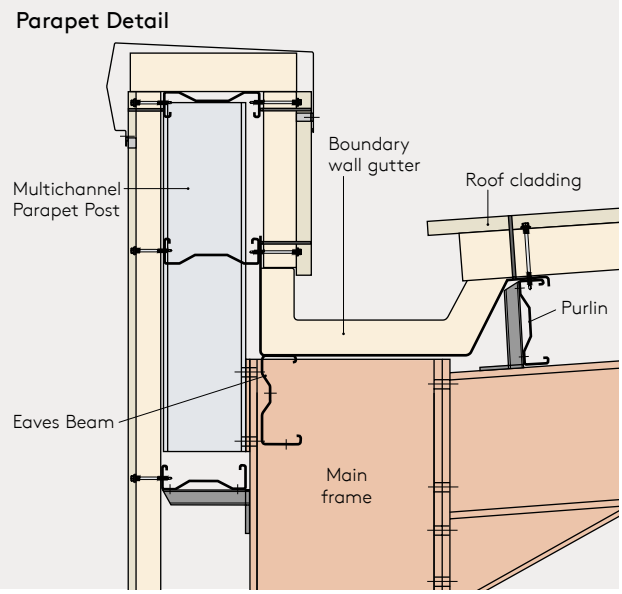
The TSA / TS14 type restraints shown are to be at corresponding position to extended boundary wall strut and should continue upslope if required.

When used with Kingspan E185 eaves beam please contact our Technical Department.

Suitable for roof pitches 0-18°. Not suitable for M300 and M350 deep purlin sections.

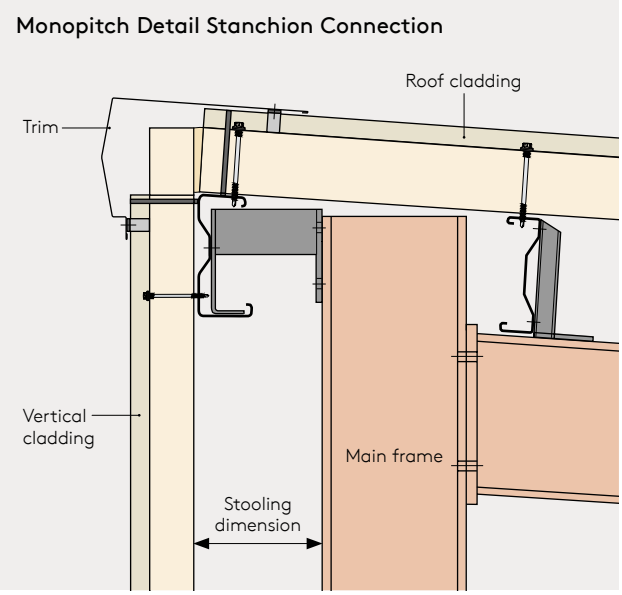
For easiest application of this strut use the latest Kingspan Tekla Macros.

Parapet



For product dimensions refer to page 56.

Mono Pitch Roof – High Eaves



For product dimensions refer to page 56.

Cladding Rails

Product Overview

Multibeam cladding rail systems are suitable for all types of modern roof construction with bay sizes up to 15m and are designed specifically to support metal-clad walls in horizontal or vertical applications.

Applications

- All types of wall cladding
- Horizontal or vertically laid cladding
- Suitable for use with Multichannel
- Bay widths up to 15m

Material Specification

Hot dip galvanised steel to BS EN 10346 and BS EN 10143 'specifications for continuously hot dip zinc /metal coated structural steel strip'. The minimum grade of steel used is S450GD, with Z275 zinc coating, giving an average coating thickness of 0.02mm to each side. Other coatings maybe available (G600 / Magnelis). Please contact our Sales Team for advice.

Connections

We recomend washers are fitted under both the bolt head and nut.

Multibeam is stronger so it spans further.

Range

- Section heights from 145mm to 350mm
- Standard flange widths from 65mm to 90mm
- Gauges from 1.2mm to 2.7mm

For full product dimensions see page 77. Other sizes may be available on specific request. Please contact our Technical Department for advice.

Lengths

All lengths are catered for; requirements in excess of 18m, please contact our Sales Department.

Spanning Systems

Multibeam can be used in all the popular and economic rail cladding systems. The enhanced stiffness of the Multibeam shape makes it ideal for all span dimensions from the very short to the very long with rail bar lengths of 18m or more, making it practical for both handling and structural performance.

Sleeves

Sleeves are used to provide continuity at the joints between members and are available in three gauges (see page 81). When joining two sections of different gauges use the heaviest gauge rail to select the sleeve for that joint.

Double Span

Use double span system where possible
- **fewer components!**
- **quicker to erect!**

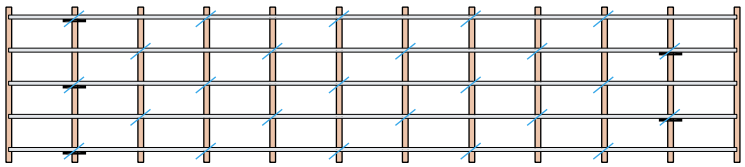
Double span lengths of Multibeam section span across three frame supports and provide design economy and speed of erection. This spanning system always results in the lowest component count. To ensure equal load distribution across the supporting steel work the joints are staggered, typically requiring only one sleeve per run of rails.

Most double span bar lengths can be provided, although bays over 9m generally use single span lengths and are sleeved at every other joint to maintain continuity. Multibeam can be supplied in various lengths, however, please check with our Sales department for lengths over 18m.

System Types

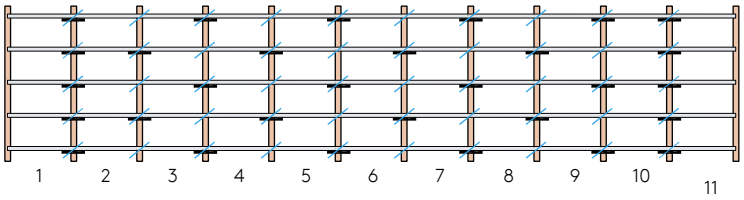
Double Span

- Most popular system.
- Ideal for all bay centres up to and including 8m.
- Fewer components.
- Quicker erection and programme completion.



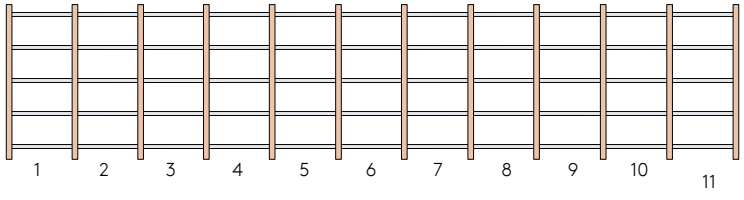
Single Span Sleeved Joints

- Option for all bay sizes particularly those with bay centres greater than 8m.
- Where site restrictions (access, weight, cranage etc.) dictates use of single span length.
- High component count.
- Normal double span load tables can be used.



Single Span (Between Columns)

- Suitable for spanning between columns.
- Reduces internal volume of building.
- Useful for all applications where the front face of the rail must be flush with outer column flange.
- Use design software for capacities.



Note: diagrams above are shown in plan view. Joint Sleeve

Cladding Types

Multibeam side rails can be used with all types of modern steel based side wall cladding whether laid vertically or horizontally.

- Insulated panels
- Twin skin
- Firewalls

Insulated Panels

Two layers of steel bonded to an insulation core, laid vertically when through fixed directly to the side rails, will provide full restraint. The vertical restraint systems shown on page 71 can be used.

Horizontally laid insulated panels should use the restraint systems shown on pages 72 and 73 and the rail capacities can be obtained from the Toolkit design software or from page 90–92. Generally the Insulated panels when laid horizontally should be fixed to the verticals between the rails and not by reducing the horizontal rail cross centres to match the panel cover width.

Horizontally Laid Insulated Panels

For Tekla Structures users please see our system brochure for pre-assembled vertical members to support horizontal cladding. Available for download at **www.kingspanstructural.co.uk** (see page 105 for further details).

Twin Skin

Is made up of a inner liner profile and outer weather skin with an internal steel spacer system and thermal insulation. The liner tray is attached directly to the Multibeam side rail using self-drill self-tapping screws and this in connection with the restraint systems shown on page 71 will provide sufficient restraint to support the values shown in the load tables or design software.

Horizontally laid twin skin usually comprises of a vertically spanning liner tray and internal spacer system with the outer sheet laid horizontally and fixed back to the vertical internal spacer. With this arrangement the inner liner is through fixed to the Multibeam rail. When used with the restraint systems shown on page 71, provides the necessary restraint to support the values shown in the load tables or Toolkit design software.

Wall Cladding Attachment

The wall cladding must be mechanically fixed to all support side rails it passes over, sufficient fixings should be placed to provide the level of restraint required.

Cladding Rail Restraints

During the construction stage the bottom Rail may need temporary propping while fixing of the cladding until the panel is fully supported in its final installation

Vertically Laid Cladding

Restraints for Bays up to 6.1m

The single strut system is utilised on buildings with bays up to 6.1m centres with adjustable diagonal tie wire as shown in the diagram.

Bays up to 3.0m generally do not require vertical support struts.

This system is for use with cladding which, when fixed restrains the Multibeam siderail outer flange.

* When wall exceeds 10m in height allow one set of diagonal ties for every 9.0m of height.

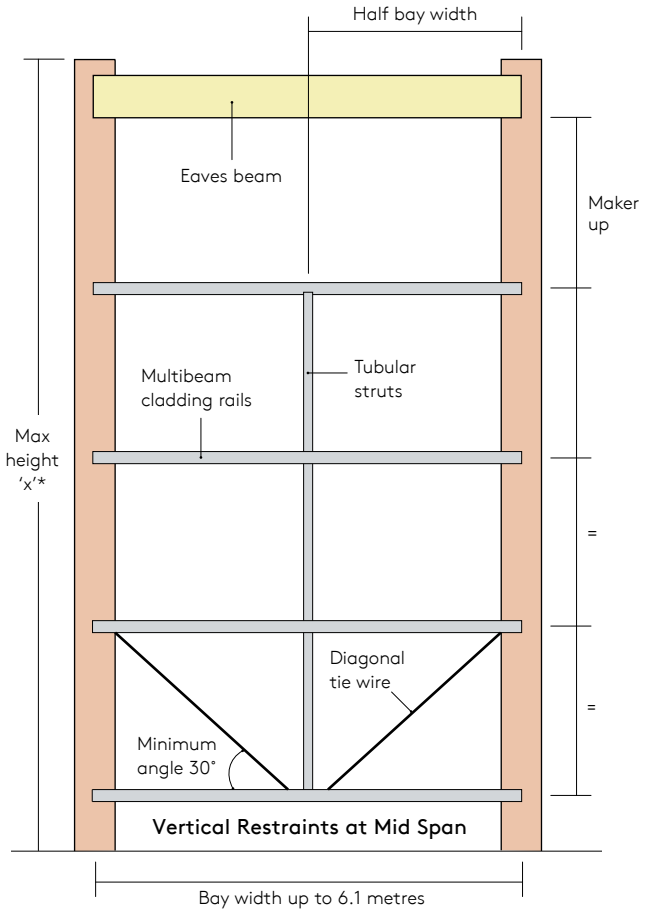
Maximum rail cross centres are 2m (for larger cross centres, contact our Technical Department).

Where the weight of the cladding is greater than 0.12 kN/m^2 please contact our Technical Department.

Where the cladding is a through-fixed insulated panel but fixed on one edge only trapping the tongue of the adjacent panel, for example the Kingspan AWP range, the restraint system opposite must be modified by replacing the bottom tube strut with an SW angle strut or same depth multichannel and the diagonal tie wire replaced with a rod diagonal (TRHD).

The strut system should be fitted between the bottom rails and the rails levelled before proceeding progressively upwards.

Where the cladding is clip fixed or fixed in such a way that the cladding can slip, relative to the side rail face please contact our Technical Department.



Restraints for Bays over 6.1m up to 9.0m

The double strut system is utilised on buildings with bays over 6.1m metres up to 9.0m.

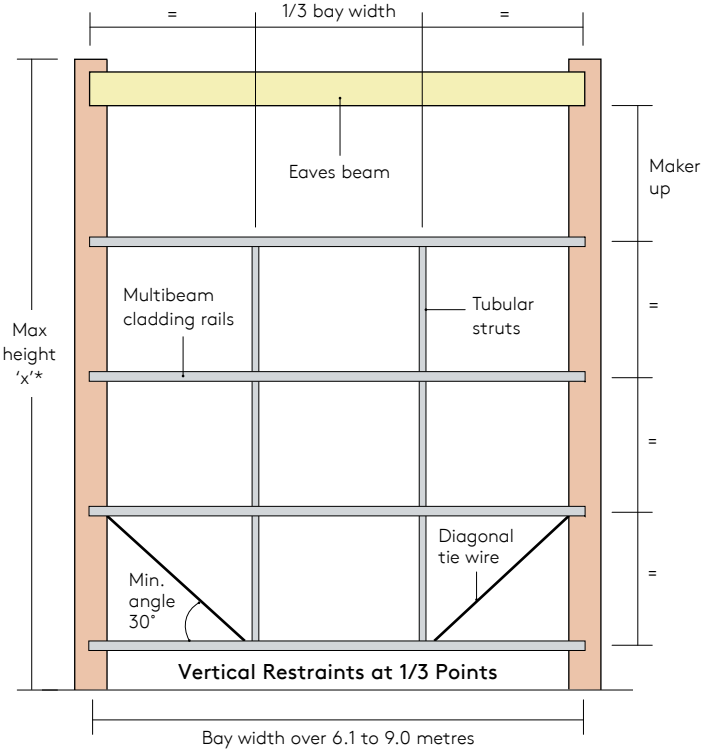
* When wall exceeds 10m in height allow one set of diagonal ties for every 9.0m of height.

Where the cladding is a through-fixed insulated panel but fixed on one edge only trapping the tongue on the adjacent panel, for example the Kingspan AWP range, the restraint system opposite must be modified by replacing the bottom tube strut with an SW angle strut or same depth multichannel and the diagonal tie wire replaced with a rod diagonal (TRHD).

Where the cladding is clip fixed or fixed in such a way that the cladding can slip, relative to the side rail face please contact our Technical Department.

Maximum rail cross centres are 2m (for larger cross centres, contact our Technical Department).

Where the weight of the cladding is greater than 0.12 kN/m^2 please contact our Technical Department.



Bays over 9.0m

Bays over 9.0m are possible with Multibeam sections.
For vertical restraints consult our Technical Department.

Cladding Rail Systems

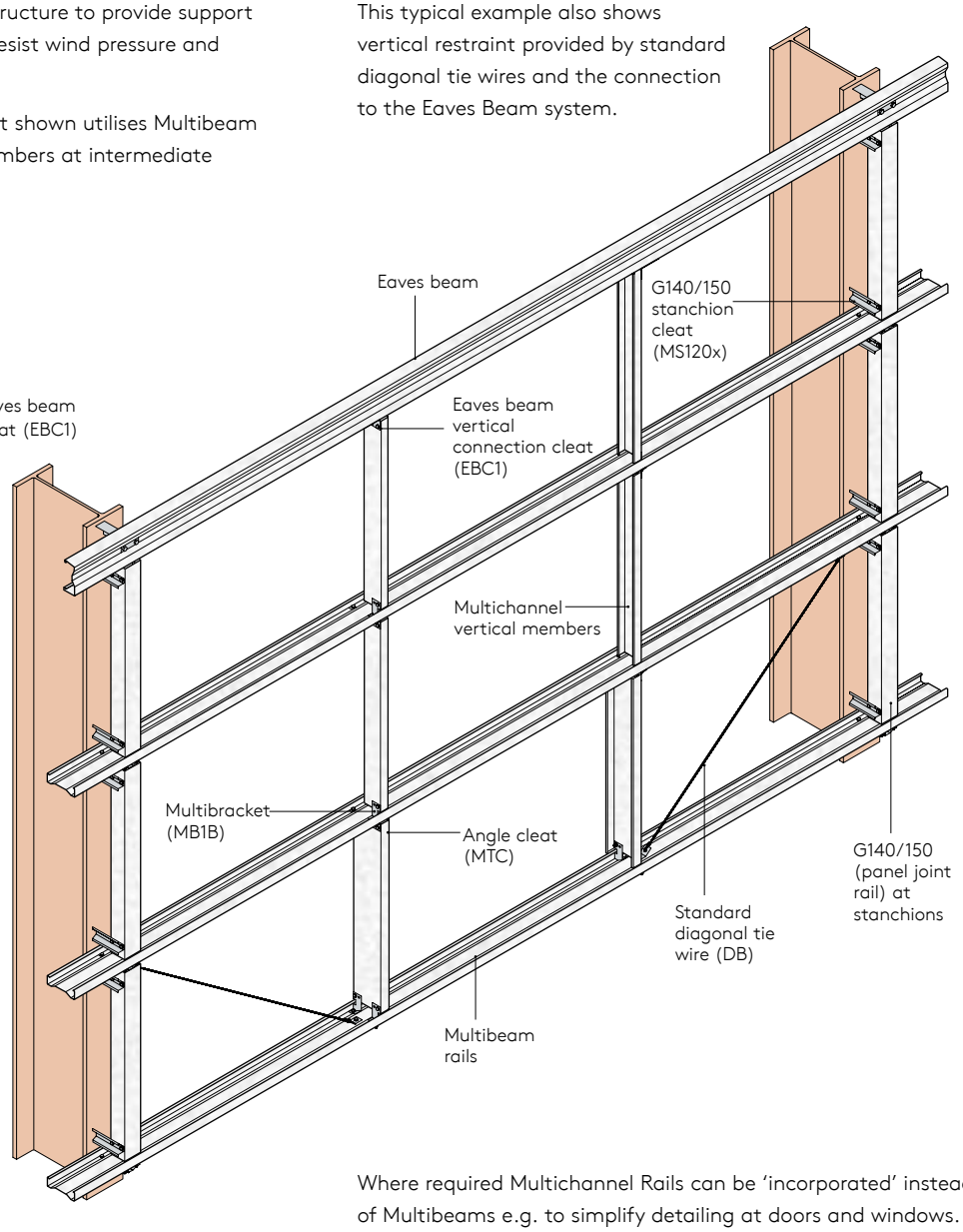
Horizontally Laid Cladding

Cladding Joints at Stanchions

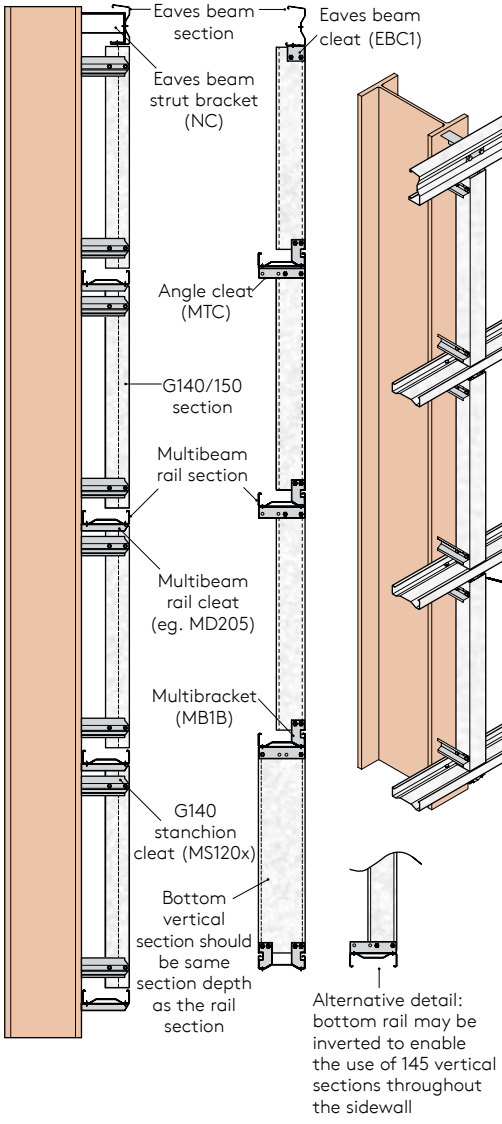
Horizontally laid panels require a structure to provide support for the panel self weight and also resist wind pressure and suction loads.

The efficient steelwork arrangement shown utilises Multibeam siderails with G140/150 vertical members at intermediate support locations.

This typical example also shows vertical restraint provided by standard diagonal tie wires and the connection to the Eaves Beam system.



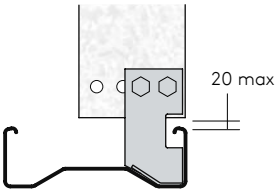
Connection Details



Where required Multichannel Rails can be 'incorporated' instead of Multibeams e.g. to simplify detailing at doors and windows.

Maximum wall heights for diagonal wires are shown on page 71 for vertically laid cladding. This value should be adjusted on a pro-rata basis for heavier sidewall weights.

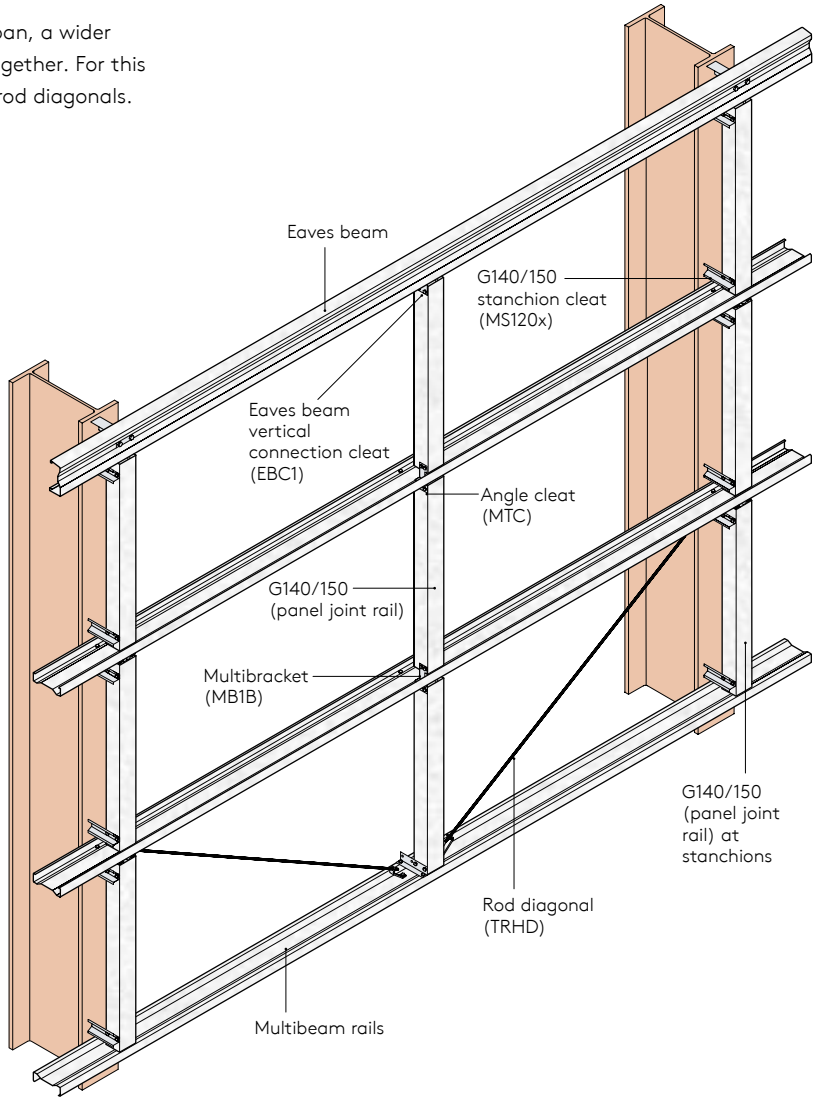
The distance between the Multichannel rail and the vertical support should not exceed 20mm.



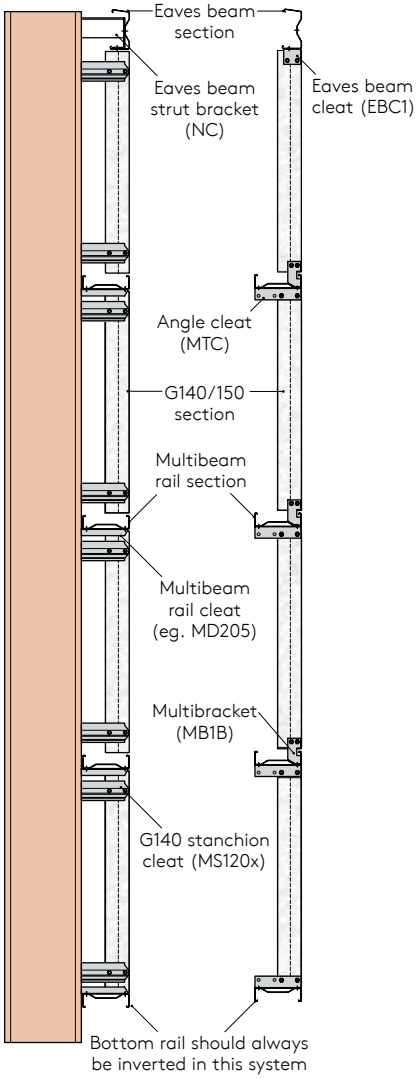
Horizontally Laid Cladding

Cladding Joint within Span

Where there is a cladding joint within the bay span, a wider flange is required in order to 'butt' the panels together. For this detail a G140/150 section is used together with rod diagonals.



Connection Details



Horizontally Laid Cladding – Top Hat Supports

Vertical top hat cladding supports provided by the sheeting contractor to support horizontally laid insulated panels – the restraints can be as shown on page 71 but the tube strut between the bottom pair of rails supporting the top hats must be replaced with a vertical Multichannel of the same depth of the rail and attached as shown on page 72.
The standard tie wire must be replaced with a rod diagonal.

The top hats must be positioned at or very close to the rail restraint positions to avoid twisting of the horizontal member. The top hat section must be attached to all rails that it passes over using suitable fixings that can support the vertical dead loads and the wind pressure and suction loads.

Firewall

Introduction

Kingspan siderails can be used to support steel cladding based firewall systems using either insulated panels or twin skin cladding.

In all cases the cladding rail system must be sufficiently designed to support the normal applied loads (dead weights and wind loading). Sheeting rails with a minimum thickness of 1.2mm and above may be used.

The performance of the Kingspan Firewall system will be affected if the details/specifications are altered in anyway.

Support Structure

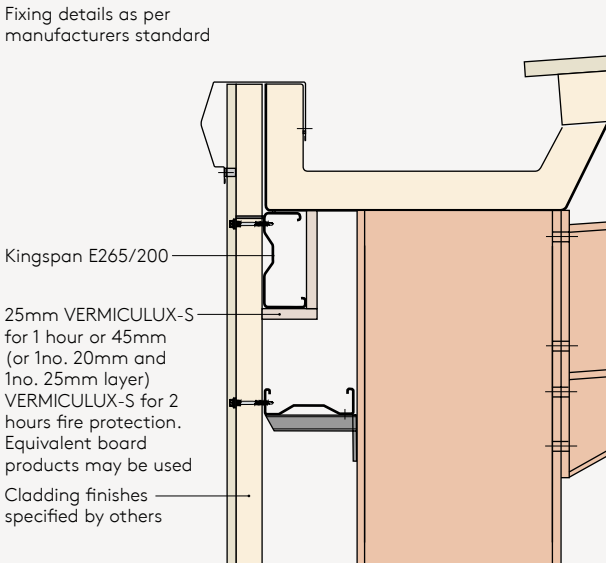
Eaves Beam & Stanchions

During a fire, the cladding system is designed to be supported from the eaves beam and stanchions. The eaves beam and stanchions must be protected to give the same period of fire resistance as the external wall using conventional fire protection methods.

The Kingspan E265200 cold formed eaves beam can be used to support the firewall system where up to 2 hours fire resistance is required. The eaves beam must be protected as shown in the typical construction details (see below). For firewall construction details in Ireland, please contact the Kingspan Technical Services Team.

Alternatively, conventionally protected hot-rolled steel sections can be used. Where the firewall system is required to have in excess of 2 hours fire resistance, a hot-rolled steel eaves beam section must be used and protected in the conventional method.

Firewall Detail at Boundary Wall Gutter

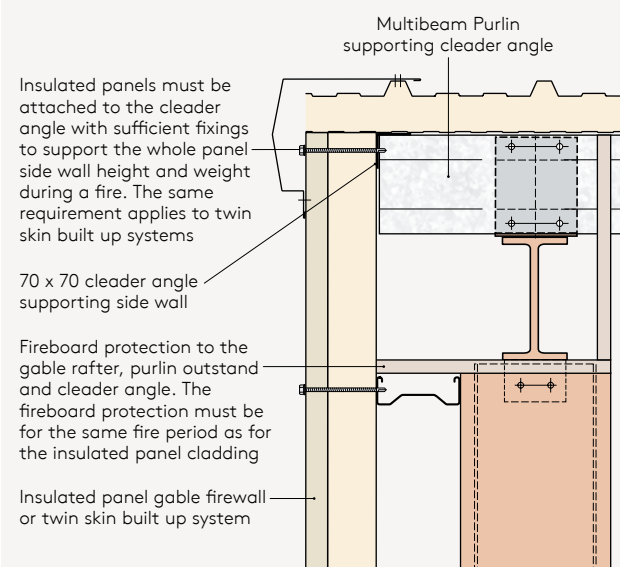


When sizing the eaves beam a check must be carried out to ensure that the eaves beam can support the dead weight of the full height of the cladding for the fire load case. If the E265200 cannot support the wall weight then the cold formed eaves beam must be substituted by a suitable fire protected hot-rolled eaves beam.

Adequate longitudinal stability to the stanchions must be provided. Guidance on this can be found in SCI publication P313 'Single Storey Steel Framed Buildings in Fire Boundary Conditions'.

Gable Rafters and Columns

At the gable end of the building the firewall is supported from the gable rafters and posts. These must be protected to the required period of fire resistance using conventional fire protection materials fitted by specialists (see below).



Limitations and Considerations

In all cases the maximum horizontal rail spacing must not exceed 2.0m. As stated on page 71, the dead weight of the cladding is limited to 0.12 kN/m^2.

For high walls over 10.0m or where the wall continuity is broken by continuous windows or other openings, it will be necessary to provide additional fire protected members within the wall height to support the dead weight of the wall cladding.

The advice given in this section does not cover the use of Kingspan Longspan, Coldstore or Benchmark insulated panels systems. The advice given only applies to a Kingspan Multibeam or Multichannel rail system. Kingspan Structural products take no responsibility for the performance of other suppliers systems.

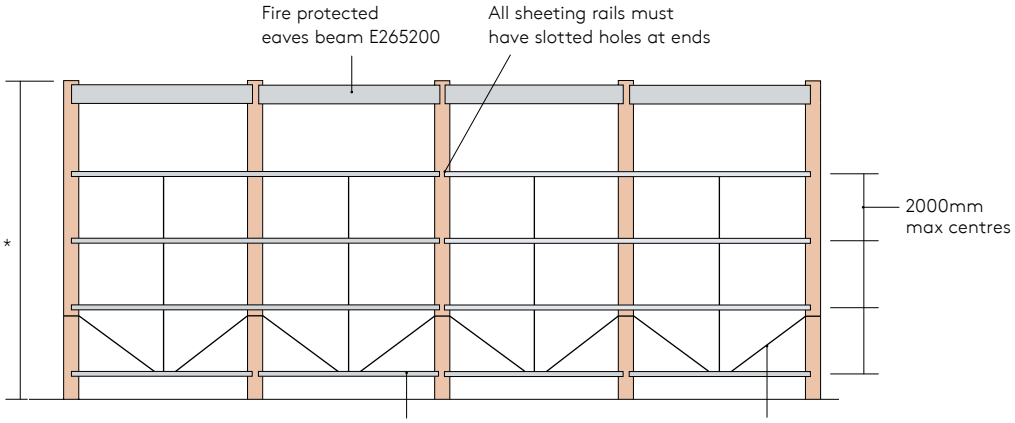
Vertically Laid Cladding

Cladding systems covered here are twin skin systems (comprising of a vertically spanning liner) and vertically laid through fixed insulated panels.

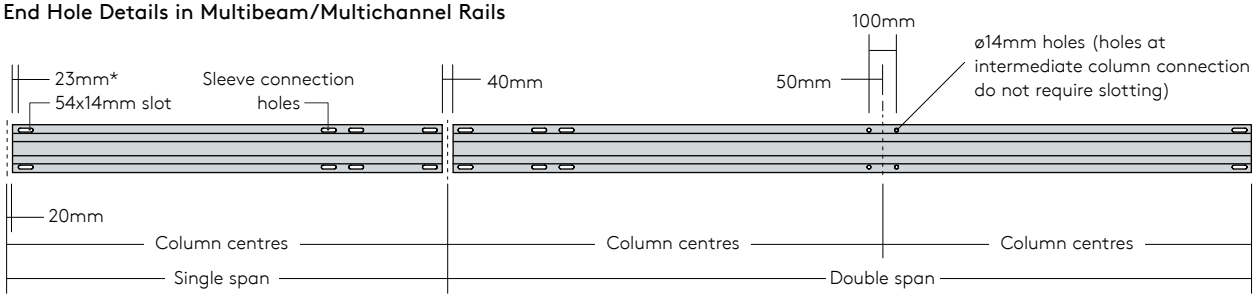
During a fire, the cladding acts as a diaphragm tied back to the stanchions through the eaves beam and bottom sheeting rail. Excessive bowing due to expansion of the sheeting rails is minimised by the following;

- All bottom sheeting rails are single spanning (but can be sleeved) see typical construction below.
- All Multibeam / Multichannel rails have slotted end connections, see end hole details in Multibeam / Multichannel rails below.
- All Multibeam / Multichannel rails are 30mm shorter than standard rails to cater for expansion, see end hole detail below.
- All sheeting rail cleat connection bolts must have plastic washers under the head of the bolt; during a fire the washer softens allowing the rail to expand, see assembled cleat and rail detail on page 76.

Typical Construction



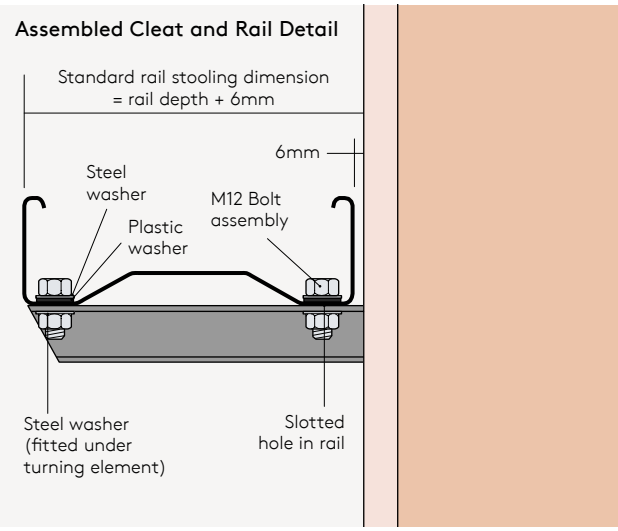
End Hole Details in Multibeam/Multichannel Rails

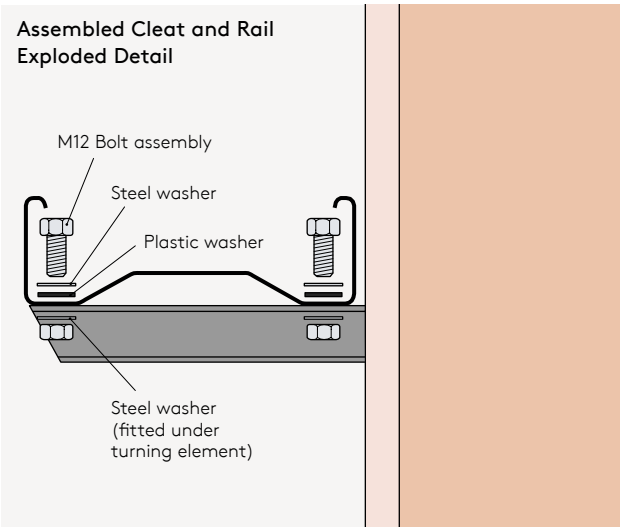


* Edge distance

Please refer to the Kingspan Firewall Handbook L00146A for construction details in Ireland.

Firewall





Vertically Laid Secret Fixed Insulated Panels

The firewall system is designed to be supported from a fire protected eaves (or gable) member (as described on previous page) with the secret fixed vertically laid insulated panel acting as a curtain. The sheeting rails retain sufficient strength to prevent significant lateral movement of the firewall.

The fire protected eaves beam or gable support member must be checked for sufficient capacity to support the dead weight of the wall during a fire.

The rail layout and detailing requirements are as previous page.

Horizontally Laid Insulated Panels

Support for this type of cladding system in a firewall using site assembled vertical members (G140/150 or Multichannel) connected between horizontal Multibeam or Multichannel horizontal rails (using cleats).

The firewall system is designed to be supported from a fire protected eaves (or gable) member (as described on previous page) with the horizontally laid cladding acting as a curtain. The sheeting rails retain sufficient strength to prevent significant lateral movement of the firewall.

The Multibeam / Multichannel rail layout must be as shown on pages 72, 73, 106 and 107.

For the support system above, the connection holes in the vertical or horizontal members should not be slotted nor should the bar length be reduced (as is the requirement for a vertically laid cladding system) the horizontally laid insulated panels are fixed direct to the vertical members between the rails and at the column positions.

It may also be necessary to have more vertical members (G140/150 & Multichannels) than are required to support the horizontally laid insulated panels in order to limit the joint load where the vertical members are connected to the eaves beam.

Certification

Firewall systems rely on the performance of the wall cladding and certification for the firewall; insulation, integrity and stability is always provided by the cladding supplier. As such the cladding supplier's requirements must always be checked to confirm that the Kingspan Structural Products rail system is suitable and adequate to support the cladding system and meets the requirements of the cladding suppliers firewall certification.

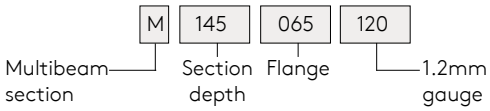
Dimensions & References

Multibeam Rails

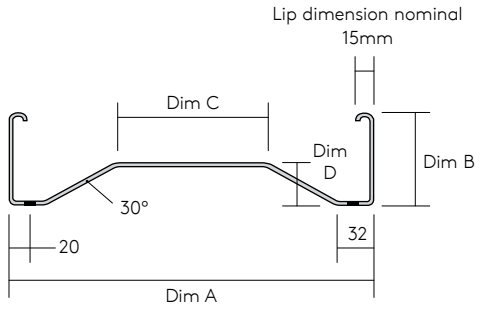
Table 3.1 Multibeam Rail References

References	Weight (kg/m)	Dims (mm) A	B	C	D	Gauge (mm)
M145065120	2.75	145	65	8	20	1.20
M145065130	2.99	145	65	8	20	1.30
M145065140	3.21	145	65	8	20	1.40
M145065150	3.45	145	65	8	20	1.50
M145065160	3.69	145	65	8	20	1.60
M145065180	4.15	145	65	8	20	1.80
M145065200	4.63	145	65	8	20	2.00
M145065220	5.06	145	65	8	20	2.20
M175065120	3.02	175	65	38	20	1.20
M175065130	3.29	175	65	38	20	1.30
M175065140	3.52	175	65	38	20	1.40
M175065150	3.79	175	65	38	20	1.50
M175065160	4.05	175	65	38	20	1.60
M175065180	4.55	175	65	38	20	1.80
M175065200	5.08	175	65	38	20	2.00
M175065220	5.56	175	65	38	20	2.20
M175065250	6.35	175	65	38	20	2.50
M205065120	3.29	205	65	68	20	1.20
M205065130	3.58	205	65	68	20	1.30
M205065140	3.84	205	65	68	20	1.40
M205065150	4.13	205	65	68	20	1.50
M205065160	4.41	205	65	68	20	1.60
M205065170	4.67	205	65	68	20	1.70
M205065180	4.96	205	65	68	20	1.80
M205065200	5.53	205	65	68	20	2.00
M205065220	6.05	205	65	68	20	2.20
M205065250	6.91	205	65	68	20	2.50
M205065270	7.49	205	65	68	20	2.70

Reference Key



References	Weight (kg/m)	Dims (mm) A	B	C	D	Gauge (mm)
M235065130	3.86	235	65	98	20	1.30
M235065140	4.14	235	65	98	20	1.40
M235065150	4.45	235	65	98	20	1.50
M235065160	4.76	235	65	98	20	1.60
M235065170	5.04	235	65	98	20	1.70
M235065180	5.35	235	65	98	20	1.80
M235065200	5.97	235	65	98	20	2.00
M235065220	6.53	235	65	98	20	2.20
M235065250	7.46	235	65	98	20	2.50
M235065270	8.08	235	65	98	20	2.70
M265065140	4.46	265	65	128	20	1.40
M265065150	4.79	265	65	128	20	1.50
M265065160	5.13	265	65	128	20	1.60
M265065180	5.76	265	65	128	20	1.80
M265065200	6.43	265	65	128	20	2.00
M265065220	7.03	265	65	128	20	2.20
M265065250	8.03	265	65	128	20	2.50
M265065270	8.70	265	65	128	20	2.70
M300090150	5.86	300	90	94	40	1.50
M300090160	6.27	300	90	94	40	1.60
M300090180	7.05	300	90	94	40	1.80
M300090200	7.86	300	90	94	40	2.00
M300090250	9.82	300	90	94	40	2.50
M300090270	10.64	300	90	94	40	2.70
M350090150	6.43	350	90	144	40	1.50
M350090160	6.87	350	90	144	40	1.60
M350090180	7.72	350	90	144	40	1.80
M350090200	8.62	350	90	144	40	2.00
M350090250	10.77	350	90	144	40	2.50
M350090270	11.66	350	90	144	40	2.70



All dimensions in millimetres.

Dimensions & References

Multicleats

Table 3:2 Multicleat References (MD300 and MD350 deep cleats are not available as Multicleats)

Sheeting Line (mm)	Multibeam Section Depths (mm)	Cleat Type: Weld-On Double	Weld-On Single	Bolt-On Double	Bolt-On Single
–	G140/150	–	MS120x	–	MS120Bx
151	145	MD145	MS145	MD145BB	MS145BB
181	up to 175	MD175	MS175	MD175BB	MS175BB
211	up to 205	MD205	MS205	MD205BB	MS205BB
241	up to 235	MD235	MS235	MD235BB	MS235BB
271	up to 265	MD265	MS265	MD265BB	MS265BB
306	300	MD300		MD300BB	
356	350	MD350		MD350BB	

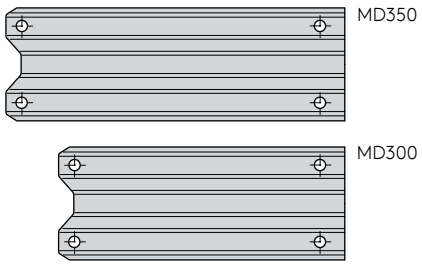
Note: All cleats are supplied in unpainted black steel as standard. Powder coated or galvanised finishes are available at extra cost if required. Please note, for galvanised finish there is an extended lead time, please contact our Sales Department for more information.

Table 3:3 Multicleat Options

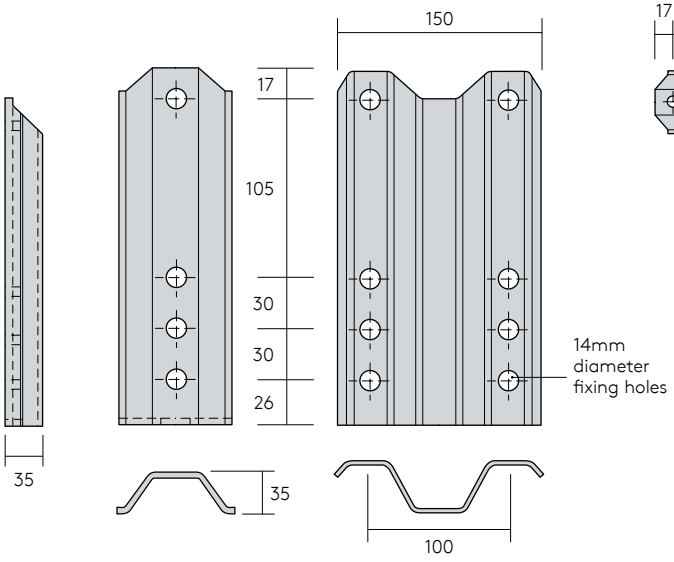
Options	Suffix	Example
Bolt-on Black	BB	MD175BB
Bolt-on Powder coated	BE	MD175BE
Bolt-on Galvanised	BG	MD175BG
Stiffened	S	MD265S
Extended	X	MD265X300 (ie; 300mm from rafter face)

MD300 and MD350 are supplied stiffened, see page 80 for details.

All Multicleat holes shown are 14mm diameter.

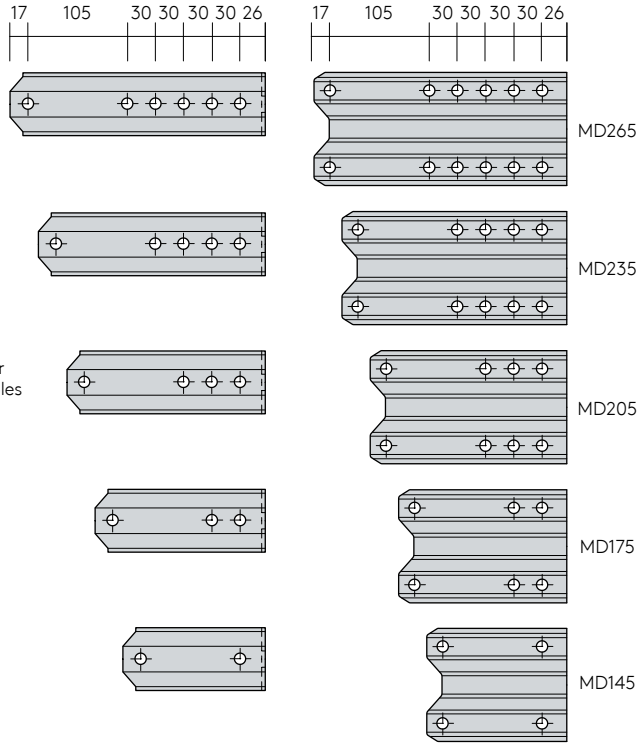


Standard Single Cleat **Standard Double Cleat**



Generally single cleats are supplied unstiffened.

Single **Double**



Multicleats provide the most economical solution for stooled-off rails.

Bolt-on Rail Cleats

All Multicleats are available as bolt-on.

Note: Various finishes are available, please see Table 3:3 on page 78.

Table 3:4 Base Plate Thicknesses

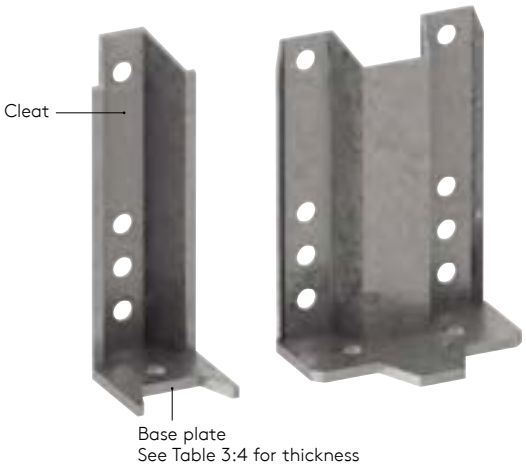
Rail Depth	Cleat Base Plate Thickness (mm)
G140/150	6
145	6
175	6
205	8
235	8
265	8
300	8
350	8

Table 3:5 Base Plate Holes Cross Centres

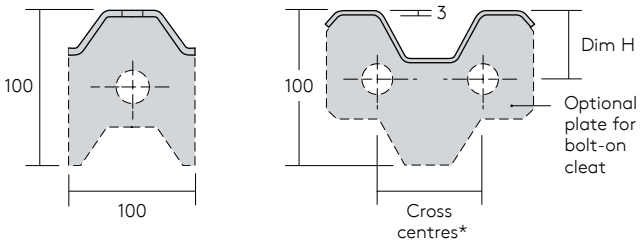
Base Plate Holes Cross Centres*	Dim H (mm)
50	55
60	55
70 (standard)	50
80	50
90	50
100	50

Multicleats allow differing section sizes to be used on any elevation, while maintaining a constant sheeting line.

Bolt-On Single Cleat **Bolt-On Double Cleat**

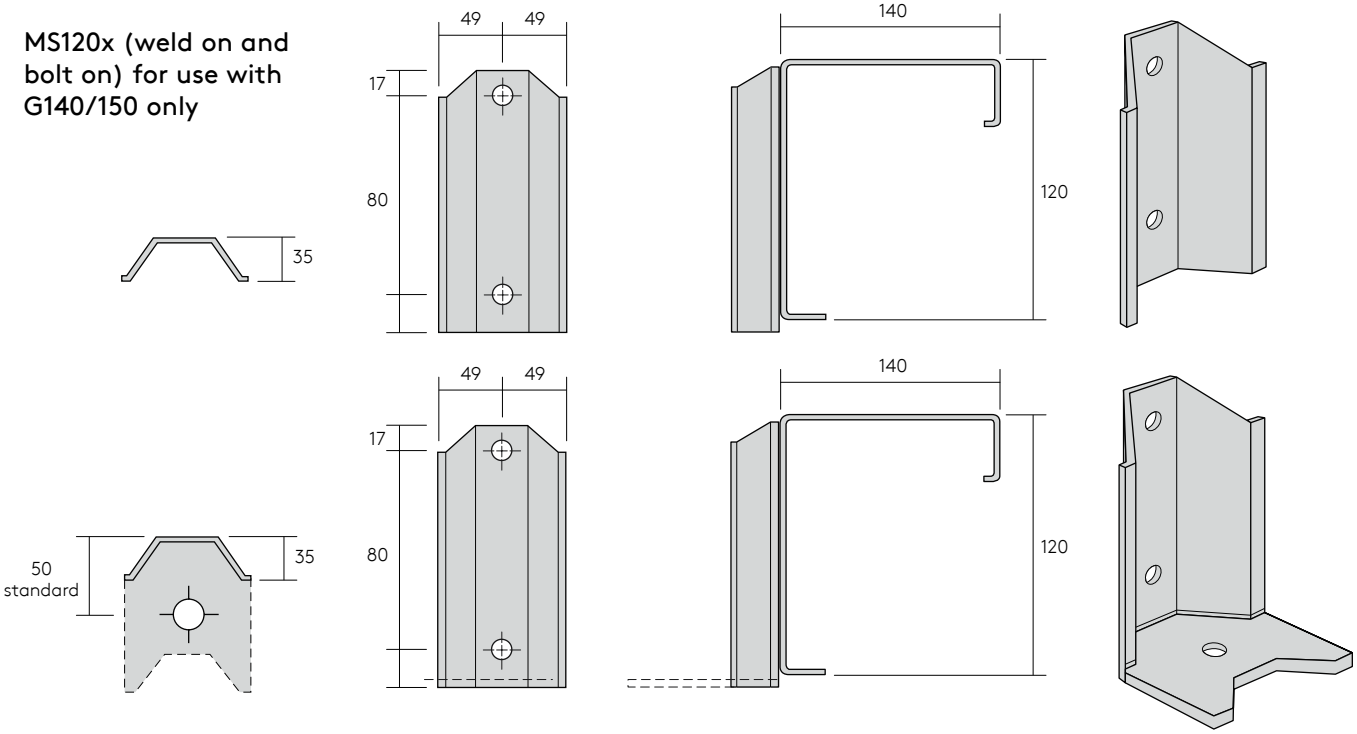


Bolt-On Single Cleat **Bolt-On Double Cleat**



All base plate holes are 18mm
Cleat thickness = 3mm

MS120x (weld on and bolt on) for use with G140/150 only



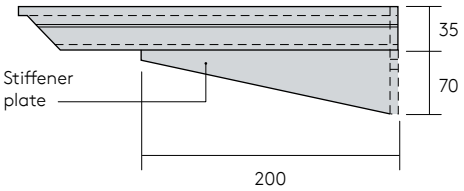
Dimensions & References

Stiffened Rail Multicleats

All Multicleats are available with stiffeners where required. Add 'stiffened' to Multicleat reference when ordering.

MD300 and MD350 are supplied stiffened.

Note: Single cleats are generally supplied unstiffened.



Multicleat Arrangement

Multicleats allow differing section sizes to be used on any elevation, while maintaining a constant sheeting line.

Diagram A

shows a 265 deep section fixed to a MD265 cleat.

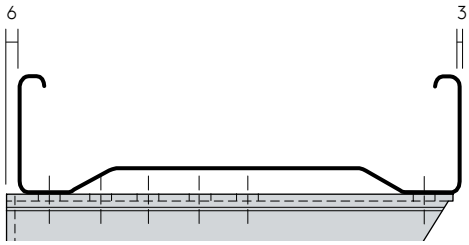
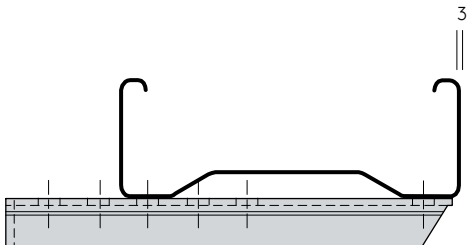


Diagram B

shows a 205 deep section fixed to a MD265 cleat.

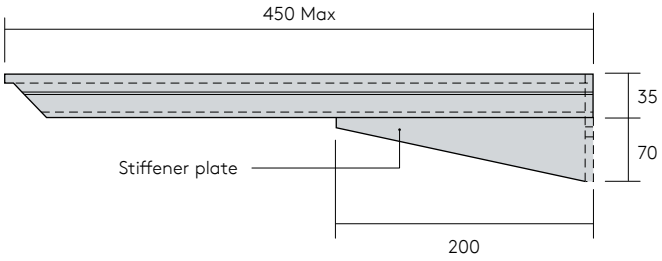


Extended Rail Cleats

Extended cleats can be manufactured to meet your specific requirements. These are manufactured to order and will be at an additional cost.

Note: Add 'extended' to cleat reference when ordering.

Extended double cleats over 270mm long are supplied complete with stiffeners. These are not available with single cleats.



Cladding Rail Sleeves

Used to provide continuity at a rail joint normally at a single span to a double, or a single to a single span.

All bolts to be M12.

Please specify sleeve reference as below.

For design details see page 69.

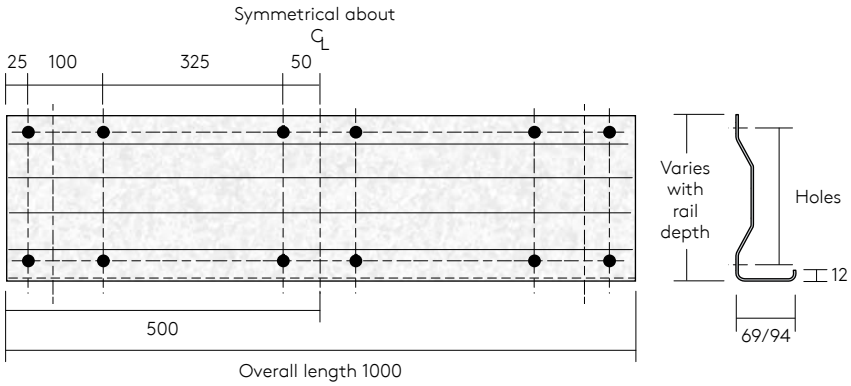
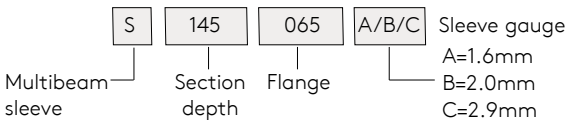


Table 3:6 Multibeam Sleeve Product References

Multibeam Part Reference	Sleeve Part Reference	Nominal Sleeve Gauge (mm)
M145065120 M145065130 M145065140 M145065150	S145065A	1.6
M145065160 M145065180	S145065B	2.0
M145065200 M145065220	S145065C	2.9
M175065120 M175065130 M175065140 M175065150	S175065A	1.6
M175065160 M175065180	S175065B	2.0
M175065200 M175065220 M175065250	S175065C	2.9
M205065120 M205065130 M205065140 M205065150	S205065A	1.6
M205065160 M205065170 M205065180	S205065B	2.0
M205065200 M205065220 M205065250 M205065270	S205065C	2.9

Multibeam Part Reference	Sleeve Part Reference	Nominal Sleeve Gauge (mm)
M235065130 M235065140 M235065150	S235065A	1.6
M235065160 M235065170 M235065180	S235065B	2.0
M235065200 M235065220 M235065250 M235065270	S235065C	2.9
M265065140 M265065150	S265065A	1.6
M265065160 M265065180	S265065B	2.0
M265065200 M265065220 M265065250 M265065270	S265065C	2.9
M300090150	S300090A	1.6
M300090160 M300090180	S300090B	2.0
M300090200 M300090250 M300090270	S300090C	2.9
M350090150	S350090A	1.6
M350090160 M350090180	S350090B	2.0
M350090200 M350090250 M350090270	S350090C	2.9

Sleeve Reference Key



Wider range of sleeves for a more economic solution.

Dimensions & References

Tube Strut TSA

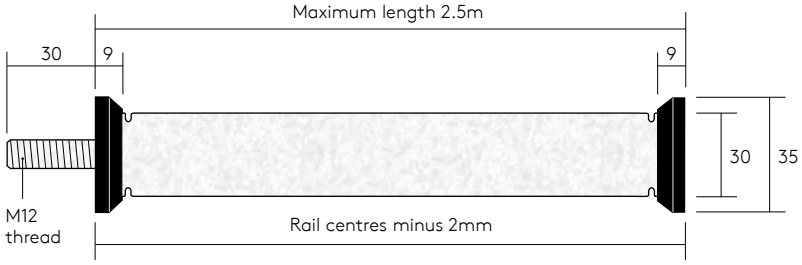
Used to restrain side rails.

Part reference: TSA0000.

Where 0000 = rail centres
e.g: TSA1000 (rail centres = 1000mm).

Minimum length = 150mm.

For design details see page 71.



Tube Strut TSB

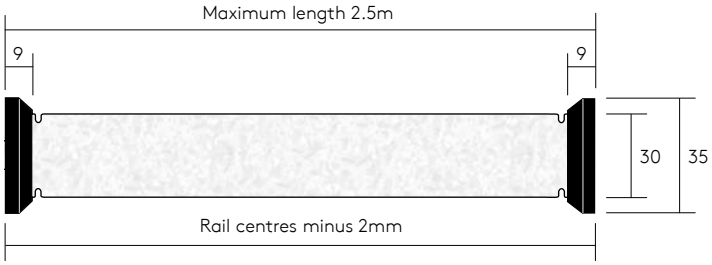
This tube strut is used to restrain side rails where a flush face is required.

Part reference: TSB0000.

Where 0000 = rail centres
e.g: TSB1000 (rail centres = 1000mm).

Minimum Length = 150mm.

For design details see page 71.



Tubular Ties

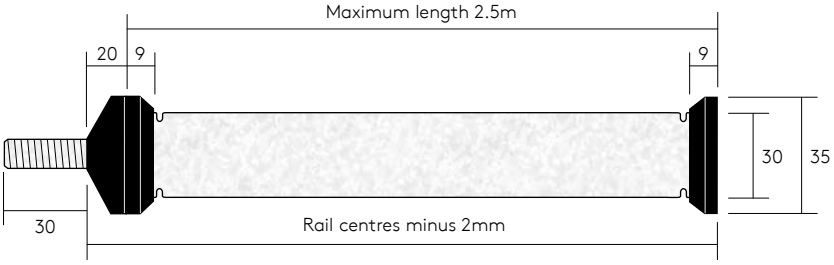
Used to restrain M145 side rails.

Part reference: TS14000.

Where 0000 = rail centres
e.g: TS141000 (rail centres = 1000mm).

Minimum length = 150mm.

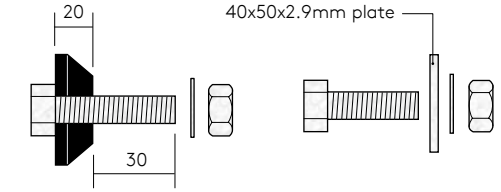
For design details see page 71.



Clamp Plates

Used to fix and complete a run of tube struts, CA145 used with M145 rails.

Part reference: CA145 / CA.



CA 145
(Used for M145 sections only)

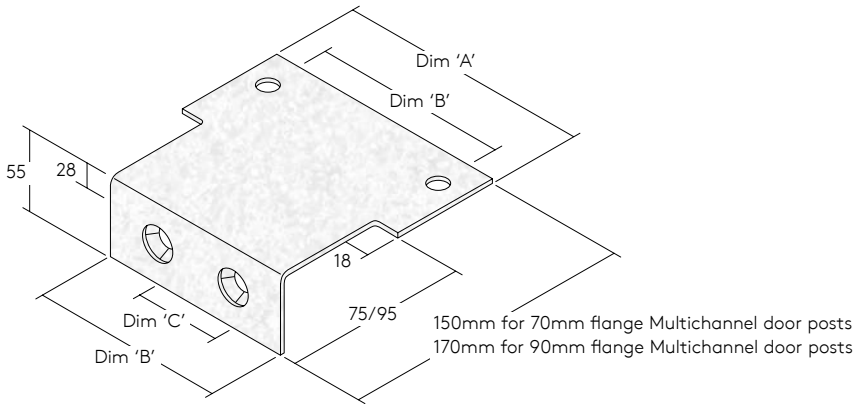
CA
(for all sizes except M145)

Door Post Cleat DPC

Used to connect a horizontal Multibeam rail to a vertical Multichannel when used to form a personnel door post. For connections into 300 and 350 deep sections cleats are supplied with 3no. Ø14mm counterform holes along the centreline.

Section Depth (mm)	Dim. 'A'	Dim. 'B'	Dim. 'C'	Cleat Ref.
145	141	105	50	DPC145
175	171	135	60	DPC175
205	201	165	90	DPC205
235	231	195	120	DPC235
265	261	225	150	DPC265
300	296	260	185	DPC300
350	346	310	235	DPC350

Manufactured from 2.9mm galvanised steel.
All holes are Ø14mm. See page 138 for counterform hole depth.

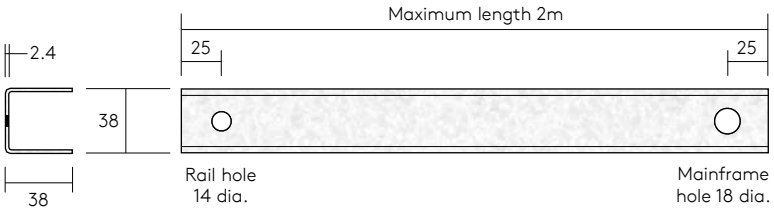


Stanchion Restraint RNA

Channel stay to provide compression and tension restraint from the rail to the inner flange of the main frame.

Part reference: RNA0000.

Where 0000 = length between hole centres e.g: RNA1000 (hole centres = 1000mm).

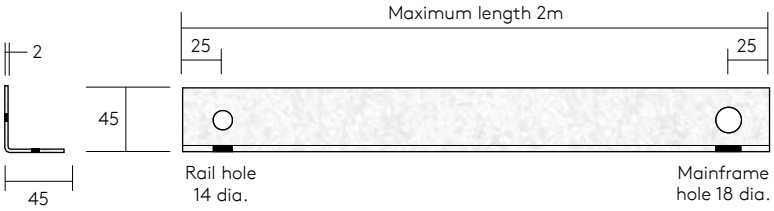


Stanchion Restraint RNB

Angle stay to provide compression and tension restraint from the rail to the inner flange of the main frame suitable for smaller main frame sections.

Part reference: RNB0000.

Where 0000 = length between hole centres e.g: RNB1000 (hole centres = 1000mm).



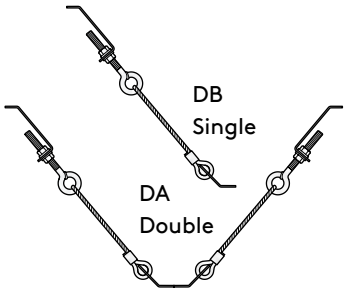
Diagonal Tie Wire

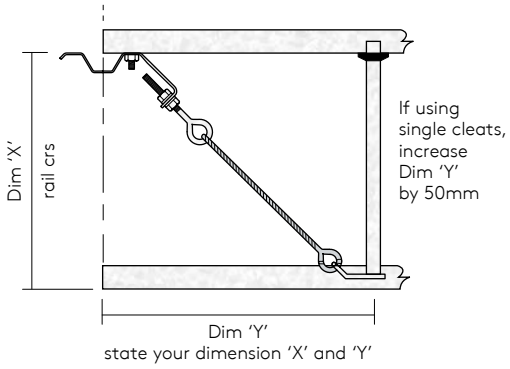
Used to support the self weight of the cladding and transfer it to the stanchions.

Part reference: DB / DA.

Please state your dimension 'X' and 'Y'.

For design details see pages 71-73.





Horizontal Panel Vertical Support

Used as the vertical support between Multibeam horizontal rails to support horizontally laid Insulated panels.

Part reference: G140/150.

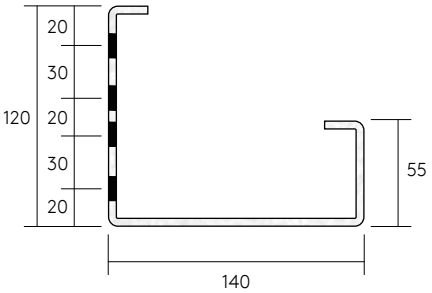
Maximum length = 8m.

1.5mm galvanised steel.

For use within the span it can be provided complete with end connections attached.

For application see pages 72-73.

For load / span tables see page 122.



All holes 14mm diameter. Standard hole grouping are at backmarks of 20mm, 50mm, 70mm and 100mm.

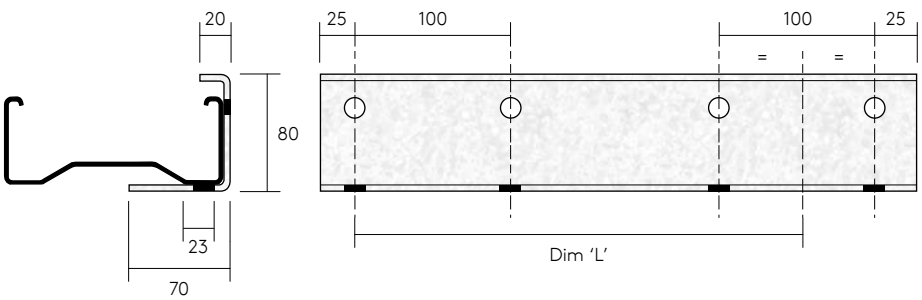
Hole placement along the length to be specified by the customer.

Rail Stubs

Part reference: SM0000.

Where 0000 = required length 'Dim L'.

Manufactured from 2.7mm galvanised steel strip.



Dimensions & References

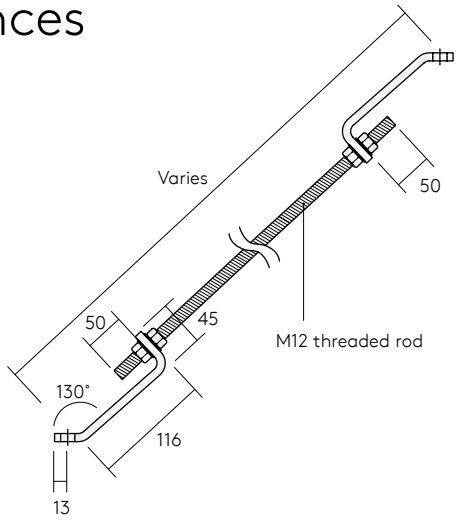
Rod Diagonal

The rod diagonal is used to transfer the load to the column when the horizontal cladding system is jointed in the bay.

Part reference: TRHD0000.

Where 0000 = length between hole centres e.g: TRHD1000 (hole centres = 1000mm).

For application see page 73.



Standard CTHDA fittings to suit 50° angle.

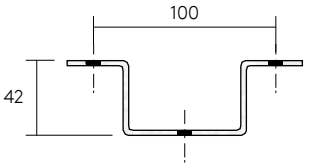
For non-standard angles contact our Technical Department.

Bottom Strut Bracket

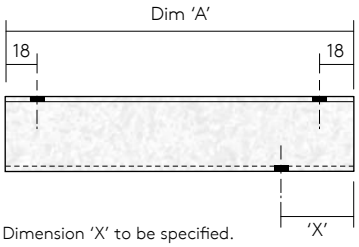
Used where different depth side rails are used on the same wall to allow the tube struts to be aligned.

Part Ref.	Section Depth	Dim 'A'
CSC145	145mm	141mm
CSC175	175mm	171mm
CSC205	205mm	201mm
CSC235	235mm	231mm
CSC265	265mm	261mm
CSC300	300mm	296mm
CSC350	350mm	346mm

Note: Thickness = 2.0mm.



Note: these cleats are supplied with opposite hand holes.



Dimension 'X' to be specified.
All holes 14 diameter.

Multibracket

Multibrackets are used to make connections between Multichannels and Multibeam.

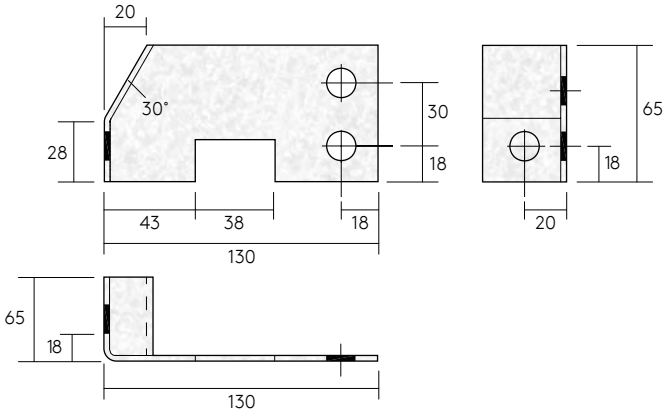
Part reference: MB1B as shown / MB1A opposite hand.

Material 3.0mm galvanised steel.

All holes 14 diameter.

For application see pages 72-73.

Note: Multibrackets are not suitable for connecting sections to a 90mm flange.



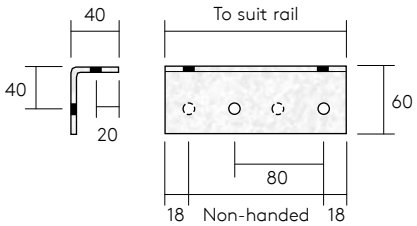
MTC Cleats

Angle cleat to attach Multibeam or Multichannel together.

For application see pages 72-73.

Part Ref.	Rail Depth
MTC145	145mm
MTC175	175mm
MTC205	205mm
MTC235	235mm
MTC265	265mm
MTC300	300mm
MTC350	350mm

Note: These cleats are supplied with opposite hand holes. Thickness = 2.0mm.



All holes 14 diameter.

Section Properties

Table 3:7 Multibeam Eurocode Section Properties

Section	Gauge	Area	Weight	Major Axis		Minor Axis		Radius of Gyration	
	^{t}nom (mm)	A_0 (cm^2)	(kg/m)	Iyy (cm^4)	W_{el}yy (cm^3)	Izz (cm^4)	W_{el}zz (cm^3)	iyy (cm)	izz (cm)
M145065120	1.20	3.68	2.75	121.15	16.72	19.24	4.56	5.74	2.29
M145065130	1.30	3.99	2.99	131.11	18.09	20.74	4.91	5.73	2.28
M145065140	1.40	4.30	3.21	140.99	19.45	22.21	5.26	5.73	2.27
M145065150	1.50	4.60	3.45	150.77	20.80	23.66	5.60	5.72	2.27
M145065160	1.60	4.91	3.69	160.48	22.14	25.08	5.94	5.72	2.26
M145065180	1.80	5.51	4.15	179.69	24.79	27.86	6.60	5.71	2.25
M145065200	2.00	6.11	4.63	198.62	27.40	30.54	7.23	5.70	2.24
M145065220	2.20	6.71	5.06	217.21	29.97	33.12	7.84	5.69	2.22
M175065120	1.20	4.03	3.02	187.92	21.48	19.28	4.53	6.83	2.19
M175065130	1.30	4.37	3.29	203.42	23.25	20.79	4.89	6.82	2.18
M175065140	1.40	4.71	3.52	218.82	25.01	22.26	5.23	6.82	2.17
M175065150	1.50	5.04	3.79	234.07	26.76	23.71	5.57	6.81	2.17
M175065160	1.60	5.38	4.05	249.21	28.49	25.13	5.91	6.81	2.16
M175065180	1.80	6.04	4.55	279.21	31.92	27.91	6.56	6.80	2.15
M175065200	2.00	6.70	5.08	308.79	35.30	30.60	7.19	6.79	2.14
M175065220	2.20	7.36	5.56	337.89	38.62	33.18	7.80	6.78	2.12
M175065250	2.50	8.33	6.35	380.74	43.52	36.89	8.68	6.76	2.10
M205065120	1.20	4.38	3.29	272.82	26.62	19.32	4.51	7.89	2.10
M205065130	1.30	4.75	3.58	295.39	28.83	20.83	4.86	7.89	2.09
M205065140	1.40	5.11	3.84	317.82	31.01	22.30	5.21	7.88	2.09
M205065150	1.50	5.48	4.13	340.05	33.18	23.75	5.55	7.88	2.08
M205065160	1.60	5.84	4.41	362.13	35.34	25.18	5.88	7.87	2.08
M205065170	1.70	6.21	4.67	384.50	37.52	26.63	6.22	7.87	2.07
M205065180	1.80	6.57	4.96	405.91	39.61	27.96	6.54	7.86	2.06
M205065200	2.00	7.29	5.53	449.12	43.82	30.64	7.17	7.85	2.05
M205065220	2.20	8.00	6.05	491.68	47.98	33.23	7.77	7.84	2.04
M205065250	2.50	9.06	6.91	554.41	54.10	36.94	8.64	7.82	2.02
M205065270	2.70	9.76	7.49	595.41	58.10	39.29	9.20	7.81	2.01
M235065130	1.30	5.12	3.86	408.72	34.79	20.86	4.85	8.93	2.02
M235065140	1.40	5.52	4.14	439.84	37.44	22.34	5.19	8.92	2.01
M235065150	1.50	5.92	4.45	470.70	40.07	23.79	5.53	8.92	2.01
M235065160	1.60	6.31	4.76	501.35	42.68	25.21	5.86	8.91	2.00
M235065170	1.70	6.70	5.04	531.67	45.26	26.59	6.18	8.91	1.99
M235065180	1.80	7.10	5.35	562.18	47.85	28.00	6.51	8.90	1.99
M235065200	2.00	7.88	5.97	622.25	52.97	30.69	7.14	8.89	1.97
M235065220	2.20	8.65	6.53	681.48	58.01	33.27	7.75	8.88	1.96
M235065250	2.50	9.80	7.46	768.88	65.45	36.98	8.62	8.86	1.94
M235065270	2.70	10.56	8.08	826.07	70.32	39.33	9.17	8.84	1.93
M265065140	1.40	5.93	4.46	586.70	44.29	22.37	5.17	9.95	1.94
M265065150	1.50	6.36	4.79	627.97	47.40	23.82	5.51	9.94	1.94
M265065160	1.60	6.78	5.13	668.97	50.50	25.25	5.84	9.93	1.93
M265065180	1.80	7.63	5.76	750.38	56.64	28.04	6.49	9.92	1.92
M265065200	2.00	8.47	6.43	830.83	62.71	30.72	7.12	9.91	1.91
M265065220	2.20	9.30	7.03	910.21	68.71	33.31	7.72	9.89	1.89
M265065250	2.50	10.54	8.03	1027.46	77.56	37.01	8.59	9.87	1.87
M265065270	2.70	11.36	8.70	1104.27	83.36	39.36	9.14	9.86	1.86
M300090150	1.50	7.75	5.86	1017.30	67.83	54.24	9.60	11.45	2.64
M300090160	1.60	8.27	6.27	1084.30	72.30	57.60	10.20	11.45	2.64
M300090180	1.80	9.31	7.05	1217.51	81.18	64.22	11.37	11.44	2.63
M300090200	2.00	10.34	7.86	1349.43	89.97	70.67	12.52	11.42	2.61
M300090250	2.50	12.89	9.82	1673.13	111.56	86.07	15.27	11.39	2.58
M300090270	2.70	13.91	10.64	1800.32	120.04	91.94	16.32	11.38	2.57
M350090150	1.50	8.48	6.43	1470.17	84.02	54.45	9.72	13.16	2.53
M350090160	1.60	9.05	6.87	1567.25	89.57	57.83	10.33	13.16	2.53
M350090180	1.80	10.19	7.72	1760.37	100.61	64.50	11.52	13.14	2.52
M350090200	2.00	11.32	8.62	1951.76	111.54	70.99	12.69	13.13	2.50
M350090250	2.50	14.12	10.77	2422.01	138.42	86.50	15.49	13.09	2.47
M350090270	2.70	15.24	11.66	2607.02	148.99	92.42	16.57	13.08	2.46

Horizontal Panel Vertical Support Eurocode Section Properties

Section	Gauge	Area	Weight	Major Axis			Minor Axis		Radius of Gyration	
	^{t}nom (mm)	A_0 (cm^2)	(kg/m)	Iyy (cm^4)	W_{el} Pos (cm^3)	W_{el} Neg (cm^3)	Izz (cm^4)	W_{el}zz (cm^3)	iyy (cm)	izz (cm)
G140/150	1.50	5.10	4.00	78.08	22.67	9.13	164.43	28.81	3.91	5.63

Load / Span Tables

Siderail Ultimate Loads: Eurocode Design

The following load / span tables show the ultimate load to comply with Eurocode BS EN 1993-1-3 + UK NAD. Multibeam cladding rails are supported on Multibeam cleats as shown in this handbook. Loads shown are UDL'S in kN and are ultimate values.

Values against deflection should be compared against values at working load. Capacity assumes the cladding provides restraint to the Multibeam, and that the Multibeam restraint system is as detailed in this handbook. The strut system should be fitted between the bottom rails and the rails levelled before proceeding progressively upwards. Maximum height limit 10m. Use grade 8.8 bolts for M265, M300 and M350.

For Stanchion Stay capacities please refer to page 122.

Table 3:8 Double Span Siderails (Vertical Cladding)

Span (m)	Section	Weight (kg/m)	Ultimate Total UDL kN		Working Load to Produce Deflection Span/150 kN
			Pressure	Suction	
4.5	M145065120	2.75	11.95	9.33	-
	M145065130	2.99	14.04	11.23	-
	M145065140	3.21	16.21	12.96	-
	M145065150	3.45	18.40	14.72	-
	M145065160	3.69	20.61	16.49	20.04
	M145065180	4.15	24.96	19.97	22.44
	M145065200	4.63	29.10	23.28	24.80
	M145065220	5.06	33.02	26.42	27.12
	M175065120	3.02	14.66	11.73	-
	M175065130	3.29	17.29	13.83	-
	M175065140	3.52	19.98	15.99	-
	M175065150	3.79	22.45	17.96	-
	M175065160	4.05	24.52	19.61	-
	M175065180	4.55	29.74	23.34	-
	M175065200	5.08	34.07	27.25	-
	M175065220	5.56	38.74	31.00	-
	M175065250	6.35	45.42	36.34	-
	M205065120	3.29	16.44	13.02	-
	M205065130	3.58	19.44	14.98	-
	M205065140	3.84	22.53	17.40	-
	M205065150	4.13	25.67	19.89	-
	M205065160	4.41	28.82	22.40	-
	M205065170	4.67	31.97	24.55	-
	M205065180	4.96	33.90	26.47	-
	M205065200	5.53	39.16	30.69	-
	M205065220	6.05	44.66	35.08	-
	M205065250	6.91	52.52	41.37	-
	M205065270	7.49	57.57	45.42	-
	M235065130	3.86	22.89	17.58	-
	M235065140	4.14	26.61	20.35	-
	M235065150	4.45	30.38	23.35	-
	M235065160	4.76	34.07	26.73	-
	M235065170	5.04	37.23	28.82	-
	M235065180	5.35	40.75	31.47	-
	M235065200	5.97	46.89	36.54	-
	M235065220	6.53	53.69	44.28	-
	M235065250	7.46	63.30	52.41	-
	M235065270	8.08	69.52	57.66	-
5.0	M145065120	2.75	10.94	8.75	-
	M145065130	2.99	12.82	10.26	-
	M145065140	3.21	14.78	11.82	14.26
	M145065150	3.45	16.76	13.41	15.25
	M145065160	3.69	18.75	15.00	16.23
	M145065180	4.15	22.67	18.13	18.17
	M145065200	4.63	26.39	21.12	20.09
	M145065220	5.06	29.93	23.94	21.97
	M175065120	3.02	13.48	10.79	-
	M175065130	3.29	15.85	12.68	-
	M175065140	3.52	18.28	14.63	-
	M175065150	3.79	20.50	16.40	-
	M175065160	4.05	22.36	17.89	-
	M175065180	4.55	27.07	21.66	-
	M175065200	5.08	30.96	24.76	-
	M175065220	5.56	35.16	28.13	34.17
	M175065250	6.35	41.17	32.94	38.51
	M205065120	3.29	15.19	12.15	-
	M205065130	3.58	17.90	14.32	-
	M205065140	3.84	20.69	16.55	-
	M205065150	4.13	23.51	18.81	-
	M205065160	4.41	26.35	21.08	-
	M205065170	4.67	29.19	23.02	-
	M205065180	4.96	30.92	24.74	-
	M205065200	5.53	35.65	28.52	-
	M205065220	6.05	40.60	32.48	-
	M205065250	6.91	47.67	38.13	-
	M205065270	7.49	52.21	41.76	-
	M235065130	3.86	21.17	16.94	-
	M235065140	4.14	24.53	19.62	-
	M235065150	4.45	27.93	22.34	-
	M235065160	4.76	31.25	25.00	-
	M235065170	5.04	34.09	27.27	-
	M235065180	5.35	37.26	29.65	-
	M235065200	5.97	42.78	34.20	-
	M235065220	6.53	48.89	41.25	-
	M235065250	7.46	57.54	48.54	-
	M235065270	8.08	63.13	53.26	-
5.5	M145065120	2.75	10.08	8.06	-
	M145065130	2.99	11.79	9.44	10.96
	M145065140	3.21	13.58	10.86	11.78
	M145065150	3.45	15.38	12.30	12.60
	M145065160	3.69	17.19	13.75	13.41
	M145065180	4.15	20.76	16.60	15.02
	M145065200	4.63	24.15	19.32	16.60
	M145065220	5.06	27.36	21.89	18.16
	M175065120	3.02	12.47	9.97	-
	M175065130	3.29	14.62	11.70	-
	M175065140	3.52	16.84	13.47	-
	M175065150	3.79	18.86	15.09	-
	M175065160	4.05	20.55	16.44	-
	M175065180	4.55	24.83	19.87	23.34
	M175065200	5.08	28.36	22.69	25.81
	M175065220	5.56	32.19	25.75	28.24
	M175065250	6.35	37.65	30.12	31.82
	M205065120	3.29	14.10	11.28	-
	M205065130	3.58	16.57	13.25	-
	M205065140	3.84	19.11	15.29	-
	M205065150	4.13	21.68	17.35	-
	M205065160	4.41	24.27	19.41	-
	M205065170	4.67	26.85	21.17	-
	M175065150	3.79	20.50	16.40	-

- indicates the load to produce a deflection of span/150 exceeds ultimate UDL capacity.

Table 3:8 Double Span Siderails (Vertical Cladding) (cont.)

Span (m)	Section	Weight (kg/m)	Ultimate Total UDL kN		Working Load to Produce Deflection Span/150 kN
			Pressure	Suction	
	M205065180	4.96	28.42	22.73	-
	M205065200	5.53	32.71	26.17	-
	M205065220	6.05	37.21	29.77	-
	M205065250	6.91	43.63	34.90	-
	M205065270	7.49	47.76	38.20	-
	M235065130	3.86	19.67	15.73	-
	M235065140	4.14	22.72	18.18	-
	M235065150	4.45	25.82	20.66	-
	M235065160	4.76	28.85	23.08	-
	M235065170	5.04	31.42	25.14	-
	M235065180	5.35	34.30	27.44	-
	M235065200	5.97	39.31	31.43	-
	M235065220	6.53	44.87	37.86	-
	M235065250	7.46	52.72	44.48	-
	M235065270	8.08	57.80	48.77	-
	M265065140	4.46	25.63	20.49	-
	M265065150	4.79	30.24	23.32	-
	M265065160	5.13	32.74	24.86	-
	M265065180	5.76	39.93	29.51	-
	M265065200	6.43	46.30	35.06	-
	M265065220	7.03	52.50	41.61	-
	M265065250	8.03	63.76	49.32	-
	M265065270	8.70	69.99	54.32	-
6.0	M145065120	2.75	9.34	7.47	8.51
	M145065130	2.99	10.92	8.73	9.21
	M145065140	3.21	12.55	10.04	9.90
	M145065150	3.45	14.21	11.37	10.59
	M145065160	3.69	15.87	12.70	11.27
	M145065180	4.15	19.14	15.31	12.62
	M145065200	4.63	22.25	17.80	13.95
	M145065220	5.06	25.19	20.15	15.26
	M175065120	3.02	11.59	9.27	-
	M175065130	3.29	13.57	10.85	-
	M175065140	3.52	15.60	12.48	15.37
	M175065150	3.79	17.46	13.97	16.44
	M175065160	4.05	19.00	15.20	17.50
	M175065180	4.55	22.93	18.35	19.61
	M175065200	5.08	26.16	20.93	21.69
	M175065220	5.56	29.67	23.74	23.73
	M175065250	6.35	34.67	27.74	26.74
	M205065120	3.29	13.14	10.52	-
	M205065130	3.58	15.41	12.33	-
	M205065140	3.84	17.74	14.20	-
	M205065150	4.13	20.11	16.09	-
	M205065160	4.41	22.48	17.99	-
	M205065170	4.67	24.85	19.59	-
	M205065180	4.96	26.28	21.02	-
	M205065200	5.53	30.22	24.17	-
	M205065220	6.05	34.34	27.47	-
	M205065250	6.91	40.22	32.17	38.94
	M205065270	7.49	44.00	35.20	41.82
	M235065130	3.86	18.35	14.67	-
	M235065140	4.14	21.15	16.92	-
	M235065150	4.45	24.00	19.20	-
	M235065160	4.76	26.77	21.42	-
	M235065170	5.04	29.13	23.30	-
	M235065180	5.35	31.77	25.42	-
	M235065200	5.97	36.36	29.07	-
	M235065220	6.53	41.46	34.97	-
	M235065250	7.46	48.65	41.04	-
	M235065270	8.08	53.30	44.97	-
	M265065140	4.46	23.92	19.12	-
	M265065150	4.79	28.17	22.29	-
	M265065160	5.13	30.45	23.74	-
	M265065180	5.76	37.04	28.00	-
	M265065200	6.43	42.88	33.11	-
	M265065220	7.03	48.56	39.15	-
	M265065250	8.03	58.89	46.22	-
	M265065270	8.70	64.59	50.80	-
6.5	M175065120	3.02	10.82	8.66	-
	M175065130	3.29	12.65	10.12	12.17
	M175065140	3.52	14.53	11.63	13.10
	M175065150	3.79	16.25	13.00	14.01
	M175065160	4.05	17.67	14.13	14.91
	M175065180	4.55	21.30	17.04	16.71
	M175065200	5.08	24.28	19.43	18.48
	M175065220	5.56	27.52	22.02	20.22
	M175065250	6.35	32.14	25.71	22.78
	M205065120	3.29	12.30	9.84	-
	M205065130	3.58	14.40	11.52	-
	M205065140	3.84	16.56	13.25	-
	M205065150	4.13	18.74	14.99	-
	M205065160	4.41	20.94	16.75	-
	M205065170	4.67	23.13	18.23	23.01
	M205065180	4.96	24.44	19.55	24.29
	M205065200	5.53	28.07	22.46	26.88
	M205065220	6.05	31.88	25.50	29.42
	M205065250	6.91	37.30	29.84	33.18
	M205065270	7.49	40.79	32.63	35.63
	M235065130	3.86	17.18	13.74	-
	M235065140	4.14	19.78	15.82	-
	M235065150	4.45	22.40	17.93	-
	M235065160	4.76	24.89	19.98	-
	M235065170	5.04	27.14	21.71	-
	M235065180	5.35	29.58	23.67	-
	M235065200	5.97	33.81	27.04	-
	M235065220	6.53	38.52	32.50	-
	M235065250	7.46	45.16	38.10	-
	M235065270	8.08	49.45	41.72	49.43
	M265065140	4.46	22.41	17.91	-
	M265065150	4.79	26.34	20.85	-
	M265065160	5.13	28.44	22.65	-
	M265065180	5.76	34.53	26.59	-
	M265065200	6.43	39.92	31.32	-
	M265065220	7.03	45.16	36.72	-
	M265065250	8.03	54.70	43.12	-
	M265065270	8.70	59.96	47.27	-

- indicates the load to produce a deflection of span/150 exceeds ultimate UDL capacity

Load / Span Tables

Table 3:8 Double Span Siderails (Vertical Cladding) (cont.)

Span (m)	Section	Weight (kg/m)	Ultimate Total UDL kN		Working Load to Produce Deflection Span/150 kN
			Pressure	Suction	
7.0	M175065120	3.02	10.15	8.12	9.70
	M175065130	3.29	11.85	9.48	10.50
	M175065140	3.52	13.60	10.88	11.29
	M175065150	3.79	15.19	12.15	12.08
	M175065160	4.05	16.51	13.21	12.86
	M175065180	4.55	19.88	15.91	14.41
	M175065200	5.08	22.65	18.12	15.93
	M175065220	5.56	25.66	20.53	17.44
	M175065250	6.35	29.94	23.95	19.65
	M205065120	3.29	11.56	9.25	-
	M205065130	3.58	13.51	10.81	-
	M205065140	3.84	15.52	12.41	-
	M205065150	4.13	17.55	14.04	17.55
	M205065160	4.41	19.59	15.67	18.69
	M205065170	4.67	21.62	17.05	19.84
	M205065180	4.96	22.84	18.27	20.94
	M205065200	5.53	26.21	20.97	23.17
	M205065220	6.05	29.74	23.79	25.37
	M205065250	6.91	34.78	27.82	28.61
	M205065270	7.49	38.02	30.41	30.72
	M235065130	3.86	16.15	12.92	-
	M235065140	4.14	18.56	14.85	-
	M235065150	4.45	21.01	16.81	-
	M235065160	4.76	23.11	18.71	-
	M235065170	5.04	25.41	20.32	-
	M235065180	5.35	27.67	22.14	-
	M235065200	5.97	31.60	25.27	-
	M235065220	6.53	35.97	30.34	35.16
	M235065250	7.46	42.13	35.54	39.67
	M235065270	8.08	46.11	38.90	42.62
	M265065140	4.46	21.07	16.84	-
	M265065150	4.79	24.74	19.58	-
	M265065160	5.13	26.68	21.32	-
	M265065180	5.76	32.34	25.27	-
	M265065200	6.43	37.34	29.69	-
	M265065220	7.03	42.20	34.31	-
	M265065250	8.03	51.07	40.26	-
	M265065270	8.70	55.95	44.11	-
7.5	M175065120	3.02	9.47	7.64	8.45
	M175065130	3.29	11.06	8.91	9.14
	M175065140	3.52	12.69	10.22	9.84
	M175065150	3.79	14.18	11.41	10.52
	M175065160	4.05	15.41	12.39	11.20
	M175065180	4.55	18.56	14.91	12.55
	M175065200	5.08	21.14	16.98	13.88
	M175065220	5.56	23.94	19.22	15.19
	M175065250	6.35	27.95	22.42	17.11
	M205065120	3.29	10.90	8.72	-
	M205065130	3.58	12.72	10.18	-
	M205065140	3.84	14.60	11.68	14.29
	M205065150	4.13	16.49	13.20	15.29
	M205065160	4.41	18.40	14.72	16.28
	M205065170	4.67	20.30	16.00	17.28
	M205065180	4.96	21.43	17.14	18.25
	M205065200	5.53	24.58	19.66	20.19
	M205065220	6.05	27.87	22.30	22.10
	M205065250	6.91	32.58	26.06	24.92
	M205065270	7.49	35.60	28.47	26.76
	M235065130	3.86	15.23	12.18	-
	M235065140	4.14	17.48	13.99	-
	M235065150	4.45	19.77	15.82	-
	M235065160	4.76	21.57	17.60	-
	M235065170	5.04	23.87	19.10	-
	M235065180	5.35	25.93	20.79	25.27
	M235065200	5.97	29.65	23.71	27.97
	M235065220	6.53	33.73	28.46	30.63
	M235065250	7.46	39.48	33.31	34.56
	M235065270	8.08	43.20	36.44	37.13
	M265065140	4.46	19.87	15.88	-
	M265065150	4.79	23.31	18.45	-
	M265065160	5.13	25.11	20.07	-
	M265065180	5.76	30.40	24.06	-
	M265065200	6.43	35.07	27.88	-
	M265065220	7.03	39.60	32.20	-
	M265065250	8.03	47.88	37.75	46.18
	M265065270	8.70	52.44	41.34	49.64
8.0	M205065120	3.29	10.31	8.25	-
	M205065130	3.58	12.02	9.61	11.67
	M205065140	3.84	13.78	11.02	12.56
	M205065150	4.13	15.56	12.45	13.43
	M205065160	4.41	17.34	13.88	14.31
	M205065170	4.67	19.13	15.08	15.19
	M205065180	4.96	20.19	16.15	16.04
	M205065200	5.53	23.14	18.51	17.74
	M205065220	6.05	26.23	20.98	19.42
	M205065250	6.91	30.63	24.50	21.90
	M205065270	7.49	33.47	26.77	23.52
	M235065130	3.86	14.41	11.52	-
	M235065140	4.14	16.52	13.22	-
	M235065150	4.45	18.66	14.93	18.60
	M235065160	4.76	20.22	16.60	19.81
	M235065170	5.04	22.52	18.01	21.00
	M235065180	5.35	24.31	19.60	22.21
	M235065200	5.97	27.93	22.33	24.58
	M235065220	6.53	31.75	26.79	26.92
	M235065250	7.46	37.14	31.33	30.38
	M235065270	8.08	40.63	34.27	32.63
	M265065140	4.46	18.80	15.03	-
	M265065150	4.79	22.03	17.44	-
	M265065160	5.13	23.72	18.96	-
	M265065180	5.76	28.68	22.95	-
	M265065200	6.43	33.05	26.28	32.82
	M265065220	7.03	37.31	30.33	35.96
	M265065250	8.03	45.07	35.53	40.59
	M265065270	8.70	49.34	38.90	43.62

- indicates the load to produce a deflection of span/150 exceeds ultimate UDL capacity.

Table 3:8 Double Span Siderails (Vertical Cladding) (cont.)

Span (m)	Section	Weight (kg/m)	Ultimate Total UDL kN		Working Load to Produce Deflection Span/150 kN
			Pressure	Suction	
8.5	M205065120	3.29	9.77	7.82	9.55
	M205065130	3.58	11.39	9.11	10.34
	M205065140	3.84	13.04	10.43	11.12
	M205065150	4.13	14.72	11.78	11.90
	M205065160	4.41	16.40	13.12	12.67
	M205065170	4.67	18.08	14.26	13.46
	M205065180	4.96	19.08	15.26	14.21
	M205065200	5.53	21.85	17.48	15.72
	M205065220	6.05	24.76	19.81	17.21
	M205065250	6.91	28.91	23.12	19.40
	M205065270	7.49	31.57	25.26	20.84
	M235065130	3.86	13.66	10.93	-
	M235065140	4.14	15.66	12.53	15.39
	M235065150	4.45	17.68	14.14	16.47
	M235065160	4.76	19.03	15.72	17.54
	M235065170	5.04	21.30	17.04	18.61
	M235065180	5.35	22.88	18.54	19.67
	M235065200	5.97	26.40	21.11	21.78
	M235065220	6.53	29.99	25.31	23.85
	M235065250	7.46	35.07	29.58	26.91
	M235065270	8.08	38.34	32.35	28.91
	M265065140	4.46	17.84	14.26	-
	M265065150	4.79	20.88	16.53	-
	M265065160	5.13	22.47	17.96	-
	M265065180	5.76	27.14	21.89	26.26
	M265065200	6.43	31.26	24.85	29.07
	M265065220	7.03	35.26	28.66	31.85
	M265065250	8.03	42.57	33.56	35.96
	M265065270	8.70	46.59	36.73	38.64
9.0	M205065120	3.29	9.29	7.44	8.52
	M205065130	3.58	10.82	8.65	9.22
	M205065140	3.84	12.38	9.91	9.92
	M205065150	4.13	13.97	11.18	10.61
	M205065160	4.41	15.56	12.45	11.30
	M205065170	4.67	17.15	13.52	12.00
	M205065180	4.96	18.08	14.47	12.67
	M205065200	5.53	20.70	16.56	14.02
	M205065220	6.05	23.45	18.76	15.35
	M205065250	6.91	27.37	21.89	17.31
	M205065270	7.49	29.88	23.90	18.59
	M235065130	3.86	12.99	10.39	12.76
	M235065140	4.14	14.88	11.90	13.73
	M235065150	4.45	16.79	13.43	14.69
	M235065160	4.76	17.98	14.92	15.65
	M235065170	5.04	20.21	16.17	16.60
	M235065180	5.35	21.61	17.58	17.55
	M235065200	5.97	25.02	20.01	19.42
	M235065220	6.53	28.42	23.98	21.27
	M235065250	7.46	33.21	28.02	24.00
	M235065270	8.08	36.30	30.63	25.79
	M265065140	4.46	16.97	13.56	-
	M265065150	4.79	19.85	15.71	19.60
	M265065160	5.13	21.34	17.06	20.88
	M265065180	5.76	25.76	20.78	23.42
	M265065200	6.43	29.64	23.57	25.93
	M265065220	7.03	33.42	27.17	28.41
	M265065250	8.03	40.33	31.79	32.07
	M265065270	8.70	44.12	34.78	34.47
9.5	M235065130	3.86	12.31	9.91	11.45
	M235065140	4.14	14.10	11.34	12.32
	M235065150	4.45	15.90	12.79	13.19
	M235065160	4.76	17.03	14.20	14.05
	M235065170	5.04	19.14	15.38	14.90
	M235065180	5.35	20.47	16.72	15.75
	M235065200	5.97	23.70	19.02	17.43
	M235065220	6.53	26.92	22.78	19.09
	M235065250	7.46	31.46	26.61	21.54
	M235065270	8.08	34.39	29.08	23.14
	M265065140	4.46	16.07	12.93	-
	M265065150	4.79	18.81	14.97	17.59
	M265065160	5.13	20.22	16.24	18.74
	M265065180	5.76	24.41	19.77	21.02
	M265065200	6.43	28.08	22.41	23.28
	M265065220	7.03	31.66	25.83	25.50
	M265065250	8.03	38.21	30.20	28.78
	M265065270	8.70	41.80	33.04	30.94
10.0	M235065130	3.86	11.69	9.46	10.33
	M235065140	4.14	13.39	10.82	11.12
	M235065150	4.45	15.11	12.20	11.90
	M235065160	4.76	16.18	13.54	12.68
	M235065170	5.04	18.19	14.66	13.44
	M235065180	5.35	19.45	15.94	14.21
	M235065200	5.97	22.52	18.12	15.73
	M235065220	6.53	25.58	21.70	17.23
	M235065250	7.46	29.89	25.33	19.44
	M235065270	8.08	32.68	27.68	20.89
	M265065140	4.46	15.27	12.35	14.83
	M265065150	4.79	17.87	14.29	15.88
	M265065160	5.13	19.21	15.50	16.91
	M265065180	5.76	23.19	18.85	18.97
	M265065200	6.43	26.68	21.36	21.01
	M265065220	7.03	30.08	24.61	23.01
	M265065250	8.03	36.30	28.77	25.98
	M265065270	8.70	39.71	31.46	27.92

- indicates the load to produce a deflection of span/150 exceeds ultimate UDL capacity.

Horizontal Panel Vertical Support Member (G140/150)

Span (m)	Ultimate Total UDL kN		Working Load to Produce Deflection Span/150 kN
	Pressure	Suction	
3.0	23.44	9.21	9.10
3.5	19.66	7.72	6.69
4.0	16.73	6.58	5.12
4.5	14.33	5.68	4.05

Rafter and Stanchion Stays

Length Between c/c Holes (mm)	RNB Angle 45 x 45	RNA Channel 38 x 38 x 38
	Ultimate Compression (kN)	
500	17.54	31.4
600	17.05	31.4
700	16.55	31.4
800	16.1	31.4
900	15.75	31.4
1000	15.55	31.4
1500	–	21
2000	–	15.5

Note: Stay attaches to Multichannel / Multibeam with an M12 (8.8 grade) bolt and to the hot-rolled steel with a M16 bolt.

Load / Span Tables

Table 3:9 Multibeam Cladding Rails (Horizontal Cladding)

Span (m)	Section	Weight (kg/m)	Ultimate Total UDL kN		Working Load to Produce Deflection Span/150 kN
			Pressure	Suction	
4.0	M145065120	2.75	14.96	14.96	22.21
	M145065130	2.99	17.16	17.16	24.03
	M145065140	3.21	19.36	19.36	25.84
	M145065150	3.45	21.54	21.54	27.64
	M145065160	3.69	23.70	23.70	29.42
	M145065180	4.15	27.96	27.96	32.94
	M145065200	4.63	32.12	32.12	36.41
	M145065220	5.06	36.20	36.20	39.81
	M175065120	3.02	16.18	16.18	34.45
	M175065130	3.29	18.94	18.94	37.29
	M175065140	3.52	21.74	21.74	40.11
	M175065150	3.79	24.57	24.57	42.90
	M175065160	4.05	27.39	27.39	45.68
	M175065180	4.55	32.99	32.99	51.18
	M175065200	5.08	38.49	38.49	56.60
	M175065220	5.56	43.86	43.86	61.93
	M175065250	6.35	51.73	51.73	69.79
4.5	M145065120	2.75	13.79	13.79	17.55
	M145065130	2.99	15.75	15.75	18.99
	M145065140	3.21	17.70	17.70	20.42
	M145065150	3.45	19.63	19.63	21.84
	M145065160	3.69	21.55	21.55	23.24
	M145065180	4.15	25.31	25.31	26.02
	M145065200	4.63	28.89	28.89	28.77
	M145065220	5.06	32.03	32.03	31.46
	M175065120	3.02	15.08	15.08	27.22
	M175065130	3.29	17.58	17.58	29.46
	M175065140	3.52	20.09	20.09	31.69
	M175065150	3.79	22.62	22.62	33.90
	M175065160	4.05	25.12	25.12	36.09
	M175065180	4.55	30.09	30.09	40.44
	M175065200	5.08	34.96	34.96	44.72
	M175065220	5.56	39.59	39.59	48.94
	M175065250	6.35	45.52	45.52	55.14
5.0	M145065120	2.75	12.77	12.77	14.21
	M145065130	2.99	14.54	14.54	15.38
	M145065140	3.21	16.29	16.29	16.54
	M145065150	3.45	18.02	18.02	17.69
	M145065160	3.69	19.74	19.74	18.83
	M145065180	4.15	22.67	22.67	21.08
	M145065200	4.63	25.46	25.46	23.30
	M145065220	5.06	28.19	28.19	25.48
	M175065120	3.02	14.12	14.12	22.05
	M175065130	3.29	16.39	16.39	23.86
	M175065140	3.52	18.66	18.66	25.67
	M175065150	3.79	20.94	20.94	27.46
	M175065160	4.05	23.19	23.19	29.24
	M175065180	4.55	27.64	27.64	32.76
	M175065200	5.08	31.26	31.26	36.23
	M175065220	5.56	34.75	34.75	39.64
	M175065250	6.35	39.86	39.86	44.67
	M205065120	3.29	14.76	14.76	32.01
	M205065130	3.58	17.45	17.45	34.65
	M205065140	3.84	20.21	20.21	37.28
	M205065150	4.13	23.01	23.01	39.89
	M205065160	4.41	25.83	25.83	42.48
	M205065170	4.67	28.66	28.66	45.11
	M205065180	4.96	31.44	31.44	47.62
	M205065200	5.53	36.81	36.81	52.69
	M205065220	6.05	41.17	41.17	57.68
	M205065250	6.91	47.50	47.50	65.04
	M205065270	7.49	51.44	51.44	69.85

Restraints at mid-span

Span (m)	Section	Weight (kg/m)	Ultimate Total UDL kN		Working Load to Produce Deflection Span/150 kN
			Pressure	Suction	
5.5	M145065120	2.75	11.89	11.89	11.75
	M145065130	2.99	13.49	13.49	12.71
	M145065140	3.21	14.94	14.94	13.67
	M145065150	3.45	16.23	16.23	14.62
	M145065160	3.69	17.48	17.48	15.56
	M145065180	4.15	19.97	19.97	17.42
	M145065200	4.63	22.35	22.35	19.26
	M145065220	5.06	24.61	24.61	21.06
	M175065120	3.02	13.27	13.27	18.22
	M175065130	3.29	15.33	15.33	19.72
	M175065140	3.52	17.41	17.41	21.22
	M175065150	3.79	19.47	19.47	22.69
	M175065160	4.05	21.11	21.11	24.16
	M175065180	4.55	24.29	24.29	27.07
	M175065200	5.08	27.38	27.38	29.94
	M175065220	5.56	30.22	30.22	32.76
	M175065250	6.35	34.38	34.38	36.91
	M205065120	3.29	13.99	13.99	26.45
	M205065130	3.58	16.48	16.48	28.64
	M205065140	3.84	19.01	19.01	30.81
	M205065150	4.13	21.57	21.57	32.97
	M205065160	4.41	24.13	24.13	35.11
	M205065170	4.67	26.44	26.44	37.28
	M205065180	4.96	28.36	28.36	39.35
	M205065200	5.53	32.18	32.18	43.54
	M205065220	6.05	35.72	35.72	47.67
	M205065250	6.91	40.78	40.78	53.75
	M205065270	7.49	44.03	44.03	57.73
6.0	M175065120	3.02	12.50	12.50	15.31
	M175065130	3.29	14.24	14.24	16.57
	M175065140	3.52	15.68	15.68	17.83
	M175065150	3.79	17.10	17.10	19.07
	M175065160	4.05	18.48	18.48	20.30
	M175065180	4.55	21.03	21.03	22.75
	M175065200	5.08	23.51	23.51	25.16
	M175065220	5.56	25.92	25.92	27.53
	M175065250	6.35	29.45	29.45	31.02
	M205065120	3.29	13.28	13.28	22.23
	M205065130	3.58	15.60	15.60	24.06
	M205065140	3.84	17.91	17.91	25.89
	M205065150	4.13	19.66	19.66	27.70
	M205065160	4.41	21.38	21.38	29.50
	M205065170	4.67	23.02	23.02	31.32
	M205065180	4.96	24.53	24.53	33.07
	M205065200	5.53	27.53	27.53	36.59
	M205065220	6.05	30.45	30.45	40.06
	M205065250	6.91	34.69	34.69	45.17
	M205065270	7.49	37.43	37.43	48.51
	M235065130	3.86	16.17	16.17	33.30
	M235065140	4.14	18.90	18.90	35.83
	M235065150	4.45	21.69	21.69	38.35
	M235065160	4.76	23.92	23.92	40.84
	M235065170	5.04	25.91	25.91	43.31
	M235065180	5.35	27.76	27.76	45.80
	M235065200	5.97	31.34	31.34	50.69
	M235065220	6.53	34.78	34.78	55.52
	M235065250	7.46	39.76	39.76	62.64
	M235065270	8.08	42.96	42.96	67.30

Restraints at mid-span

Table 3:9 Multibeam Cladding Rails (Horizontal Cladding) (cont.)

Span (m)	Section	Weight (kg/m)	Ultimate Total UDL kN		Working Load to Produce Deflection Span/150 kN
			Pressure	Suction	
6.0	M175065120	3.02	10.33	10.33	14.08
	M175065130	3.29	11.89	11.89	15.24
	M175065140	3.52	17.06	17.06	16.40
	M175065150	3.79	18.96	18.96	17.54
	M175065160	4.05	20.83	20.83	18.67
	M175065180	4.55	24.49	24.49	20.92
	M175065200	5.08	27.52	27.52	23.14
	M175065220	5.56	30.37	30.37	25.32
	M175065250	6.35	34.56	34.56	28.53
	M205065120	3.29	10.88	10.88	20.44
	M205065130	3.58	12.82	12.82	22.13
	M205065140	3.84	14.77	14.77	23.81
	M205065150	4.13	16.71	16.71	25.48
	M205065160	4.41	18.62	18.62	27.13
	M205065170	4.67	20.53	20.53	28.81
	M205065180	4.96	28.45	28.45	30.41
	M205065200	5.53	33.00	33.00	33.65
	M205065220	6.05	36.62	36.62	36.84
	M205065250	6.91	41.77	41.77	41.54
	M205065270	7.49	45.13	45.13	44.61
	M235065130	3.86	13.13	13.13	30.62
	M235065140	4.14	15.43	15.43	32.96
	M235065150	4.45	17.77	17.77	35.27
	M235065160	4.76	20.11	20.11	37.56
	M235065170	5.04	22.45	22.45	39.84
	M235065180	5.35	24.77	24.77	42.12
	M235065200	5.97	29.32	29.32	46.62
	M235065220	6.53	33.73	33.73	51.06
	M235065250	7.46	49.10	49.10	57.61
	M235065270	8.08	53.11	53.11	61.89
6.5	M175065120	3.02	11.24	11.24	13.04
	M175065130	3.29	12.47	12.47	14.12
	M175065140	3.52	13.60	13.60	15.19
	M175065150	3.79	14.72	14.72	16.25
	M175065160	4.05	15.81	15.81	17.30
	M175065180	4.55	17.96	17.96	19.38
	M175065200	5.08	20.05	20.05	21.43
	M175065220	5.56	22.09	22.09	23.45
	M175065250	6.35	25.10	25.10	26.43
	M205065120	3.29	12.63	12.63	18.94
	M205065130	3.58	14.18	14.18	20.51
	M205065140	3.84	15.60	15.60	22.06
	M205065150	4.13	16.95	16.95	23.60
	M205065160	4.41	18.28	18.28	25.14
	M205065170	4.67	19.62	19.62	26.69
	M205065180	4.96	20.86	20.86	28.18
	M205065200	5.53	23.36	23.36	31.18
	M205065220	6.05	25.81	25.81	34.13
	M205065250	6.91	29.37	29.37	38.48
	M205065270	7.49	31.69	31.69	41.33
	M235065130	3.86	15.45	15.45	28.37
	M235065140	4.14	17.34	17.34	30.53
	M235065150	4.45	18.96	18.96	32.67
	M235065160	4.76	20.53	20.53	34.80
	M235065170	5.04	22.06	22.06	36.90
	M235065180	5.35	23.58	23.58	39.02
	M235065200	5.97	26.53	26.53	43.19
	M235065220	6.53	29.37	29.37	47.30
	M235065250	7.46	33.51	33.51	53.37
	M235065270	8.08	36.19	36.19	57.34

Restraints at 1/3 points

Restraints at mid-span

Span (m)	Section	Weight (kg/m)	Ultimate Total UDL kN		Working Load to Produce Deflection Span/150 kN
			Pressure	Suction	
6.5	M175065120	3.02	9.73	9.73	12.00
	M175065130	3.29	11.15	11.15	12.99
	M175065140	3.52	15.98	15.98	13.97
	M175065150	3.79	17.73	17.73	14.94
	M175065160	4.05	19.44	19.44	15.91
	M175065180	4.55	22.15	22.15	17.83
	M175065200	5.08	24.75	24.75	19.71
	M175065220	5.56	27.29	27.29	21.57
	M175065250	6.35	31.04	31.04	24.31
	M205065120	3.29	10.36	10.36	17.42
	M205065130	3.58	12.15	12.15	18.86
	M205065140	3.84	13.93	13.93	20.29
	M205065150	4.13	15.70	15.70	21.71
	M205065160	4.41	17.45	17.45	23.12
	M205065170	4.67	19.19	19.19	24.55
	M205065180	4.96	26.51	26.51	25.92
	M205065200	5.53	29.67	29.67	28.67
	M205065220	6.05	32.79	32.79	31.39
	M205065250	6.91	37.38	37.38	35.39
	M205065270	7.49	40.36	40.36	38.01
	M235065130	3.86	12.57	12.57	26.09
	M235065140	4.14	14.70	14.70	28.08
	M235065150	4.45	16.85	16.85	30.05
	M235065160	4.76	19.00	19.00	32.01
	M235065170	5.04	21.14	21.14	33.94
	M235065180	5.35	23.26	23.26	35.89
	M235065200	5.97	34.61	34.61	39.73
	M235065220	6.53	38.32	38.32	43.51
	M235065250	7.46	43.76	43.76	49.09
	M235065270	8.08	47.31	47.31	52.74
7.0	M205065120	3.29	9.87	9.87	15.02
	M205065130	3.58	11.52	11.52	16.26
	M205065140	3.84	13.17	13.17	17.50
	M205065150	4.13	14.80	14.80	18.72
	M205065160	4.41	20.84	20.84	19.93
	M205065170	4.67	22.30	22.30	21.17
	M205065180	4.96	23.70	23.70	22.34
	M205065200	5.53	26.52	26.52	24.72
	M205065220	6.05	29.30	29.30	27.07
	M205065250	6.91	33.38	33.38	30.52
	M205065270	7.49	35.96	35.96	32.78
	M235065130	3.86	12.03	12.03	22.50
	M235065140	4.14	14.01	14.01	24.21
	M235065150	4.45	16.00	16.00	25.91
	M235065160	4.76	17.98	17.98	27.60
	M235065170	5.04	19.95	19.95	29.27
	M235065180	5.35	27.47	27.47	30.95
	M235065200	5.97	30.81	30.81	34.25
	M235065220	6.53	34.09	34.09	37.52
	M235065250	7.46	38.92	38.92	42.33
	M235065270	8.08	42.03	42.03	45.47

Restraints at 1/3 points

Restraints at 1/3 points

Load / Span Tables

Table 3:9 Multibeam Cladding Rails (Horizontal Cladding) (cont.)

Span (m)	Section	Weight (kg/m)	Ultimate Total UDL kN		Working Load to Produce Deflection Span/150 kN
			Pressure	Suction	
7.5	M205065120	3.29	9.42	9.42	13.08
	M205065130	3.58	10.95	10.95	14.17
	M205065140	3.84	12.47	12.47	15.24
	M205065150	4.13	17.30	17.30	16.31
	M205065160	4.41	18.59	18.59	17.37
	M205065170	4.67	19.90	19.90	18.44
	M205065180	4.96	21.14	21.14	19.47
	M205065200	5.53	23.66	23.66	21.54
	M205065220	6.05	26.13	26.13	23.58
	M205065250	6.91	29.58	29.58	26.59
	M205065270	7.49	31.81	31.81	28.55
	M235065120	3.55	9.72	9.72	18.10
	M235065130	3.86	11.53	11.53	19.60
	M235065140	4.14	13.37	13.37	21.09
	M235065150	4.45	15.22	15.22	22.57
	M235065160	4.76	21.40	21.40	24.04
	M235065170	5.04	22.89	22.89	25.50
	M235065180	5.35	24.40	24.40	26.96
	M235065200	5.97	27.37	27.37	29.84
	M235065220	6.53	30.28	30.28	32.68
	M235065250	7.46	34.38	34.38	36.87
	M235065270	8.08	36.98	36.98	39.61
8.0	M235065120	3.55	9.35	9.35	15.91
	M235065130	3.86	11.06	11.06	17.23
	M235065140	4.14	12.78	12.78	18.54
	M235065150	4.45	17.65	17.65	19.84
	M235065160	4.76	18.99	18.99	21.13
	M235065170	5.04	20.32	20.32	22.41
	M235065180	5.35	21.66	21.66	23.69
	M235065200	5.97	24.28	24.28	26.23
	M235065220	6.53	26.69	26.69	28.72
	M235065250	7.46	30.20	30.20	32.41
	M235065270	8.08	32.47	32.47	34.82
	M265065120	3.82	9.34	9.34	21.21
	M265065130	4.16	11.25	11.25	22.98
	M265065140	4.46	13.22	13.22	24.73
	M265065150	4.79	15.23	15.23	26.47
	M265065160	5.13	21.34	21.34	28.19
	M265065180	5.76	24.40	24.40	31.63
	M265065200	6.43	27.43	27.43	35.02
	M265065220	7.03	30.25	30.25	38.36
	M265065250	8.03	34.26	34.26	43.30
	M265065270	8.70	36.86	36.86	46.54

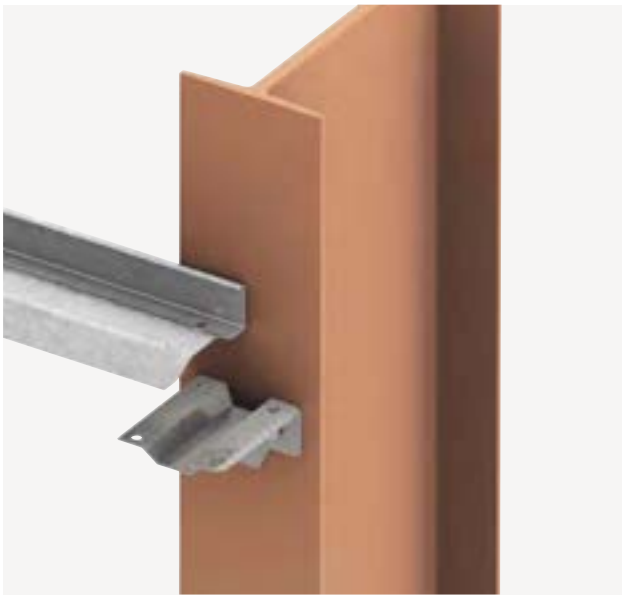
Restraints at 1/3 points

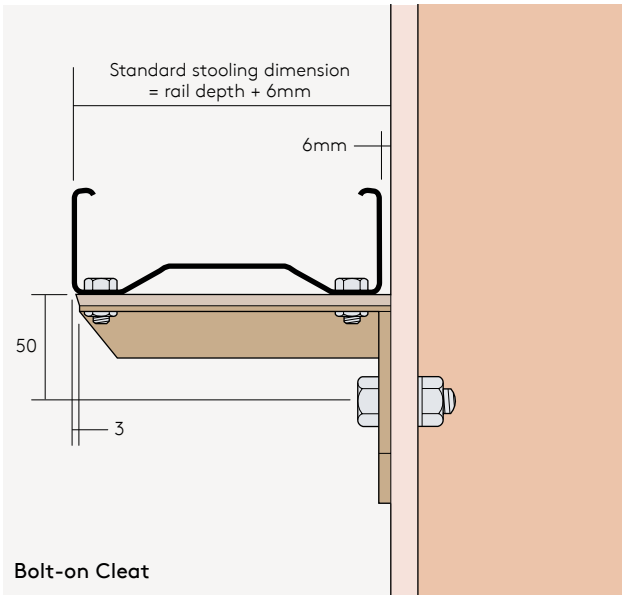
Span (m)	Section	Weight (kg/m)	Ultimate Total UDL kN		Working Load to Produce Deflection Span/150 kN
			Pressure	Suction	
8.0	M235065120	3.55	8.39	8.39	13.67
	M235065130	3.86	9.90	9.90	14.80
	M235065140	4.14	11.44	11.44	15.92
	M235065150	4.45	12.97	12.97	17.04
	M235065160	4.76	14.50	14.50	18.15
	M235065170	5.04	16.01	16.01	19.25
	M235065180	5.35	22.19	22.19	20.35
	M235065200	5.97	24.97	24.97	22.53
	M235065220	6.53	27.72	27.72	24.67
	M235065250	7.46	31.73	31.73	27.83
	M235065270	8.08	34.16	34.16	29.91
	M265065120	3.82	8.39	8.39	18.22
	M265065130	4.16	10.09	10.09	19.73
	M265065140	4.46	11.85	11.85	21.24
	M265065150	4.79	13.65	13.65	22.73
	M265065160	5.13	15.45	15.45	24.22
	M265065180	5.76	19.07	19.07	27.17
	M265065200	6.43	28.33	28.33	30.08
	M265065220	7.03	31.53	31.53	32.95
	M265065250	8.03	36.22	36.22	37.20
	M265065270	8.70	39.13	39.13	39.98
9.0	M235065120	3.55	10.70	10.70	12.57
	M235065130	3.86	11.79	11.79	13.61
	M235065140	4.14	12.88	12.88	14.65
	M235065150	4.45	13.96	13.96	15.68
	M235065160	4.76	14.93	14.93	16.70
	M235065170	5.04	15.89	15.89	17.71
	M235065180	5.35	16.86	16.86	18.72
	M235065200	5.97	18.75	18.75	20.72
	M235065220	6.53	20.58	20.58	22.70
	M235065250	7.46	23.28	23.28	25.61
	M235065270	8.08	25.04	25.04	27.51
	M265065120	3.82	8.78	8.78	16.76
	M265065130	4.16	13.10	13.10	18.15
	M265065140	4.46	14.35	14.35	19.54
	M265065150	4.79	15.59	15.59	20.91
	M265065160	5.13	16.78	16.78	22.28
	M265065180	5.76	18.97	18.97	24.99
	M265065200	6.43	21.11	21.11	27.67
	M265065220	7.03	23.20	23.20	30.31
	M265065250	8.03	26.25	26.25	34.22
	M265065270	8.70	28.22	28.22	36.77
9.0	M235065130	3.86	9.52	9.52	13.20
	M235065140	4.14	10.97	10.97	14.20
	M235065150	4.45	12.41	12.41	15.20
	M235065160	4.76	13.84	13.84	16.19
	M235065170	5.04	18.91	18.91	17.17
	M235065180	5.35	20.21	20.21	18.15
	M235065200	5.97	22.74	22.74	20.09
	M235065220	6.53	25.25	25.25	22.01
	M235065250	7.46	28.63	28.63	24.83
	M235065270	8.08	30.81	30.81	26.68
	M265065140	4.46	11.43	11.43	18.95
	M265065150	4.79	13.12	13.12	20.28
	M265065160	5.13	14.82	14.82	21.60
	M265065180	5.76	22.80	22.80	24.23
	M265065200	6.43	25.74	25.74	26.83
	M265065220	7.03	28.64	28.64	29.39
	M265065250	8.03	32.66	32.66	33.18
	M265065270	8.70	35.16	35.16	35.66

Restraints at 1/4 points

Construction Details

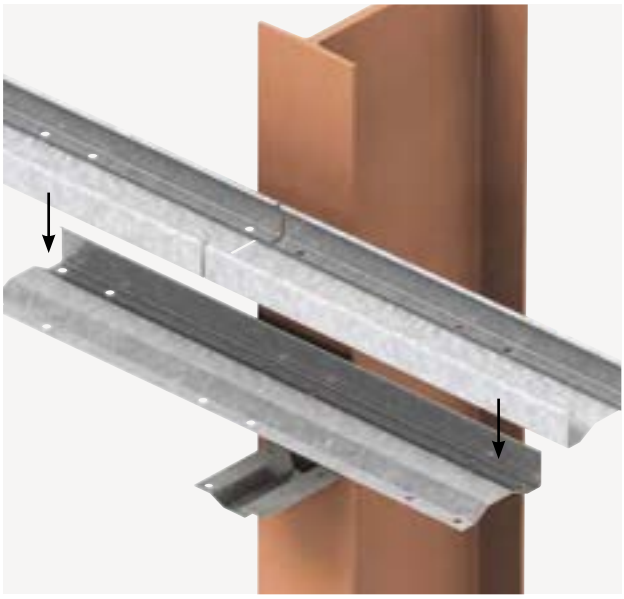
Rail Connection

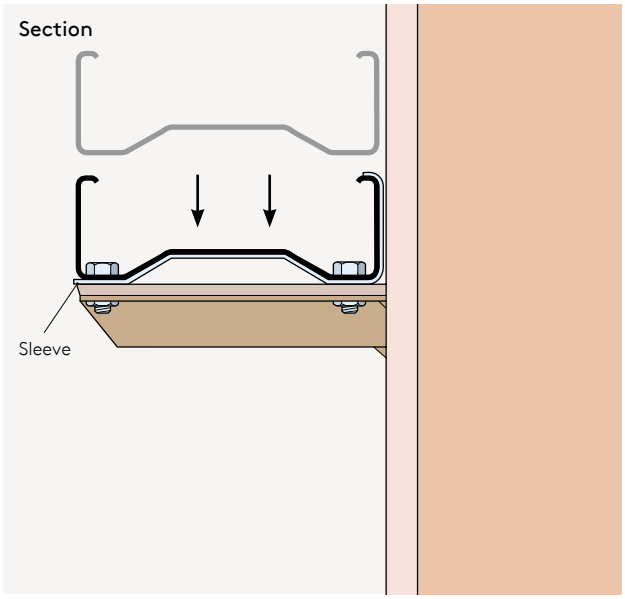




For product dimensions refer to page 79.

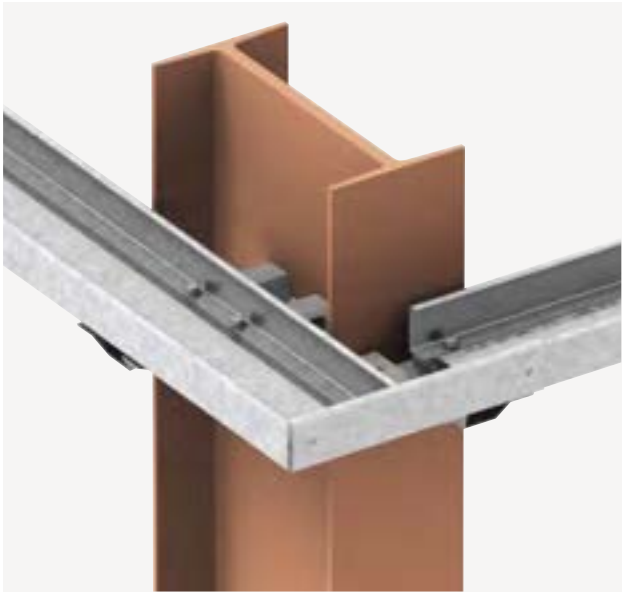
Cladding Rail Sleeve

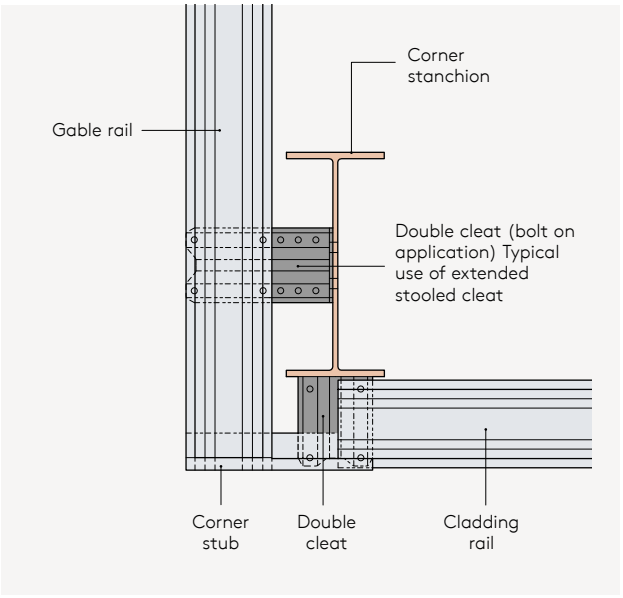




For product dimensions refer to page 81.

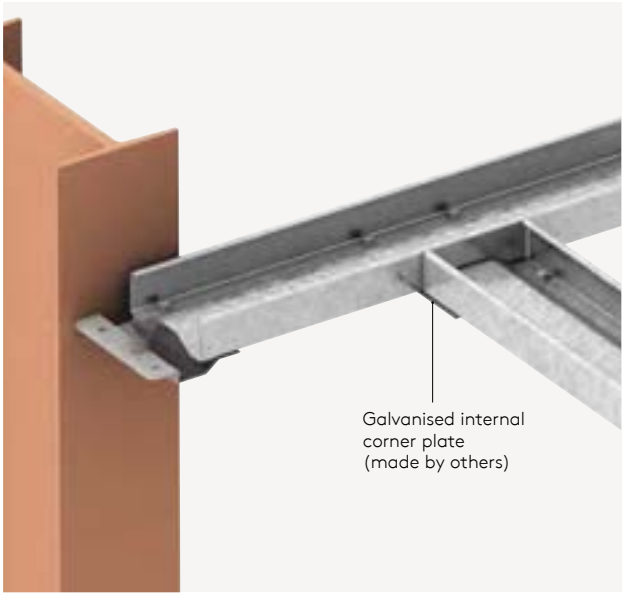
External Corner

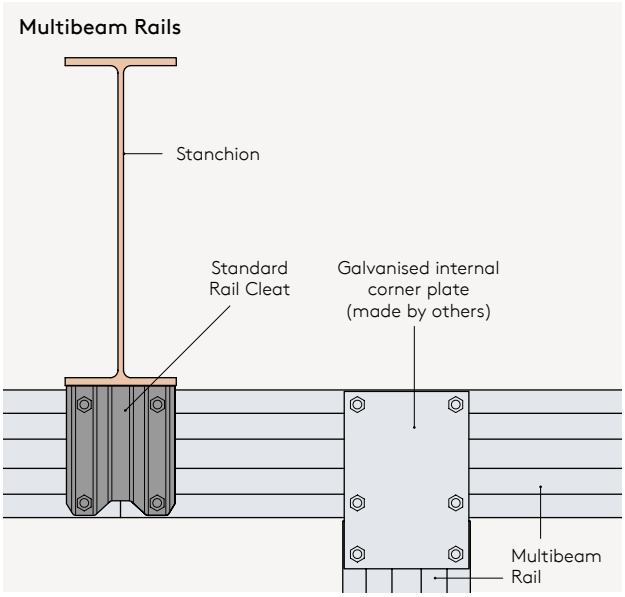




For product dimensions refer to page 83.

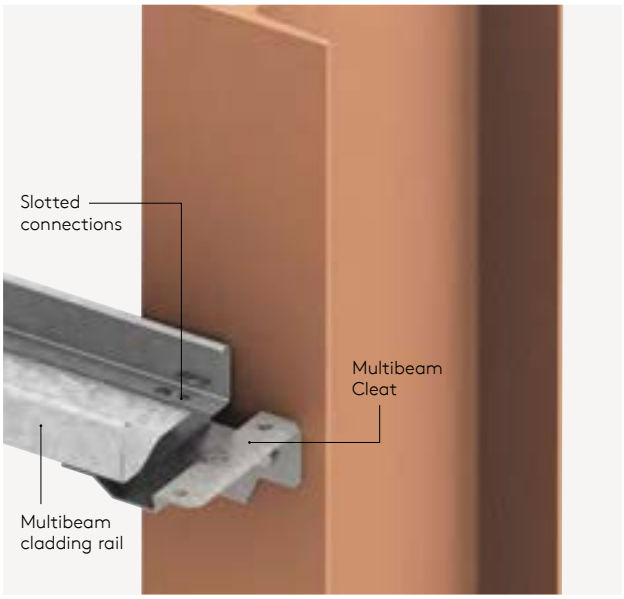
Internal Corner

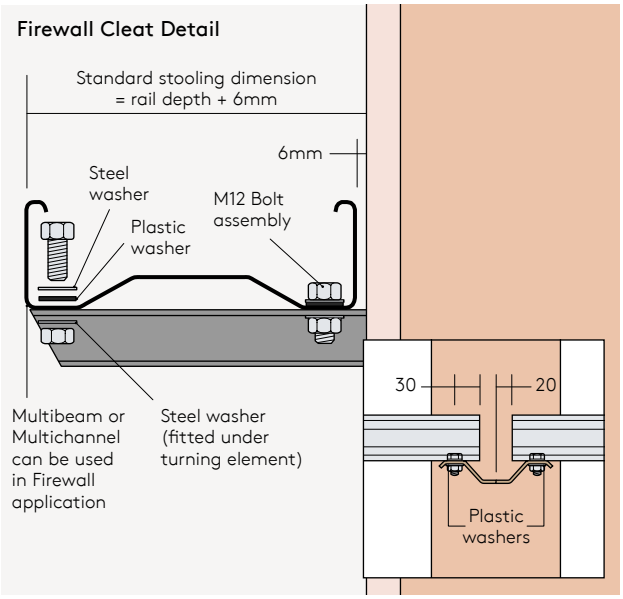




Construction Details

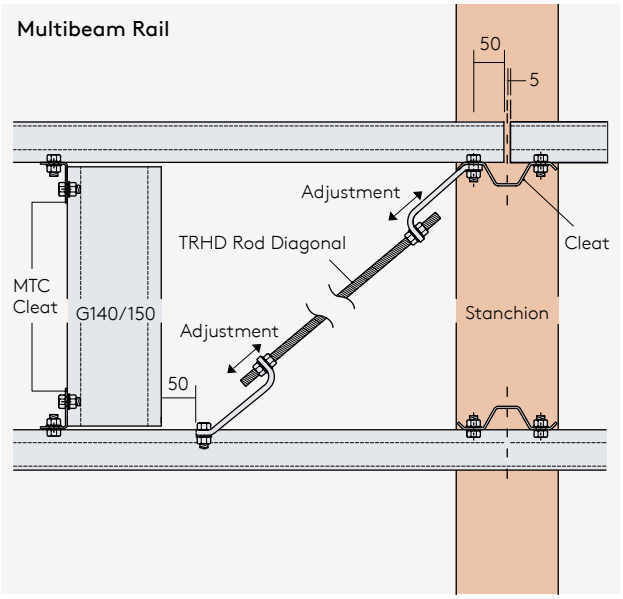
Slotted Cladding Rail on a Firewall





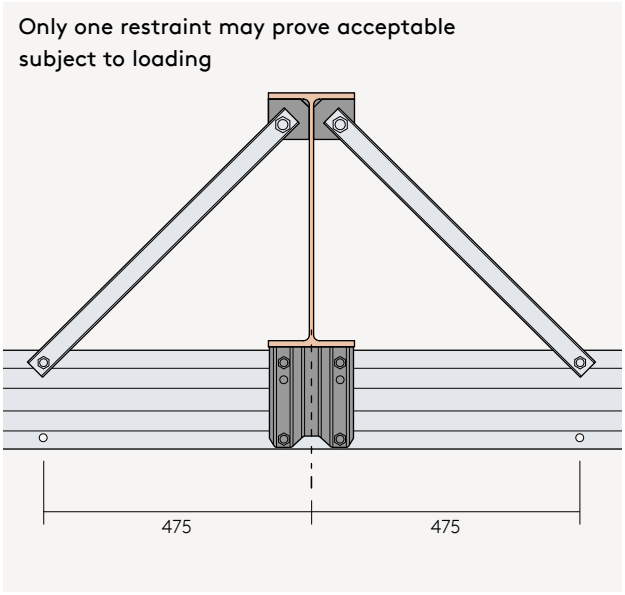
For product dimensions refer to page 75.

Rod Diagonal with G140/150



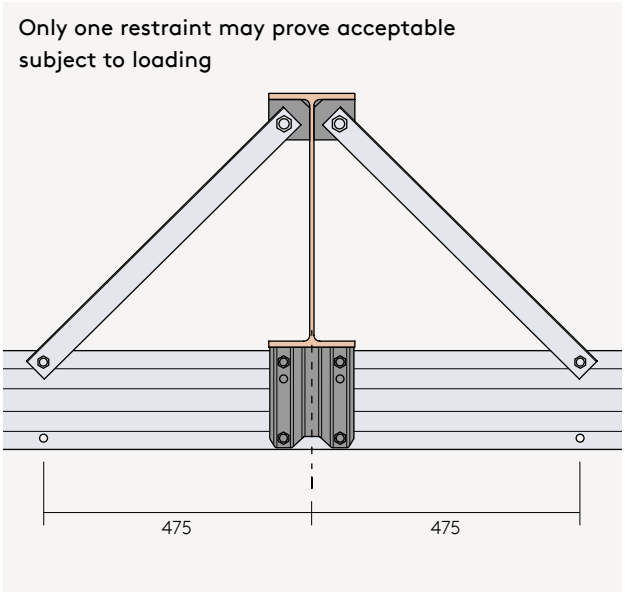
For product dimensions refer to page 84.

Stanchion Stay Type RNA



For product dimensions refer to page 83.

Stanchion Stay Type RNB



For product dimensions refer to page 83.

Construction Details

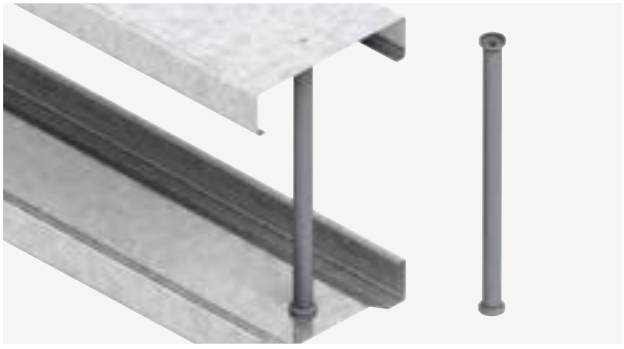
Tube Strut Arrangements Type TSA

For product dimensions refer to page 82.

Tube Strut Arrangements Type TSB

For product dimensions refer to page 82.

Tube Strut Arrangements Type TSB

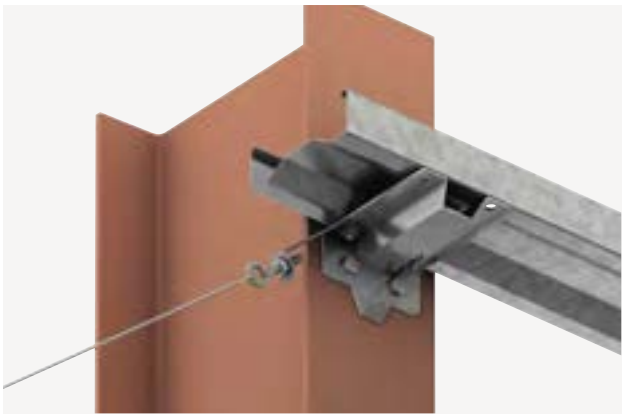


For product dimensions refer to page 82.

Bottom Strut Bracket

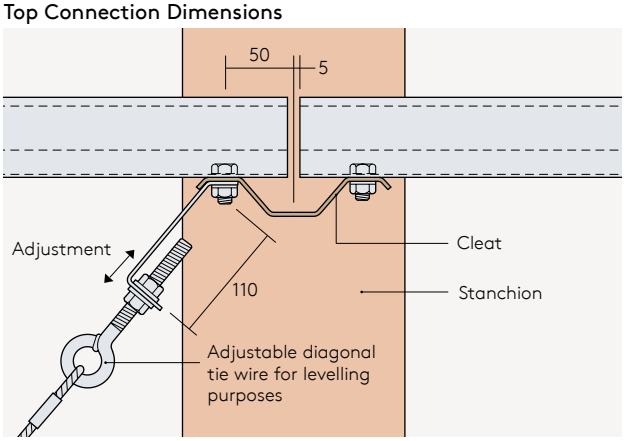
For product dimensions refer to page 84.

Diagonal Tie Wire Restraint

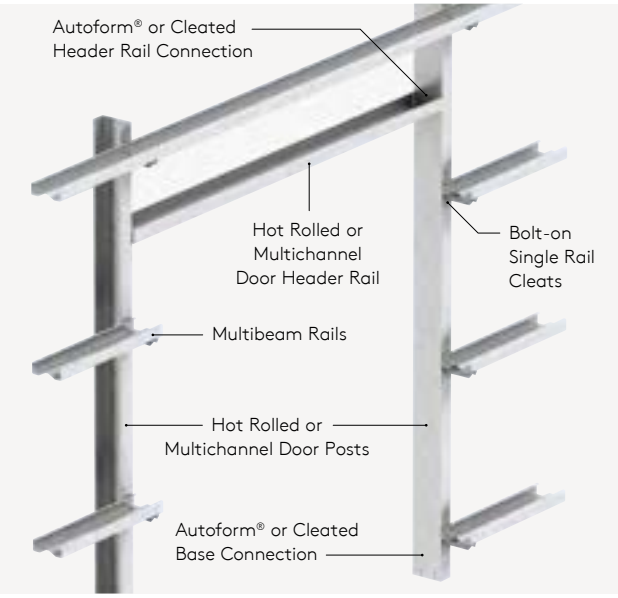


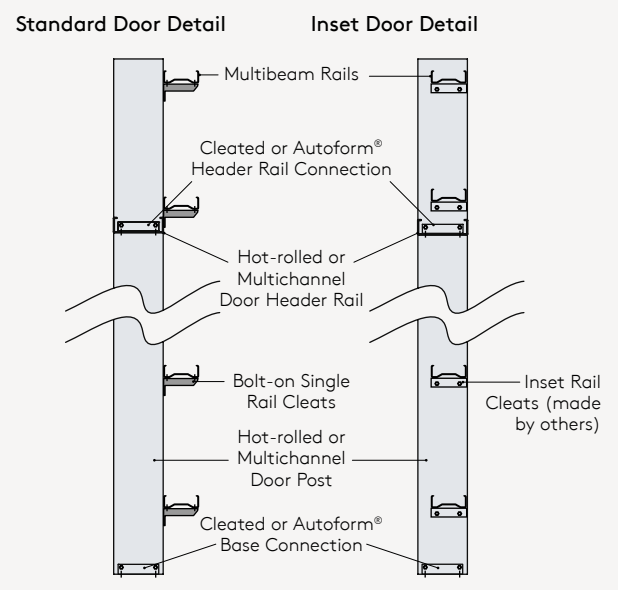
For product dimensions refer to page 83.

Top Connection Dimensions



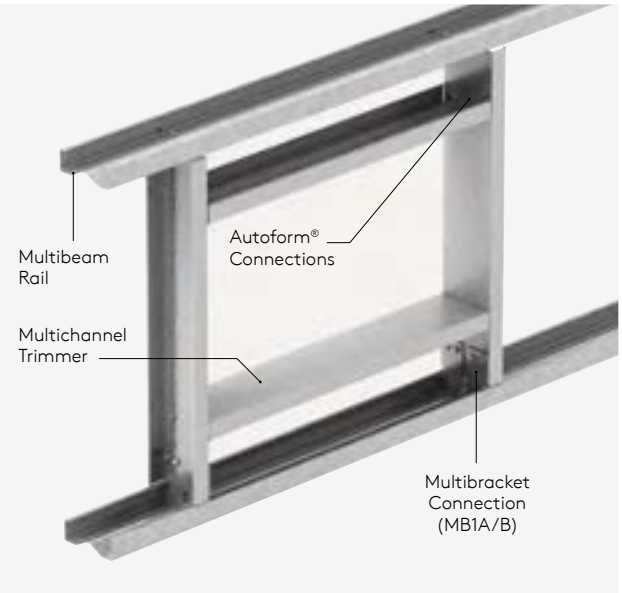
Door Openings

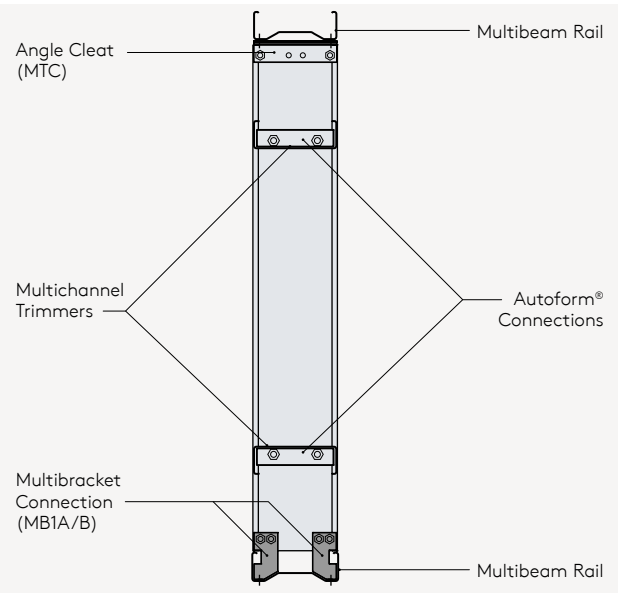




When the door framework needs to be set to the same level as the cladding rails, the rail cleats will need to be made by others. Alternatively, Multichannel rails could be considered.

Window Openings





For Multichannel details see page 101 onwards.

Multichannel

Product Overview

Multichannel is a range of pre-engineered, structural channel sections designed to complement the Multibeam purlin and cladding rail systems. Multichannel is an ideal solution for vertically or horizontally-laid cladding and can be an effective substitute for conventional hot-rolled sections and timber.

Applications

- Horizontally laid cladding rails
- Parapet posts
- Mezzanine floors
- Brickwork restraints
- Door and window trimmers, ribbon windows
- Wind bracing
- Columns
- Gable ends
- General engineering applications

Material Specification

Hot dip galvanised steel to BS EN 10346 and BS EN 10143 'specifications for continuously hot dip zinc /metal coated structural steel strip'. The minimum grade of steel used is S450GD, with Z275 zinc coating, giving an average coating thickness of 0.02mm to each side. Other coatings maybe available (G600 / Magnelis). Please contact our Sales Team for advice.

Connections

We recommend washers are fitted under both the bolt head and nut.

Range

- Section heights from 145mm to 350mm
- Flange widths from 70mm to 90mm
- Gauges from 1.2mm to 2.7mm

For full product dimensions see page 110. Other sizes may be available on specific request. Please contact our Technical Department for advice.

Lengths

All lengths are catered for; requirements in excess of 18m, please contact our Sales Department.

Wall Cladding Attachment

The wall cladding must be mechanically fixed to all support side rails it passes over, sufficient fixings should be placed to provide the level of restraint required.

Multichannel sections offer lightweight robust construction and may be used in lieu of some hot rolled sections, offering easier site handling. Multichannel is suitable for a wide range of structural applications including horizontal cladding support, door and window trimmers, wind bracing, mezzanine floor beams, brickwork restraints, gable rafters and columns.

Autoform® Ends

The unique feature of the Multichannel system is the Autoform® end. Autoform® eliminates the need for fixing cleats and brackets which simplifies the construction process by providing numerous connection solutions to speed fabrication and on-site construction.

Autoform® ends are available with the returns turned inward or outward and can be punched or counterformed with standard hole options as required.

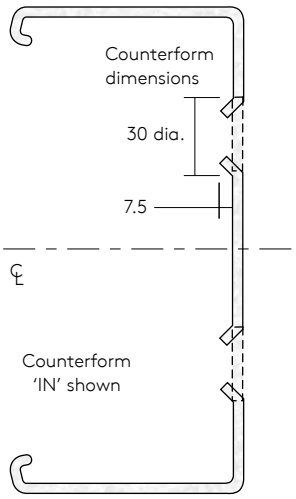
Using this system, connections are primarily made using two bolts which halves the connection time in fabrication and also reduces fixing material costs.

Notches

Multichannel can be supplied with plain ends, notched ends (top, bottom or both) and / or with Autoform® ends offering installation flexibility.

Counterform Holes

In order to provide a flush connection for door and window applications an off-line process of counterforming is used. This enables countersunk bolts to be used without compromising the finish of the Multichannel rail.



Autoform® In

Autoform® Out

Autoform® ends remove the need for cleats and reduce the amount of components required on site.

Autoform® Notched Ends

Autoform® In

Restraints

Vertically Laid Cladding

Restraints for Bays up to 6.1m

The single strut system is utilised on buildings with bays up to 6.1m centres with adjustable diagonal tie wire as shown in the diagram.

Bays up to 3.0m generally do not require vertical support struts.

This system is for use with cladding which, when fixed restrains the Multibeam siderail outer flange.

* When wall exceeds 10m in height allow one set of diagonal ties for every 9.0m of height.

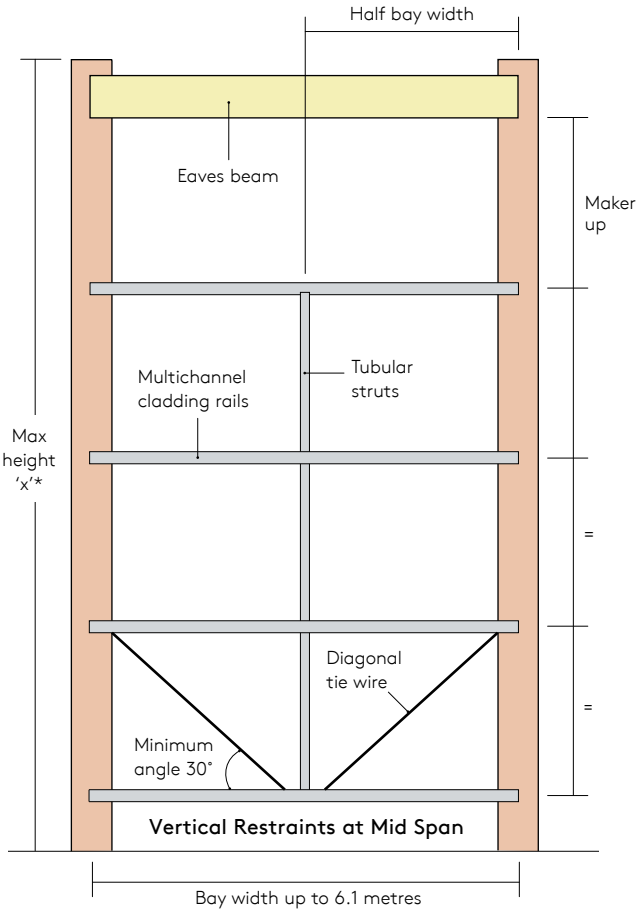
Maximum rail cross centres are 2m (for larger cross centres, contact our Technical Department).

Where the weight of the cladding is greater than 0.12 kN/m^2 please contact our Technical Department.

Where the cladding is a through-fixed insulated panel but fixed on one edge only trapping the tongue of the adjacent panel, for example the Kingspan AWP range, the restraint system opposite must be modified by replacing the bottom tube strut with an SW angle strut or same depth multichannel and the diagonal tie wire replaced with a rod diagonal (TRHD).

The strut system should be fitted between the bottom rails and the rails levelled before proceeding progressively upwards.

Where the cladding is clip fixed or fixed in such a way that the cladding can slip, relative to the side rail face please contact our Technical Department.



Restraints for Bays over 6.1m up to 9.0m

The double strut system is utilised on buildings with bays over 6.1m metres up to 9.0m.

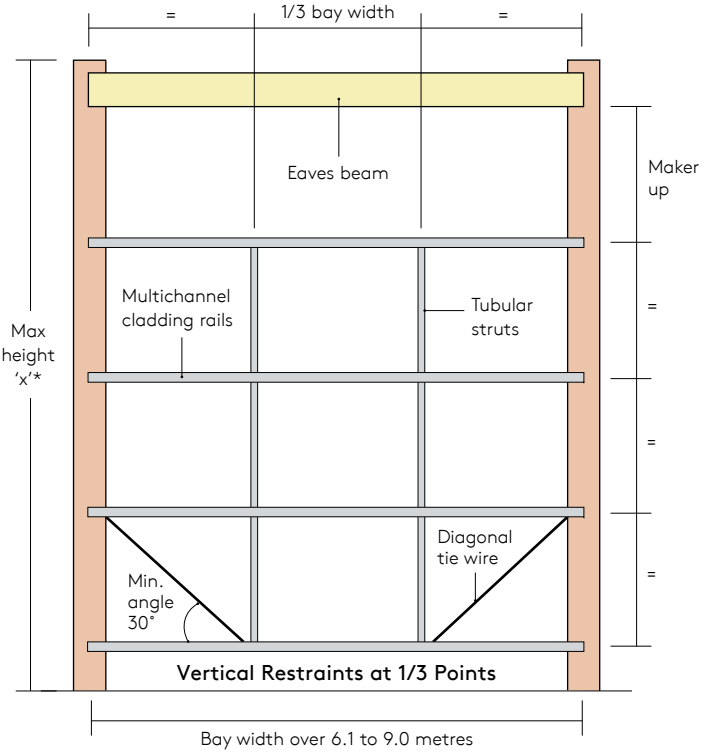
* When wall exceeds 10m in height allow one set of diagonal ties for every 9.0m of height.

Where the cladding is a through-fixed insulated panel but fixed on one edge only trapping the tongue on the adjacent panel, for example the Kingspan AWP range, the restraint system opposite must be modified by replacing the bottom tube strut with an SW angle strut or same depth multichannel and the diagonal tie wire replaced with a rod diagonal (TRHD).

Where the cladding is clip fixed or fixed in such a way that the cladding can slip, relative to the side rail face please contact our Technical Department.

Maximum rail cross centres are 2m (for larger cross centres, contact our Technical Department).

Where the weight of the cladding is greater than 0.12 kN/m^2 please contact our Technical Department.



During the construction stage the bottom Rail may need temporary propping while fixing of the cladding until the Panel is fully supported in its final installation.

Bays over 9.0m

Bays over 9.0m are possible with Multichannel sections. For vertical restraints consult our Technical Department.

For Firewall information refer to pages 74-76.

Pre-Assembled Cladding Support System

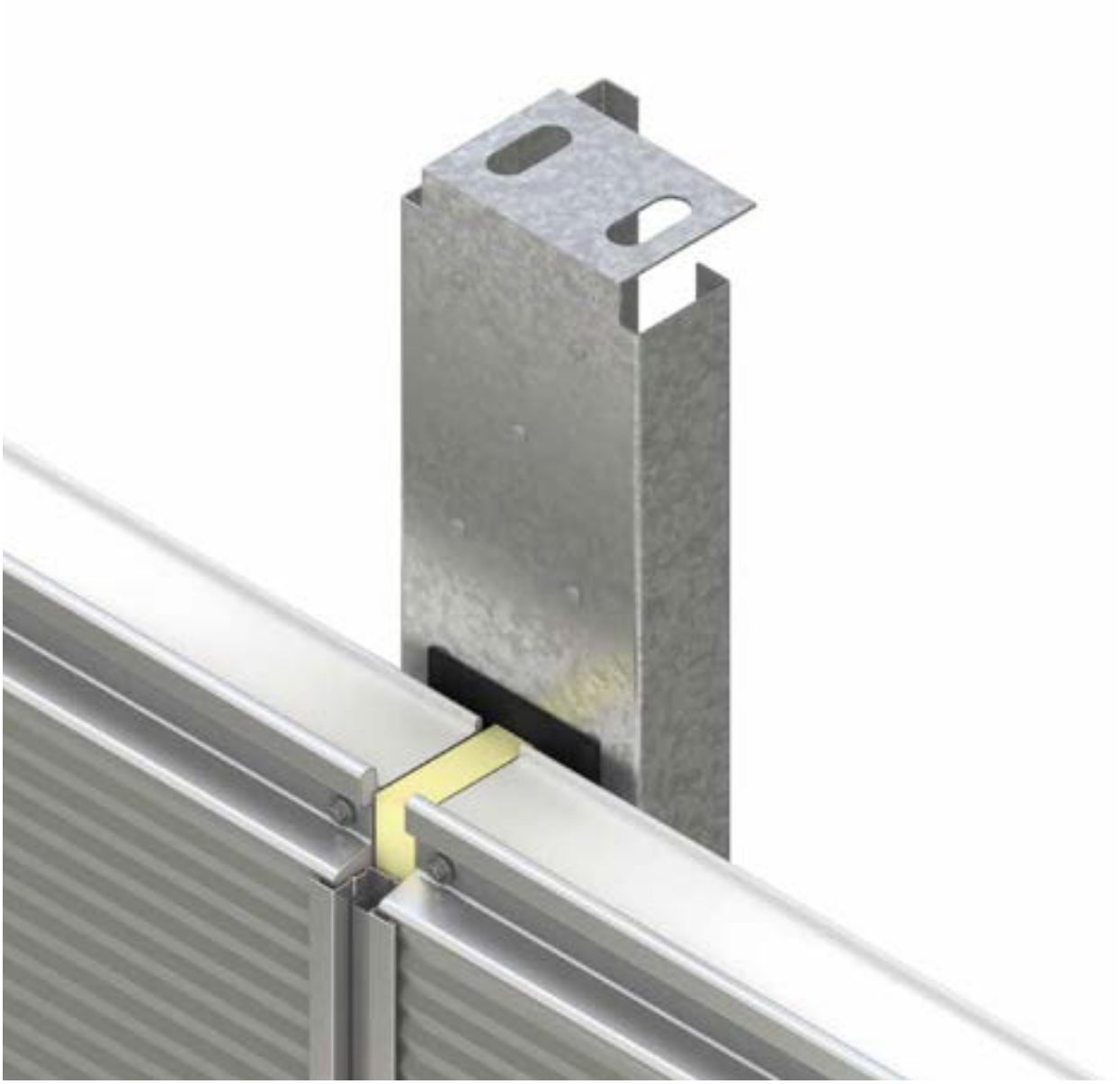
To complement the existing Structural Products & Systems range we now offer a pre-assembled vertical support system for horizontally laid composite panels. These are available exclusively to clients detailing our components within Tekla Structures and utilising the benefits of its parametric modelling macros.

This system can only be detailed for manufacture using Tekla Structures version 21 service release 3, and version 21.1 service release 1 and above.

To assist users of Tekla Structures detailing this support system, a range of help videos can be viewed at: www.kingspanpanels.co.uk/structural/resource-centre

We recommend users check the support requirements of the cladding system with the manufacturer prior to use.

Contact your Area Sales Manager for further information.



Cladding Rail Systems

Horizontally Laid Cladding

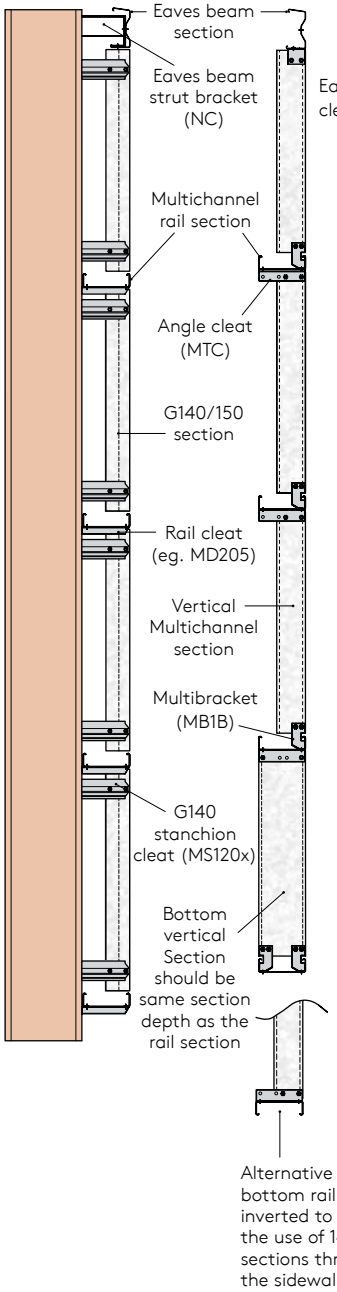
Cladding Joints at Stanchions

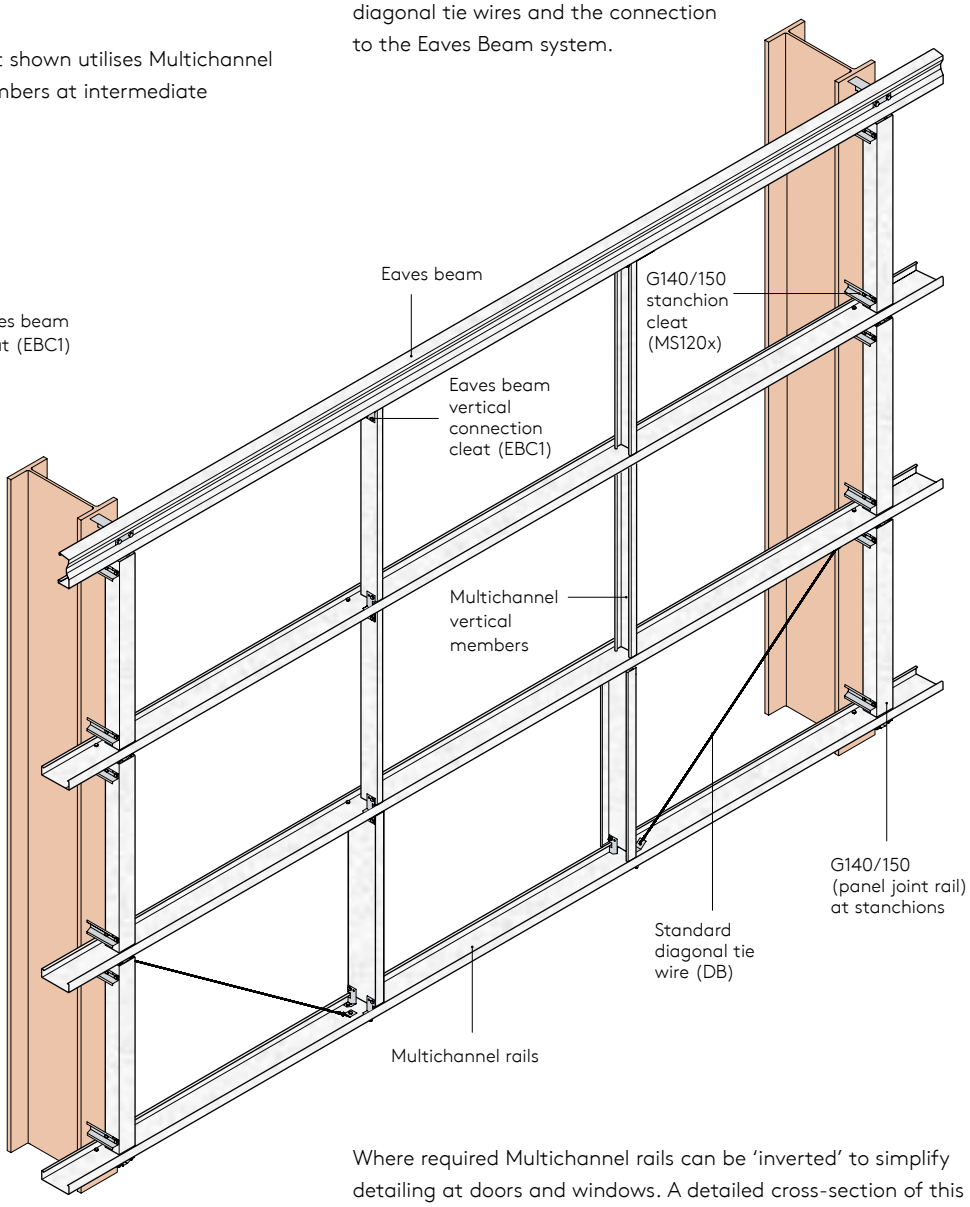
Horizontally laid panels require a structure to provide support for the panel self weight and also resist wind pressure and suction loads.

The efficient steelwork arrangement shown utilises Multichannel siderails with G140/150 vertical members at intermediate support locations.

This typical example also shows vertical restraint provided by standard diagonal tie wires and the connection to the Eaves Beam system.

Connection Details

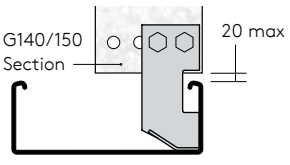




Where required Multichannel rails can be 'inverted' to simplify detailing at doors and windows. A detailed cross-section of this alternative is shown opposite.

Maximum wall heights for diagonal wires are shown on page 104 for vertically laid cladding. This value should be adjusted on a pro-rata basis for heavier sidewall weights.

The distance between the Multichannel rail and the vertical support should not exceed 20mm.

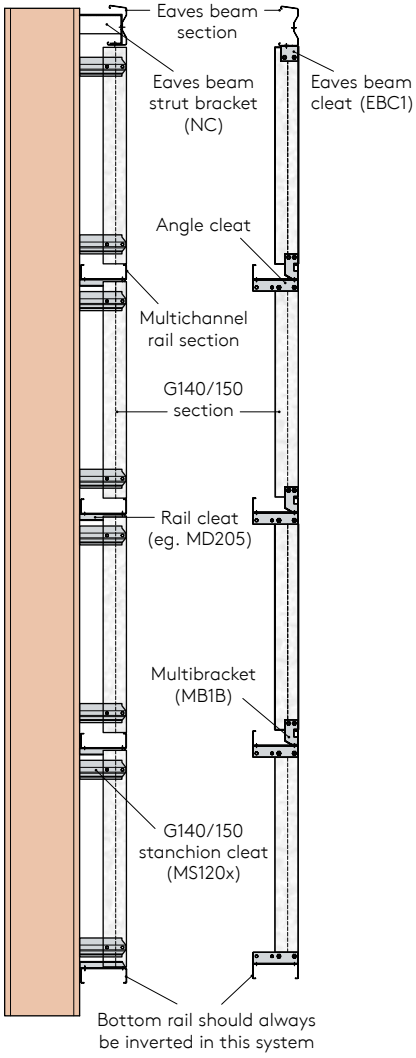


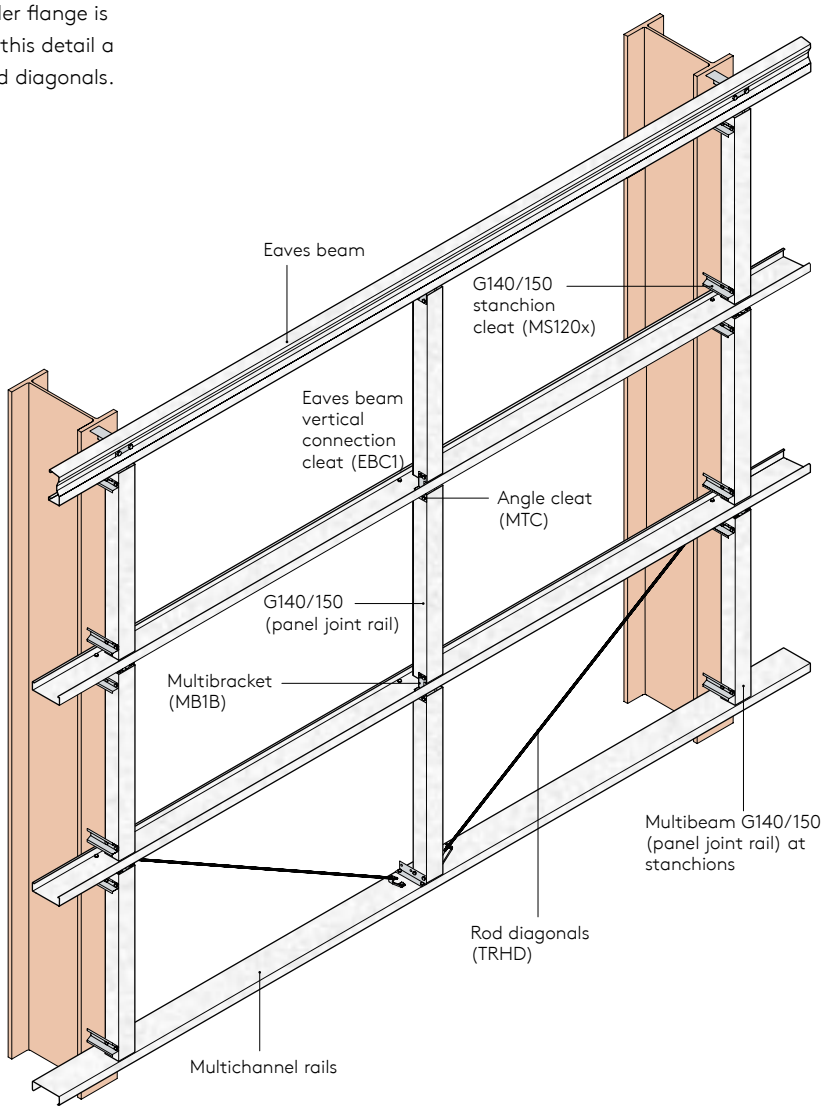
Horizontally Laid Cladding

Cladding Joint within Span

Where cladding is joined within the bay span a wider flange is required in order to 'butt' the panels together. For this detail a G140/150 section is used together with screwed rod diagonals.

Connection Details





Horizontally Laid Cladding – Top Hat Supports

Vertical top hat cladding supports provided by the sheeting contractor to support horizontally laid insulated panels – the restraints can be as shown on page 104 but the tube strut between the bottom pair of rails supporting the top hats must be replaced with a vertical Multichannel of the same depth of the rail and attached as shown on page 106. The standard tie wire must be replaced with a rod diagonal.

The top hats must be positioned at or very close to the rail restraint positions to avoid twisting of the horizontal member. The top hat section must be attached to all rails that it passes over using suitable fixings that can support the vertical dead loads and the wind pressure and suction loads.

Applications

Parapet Posts

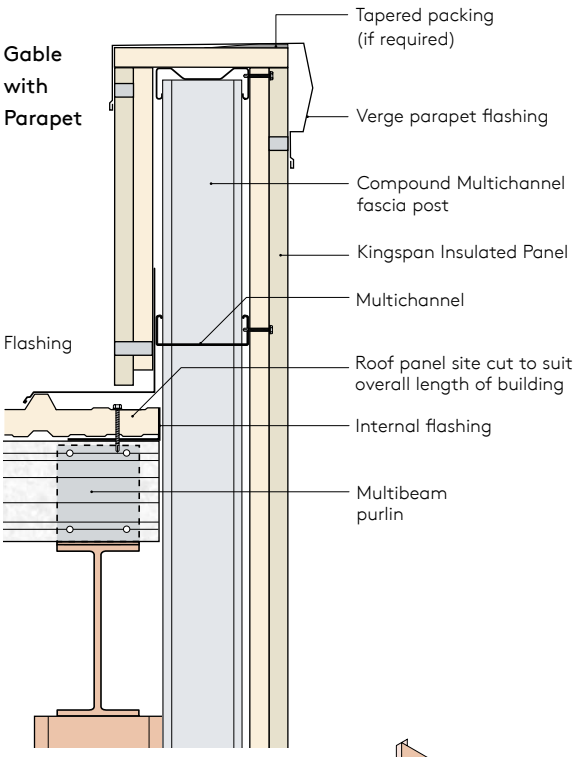
Multichannel can be used as an efficient and economical parapet post section to support vertical or horizontally laid cladding on industrial and commercial buildings.

The Multichannel parapet post can be supplied as a kit for assembly on site or as a fully assembled component ready to attach to the main steelwork and complete with attachment cleats to suit Multichannel or Multibeam horizontal cladding rails.

Use the Toolkit design software to select sections against the applied wind loads and dead weights of the supported cladding.

For specific construction details please contact our Technical department.

Gable with Parapet



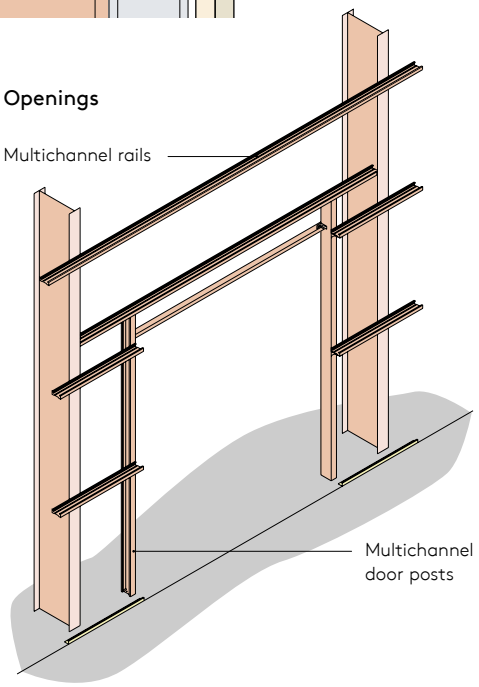
Door and Window Openings

In sidewall situations where openings are required, we recommend the use of Multichannel sections. These versatile sections provide an easy solution for door and window openings, trimmers etc. and section sizes are compatible with Multichannel cladding rail section sizes.

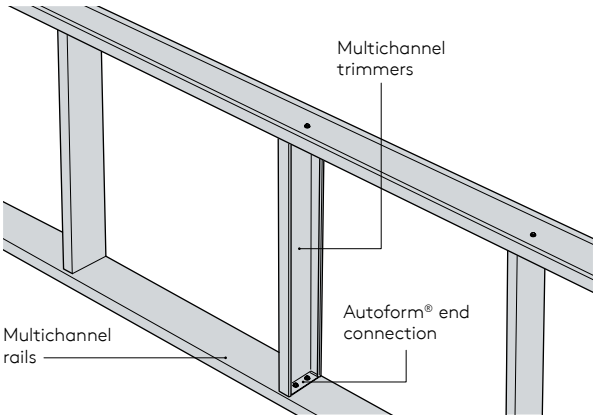
Where required Multichannels can be used as a substitute for Multibeam cladding rails as all components (e.g. cleats etc.) are fully compatible.

It must be noted however, that equivalent section sizes may not provide an identical performance and heavier gauges may be required (see section properties on page 118).

Door Openings



Window Openings



Window Trimmers

Mezzanine Floors

Multichannels can be used for primary or secondary floor beams in mezzanine floor applications. They can also be used singly or compounded to form columns, and can be used as stair rails and treads providing a completely pre-engineered mezzanine floor package.

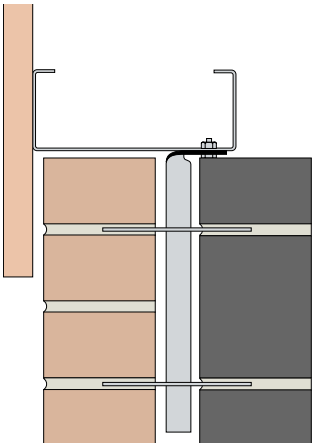
Multichannel Mezzanine floor beams can be utilised with all popular types of flooring including checkerplate, timber etc. They can be fitted between steel or over steel supports either with or without cleats. Fitting over steelwork gives the economy of double span members but increases the depth of the floor structure.

Construction details are provided for all three systems , please see pages 134 and 135 for further information.

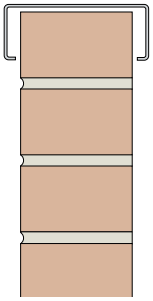
Brickwork Restraints

The Multichannel brickwork restraint has been developed to accommodate standard brick and block sizes used in construction today. The restraint provides an efficient method of restraining brickwork panels in steel framed buildings. Compared with hot-rolled alternatives it is easier to handle on site due to it's light weight and no additional finishing is required.

Multichannel brickwork restraints suit 100mm and 140mm block / brickwork walls and are available in lengths up to 9m either as a single or compound section. Attachment to the brickwork can be Rawlbolts (or similar), threaded rods built into the wall or flat strapped brick restraints built into the brickwork.



Combined rail / restraint



Single leaf restraint

Gable Posts

Compound Multichannel members can be used as an infill gable post (to facilitate a future gable extension) where a full portal frame is provided at the gable.

Compound Multichannel posts can be supplied with side rail cleats, restraint brackets and base cleats pre-assembled in the factory to minimise site work and promote rapid erection. Alternatively a kit of parts is available for full assembly on site.

Multichannel infill posts are not suitable for free standing applications (including during erection) and must be placed between self supporting main beams and the foundations for stability.

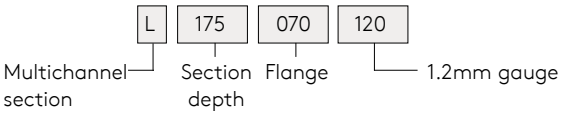
Products & References

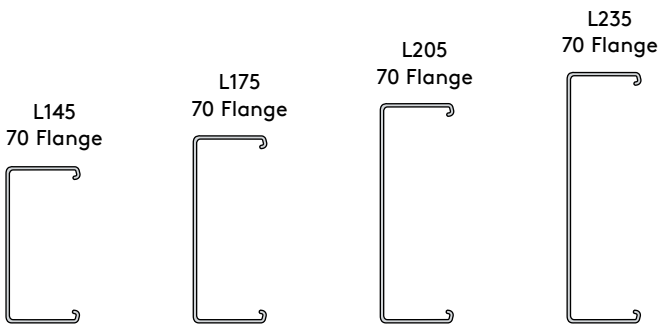
Multichannel Sections

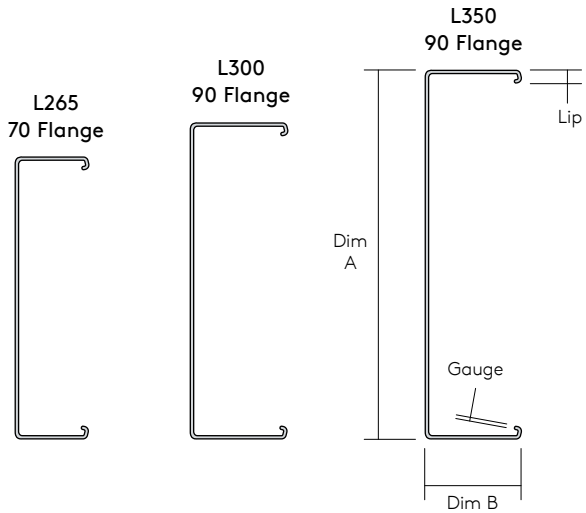
References	Weight (kg/m)	Dims (mm) A	B	Gauge (mm)
L145070120	2.75	145	70	1.20
L145070130	2.99	145	70	1.30
L145070140	3.21	145	70	1.40
L145070150	3.45	145	70	1.50
L145070160	3.69	145	70	1.60
L145070180	4.15	145	70	1.80
L145070200	4.63	145	70	2.00
L145070220	5.06	145	70	2.20
L175070120	3.02	175	70	1.20
L175070130	3.29	175	70	1.30
L175070140	3.52	175	70	1.40
L175070150	3.79	175	70	1.50
L175070160	4.05	175	70	1.60
L175070180	4.55	175	70	1.80
L175070200	5.08	175	70	2.00
L175070220	5.56	175	70	2.20
L175070250	6.35	175	70	2.50
L205070120	3.29	205	70	1.20
L205070130	3.58	205	70	1.30
L205070140	3.84	205	70	1.40
L205070150	4.13	205	70	1.50
L205070160	4.41	205	70	1.60
L205070170	4.67	205	70	1.70
L205070180	4.96	205	70	1.80
L205070200	5.53	205	70	2.00
L205070220	6.05	205	70	2.20
L205070250	6.91	205	70	2.50
L205070270	7.49	205	70	2.70

References	Weight (kg/m)	Dims (mm) A	B	Gauge (mm)
L235070130	3.86	235	70	1.30
L235070140	4.14	235	70	1.40
L235070150	4.45	235	70	1.50
L235070160	4.76	235	70	1.60
L235070170	5.04	235	70	1.70
L235070180	5.35	235	70	1.80
L235070200	5.97	235	70	2.00
L235070220	6.53	235	70	2.20
L235070250	7.46	235	70	2.50
L235070270	8.08	235	70	2.70
L265070140	4.46	265	70	1.40
L265070150	4.79	265	70	1.50
L265070160	5.13	265	70	1.60
L265070180	5.76	265	70	1.80
L265070200	6.43	265	70	2.00
L265070220	7.03	265	70	2.20
L265070250	8.03	265	70	2.50
L265070270	8.70	265	70	2.70
L300090150	5.64	300	90	1.50
L300090160	6.03	300	90	1.60
L300090180	6.78	300	90	1.80
L300090200	7.56	300	90	2.00
L300090250	9.44	300	90	2.50
L300090270	10.23	300	90	2.70
L350090150	6.20	350	90	1.50
L350090160	6.63	350	90	1.60
L350090180	7.45	350	90	1.80
L350090200	8.32	350	90	2.00
L350090250	10.39	350	90	2.50
L350090270	11.25	350	90	2.70

Reference Key







Multicleats

Table 4:1 Multicleat References (MD300 and MD350 cleats are not available as Multicleats)

Sheeting Line (mm)	Multichannel Section Depths (mm)	Cleat Type: Weld-On Double	Weld-On Single	Bolt-On Double	Bolt-On Single
–	G140/150	–	MS 120x	–	MS 120Bx
151	145	MD 145	MS 145	MD 145BB	MS 145BB
181	up to 175	MD 175	MS 175	MD 175BB	MS 175BB
211	up to 205	MD 205	MS 205	MD 205BB	MS 205BB
241	up to 235	MD 235	MS 235	MD 235BB	MS 235BB
271	up to 265	MD 265	MS 265	MD 265BB	MS 265BB
306	300	MD 300		MD 300BB	
356	350	MD 350		MD 350BB	

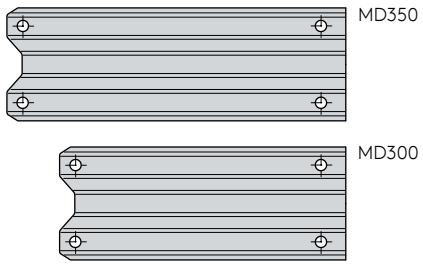
Note: All cleats are supplied in unpainted black steel as standard. Powder coated or galvanised finishes are available at extra cost if required. Please note, for galvanised finish there is an extended lead time, please contact our Sales Department for more information.

Table 4:2 Multicleat Options

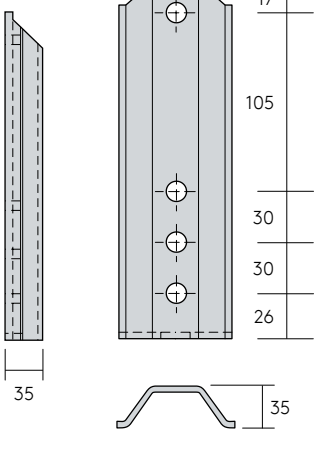
Options	Suffix	Example
Bolt-on Black	BB	MD175BB
Bolt-on Powder coated	BE	MD175BE
Bolt-on Galvanised	BG	MD175BG
Stiffened	S	MD265S
Extended	X	MD265X300 (ie; 300mm from rafter face)

MD300 and MD350 are supplied stiffened, see page 113 for details.

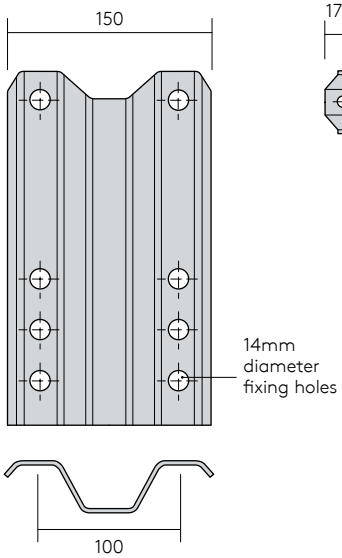
All Multicleat holes shown are 14mm diameter.



Standard Single Cleat

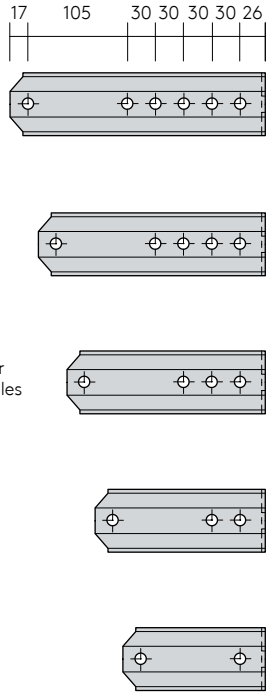


Standard Double Cleat

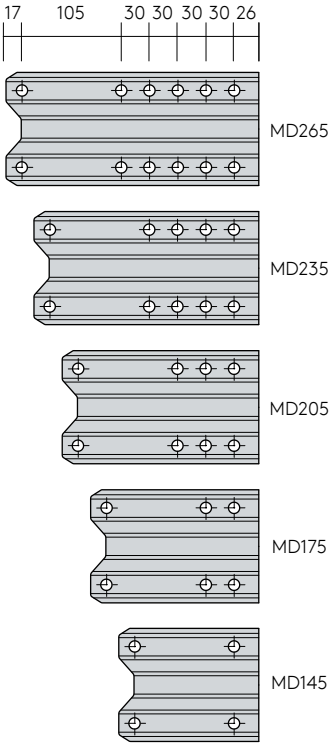


Generally single cleats are supplied unstiffened.

Single



Double



Multicleats provide the most economical solution for stooled-off rails.

Products & References

Bolt-on Rail Cleats

All Multicleats are available as bolt-on.

Note: Various finishes are available, please see Table 4:2 on page 111.

Table 4:3 Base Plate Thicknesses

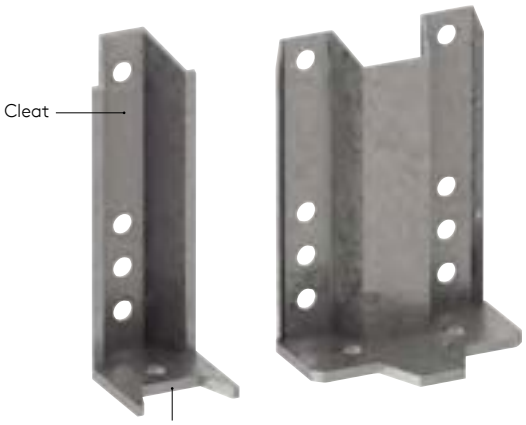
Rail Depth	Cleat Base Plate Thickness (mm)
G140/150	6
145	6
175	6
205	8
235	8
265	8
300	8
350	8

Table 4:4 Base Plate Holes Cross Centres

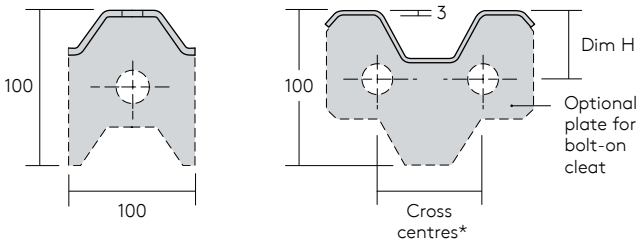
Base Plate Holes Cross Centres*	Dim H (mm)
50	55
60	55
70 (standard)	50
80	50
90	50
100	50

Multicleats allow differing section sizes to be used on any elevation, while maintaining a constant sheeting line.

Bolt-On Single Cleat **Bolt-On Double Cleat**

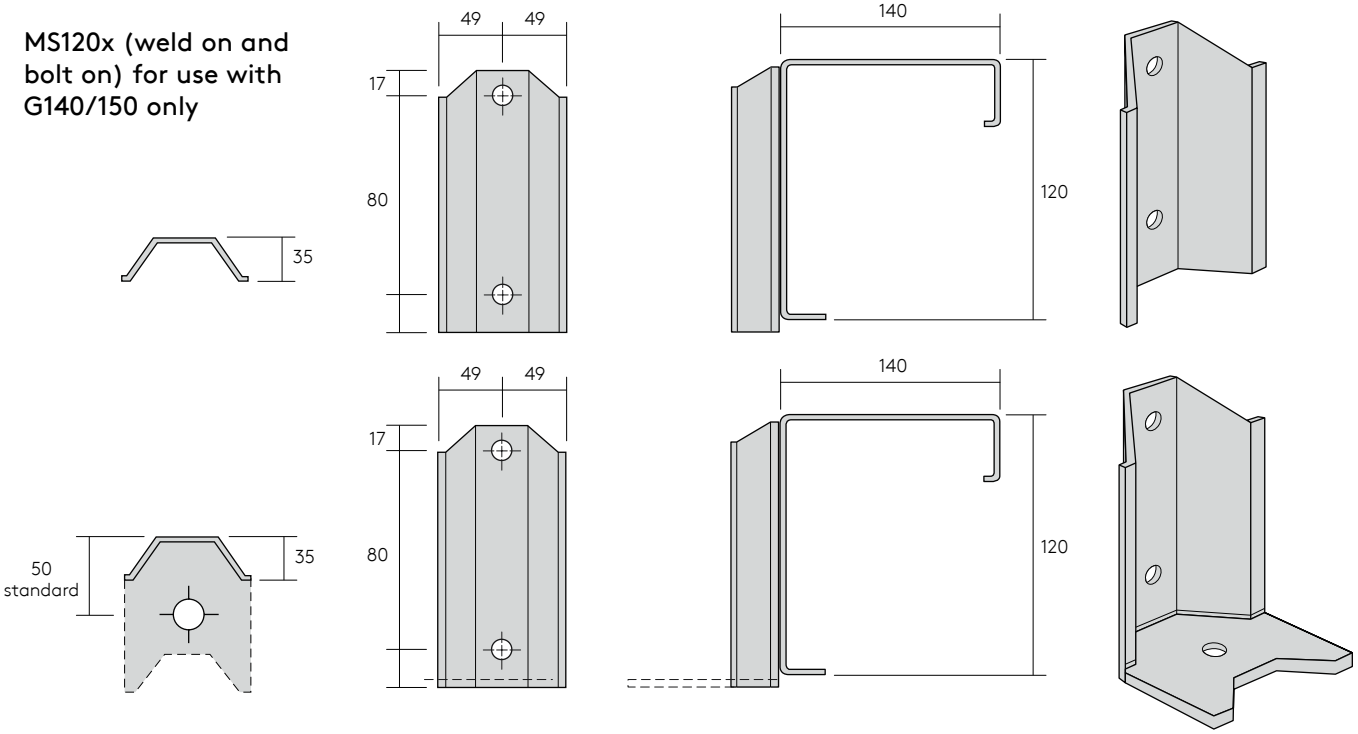


Bolt-On Single Cleat **Bolt-On Double Cleat**



All base plate holes are 18mm
Cleat thickness = 3mm
All dimensions are in mm unless otherwise stated.

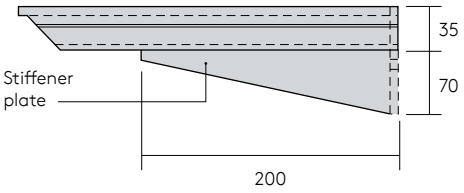
MS120x (weld on and bolt on) for use with G140/150 only



Stiffened Rail Multicleats

All Multicleats are available with stiffeners where required, eg. tiled roof applications. Add 'stiffened' to Multicleat reference when ordering. See Table 4:2, page 111.

Note: Single cleats are generally supplied unstiffened.



Multicleat Arrangement

Multicleats allow differing section sizes to be used on any elevation, while maintaining a constant sheeting line.

Diagram A

shows a 265 deep section fixed to a MD265 cleat.

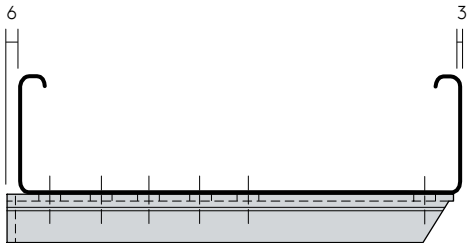
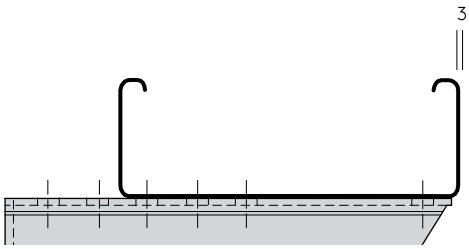


Diagram B

shows a 205 deep section fixed to a MD265 cleat.

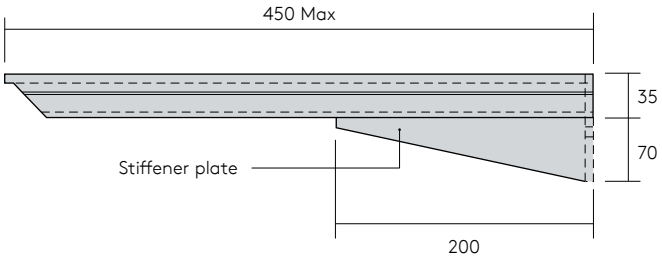


Extended Rail Cleats

Extended cleats can be manufactured to meet your specific requirements. These are manufactured to order and will be at an additional cost.

Note: Add 'extended' to cleat reference when ordering.

Extended double cleats over 270mm long are supplied complete with stiffeners. These are not available with single cleats.



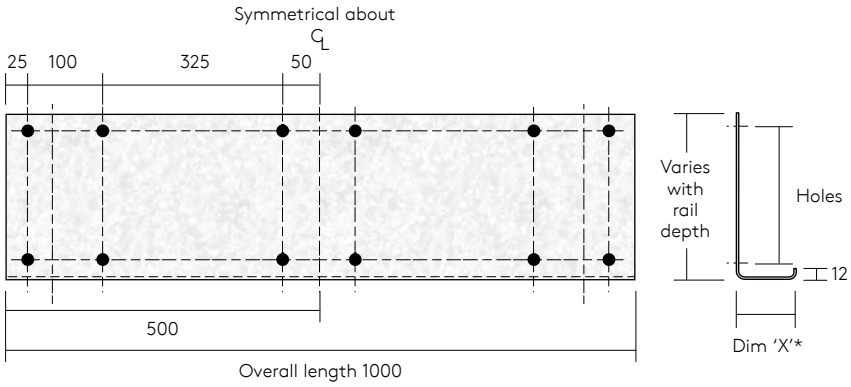
Products & References

Multichannel Sleeves

Used to provide continuity at a rail joint normally at a single span to a double, or a single to a single span.

All bolts to be M12.

Please specify sleeve reference as below.



* Dim X is: 80 when 70 flange
100 when 90 flange

Table 4:5 Multichannel Sleeve References

Sleeve Reference	To Suit Channel Section Web	Flange
CSL14570	145	70
CSL17570	175	70
CSL20570	205	70
CSL23570	235	70
CSL26570	265	70
CSL30090	300	90
CSL35090	350	90

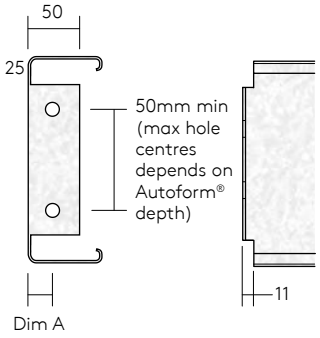
Autoform® in and Autoform® Out

Standard Autoform® Ends are supplied with a 50mm return on all section sizes, non-standard returns are available on request. Dim A holes should be 20mm from the web for 14mm dia holes (M12 bolts) or 25mm from the web for 18mm (M16 bolts).

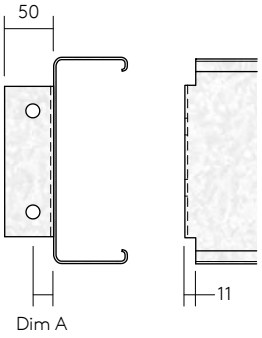
Part reference: AFIN / AFOUT.

Minimum channel length = 125mm.

For Autoform® details please see page 138.



Autoform® In

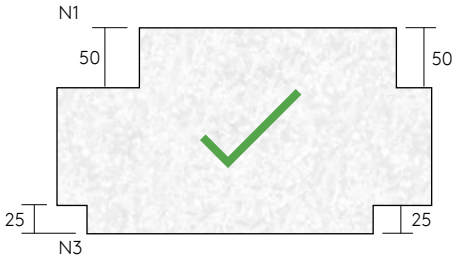


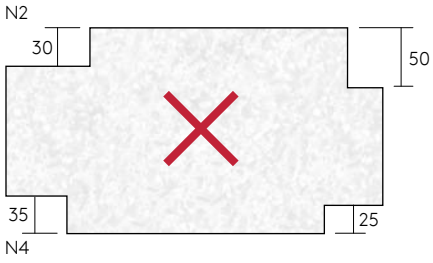
Autoform® Out

Notches

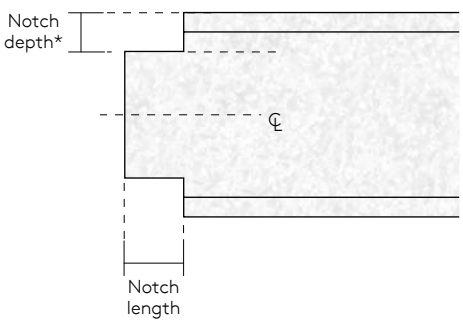
Notches can be cut from the top, bottom or both ends. Standard notches are 25mm in depth cut to the lengths shown. Non-standard notches can be cut subject to quantity, please contact our Technical Department for details.

Notch reference: N1 / N2 / N3 / N4.





	Section	Min. (mm)	Max. (mm)
Notch Length	All	30	250
Notch Depth	145	11	46
	175	11	61
	205	11	76
	235	11	76
	265	11	76
	300	11	76
	350	11	76



Note: Notch depth at each flange must match e.g. top lead notch depth (N1) = top tail notch depth (N2).

*For maximum notch depth please contact our Customer Service Department.

Tube Strut TSA

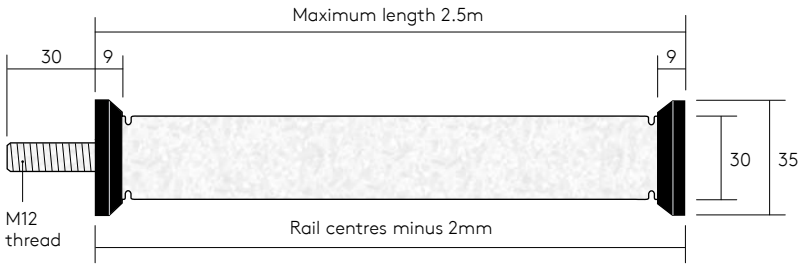
Used to restrain purlins and side rails.

Part reference: TSA0000.

Where 0000 = rail centres
e.g: TSA1000 (rail centres = 1000mm).

Minimum length = 150mm.

For application see page 104.



Tube Strut TSB

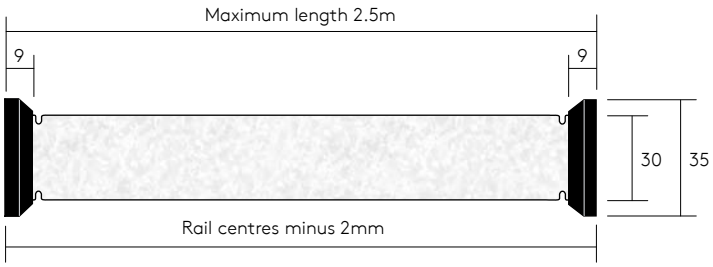
This tube strut is used to restrain side rails where a flush face is required.

Part reference: TSB0000.

Where 0000 = rail centres
e.g: TSB1000 (rail centres = 1000mm).

Minimum length = 150mm.

For application see page 104.



Heavy Duty Mezzanine Floor Restraint SWF

Angle strut used to restrain the larger sections on Mezzanine Floor applications.

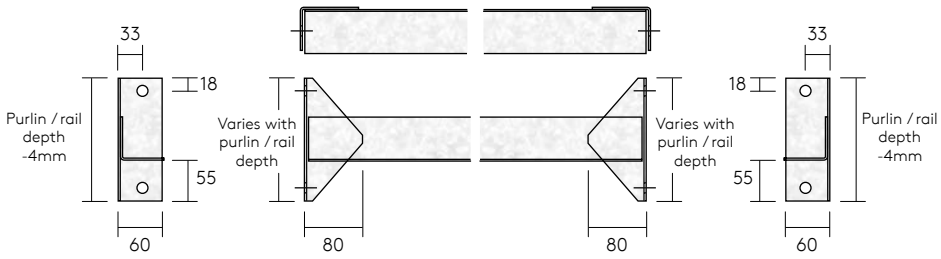
Part reference: SWF0000.

Where 0000 = overall length
e.g: SWF1500 (overall length = 1500mm).

Channel section size must be specified.

Minimum length = 275mm.

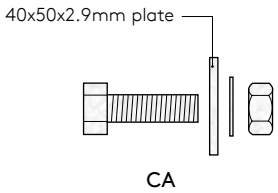
For application see page 134.



Clamp Plates

Used to fix and complete a run of tube struts.

Part reference: CA.



CA

Screwed Rod

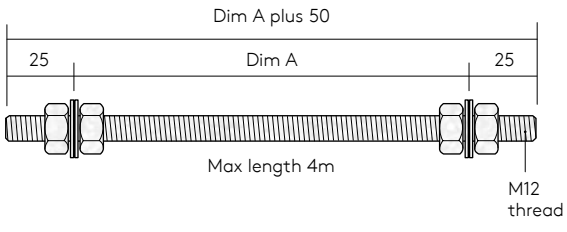
Restraint on mezzanine floor beams.

Part reference: TR0000.

Where 0000 = Dim A

e.g: TR0000 (joist centres = 500mm).

For application see page 134.



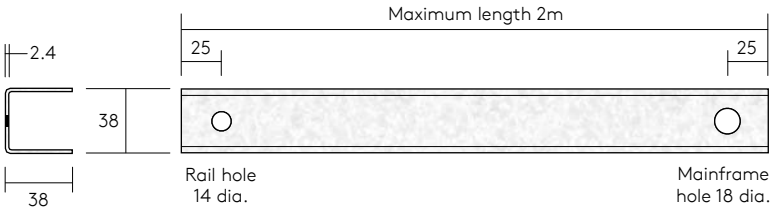
Products & References

Stanchion Restraint RNA

Channel stay to provide compression and tension restraint from the rail to the inner flange of the main frame.

Part reference: RNA0000.

Where 0000 = length between hole centres e.g: RNA1000 (hole centres = 1000mm).

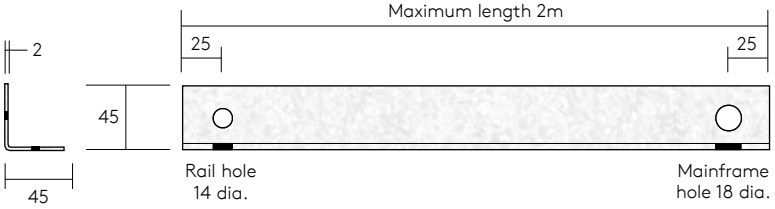


Stanchion Restraint RNB

Angle stay to provide compression and tension restraint from the rail to the inner flange of the main. Frame suitable for smaller main frame sections.

Part reference: RNB0000.

Where 0000 = length between hole centres e.g: RNB1000 (hole centres = 1000mm).



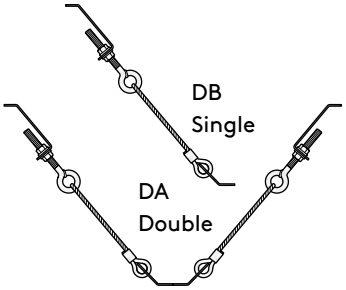
Diagonal Tie Wire

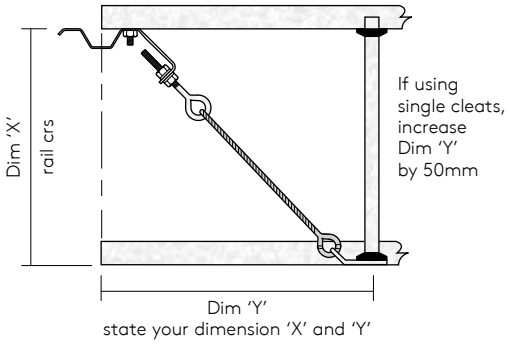
Used to support the self weight of the cladding and transfer it to the stanchions.

Part reference: DB / DA.

Please state your dimension 'X' and 'Y'.

For design details see pages 104 and 106.





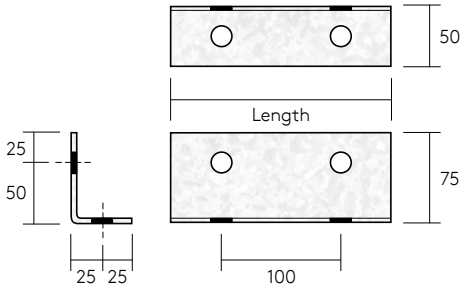
Multichannel Base Cleats

Section	Cleat Reference	Length
L175	MC175	155mm
L205	MC205	185mm
L235	MC235	215mm
L265	MC265	245mm
L300	MC300	280mm
L350	MC350	330mm

Note: Thickness = 2.9mm.

Hot rolled end cleats are also available, Please contact Kingspan sales for more information.

All holes 18mm diameter.

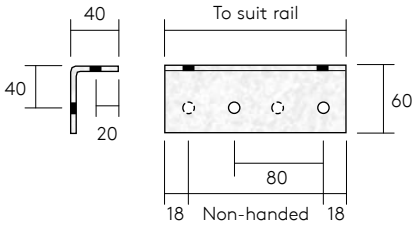


MTC Cleats

Angle cleat to attach Multibeam or Multichannel together.

Part Reference	Rail Depth
MTC145	145mm
MTC175	175mm
MTC205	205mm
MTC235	235mm
MTC265	265mm
MTC300	300mm
MTC350	350mm

Note: Thickness = 2.0mm.



All holes 14mm diameter.

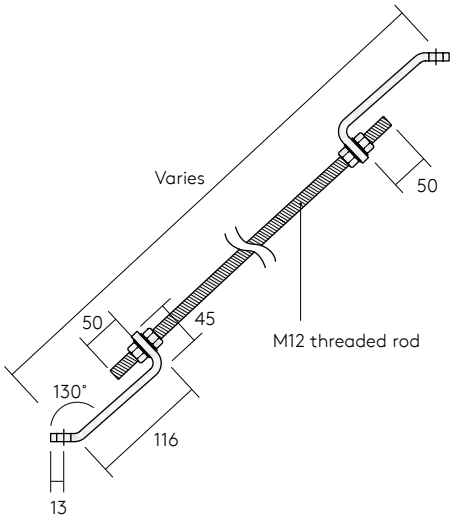
Rod Diagonal

The rod diagonal is used to transfer the load to the column when the horizontal cladding system is jointed in the bay.

Part reference: TRHD0000.

Where 0000 = length between hole centres e.g: TRHD1000 (hole centres = 1000mm).

For application see page 107.



Diagonal angle must be supplied when ordering (available in 5° increments from 30° to 60°).

Horizontal Panel Vertical Support

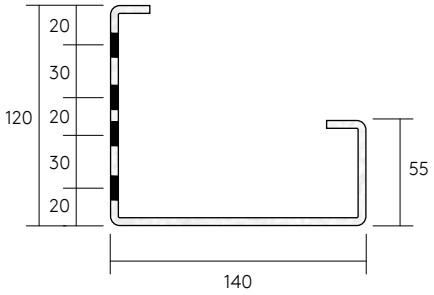
Used as the vertical support between Multichannel horizontal rails to support horizontally laid Insulated panels.

Part reference: G140/150.

Maximum length = 8 metres.

1.5mm galvanised steel.

For use within the span it can be provided complete with end connections attached.



All holes 14mm diameter. Standard hole grouping are at backmarks of 20mm, 50mm, 70mm and 100mm.

Hole placement along the length to be specified by the customer.

Multibracket

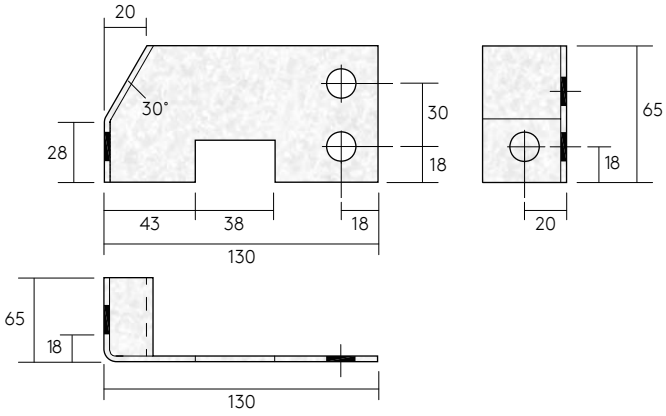
Multibrackets are used to make connections between Multichannels and Multibeam.

Part reference: MB1B as shown / MB1A opposite hand.

Material 3.0mm galvanised steel.

All holes 14 diameter.

Note: Multibrackets are not suitable for connecting sections to a 90mm flange.

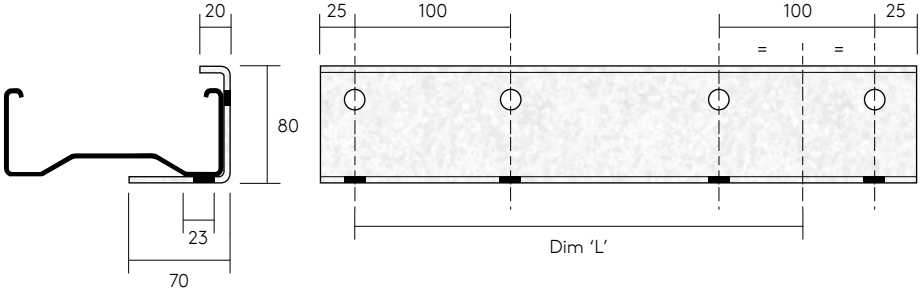


Rail Stubs

Part reference: SM0000.

Where 0000 = required length 'Dim L'.

Manufactured from 2.7mm galvanised steel strip.



Section Properties

Table 4:6 Multichannel Eurocode Section Properties

Section	Gauge	Area	Weight	Major Axis		Minor Axis		Radius of Gyration	
	t_{nom} (mm)	A_0 (cm^2)	(kg/m)	Iyy (cm^4)	$W_{el}yy$ (cm^3)	Izz (cm^4)	$W_{el}zz$ (cm^3)	iyy (cm)	izz (cm)
L145070120	1.20	3.68	2.75	125.52	17.32	26.07	4.64	5.86	2.67
L145070130	1.30	3.99	2.99	135.84	18.74	28.12	5.06	5.85	2.66
L145070140	1.40	4.30	3.21	146.07	20.15	30.14	5.47	5.85	2.66
L145070150	1.50	4.60	3.45	156.23	21.56	32.14	5.88	5.85	2.65
L145070160	1.60	4.91	3.69	166.30	22.94	34.09	6.29	5.84	2.64
L145070180	1.80	5.51	4.15	186.23	25.69	37.93	7.11	5.83	2.63
L145070200	2.00	6.11	4.63	205.84	28.40	41.65	7.91	5.82	2.62
L145070220	2.20	6.71	5.06	225.36	31.09	45.34	8.72	5.82	2.61
L175070120	1.20	4.03	3.02	193.51	22.12	27.79	4.65	6.95	2.63
L175070130	1.30	4.37	3.29	209.48	23.95	29.98	5.07	6.95	2.63
L175070140	1.40	4.71	3.52	225.31	25.76	32.13	5.48	6.94	2.62
L175070150	1.50	5.04	3.79	241.06	27.56	34.26	5.89	6.94	2.62
L175070160	1.60	5.38	4.05	256.66	29.34	36.34	6.30	6.93	2.61
L175070180	1.80	6.04	4.55	287.59	32.87	40.44	7.12	6.92	2.60
L175070200	2.00	6.70	5.08	318.05	36.36	44.40	7.92	6.91	2.58
L175070220	2.20	7.36	5.56	348.06	39.79	48.24	8.71	6.90	2.57
L175070250	2.50	8.33	6.35	392.24	44.84	53.77	9.87	6.89	2.55
L205070120	1.20	4.38	3.29	279.52	27.28	29.24	4.67	8.01	2.59
L205070130	1.30	4.75	3.58	302.65	29.53	31.54	5.08	8.01	2.59
L205070140	1.40	5.11	3.84	325.60	31.77	33.80	5.49	8.00	2.58
L205070150	1.50	5.48	4.13	348.43	34.00	36.04	5.91	8.00	2.57
L205070160	1.60	5.84	4.41	371.06	36.21	38.23	6.31	7.99	2.57
L205070170	1.70	6.21	4.67	393.58	38.41	40.40	6.72	7.99	2.56
L205070180	1.80	6.57	4.96	415.95	40.59	42.53	7.13	7.98	2.55
L205070200	2.00	7.29	5.53	460.21	44.91	46.70	7.93	7.97	2.54
L205070220	2.20	8.00	6.05	503.86	49.17	50.74	8.72	7.96	2.53
L205070250	2.50	9.06	6.91	568.20	55.45	56.55	9.88	7.94	2.51
L205070270	2.70	9.76	7.49	610.33	59.56	60.26	10.63	7.93	2.49
L235070130	1.30	5.12	3.86	417.05	35.50	32.87	5.09	9.05	2.54
L235070140	1.40	5.52	4.14	448.77	38.20	35.22	5.51	9.04	2.53
L235070150	1.50	5.92	4.45	480.31	40.88	37.55	5.92	9.03	2.53
L235070160	1.60	6.31	4.76	511.60	43.55	39.83	6.33	9.03	2.52
L235070170	1.70	6.70	5.04	542.75	46.20	42.09	6.73	9.02	2.51
L235070180	1.80	7.10	5.35	573.70	48.83	44.32	7.14	9.02	2.51
L235070200	2.00	7.88	5.97	634.98	54.05	48.66	7.94	9.00	2.49
L235070220	2.20	8.65	6.53	695.46	59.20	52.86	8.73	8.99	2.48
L235070250	2.50	9.80	7.46	784.71	66.80	58.91	9.89	8.97	2.46
L235070270	2.70	10.56	8.08	843.21	71.77	62.77	10.64	8.96	2.44
L265070140	1.40	5.93	4.46	596.64	45.04	36.45	5.52	10.06	2.49
L265070150	1.50	6.36	4.79	638.68	48.21	38.86	5.93	10.05	2.48
L265070160	1.60	6.78	5.13	680.39	51.36	41.22	6.34	10.04	2.47
L265070180	1.80	7.63	5.76	763.22	57.61	45.86	7.15	10.03	2.46
L265070200	2.00	8.47	6.43	845.00	63.78	50.34	7.95	10.02	2.44
L265070220	2.20	9.30	7.03	925.77	69.88	54.68	8.74	10.00	2.43
L265070250	2.50	10.54	8.03	1045.09	78.89	60.94	9.90	9.98	2.41
L265070270	2.70	11.36	8.70	1123.36	84.79	64.93	10.65	9.97	2.40
L300090150	1.50	7.42	5.64	989.64	65.98	74.10	8.66	11.55	3.16
L300090160	1.60	7.92	6.03	1054.74	70.33	78.69	9.26	11.54	3.15
L300090180	1.80	8.91	6.78	1184.14	78.95	87.76	10.48	11.53	3.14
L300090200	2.00	9.89	7.56	1312.17	87.49	96.58	11.68	11.52	3.12
L300090250	2.50	12.33	9.44	1626.46	108.45	117.65	14.63	11.48	3.09
L300090270	2.70	13.30	10.23	1749.84	116.67	125.68	15.78	11.47	3.07
L350090150	1.50	8.15	6.20	1425.79	81.48	77.26	8.68	13.23	3.08
L350090160	1.60	8.70	6.63	1519.82	86.86	82.05	9.29	13.22	3.07
L350090180	1.80	9.79	7.45	1706.85	97.55	91.50	10.51	13.21	3.06
L350090200	2.00	10.87	8.32	1892.02	108.13	100.69	11.71	13.19	3.04
L350090250	2.50	13.56	10.39	2347.16	134.14	122.63	14.66	13.16	3.01
L350090270	2.70	14.63	11.25	2526.07	144.36	130.99	15.81	13.14	2.99

Horizontal Panel Vertical Support Eurocode Section Properties

Section	Gauge	Area	Weight	Major Axis			Minor Axis		Radius of Gyration	
	t_{nom} (mm)	A_0 (cm^2)	(kg/m)	Iyy (cm^4)	W_{el} Pos (cm^3)	W_{el} Neg (cm^3)	Izz (cm^4)	$W_{el}zz$ (cm^3)	iyy (cm)	izz (cm)
G140/150	1.50	5.10	4.00	78.08	22.67	9.13	164.43	28.81	3.91	5.63

Load / Span Tables

Multichannel Brickwork Restraint: Eurocode Design

Working Loads

Loads shown are working loads limited to a deflection of span/300, span/360 or span/500. Sections can be used as combined sheeting rail / brick restraint, or as a brick restraint built into the brickwork either as a single or compound section. Attachment to the brickwork can be: rawlbolts; threaded rods built into the wall; shop-fired fixings; or flat strapped brick restraints.

Use of the Autoform® connection can provide an efficient solution for the attachment of brick restraints to the steelwork. Please contact our Technical Department for further details.

Table 4:7 Multichannel Brickwork Restraint Single Span

Span (m)	Section	Weight (kg/m)	Ultimate Total UDL kN		Working Load to Produce Deflection kN		
			Pressure	Suction	Span/300	Span/360	Span/500
4.0	L175070120	3.02	13.60	13.60	6.50	5.42	3.90
	L175070130	3.29	15.60	15.60	7.04	5.87	4.22
	L175070140	3.52	17.65	17.65	7.57	6.31	4.54
	L175070150	3.79	19.73	19.73	8.10	6.75	4.86
	L175070160	4.05	21.81	21.81	8.62	7.19	5.17
	L175070180	4.55	26.34	26.34	9.66	8.05	5.80
	L175070200	5.08	29.90	29.90	10.69	8.90	6.41
	L175070220	5.56	33.70	33.70	11.69	9.75	7.02
	L175070250	6.35	39.12	39.12	13.18	10.98	7.91
	L205070120	3.29	15.23	15.23	9.39	7.83	5.63
	L205070130	3.58	18.23	18.23	10.17	8.47	6.10
	L205070140	3.84	20.72	20.72	10.94	9.12	6.56
	L205070150	4.13	23.24	23.24	11.71	9.76	7.02
	L205070160	4.41	25.77	25.77	12.47	10.39	7.48
	L205070170	4.67	28.28	28.28	13.23	11.02	7.93
	L205070180	4.96	30.76	30.76	13.98	11.64	8.39
	L205070200	5.53	35.59	35.59	15.46	12.89	9.28
4.5	L175070120	3.02	12.09	12.09	5.14	4.28	3.08
	L175070130	3.29	13.86	13.86	5.56	4.63	3.34
	L175070140	3.52	15.69	15.69	5.98	4.99	3.59
	L175070150	3.79	17.54	17.54	6.40	5.33	3.84
	L175070160	4.05	19.38	19.38	6.81	5.68	4.09
	L175070180	4.55	23.05	23.05	7.63	6.36	4.58
	L175070200	5.08	26.58	26.58	8.44	7.04	5.06
	L175070220	5.56	29.95	29.51	9.24	7.70	5.55
	L175070250	6.35	34.77	33.16	10.41	8.68	6.25
	L205070120	3.29	14.04	14.04	7.42	6.19	4.45
	L205070130	3.58	16.21	16.21	8.03	6.70	4.82
	L205070140	3.84	18.42	18.42	8.64	7.20	5.19
	L205070150	4.13	20.66	20.66	9.25	7.71	5.55
	L205070160	4.41	22.91	22.91	9.85	8.21	5.91
	L205070170	4.67	25.13	25.13	10.45	8.71	6.27
	L205070180	4.96	27.35	27.35	11.04	9.20	6.63
	L205070200	5.53	31.64	31.64	12.22	10.18	7.33
5.0	L175070120	3.02	10.88	10.88	4.16	3.47	2.49
	L175070130	3.29	12.48	12.48	4.50	3.75	2.70
	L175070140	3.52	14.12	14.12	4.84	4.04	2.91
	L175070150	3.79	15.78	15.78	5.19	4.32	3.11
	L175070160	4.05	17.45	17.45	5.52	4.60	3.31
	L175070180	4.55	20.75	20.69	6.19	5.15	3.71
	L175070200	5.08	23.92	22.84	6.84	5.70	4.10
	L175070220	5.56	26.96	24.92	7.48	6.24	4.49
	L175070250	6.35	31.30	28.02	8.44	7.03	5.06
	L205070120	3.29	12.64	12.64	6.01	5.01	3.61
	L205070130	3.58	14.59	14.59	6.51	5.42	3.91
	L205070140	3.84	11.58	11.58	7.00	5.84	4.20
	L205070150	4.13	18.60	18.60	7.49	6.24	4.50
	L205070160	4.41	20.62	20.62	7.98	6.65	4.79
	L205070170	4.67	22.62	22.62	8.46	7.05	5.08
	L205070180	4.96	24.61	24.61	8.95	7.46	5.37
	L205070200	5.53	28.47	27.98	9.90	8.25	5.94

Load / Span Tables

Table 4:7 Multichannel Brickwork Restraint Single Span (continued)

Span (m)	Section	Weight (kg/m)	Ultimate Total UDL kN		Working Load to Produce Deflection kN		
			Pressure	Suction	span/300	span/360	span/500
5.5	L175070120	3.02	9.89	9.89	3.44	2.86	2.06
	L175070130	3.29	11.34	11.34	3.72	3.10	2.23
	L175070140	3.52	12.83	12.83	4.01	3.34	2.40
	L175070150	3.79	14.35	14.35	4.28	3.57	2.57
	L175070160	4.05	15.86	15.50	4.56	3.80	2.74
	L175070180	4.55	13.36	17.33	5.11	4.26	3.07
	L175070200	5.08	21.75	19.13	5.65	4.71	3.39
	L175070220	5.56	24.50	20.89	6.19	5.16	3.71
	L175070250	6.35	28.45	23.49	6.97	5.81	4.18
	L205070120	3.29	11.48	11.48	4.97	4.14	2.98
	L205070130	3.58	13.26	13.26	5.38	4.48	3.23
	L205070140	3.84	15.07	15.07	5.79	4.82	3.47
	L205070150	4.13	16.90	16.90	6.19	5.16	3.72
	L205070160	4.41	18.74	18.74	6.60	5.50	3.96
	L205070170	4.67	20.56	20.09	7.00	5.83	4.20
	L205070180	4.96	22.37	21.20	7.39	6.16	4.43
	L205070200	5.53	25.88	23.39	8.18	6.82	4.91
6.0	L175070150	3.79	13.15	12.11	3.60	3.00	2.16
	L175070160	4.05	14.54	12.88	3.83	3.19	2.30
	L175070180	4.55	17.29	14.41	4.30	3.58	2.58
	L175070200	5.08	19.93	15.91	4.75	3.96	2.85
	L175070220	5.56	22.46	17.39	5.20	4.33	3.12
	L175070250	6.35	20.08	19.57	5.86	4.88	3.52
	L205070120	3.29	10.53	10.53	4.17	3.48	2.50
	L205070130	3.58	12.16	12.16	4.52	3.77	2.71
	L205070140	3.84	13.82	13.82	4.86	4.05	2.92
	L205070150	4.13	15.49	14.81	5.20	4.33	3.12
	L205070160	4.41	17.18	15.74	5.54	4.62	3.33
	L205070170	4.67	18.85	16.67	5.88	4.90	3.52
	L205070180	4.96	20.51	17.60	6.21	5.18	3.73
	L205070200	5.53	23.72	19.42	6.87	5.73	4.12
6.5	L175070150	3.79	12.14	11.64	3.07	2.56	1.84
	L175070160	4.05	13.42	12.37	3.27	2.72	1.96
	L175070180	4.55	15.96	13.83	3.66	3.05	2.20
	L175070200	5.08	18.40	15.26	4.05	3.37	2.43
	L175070220	5.56	20.74	16.65	4.43	3.69	2.66
	L175070250	6.35	24.07	18.70	4.99	4.16	2.99
	L205070120	3.29	9.72	9.72	3.56	2.96	2.13
	L205070130	3.58	11.22	11.22	3.85	3.21	2.31
	L205070140	3.84	12.75	12.75	4.14	3.45	2.49
	L205070150	4.13	14.30	14.27	4.43	3.69	2.66
	L205070160	4.41	15.85	15.17	4.72	3.94	2.83
	L205070170	4.67	17.40	16.06	5.01	4.17	3.01
	L205070180	4.96	18.93	16.95	5.29	4.41	3.18
	L205070200	5.53	21.90	18.69	5.86	4.88	3.51
	L205070220	6.05	24.76	21.57	6.41	5.34	3.85
	L205070250	6.91	28.88	22.91	7.23	6.02	4.34
7.0	L175070150	3.79	11.27	9.93	2.64	2.20	1.59
	L175070160	4.05	12.46	10.55	2.81	2.35	1.69
	L175070180	4.55	14.82	11.79	3.16	2.63	1.89
	L175070200	5.08	17.09	13.01	3.49	2.91	2.09
	L175070220	5.56	19.26	14.20	3.82	3.18	2.29
	L175070250	6.35	22.35	15.95	4.30	3.59	2.58
	L205070120	3.29	9.02	9.02	3.07	2.56	1.84
	L205070130	3.58	10.42	10.42	3.32	2.77	1.99
	L205070140	3.84	11.84	11.38	3.57	2.98	2.14
	L205070150	4.13	13.28	12.16	3.82	3.18	2.30
	L205070160	4.41	14.72	12.93	4.07	3.39	2.44
	L205070170	4.67	16.16	13.69	4.32	3.60	2.59
	L205070180	4.96	17.58	14.44	4.56	3.80	2.74
	L205070200	5.53	20.34	15.93	5.05	4.21	3.03
	L205070220	6.05	23.00	17.38	5.53	4.61	3.32
	L205070250	6.91	26.82	19.51	6.24	5.19	3.74

Table 4:8 Multichannel Brickwork Restraint Double Span

Span (m)	Section	Weight (kg/m)	Ultimate Total UDL kN		Working Load to Produce Deflection kN		
			Pressure	Suction	span/300 (kN)	span/360	span/500
4.0	L175070120	3.02	11.07	11.07	15.66	13.05	9.40
	L175070130	3.29	13.35	13.35	16.95	14.13	10.17
	L175070140	3.52	15.75	15.75	18.24	15.20	10.94
	L175070150	3.79	18.24	18.24	19.51	16.26	11.71
	L175070160	4.05	20.77	20.77	20.77	17.31	12.46
	L175070180	4.55	25.88	25.88	23.28	19.40	13.97
	L175070200	5.08	30.85	30.85	25.74	21.45	15.45
	L175070220	5.56	35.60	35.60	28.17	23.48	16.90
	L175070250	6.35	42.30	42.30	31.75	26.46	19.05
	L205070120	3.29	10.85	10.85	22.62	18.85	13.57
	L205070130	3.58	13.34	13.34	24.50	20.41	14.70
	L205070140	3.84	16.03	16.03	26.35	21.96	15.81
	L205070150	4.13	18.89	18.89	28.20	23.50	16.92
	L205070160	4.41	21.87	21.87	30.03	25.03	18.02
	L205070170	4.67	24.93	24.93	31.86	26.55	19.11
	L205070180	4.96	28.04	28.04	33.67	28.05	20.20
	L205070200	5.53	34.25	34.25	37.25	31.04	22.35
4.5	L175070120	3.02	9.22	9.22	12.38	10.31	7.43
	L175070130	3.29	11.05	11.05	13.40	11.16	8.04
	L175070140	3.52	12.96	12.96	14.41	12.01	8.65
	L175070150	3.79	14.93	14.93	15.42	12.85	9.25
	L175070160	4.05	16.92	16.92	16.41	13.68	9.85
	L175070180	4.55	20.93	20.93	18.39	15.33	11.03
	L175070200	5.08	24.80	24.80	20.34	16.95	12.20
	L175070220	5.56	28.49	28.49	22.26	18.55	13.36
	L175070250	6.35	33.69	33.69	25.08	20.90	15.05
	L205070120	3.29	9.20	9.20	17.88	14.90	10.73
	L205070130	3.58	11.25	11.25	19.35	16.13	11.61
	L205070140	3.84	13.43	13.43	20.82	17.35	12.49
	L205070150	4.13	15.74	15.74	22.28	18.57	13.37
	L205070160	4.41	18.12	18.12	23.73	19.77	14.24
	L205070170	4.67	20.55	20.55	25.17	20.97	15.10
	L205070180	4.96	23.00	23.00	26.60	22.17	15.96
	L205070200	5.53	27.86	27.86	29.43	24.53	17.66
5.0	L175070120	3.02	8.65	8.65	10.02	8.35	6.01
	L175070130	3.29	10.31	10.31	10.85	9.04	6.51
	L175070140	3.52	12.03	12.03	11.67	9.73	7.00
	L175070150	3.79	13.80	13.80	12.49	10.41	7.49
	L175070160	4.05	15.59	15.59	13.29	11.08	7.98
	L175070180	4.55	19.16	19.16	14.90	12.41	8.94
	L175070200	5.08	22.60	22.60	16.47	13.73	9.88
	L175070220	5.56	25.87	25.87	18.03	15.02	10.82
	L175070250	6.35	30.50	30.50	20.32	16.93	12.19
	L205070120	3.29	8.77	8.77	14.48	12.07	8.69
	L205070130	3.58	10.66	10.66	15.68	13.06	9.41
	L205070140	3.84	12.67	12.67	16.87	14.06	10.12
	L205070150	4.13	14.77	14.77	18.05	15.04	10.83
	L205070160	4.41	16.92	16.92	19.22	16.02	11.53
	L205070170	4.67	19.11	19.11	20.39	16.99	12.23
	L205070180	4.96	21.31	21.31	21.55	17.96	12.93
	L205070200	5.53	25.63	25.63	23.84	19.87	14.30
5.5	L175070120	3.02	8.13	8.13	8.28	6.90	4.97
	L175070130	3.29	9.64	9.64	8.97	7.47	5.38
	L175070140	3.52	11.21	11.21	9.65	8.04	5.79
	L175070150	3.79	12.81	12.81	10.32	8.60	6.19
	L175070160	4.05	14.43	14.43	10.99	9.16	6.59
	L175070180	4.55	17.64	17.64	12.31	10.26	7.39
	L175070200	5.08	20.74	20.74	13.62	11.35	8.17
	L175070220	5.56	23.68	23.34	14.90	12.42	8.94
	L175070250	6.35	27.85	26.58	16.79	13.99	10.08
	L205070120	3.29	8.36	8.36	11.97	9.97	7.18
	L205070130	3.58	10.11	10.11	12.96	10.80	7.77
	L205070140	3.84	11.96	11.96	13.94	11.62	8.36
	L205070150	4.13	13.88	13.88	14.92	12.43	8.95
	L205070160	4.41	15.73	14.87	15.89	13.24	9.53
	L205070170	4.67	17.82	16.73	16.85	14.04	10.11
	L205070180	4.96	19.80	18.49	17.81	14.84	10.68
	L205070200	5.53	23.69	20.98	19.70	16.42	11.82

Load / Span Tables

Table 4:8 Multichannel Brickwork Restraint Double Span (continued)

Span (m)	Section	Weight (kg/m)	Ultimate Total UDL kN		Working Load to Produce Deflection kN		
			Pressure	Suction	Span/300	Span/360	Span/500
6.0	L175070150	3.79	11.94	11.94	8.67	7.23	5.20
	L175070160	4.05	13.41	13.41	9.23	7.69	5.54
	L175070180	4.55	16.34	16.34	10.35	8.62	6.21
	L175070200	5.08	19.15	19.15	11.44	9.53	6.86
	L175070220	5.56	21.82	21.82	12.52	10.43	7.51
	L175070250	6.35	25.61	25.61	14.11	11.76	8.47
	L205070120	3.29	7.97	7.97	10.05	8.38	6.03
	L205070130	3.58	9.59	9.59	10.89	9.07	6.53
	L205070140	3.84	11.30	11.30	11.71	9.76	7.03
	L205070150	4.13	13.06	13.06	12.53	10.44	7.52
	L205070160	4.41	14.86	14.86	13.35	11.12	8.01
	L205070170	4.67	16.67	16.67	14.16	11.80	8.49
	L205070180	4.96	18.47	18.47	14.96	12.47	8.98
	L205070200	5.53	22.00	21.52	16.55	13.80	9.93
6.5	L175070150	3.79	11.17	11.17	7.39	6.16	4.43
	L175070160	4.05	12.52	12.52	7.87	6.56	4.72
	L175070180	4.55	15.20	15.20	8.81	7.35	5.29
	L175070200	5.08	17.78	17.78	9.75	8.12	5.85
	L175070220	5.56	20.23	20.23	10.67	8.89	6.40
	L175070250	6.35	23.71	23.71	12.02	10.02	7.21
	L205070120	3.29	7.60	7.60	8.57	7.14	5.14
	L205070130	3.58	9.11	9.11	9.28	7.73	5.57
	L205070140	3.84	10.69	10.69	9.98	8.32	5.99
	L205070150	4.13	12.32	12.32	10.68	8.90	6.41
	L205070160	4.41	13.98	13.98	11.37	9.48	6.82
	L205070170	4.67	15.64	15.64	12.06	10.05	7.24
	L205070180	4.96	17.30	17.30	12.75	10.62	7.65
	L205070200	5.53	20.52	20.52	14.11	11.75	8.46
	L205070220	6.05	23.62	23.62	15.44	12.87	9.27
	L205070250	6.91	28.03	28.03	17.42	14.51	10.45
7.0	L175070150	3.79	10.48	10.48	6.37	5.31	3.82
	L175070160	4.05	11.73	11.73	6.78	5.65	4.07
	L175070180	4.55	14.20	14.20	7.60	6.33	4.56
	L175070200	5.08	16.58	16.58	8.41	7.00	5.04
	L175070220	5.56	18.84	18.84	9.20	7.67	5.52
	L175070250	6.35	22.06	22.06	10.37	8.64	6.22
	L205070120	3.29	7.25	7.25	7.39	6.16	4.43
	L205070130	3.58	8.67	8.67	8.00	6.67	4.80
	L205070140	3.84	10.14	10.14	8.61	7.17	5.16
	L205070150	4.13	11.66	11.66	9.21	7.67	5.53
	L205070160	4.41	13.19	13.19	9.81	8.17	5.88
	L205070170	4.67	14.72	14.72	10.40	8.67	6.24
	L205070180	4.96	16.25	16.25	10.99	9.16	6.60
	L205070200	5.53	19.22	19.22	12.16	10.14	7.30
	L205070220	6.05	22.07	22.07	13.32	11.10	7.99
	L205070250	6.91	26.13	26.13	15.02	12.51	9.01

Rafter and Stanchion Stays

Length Between c/c Holes (mm)	RNB Angle 45 x 45	RNA Channel 38 x 38 x 38
	Ultimate Compression (kN)	
500	17.54	31.4
600	17.05	31.4
700	16.55	31.4
800	16.1	31.4
900	15.75	31.4
1000	15.55	31.4
1500	–	21
2000	–	15.5

Note: Stay attaches to Multichannel / Multibeam with an M12 (8.8 grade) bolt and to the hot-rolled steel with a M16 bolt.

Horizontal Panel Vertical Support Member (G140/150)

Span (m)	Ultimate Total UDL kN		Working Load to Produce Deflection Span/150 kN
	Pressure	Suction	
3.0	23.44	9.21	9.10
3.5	19.66	7.72	6.69
4.0	16.73	6.58	5.12
4.5	14.33	5.68	4.05

Siderail Ultimate Loads: Eurocode Design

The following load / span tables show the ultimate load to comply with Eurocode BS EN 1993-1-3 + UK NAD. Multichannel cladding rails are supported on Multichannel cleats as shown in this handbook. Loads shown are UDL'S in kN and are ultimate values.

Values against deflection should be compared against values at working load. Capacity assumes the cladding provides restraint to the Multichannel, and that the Multichannel restraint system is as detailed in this handbook. The strut system should be fitted between the bottom rails and the rails levelled before proceeding progressively upwards. Maximum height limit 10m. Use grade 8.8 bolts for L265, L300 and L350.

For Stanchion Stay capacities please refer to page 122.

Table 4:9 Double Span Cladding Rails (Vertical Cladding)

Span (m)	Section	Weight (kg/m)	Ultimate Total UDL kN		Working Load to Produce Deflection Span/150 kN
			Pressure	Suction	
4.0	L145070120	2.75	9.39	9.39	19.83
	L145070130	2.99	11.06	11.06	21.47
	L145070140	3.21	12.79	12.79	23.08
	L145070150	3.45	14.56	14.56	24.69
	L145070160	3.69	16.33	16.33	26.28
	L145070180	4.15	19.85	19.85	29.43
	L145070200	4.63	23.22	23.22	32.53
	L145070220	5.06	26.41	26.41	35.61
4.5	L145070120	2.75	8.62	8.62	15.67
	L145070130	2.99	10.1	10.1	16.96
	L145070140	3.21	11.63	11.63	18.24
	L145070150	3.45	13.19	13.19	19.51
	L145070160	3.69	14.75	14.75	20.76
	L145070180	4.15	17.85	17.85	23.25
	L145070200	4.63	20.82	20.82	25.7
	L145070220	5.06	23.62	23.62	28.14
5.0	L145070120	2.75	7.95	7.95	12.69
	L145070130	2.99	9.28	9.28	13.74
	L145070140	3.21	10.65	10.65	14.77
	L145070150	3.45	12.04	12.04	15.8
	L145070160	3.69	13.44	13.44	16.82
	L145070180	4.15	16.2	16.2	18.83
	L145070200	4.63	18.85	18.85	20.82
	L145070220	5.06	21.35	21.35	22.79
	L175070120	3.02	8.62	8.62	19.57
	L175070130	3.29	10.31	10.31	21.19
	L175070140	3.52	12.03	12.03	22.79
	L175070150	3.79	13.8	13.8	24.38
5.5	L145070120	2.75	7.36	7.36	10.49
	L145070130	2.99	8.57	8.57	11.35
	L145070140	3.21	9.81	9.81	12.21
	L145070150	3.45	11.07	11.07	13.06
	L145070160	3.69	12.33	12.33	13.9
	L145070180	4.15	14.82	14.82	15.57
	L145070200	4.63	17.21	17.02	17.2
	L145070220	5.06	19.47	18.74	18.84
	L175070120	3.02	8.13	8.13	16.17
	L175070130	3.29	9.64	9.64	17.51
	L175070140	3.52	11.21	11.21	18.83
	L175070150	3.79	12.81	12.81	20.15
	L175070160	4.05	14.43	14.43	21.45
	L175070180	4.55	17.64	17.64	22.57
	L175070200	5.08	20.74	20.74	26.58
6.0	L145070140	3.21	9.08	9.08	10.26
	L145070150	3.45	10.23	10.23	10.97
	L145070160	3.69	11.38	11.38	11.68
	L145070180	4.15	13.65	13.19	13.08
	L145070200	4.63	15.83	14.69	14.46
	L145070220	5.06	17.89	16.15	15.83
	L175070120	3.02	7.65	7.65	13.59
	L175070130	3.29	9.04	9.04	14.71
	L175070140	3.52	10.48	10.48	15.82
	L175070150	3.79	11.94	11.94	16.93
	L175070160	4.05	13.41	13.41	18.03
	L175070180	4.55	16.34	16.22	20.2
	L175070200	5.08	19.15	18.25	22.34
	L205070120	3.29	7.97	7.97	19.63
	L205070130	3.58	9.59	9.59	21.26
	L205070140	3.84	11.3	11.3	22.87
	L205070150	4.13	13.06	13.06	24.47
6.5	L175070150	3.79	11.17	11.17	14.43
	L175070160	4.05	12.52	12.52	11.03
	L175070180	4.55	15.52	15.52	17.21
	L175070200	5.08	17.78	17.78	19.03
	L205070120	3.29	7.6	7.6	16.73
	L205070130	3.58	9.11	9.11	18.11
	L205070140	3.84	10.69	10.69	19.48
	L205070150	4.13	12.32	12.32	20.85
	L205070160	4.41	13.98	13.98	22.2
	L205070170	4.67	15.64	15.64	23.55
	L205070180	4.96	17.3	17.3	24.89
	L205070200	5.53	20.52	20.52	27.54
	L235070130	3.86	9.28	9.28	24.96
	L235070140	4.14	11.07	11.07	26.86
	L235070150	4.45	12.94	12.94	28.74
	L235070160	4.76	14.87	14.87	30.62
	L235070170	5.04	16.83	16.83	32.48
	L235070180	5.35	18.8	18.8	34.33
	L235070200	5.97	22.72	22.72	38.87
7.0	L205070120	3.29	7.25	7.25	14.42
	L205070130	3.58	8.67	8.67	15.62
	L205070140	3.84	10.14	10.14	16.8
	L205070150	4.13	11.66	11.66	17.98
	L205070160	4.41	13.19	13.19	19.15
	L205070170	4.67	14.72	14.72	20.31
	L205070180	4.96	16.25	16.25	21.46
	L205070200	5.53	19.22	19.22	23.75
	L235070130	3.86	8.91	8.91	21.52
	L235070140	4.14	10.58	10.58	23.16
	L235070150	4.45	12.33	12.33	24.78
	L235070160	4.76	14.13	14.13	26.4
	L235070170	5.04	15.95	15.95	28.01
	L235070180	5.35	17.78	17.78	29.6
	L235070200	5.97	21.39	21.39	32.76

Load / Span Tables

Table 4:10 Double Span Cladding Rails (Horizontal Cladding)

Span (m)	Section	Weight (kg/m)	Ultimate Total UDL kN		Working Load to Produce Deflection
			Pressure	Suction	Span/150 kN
4.0	L145070120	2.75	12.83	12.83	23.01
	L145070130	2.99	15.06	15.06	24.9
	L145070140	3.21	17.38	17.38	26.77
	L145070150	3.45	19.77	19.77	28.64
	L145070160	3.69	22.19	22.19	30.48
	L145070180	4.15	27.04	27.04	34.14
	L145070200	4.63	31.76	31.76	37.73
Restraints at mid-span	L145070220	5.06	36.29	36.29	41.31
4.5	L145070120	2.75	11.79	11.79	18.18
	L145070130	2.99	13.8	13.8	19.67
	L145070140	3.21	15.89	15.89	21.16
	L145070150	3.45	18.02	18.02	22.63
	L145070160	3.69	20.18	20.18	24.08
	L145070180	4.15	24.51	24.51	26.97
	L145070200	4.63	28.71	28.71	29.81
Restraints at mid-span	L145070220	5.06	32.72	32.72	32.64
5.0	L145070120	2.75	10.91	10.91	14.72
	L145070130	2.99	12.73	12.73	15.94
	L145070140	3.21	14.62	14.62	17.14
	L145070150	3.45	16.55	16.55	18.33
	L145070160	3.69	18.5	18.5	19.51
	L145070180	4.15	22.32	22.32	21.85
	L145070200	4.63	25.98	25.98	24.15
	L145070220	5.06	29.46	29.46	26.44
	L175070120	3.02	12.33	12.33	22.7
	L175070130	3.29	14.47	14.47	24.57
	L175070140	3.52	16.8	16.8	26.43
Restraints at mid-span	L175070150	3.79	19.19	19.19	28.28
5.5	L145070120	2.75	10.11	10.11	12.17
	L145070130	2.99	11.7	11.7	13.17
	L145070140	3.21	13.35	13.35	14.16
	L145070150	3.45	15.03	15.03	15.15
	L145070160	3.69	16.71	16.71	16.12
	L145070180	4.15	20.06	20.06	18.06
	L145070200	4.63	23.29	23.29	19.96
	L145070220	5.06	26.37	26.37	21.85
	L175070120	3.02	11.46	11.46	18.76
	L175070130	3.29	13.51	13.51	20.31
	L175070140	3.52	15.65	15.65	21.84
	L175070150	3.79	17.78	17.78	23.37
	L175070160	4.05	19.88	19.88	24.88
	L175070180	4.55	24.06	24.06	27.88
Restraints at mid-span	L175070200	5.08	28.1	28.1	30.84

Span (m)	Section	Weight (kg/m)	Ultimate Total UDL kN		Working Load to Produce Deflection
			Pressure	Suction	Span/150 kN
6.0	L145070140	3.21	12.1	12.1	11.9
	L145070150	3.45	13.6	13.6	12.73
	L145070160	3.69	15.09	15.09	13.55
	L145070180	4.15	18.05	18.05	15.17
	L145070200	4.63	20.9	20.9	16.77
	L145070220	5.06	23.62	23.62	18.36
	L175070120	3.02	10.69	10.69	15.76
	L175070130	3.29	12.47	12.47	17.07
	L175070140	3.52	14.3	14.3	18.36
	L175070150	3.79	16.16	16.16	19.64
	L175070160	4.05	18.01	18.01	20.91
	L175070180	4.55	21.71	21.71	23.43
	L175070200	5.08	25.26	25.26	25.91
	L205070120	3.29	11.56	11.56	22.77
	L205070130	3.58	13.78	13.78	24.66
	L205070140	3.84	16.07	16.07	26.53
Restraints at mid-span	L205070150	4.13	18.3	18.3	28.39
6.0	L145070140	3.21	13.01	13.01	10.94
	L145070150	3.45	14.59	14.59	11.71
	L145070160	3.69	16.18	16.18	12.46
	L145070180	4.15	19.32	19.32	13.95
	L145070200	4.63	22.35	22.35	15.42
	L145070220	5.06	25.23	25.23	16.89
	L175070120	3.02	11.32	11.32	14.5
	L175070130	3.29	13.28	13.28	15.7
	L175070140	3.52	15.29	15.29	16.88
	L175070150	3.79	17.36	17.36	18.06
	L175070160	4.05	19.42	19.42	19.23
	L175070180	4.55	23.45	23.45	21.55
	L175070200	5.08	27.23	27.23	23.83
	L205070120	3.29	12.26	12.26	20.94
	L205070130	3.58	14.6	14.6	22.68
	L205070140	3.84	17.03	17.03	24.4
Restraints at 1/3 points	L205070150	4.13	19.52	19.52	26.11
6.5	L175070150	3.79	16.12	16.12	15.39
	L175070160	4.05	17.91	17.91	16.39
	L175070180	4.55	21.46	21.46	18.36
	L175070200	5.08	24.89	24.89	20.31
	L205070120	3.29	11.62	11.62	17.85
	L205070130	3.58	13.79	13.79	19.32
	L205070140	3.84	16.04	16.04	20.79
	L205070150	4.13	18.34	18.34	22.24
	L205070160	4.41	20.66	20.66	23.69
	L205070170	4.67	22.94	22.94	25.13
	L205070180	4.96	25.06	25.06	26.56
	L205070200	5.53	29.22	29.22	29.38
	L235070130	3.86	11.15	11.15	26.63
	L235070140	4.14	13.51	13.51	28.65
	L235070150	4.45	19.9	19.9	30.66
	L235070160	4.76	22.62	22.62	32.66
	L235070170	5.04	25.37	25.37	34.65
	L235070180	5.35	28.12	28.12	36.63
Restraints at 1/3 points	L235070200	5.97	33.31	33.31	40.54

Table 4:10 Double Span Cladding Rails (Horizontal Cladding) (cont.)

Span (m)	Section	Weight (kg/m)	Ultimate Total UDL kN		Working Load to Produce Deflection Span/150 kN
			Pressure	Suction	
7.0	L205070120	3.29	10.99	10.99	15.39
	L205070130	3.58	13	13	16.66
	L205070140	3.84	15.07	15.07	17.92
	L205070150	4.13	17.18	17.18	19.18
	L205070160	4.41	19.14	19.14	20.43
	L205070170	4.67	21.08	21.08	21.67
	L205070180	4.96	23.02	23.02	22.9
	L205070200	5.53	26.79	26.79	25.33
	L235070130	3.86	13.83	13.83	22.9
	L235070140	4.14	16.23	16.23	24.7
	L235070150	4.45	18.7	18.7	26.44
	L235070160	4.76	21.2	21.2	28.16
	L235070170	5.04	23.72	23.72	29.88
	L235070180	5.35	26.13	26.13	31.58
	L235070200	5.97	30.58	30.58	34.95
7.5	L205070120	3.29	10.34	10.34	13.4
	L205070130	3.58	12.2	12.2	14.51
	L205070140	3.84	14.07	14.07	15.56
	L205070150	4.13	15.86	15.86	16.71
	L205070160	4.41	17.65	17.65	17.79
	L205070170	4.67	19.42	19.42	18.87
	L205070180	4.96	21.18	21.18	19.95
	L205070200	5.53	24.61	24.61	22.07
	L235070130	3.86	13.06	13.06	20
	L235070140	4.14	15.29	15.29	21.52
	L235070150	4.45	17.56	17.56	23.03
	L235070160	4.76	19.86	19.86	24.53
	L235070170	5.04	22	22	26.03
	L235070180	5.35	24.07	24.07	27.51
	L235070200	5.97	28.11	28.11	30.45
8.0	L205070150	4.13	14.66	14.66	14.68
	L205070160	4.41	16.28	16.28	15.64
	L205070170	4.67	17.9	17.9	16.59
	L205070180	4.96	19.5	19.5	17.53
	L205070200	5.53	22.61	22.61	19.4
	L235070130	3.86	12.33	12.33	17.58
	L235070140	4.14	14.39	14.39	18.91
	L235070150	4.45	16.49	16.49	20.24
	L235070160	4.76	18.4	18.4	21.56
	L235070170	5.04	20.3	20.3	22.88
	L235070180	5.35	22.18	22.18	24.18
	L235070200	5.97	25.85	25.85	26.76
8.5	L235070130	3.86	11.62	11.62	15.57
	L235070140	4.14	13.49	13.49	16.75
	L235070150	4.45	15.22	15.22	17.93
	L235070160	4.76	16.96	16.96	19.1
	L235070170	5.04	18.67	18.67	20.26
	L235070180	5.35	20.37	20.37	21.42
	L235070200	5.97	23.67	23.67	23.71
	L235070220	6.53	26.85	26.85	25.96
	L235070250	7.46	31.43	31.43	29.3
	L235070270	8.08	34.37	34.37	31.48
	L265070140	4.46	14.31	14.31	22.28
	L265070150	4.79	16.51	16.51	23.84
	L265075160	5.13	17.18	17.18	25.4
	L265070180	5.76	22.64	22.64	28.49
	L265070200	6.43	26.47	26.47	31.55
	L265070220	7.03	30.18	30.18	34.56
	L265070250	8.03	35.54	35.54	39.02
	L265070270	8.70	38.99	38.99	41.94

Restraints at 1/3 points

Restraints at 1/3 points

Restraints at 1/3 points

Restraints at 1/3 points

Load / Span Tables

Single Span Load Tables for Multichannel Floor Beams: Eurocode Design

Ultimate Loads

Load tables are for Multichannels used as secondary floor beams. These can be fixed in one of three ways; between support steelwork, over support steelwork fixed with or without Multibeam cleats (single or double span).

ALL LOADS SHOWN ARE ULTIMATE. VALUES SHOWN FOR DEFLECTION SHOULD BE COMPARED AGAINST APPLIED VALUES AT WORKING LOAD.

Loading assumes deck provides restraint to Multichannels and Multichannel restraints are provided at mid-span before placement of the deck. The deck should be suitably attached at the edge to restrain the floor (not applicable to Multichannel fixed over steel with cleats).

Multichannels must be fixed heel to heel and toe to toe.
See Construction Details on page 134.

Table 4:11 Multichannel Floor Beams Single Span Between Steel

Span (m)	Section	Weight (kg/m)	Ultimate Total UDL kN	Working Load to Produce Deflection kN	
				Span/250	Span/360
3.0	L145070120	2.75	14.93	8.78	7.32
	L145070130	2.99	17.04	9.51	7.92
	L145070140	3.21	19.22	10.22	8.52
	L145070150	3.45	21.43	10.93	9.11
	L145070160	3.69	23.64	11.64	9.70
	L145070180	4.15	28.04	13.03	10.86
	L145070200	4.63	32.25	14.41	12.00
	L175070120	3.02	17.84	13.54	11.28
	L175070130	3.29	20.80	14.66	12.21
	L175070140	3.52	23.53	15.76	13.14
	L175070150	3.79	26.30	16.87	14.05
	L175070160	4.05	29.08	17.96	14.97
	L175070180	4.55	34.58	20.12	16.77
	L175070200	5.08	39.86	22.26	18.55
3.5	L145070120	2.75	12.80	6.45	5.38
	L145070130	2.99	14.61	6.98	5.82
	L145070140	3.21	16.47	7.51	6.26
	L145070150	3.45	18.37	8.03	6.69
	L145070160	3.69	20.27	8.55	7.12
	L145070180	4.15	24.03	9.57	7.98
	L145070200	4.63	27.65	10.58	8.82
	L175070120	3.02	15.54	9.95	8.29
	L175070130	3.29	17.83	10.77	8.97
	L175070140	3.52	20.17	11.58	9.65
	L175070150	3.79	22.55	12.39	10.33
	L175070160	4.05	24.92	13.19	11.00
	L175070180	4.55	29.64	14.78	12.32
	L175070200	5.08	34.17	16.35	13.62
4.0	L145070120	2.75	11.20	4.94	4.12
	L145070130	2.99	12.78	5.35	4.46
	L145070140	3.21	14.41	5.75	4.79
	L145070150	3.45	16.07	6.15	5.12
	L145070160	3.69	17.73	6.55	5.45
	L145070180	4.15	21.02	7.33	6.11
	L145070200	4.63	24.19	8.10	6.75
	L145070220	5.06	27.19	8.87	7.39
	L175070120	3.02	13.60	7.62	6.35
	L175070130	3.29	15.60	8.25	6.87
	L175070140	3.52	17.65	8.87	7.39
	L175070150	3.79	19.73	9.49	7.91
	L175070160	4.05	21.81	10.10	8.42
	L175070180	4.55	25.94	11.32	9.43
	L175070200	5.08	29.90	12.52	10.43
	L175070220	5.56	33.70	13.70	11.42
	L175070250	6.35	39.12	15.44	12.87
4.5	L175070120	3.02	12.09	6.02	5.01
	L175070130	3.29	13.86	6.51	5.43
	L175070140	3.52	15.69	7.01	5.84
	L175070150	3.79	17.54	7.50	6.25
	L175070160	4.05	19.38	7.98	6.65
	L175070180	4.55	23.05	8.94	7.45
	L175070200	5.08	26.58	9.89	8.24
	L175070200	5.08	26.58	9.89	8.24
	L175070220	5.56	29.95	10.82	9.02
	L175070250	6.35	34.77	12.20	10.17
	L205070120	3.29	14.04	8.69	7.24
	L205070130	3.58	16.21	9.41	7.84
	L205070140	3.84	18.42	10.13	8.44
	L205070150	4.13	20.66	10.84	9.03
	L205070160	4.41	22.91	11.54	9.62
5.0	L175070120	3.02	10.88	4.87	4.06
	L175070130	3.29	12.48	5.28	4.40
	L175070140	3.52	14.12	5.68	4.73
	L175070150	3.79	15.78	6.07	5.06
	L175070160	4.05	17.45	6.47	5.39
	L175070180	4.55	20.75	7.24	6.04
	L175070200	5.08	23.92	8.01	6.68
	L175070220	5.56	26.96	8.77	7.31
	L175070250	6.35	31.30	9.88	8.23
	L205070120	3.29	12.64	7.04	5.87
	L205070130	3.58	14.59	7.62	6.35
	L205070140	3.84	16.58	8.20	6.84
	L205070150	4.13	18.60	8.78	7.31
	L205070160	4.41	20.62	9.35	7.79
5.5	L205070120	3.29	11.48	5.82	4.85
	L205070130	3.58	13.26	6.30	5.25
	L205070140	3.84	15.07	6.78	5.65
	L205070150	4.13	16.90	7.25	6.04
	L205070160	4.41	18.74	7.72	6.44
	L205070170	4.67	20.56	8.19	6.83
	L205070180	4.96	22.37	8.66	7.22
	L205070200	5.53	25.88	9.58	7.98
	L205070220	6.05	29.27	10.49	8.74
	L205070250	6.91	34.13	11.83	9.86
	L205070270	7.49	37.27	12.71	10.59
6.0	L205070160	3.29	17.18	6.49	5.41
	L205070170	3.58	18.85	6.89	5.74
	L205070180	3.84	20.51	7.28	6.06
	L205070200	4.13	23.72	8.05	6.71
	L205070220	4.41	26.83	8.81	7.35
	L205070250	4.67	31.29	9.94	8.28
	L205070270	4.96	34.16	10.68	8.90
	L235070130	3.86	13.75	7.30	6.08
	L235070140	4.14	15.71	7.85	6.54
	L235070150	4.45	17.70	8.40	7.00
	L235070160	4.76	19.69	8.95	7.46
	L235070170	5.04	21.67	9.49	7.91
	L235070180	5.35	23.63	10.04	8.36
	L235070200	5.97	27.46	11.11	9.26
	L235070220	6.53	31.16	12.17	10.14
	L235070250	7.46	36.53	13.73	11.44
	L235070270	8.08	40.01	14.75	12.29

Single Span Load Tables for Multichannel Floor Beams: Eurocode Design

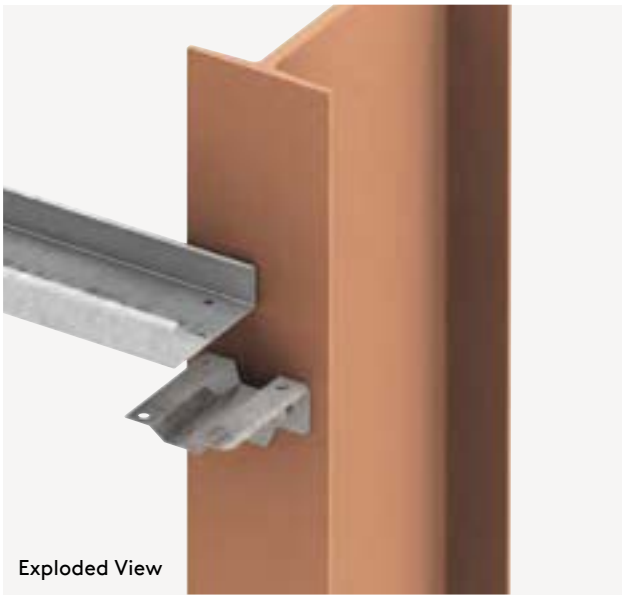
Table 4:12 Multichannel Floor Beams Single Span on Cleats

Span (m)	Section	Weight (kg/m)	Ultimate Total UDL kN	Working Load to Produce Deflection kN	
				Span/250	Span/360
3.0	L145070120	2.75	14.93	8.78	7.32
	L145070130	2.99	17.04	9.51	7.92
	L145070140	3.21	19.22	10.22	8.52
	L145070150	3.45	21.43	10.93	9.11
	L145070160	3.69	23.64	11.64	9.70
	L145070180	4.15	28.04	13.03	10.86
	L145070200	4.63	32.25	14.41	12.00
	L175070120	3.02	17.84	13.54	11.28
	L175070130	3.29	20.80	14.66	12.21
	L175070140	3.52	23.53	15.76	13.14
	L175070150	3.79	26.30	16.87	14.05
	L175070160	4.05	29.08	17.96	14.97
	L175070180	4.55	34.58	20.12	16.77
	L175070200	5.08	39.86	22.26	18.55
3.5	L145070120	2.75	12.80	6.45	5.38
	L145070130	2.99	14.61	6.98	5.82
	L145070140	3.21	16.47	7.51	6.26
	L145070150	3.45	18.37	8.03	6.69
	L145070160	3.69	20.27	8.55	7.12
	L145070180	4.15	24.03	9.57	7.98
	L145070200	4.63	27.65	10.58	8.82
	L175070120	3.02	15.54	9.95	8.29
	L175070130	3.29	17.83	10.77	8.97
	L175070140	3.52	20.17	11.58	9.65
	L175070150	3.79	22.55	12.39	10.33
	L175070160	4.05	24.92	13.19	11.00
	L175070180	4.55	29.64	14.78	12.32
	L175070200	5.08	34.17	16.35	13.62
4.0	L145070120	2.75	11.20	4.94	4.12
	L145070130	2.99	12.78	5.35	4.46
	L145070140	3.21	14.41	5.75	4.79
	L145070150	3.45	16.07	6.15	5.12
	L145070160	3.69	17.73	6.55	5.45
	L145070180	4.15	21.02	7.33	6.11
	L145070200	4.63	24.19	8.10	6.75
	L145070220	5.06	27.19	8.87	7.39
	L175070120	3.02	13.60	7.62	6.35
	L175070130	3.29	15.60	8.25	6.87
	L175070140	3.52	17.65	8.87	7.39
	L175070150	3.79	19.73	9.49	7.91
	L175070160	4.05	21.81	10.10	8.42
	L175070180	4.55	25.94	11.32	9.43
	L175070200	5.08	29.90	12.52	10.43
	L175070220	5.56	33.70	13.70	11.42
	L175070250	6.35	39.12	15.44	12.87
4.5	L175070120	3.02	12.09	6.02	5.01
	L175070130	3.29	13.86	6.51	5.43
	L175070140	3.52	15.69	7.01	5.84
	L175070150	3.79	17.54	7.50	6.25
	L175070160	4.05	19.38	7.98	6.65
	L175070180	4.55	23.05	8.94	7.45
	L175070200	5.08	26.58	9.89	8.24
	L175070220	5.56	29.95	10.82	9.02
	L175070250	6.35	34.77	12.20	10.17
	L205070120	3.29	14.04	8.69	7.24
	L205070130	3.58	16.21	9.41	7.84
	L205070140	3.84	18.42	10.13	8.44
	L205070150	4.13	20.66	10.84	9.03
	L205070160	4.41	22.91	11.54	9.62
5.0	L175070120	3.02	10.88	4.87	4.06
	L175070130	3.29	12.48	5.28	4.40
	L175070140	3.52	14.12	5.68	4.73
	L175070150	3.79	15.78	6.07	5.06
	L175070160	4.05	17.45	6.47	5.39
	L175070180	4.55	20.75	7.24	6.04
	L175070200	5.08	23.92	8.01	6.68
	L175070220	5.56	26.96	8.77	7.31
	L175070250	6.35	31.30	9.88	8.23
	L205070120	3.29	12.64	7.04	5.87
	L205070130	3.58	14.59	7.62	6.35
	L205070140	3.84	16.58	8.20	6.84
	L205070150	4.13	18.60	8.78	7.31
	L205070160	4.41	20.62	9.35	7.79
5.5	L205070120	3.29	11.48	5.82	4.85
	L205070130	3.58	13.26	6.30	5.25
	L205070140	3.84	15.07	6.78	5.65
	L205070150	4.13	16.90	7.25	6.04
	L205070160	4.41	18.74	7.72	6.44
	L205070170	4.67	20.56	8.19	6.83
	L205070180	4.96	22.37	8.66	7.22
	L205070200	5.53	25.88	9.58	7.98
	L205070220	6.05	29.27	10.49	8.74
	L205070250	6.91	34.13	11.83	9.86
	L205070270	7.49	37.27	12.71	10.59
6.0	L205070160	3.29	17.18	6.49	5.41
	L205070170	3.58	18.85	6.89	5.74
	L205070180	3.84	20.51	7.28	6.06
	L205070200	4.13	23.72	8.05	6.71
	L205070220	4.41	26.83	8.81	7.35
	L205070250	4.67	31.29	9.94	8.28
	L205070270	4.96	34.16	10.68	8.90
	L235070130	3.86	13.75	7.30	6.08
	L235070140	4.14	15.71	7.85	6.54
	L235070150	4.45	17.70	8.40	7.00
	L235070160	4.76	19.69	8.95	7.46
	L235070170	5.04	21.67	9.49	7.91
	L235070180	5.35	23.63	10.04	8.36
	L235070200	5.97	27.46	11.11	9.26
	L235070220	6.53	31.16	12.17	10.14
	L235070250	7.46	36.53	13.73	11.44
	L235070270	8.08	40.01	14.75	12.29

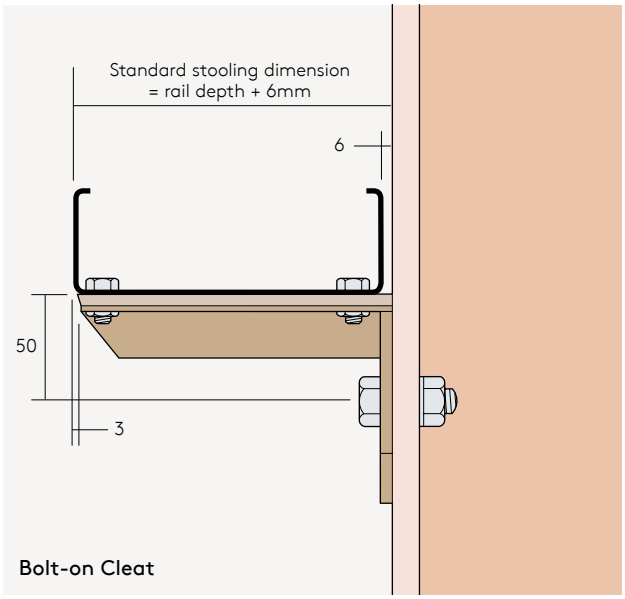
Note: Section self weight has not been subtracted from the loadings shown.

Construction Details

Rail Connection

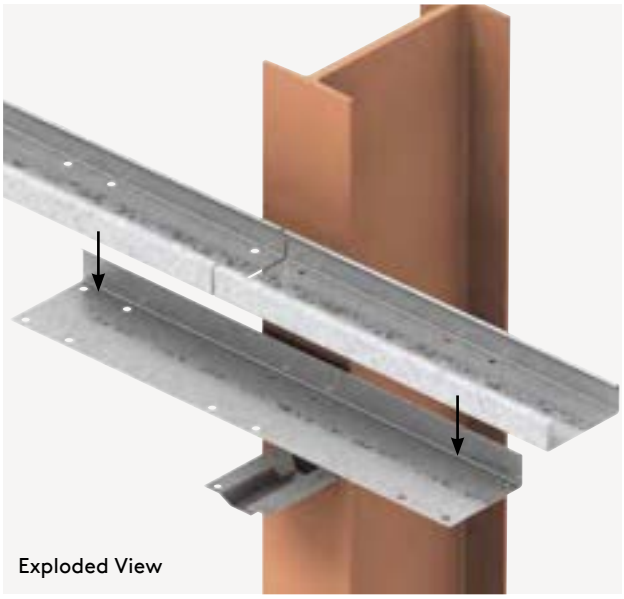


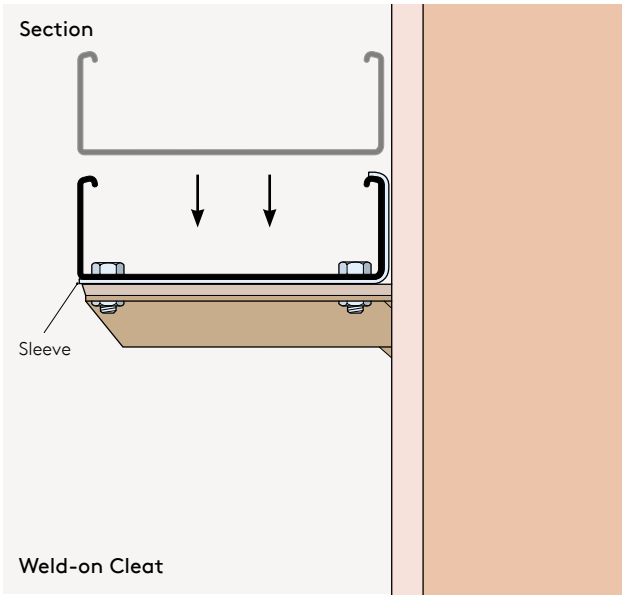
Cleat Connection to Rail



For product dimensions refer to page 112.

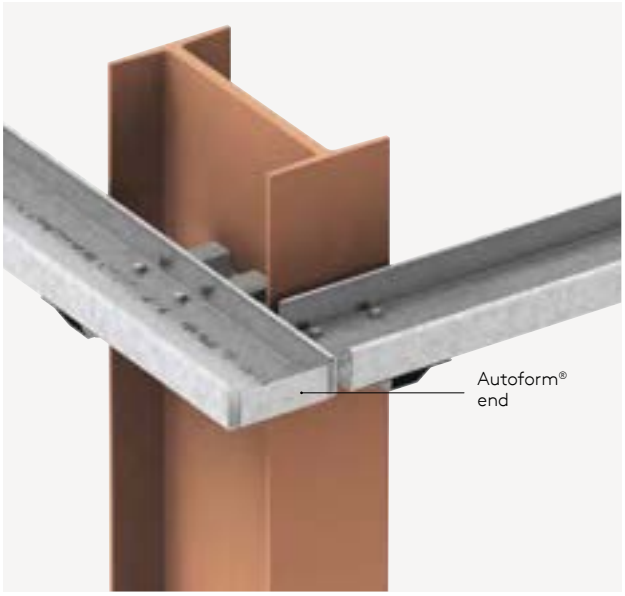
Cladding Rail Sleeve

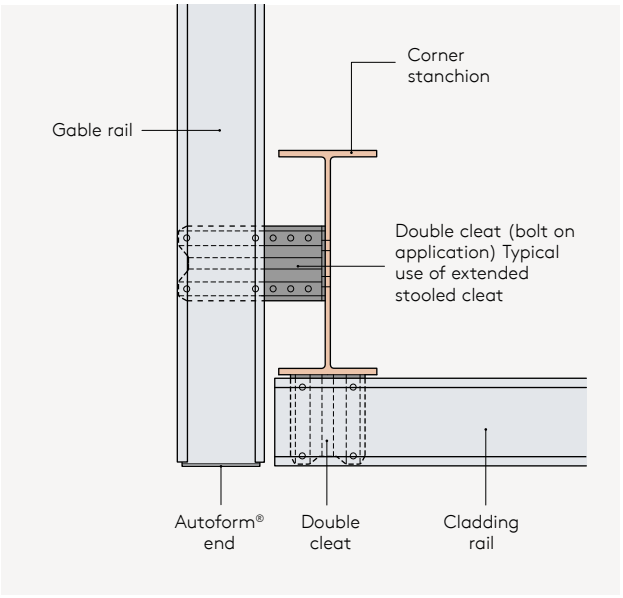




For product dimensions refer to page 114.

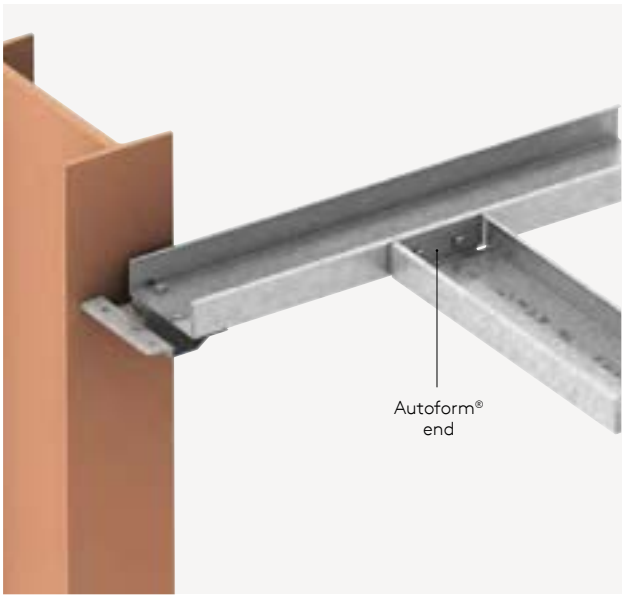
Cladding Rails External Corner

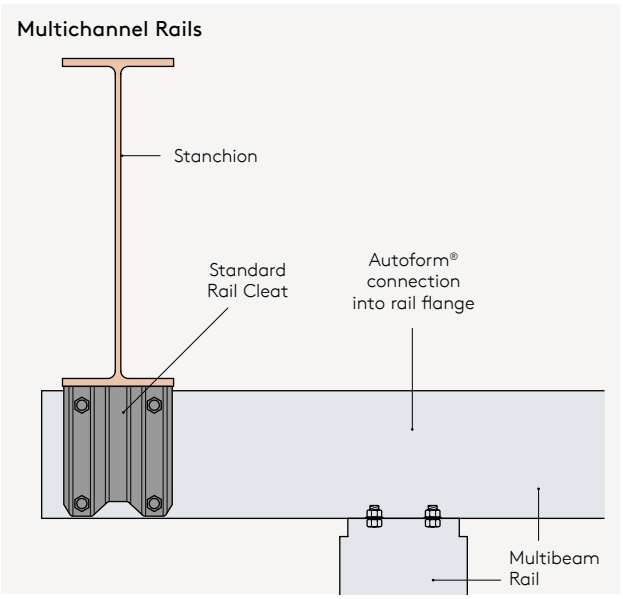




For product dimensions refer to page 114.

Cladding Rails Internal Corner

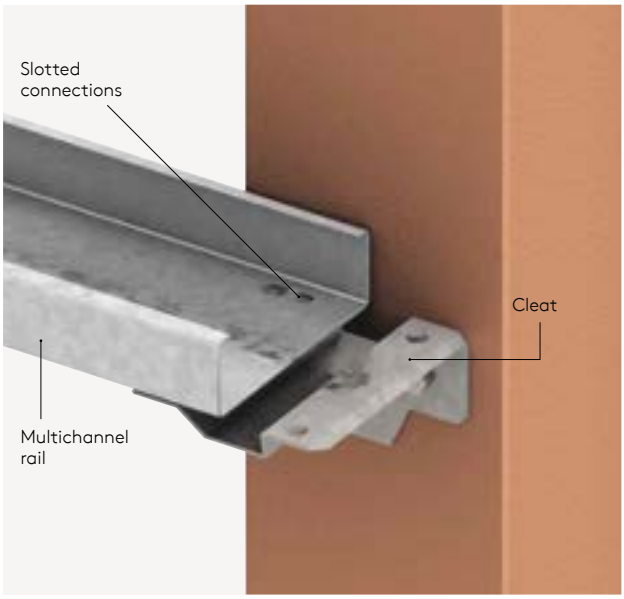


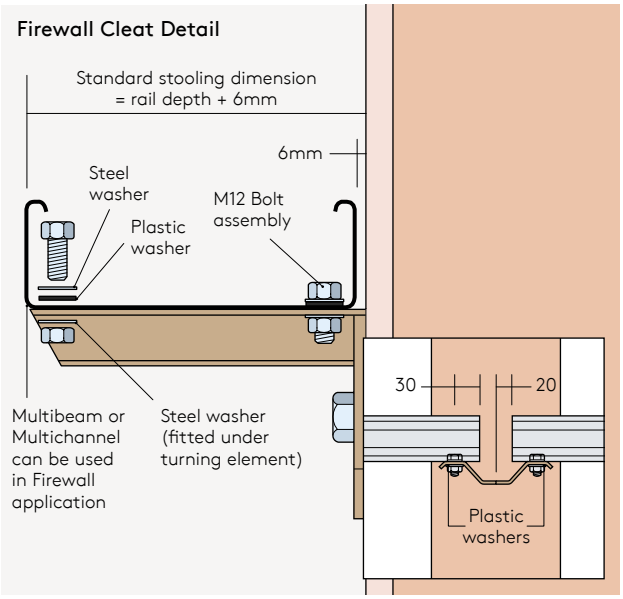


For product dimensions refer to page 114.

Construction Details

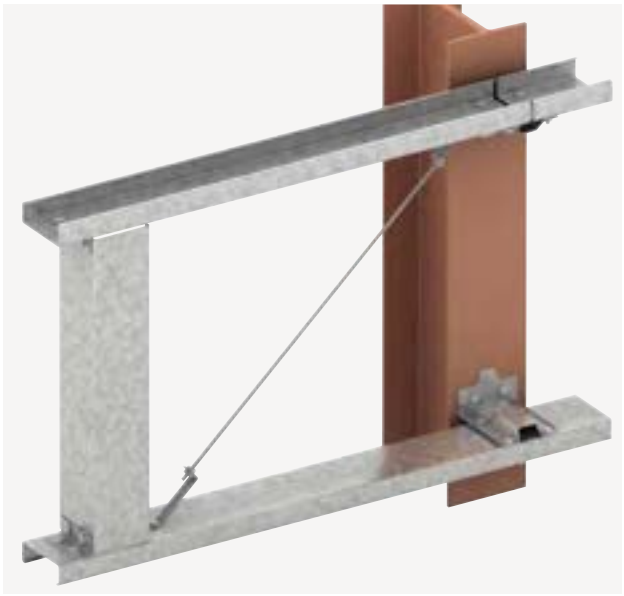
Slotted Cladding Rail on a Firewall

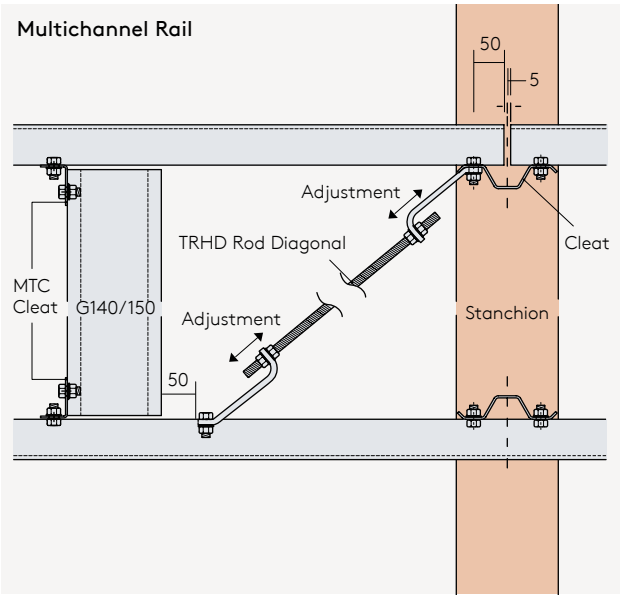




For product dimensions refer to page 75.

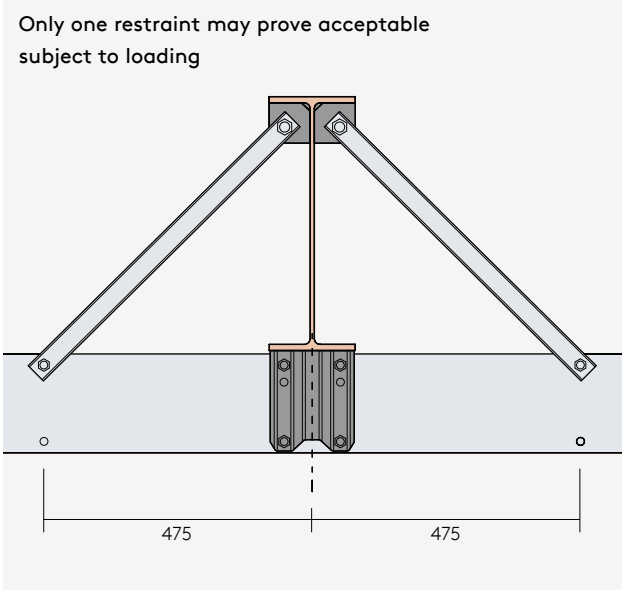
Rod Diagonal with G140/150





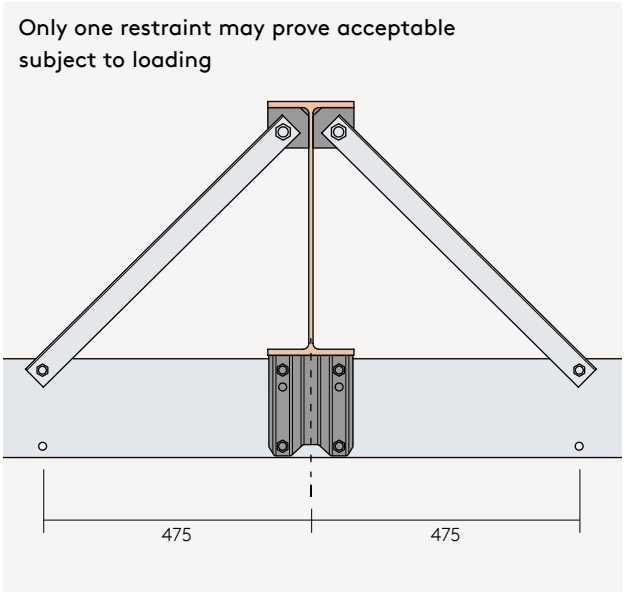
For product dimensions refer to page 117.

Stanchion Stay Type RNA



For product dimensions refer to page 116.

Stanchion Stay Type RNB

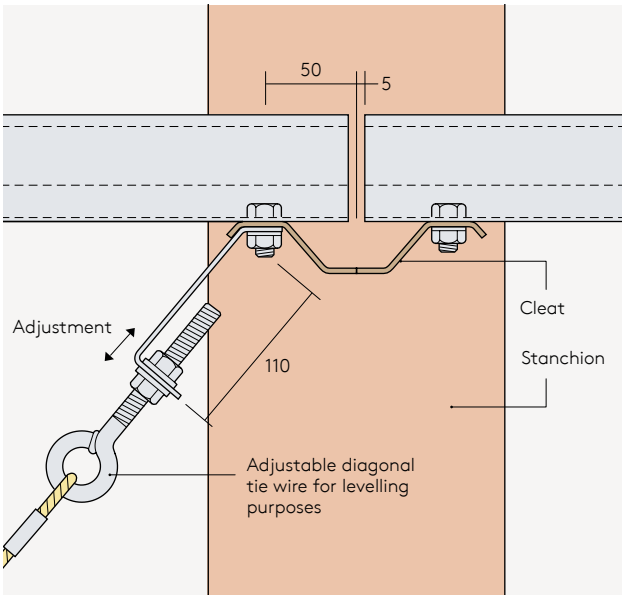


For product dimensions refer to page 116.

Construction Details

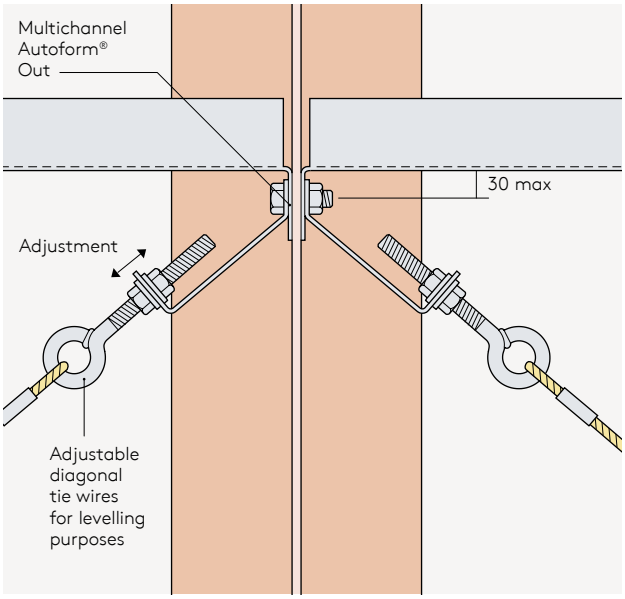
Diagonal Tie Wire Restraint

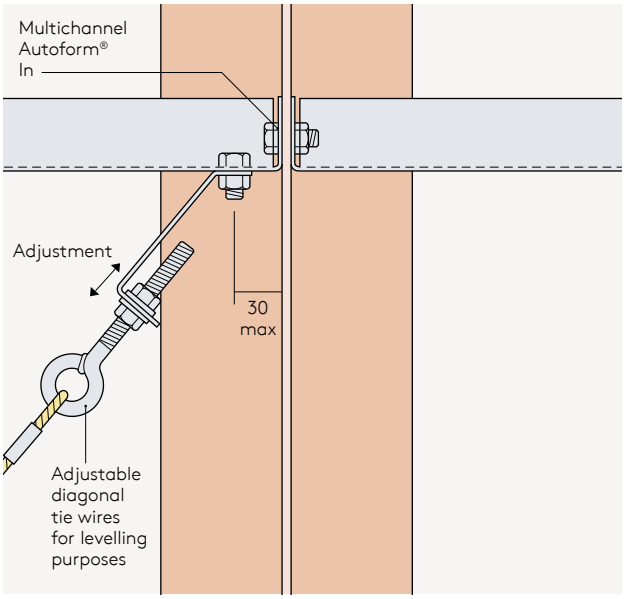
For product dimensions refer to page 116.



Top cleat fixes to cleat hole nearest column.

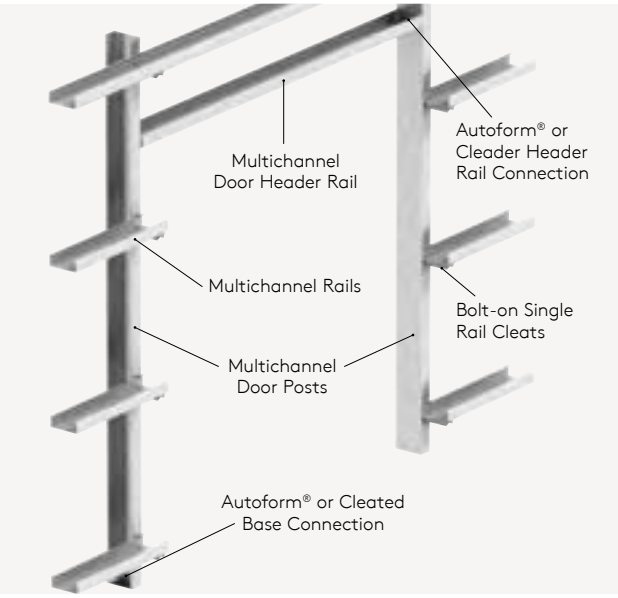
Multichannel between Columns – Autoform® Connection



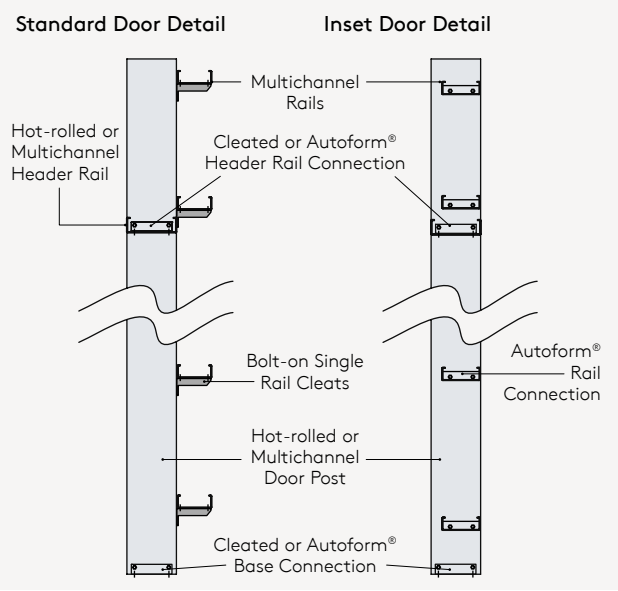


For product dimensions refer to page 114.

Door Openings

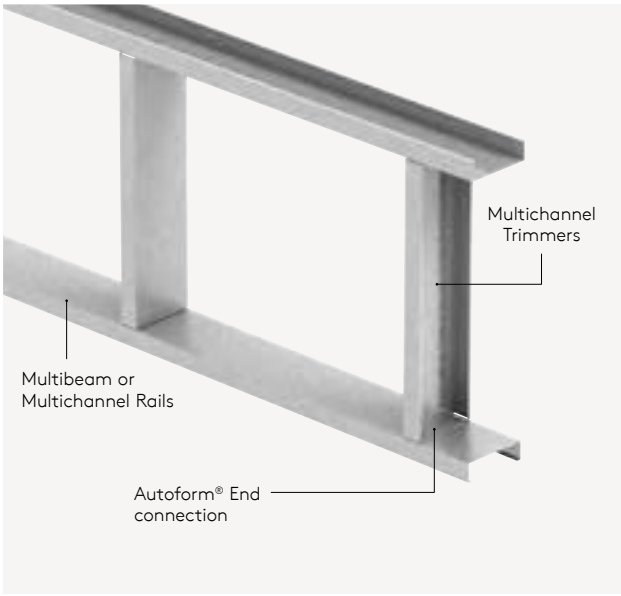


For product dimensions refer to page 114.

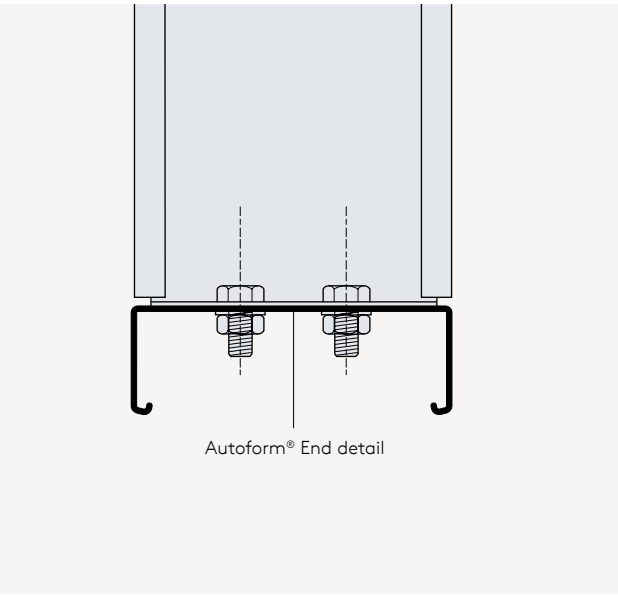


When the door framework needs to be set to the same level as the cladding rails, the Autoform® detail can be used.

Window Openings

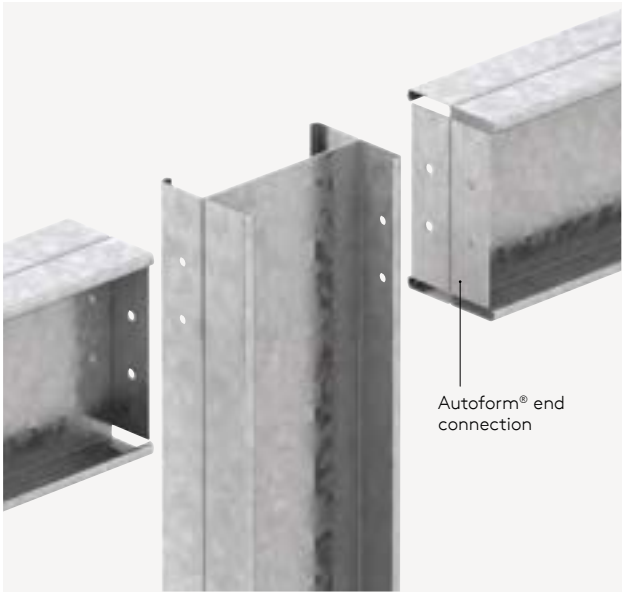


For product dimensions refer to page 114.



Construction Details

Column Top

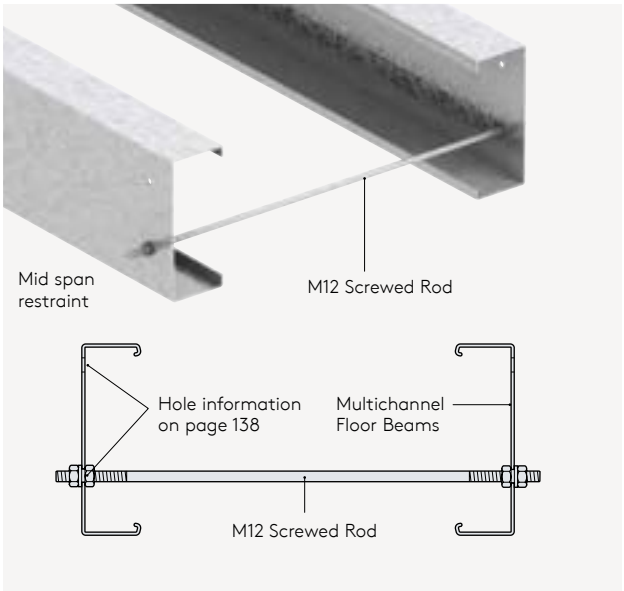


For product dimensions refer to page 114.

Column Base

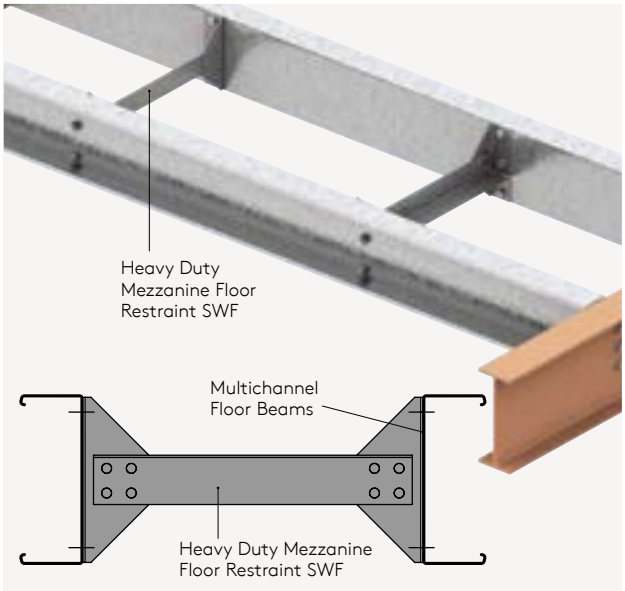
For product dimensions refer to page 116.

Mezzanine Floor Restraint



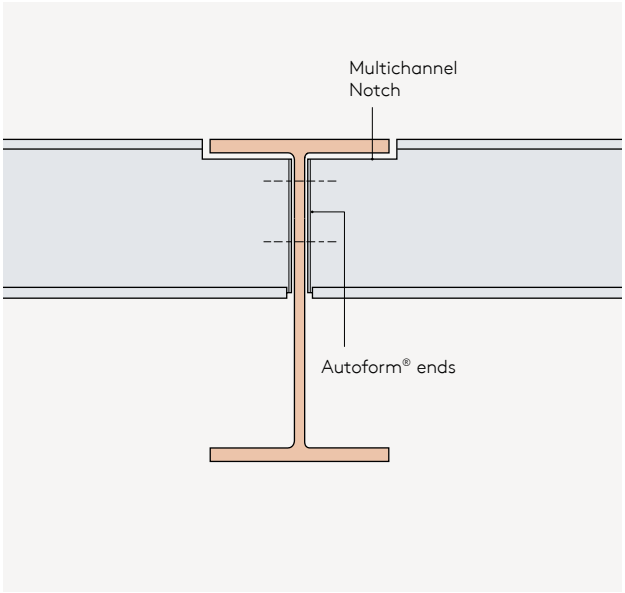
For product dimensions refer to page 110.

Heavy Duty Mezzanine Floor Restraint



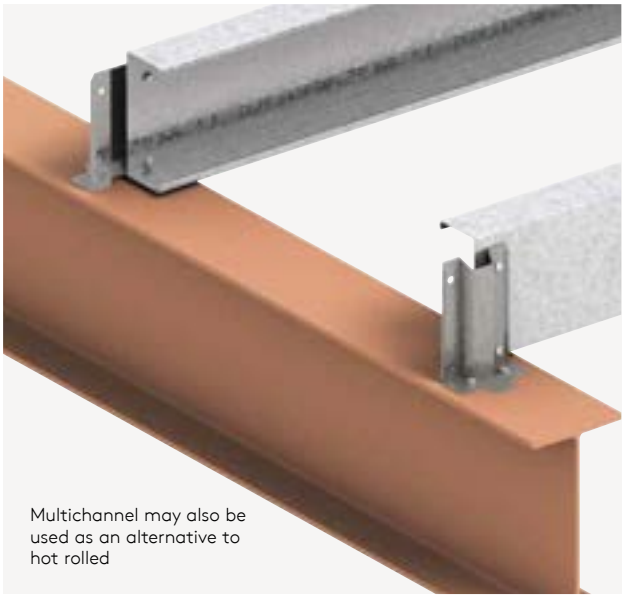
For product dimensions refer to page 115.

Mezzanine Floor between Steelwork



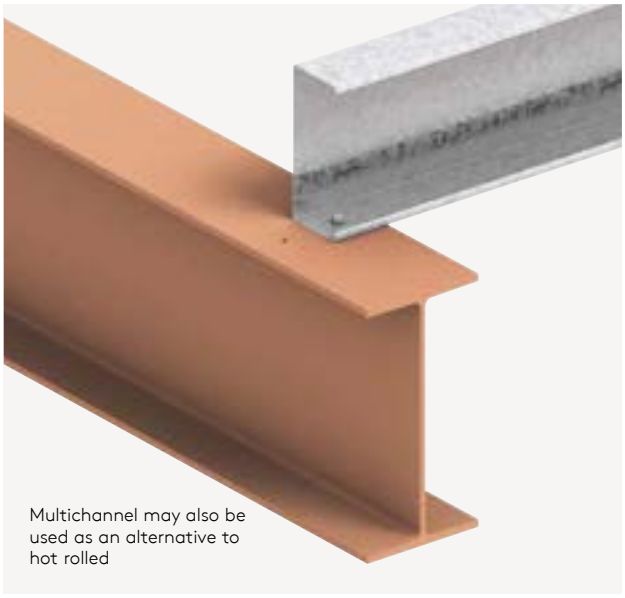
For product dimensions refer to page 114.

Mezzanine Floor over Support Steelwork with Cleat



For product dimensions refer to page 112.

Mezzanine Floor over Support Steelwork without Cleat



Ordering Methods

Preferred methods of ordering and detailing Kingspan Multibeam Purlin, Cladding Rail and Multichannel systems can be detailed and ordered using either of the following quick and simple methods as follows:

Kingspan Detailing and Ordering Software
Custom designed programme available to download from the Kingspan Structural website www.kingspanstructural.co.uk

When ordering with the Toolkit software please ensure details are supplied to Kingspan in the electronic transfer file format (.WTX)

Kingspan Direct Detailing
For Tekla Structures 3D CAD software please ensure details are supplied to Kingspan Structural in the following electronic transfer file formats: (.WDX) along with the cold rolled assembly list (.XSR)

Any non-standard details must be supplied in 'pdf' format.
All the systems mentioned allow the user to incorporate the Kingspan Structural products shown in this literature. The electronic ordering details can be generated within these systems and sent to Kingspan Structural via email.

Manual Detailing
Purpose designed order / detail forms can be made available upon request for those customers who do not have access to electronic detailing software.

Customer Services
For assistance and guidance in product ordering please contacts our dedicated Structural customer services team on 01944 712000.

Eaves Beam Hole Arrangements and Options
For examples of hole and connection details please refer to the construction details section pages 56, 62 and 63.

Cleader Angle Options – Please see page 25.

Horizontal Panel Vertical Support Hole Arrangements and Options (G140/150)

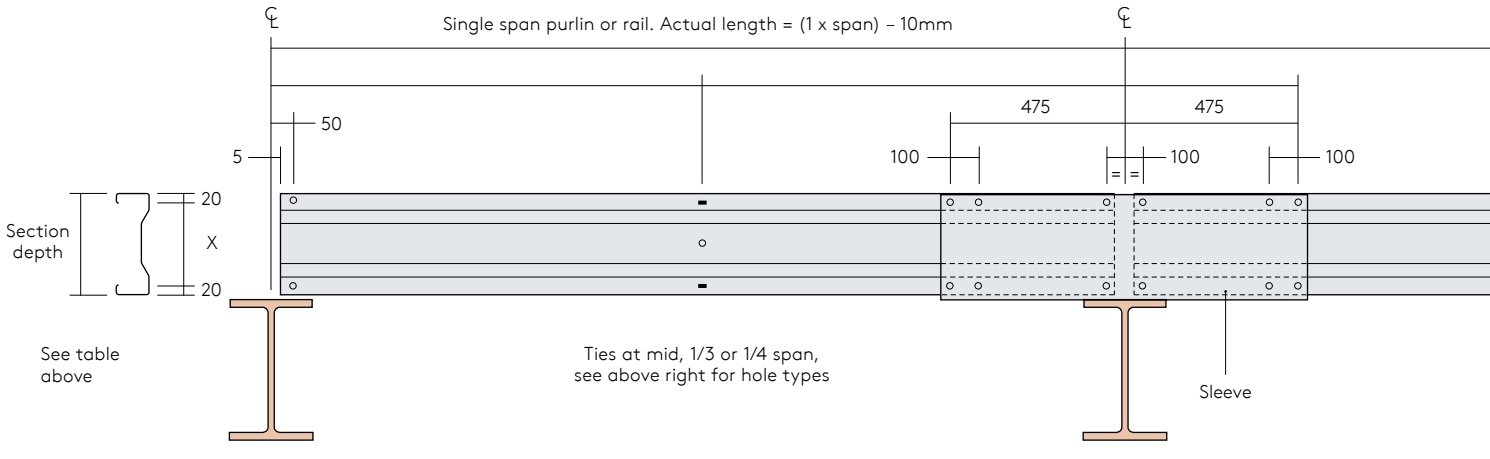
Hole Arrangement – Please see page 83.

For cleat connection details please refer to the construction details section pages 79 and 84.

Members can be supplied with or without end cleats assembled (additional 1 week lead time for assembled components).

Ancillaries
For all fixing details please refer to the construction details sections.

Weld-on cleats are generally delivered to fabricator's own works. Transport charges do not normally apply to the delivery of cleats.



ALL HOLES 14 Ø UNLESS STATED

PURLIN / RAIL SLEEVE HOLES

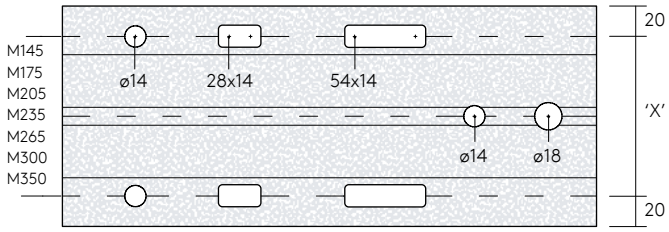
Multibeam Purlin and Rail Hole Arrangements and Options

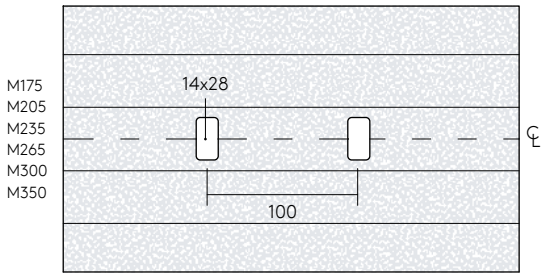
Web Holes

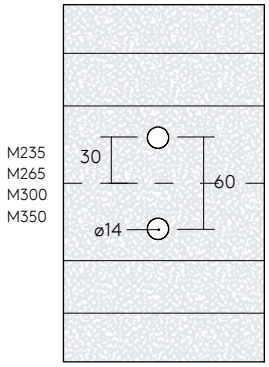
See hole configurations below.

All holes Ø14 unless stated.

All web holes if not on centre line are to be detailed in pairs.







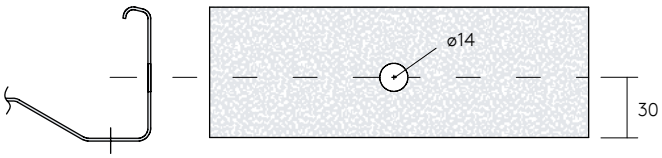
Further examples of hole details see layout below.

Standard holes are punched as shown below

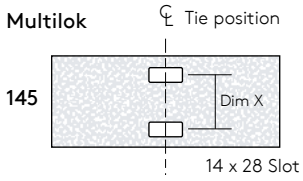
Section Depth mm	145	175	205	235	265	300	350
Dim 'x' hole centres in mm	105	135	165	195	225	260	310

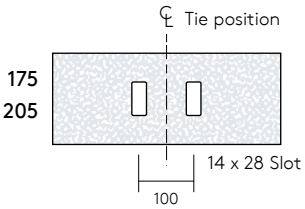
Flange Holes

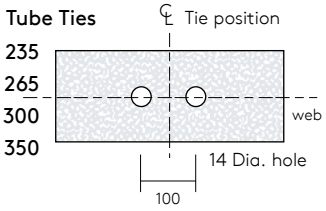
Ø14 holes at 30mm backmark from heel of section.



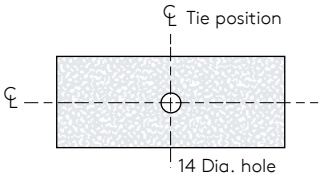
Purlin Tie Holes

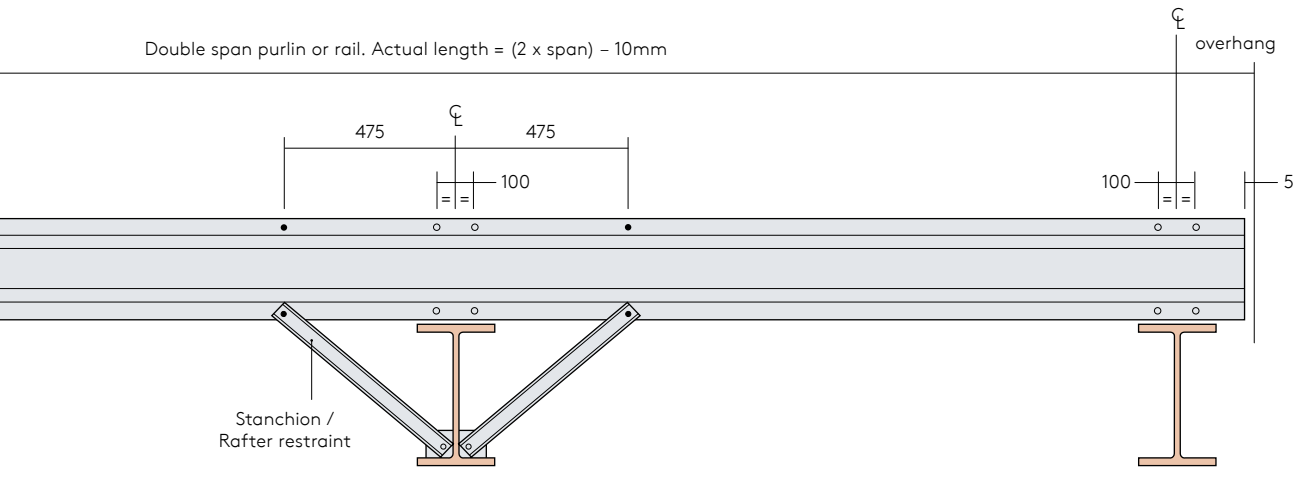






Rail Tie Holes





RAFTER / STANCHION STAY HOLES (See above)

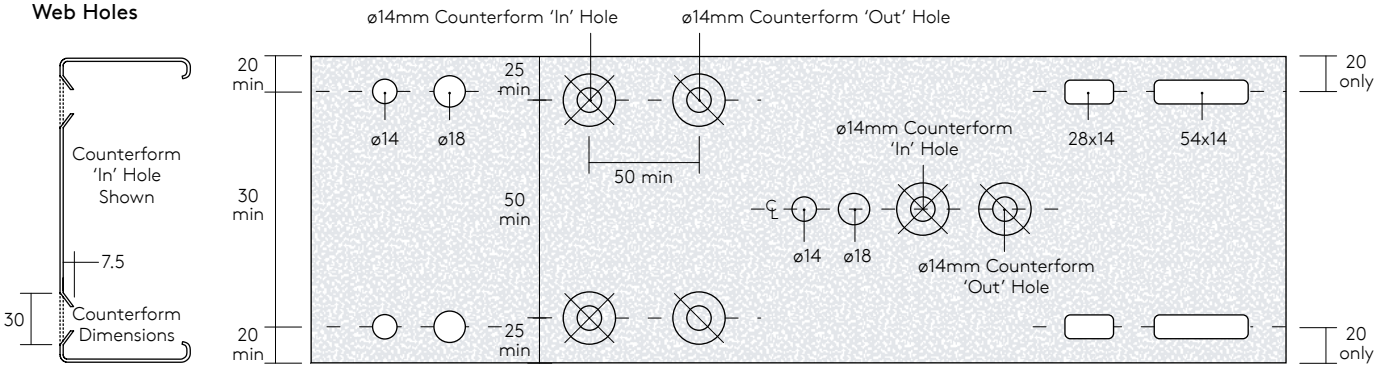
Ordering Methods

Multichannel

Multichannel can be supplied with plain ends (i.e. cut to length), notched ends (top, bottom or both) or Autoform® ends.

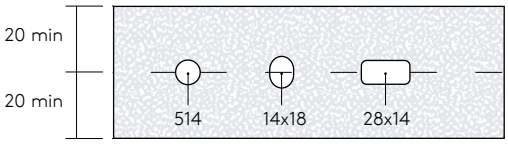
Note: With counter formed holes please consider using an 8mm thick packer with a 32mm diameter hole supplied by others.

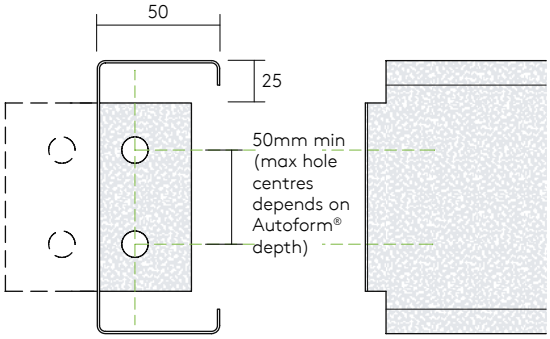
Web Holes



Minimum channel length = 125mm

Flange Holes





Hole group combination

When the number of hole groups exceed three combinations please contact Customer Service Department for availability.

Autoform® Ends

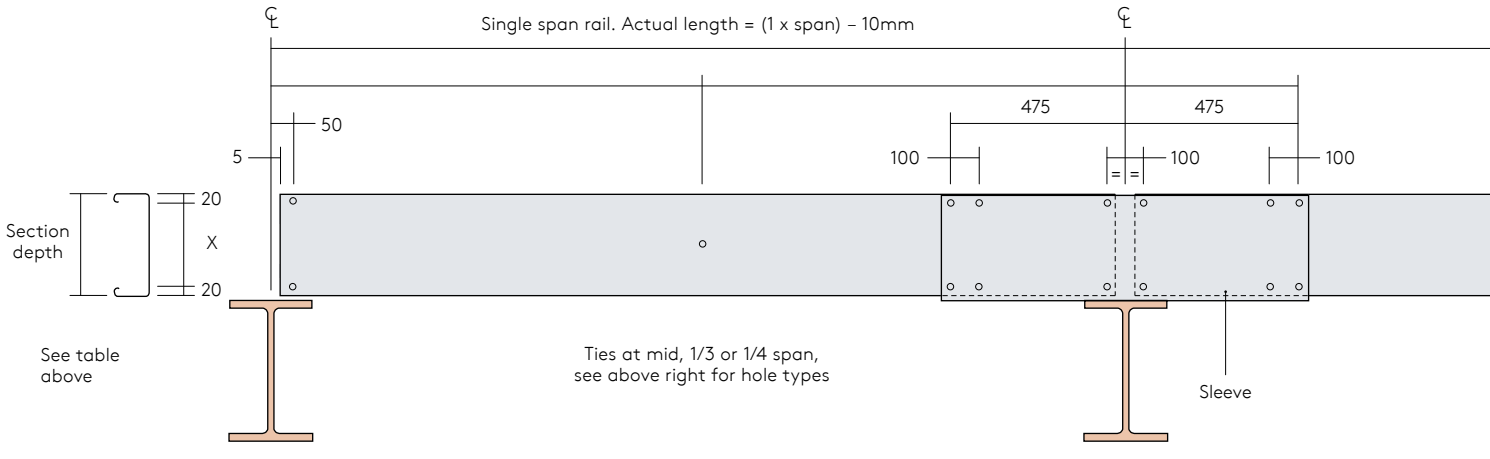
Autoform® ends are available with the returns turned inward or outward, these can be punched or counterformed with standard hole options as required. These holes should be 20mm from the web for M12 bolts or 25mm from the web for M16 bolts or M12 counterform holes.

Standard Autoform® ends are supplied with a 50mm return on all section sizes. Non-standard returns are available on request ranging from 50mm to 95mm.

Autoform® Details

Min. Notch Depth	11mm
Max. Notch Depth	(see notch table)*
Min. Notch Length	11mm
Max. Notch Length	195mm
Min. Autoform® Return	50mm
Max. Autoform® Return	95mm
Min. Multichannel Length	125mm

*Autoform® hole centres should be considered



ALL HOLES 14 Ø UNLESS STATED

RAIL SLEEVE HOLES

Notching

Notches can be cut either top or bottom or both. Standard notches are 25mm in depth cut to the lengths shown below.

Notch depths on each flange must match, ie. Top Lead end 50mm; Tail end 50mm; Bottom Lead end 25mm; Tail end 25mm.

Non-standard notches can be cut subject to quantity, please contact our Sales Department for details.

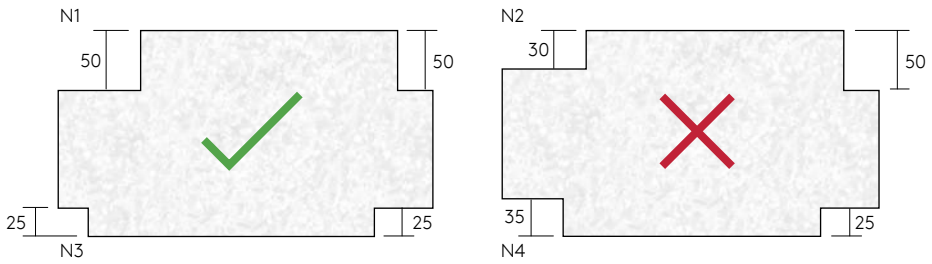
Hole Arrangements

Minimum backmark 20mm (counterform holes min 25mm backmark).

Paired holes available minimum 50mm centres.

14mm x 28mm and 14mm x 54mm slotted holes only available 20mm backmark.

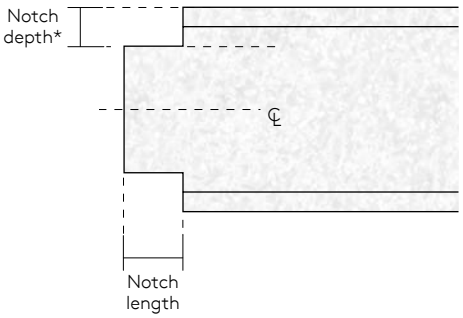
For further examples of hole details please see below.

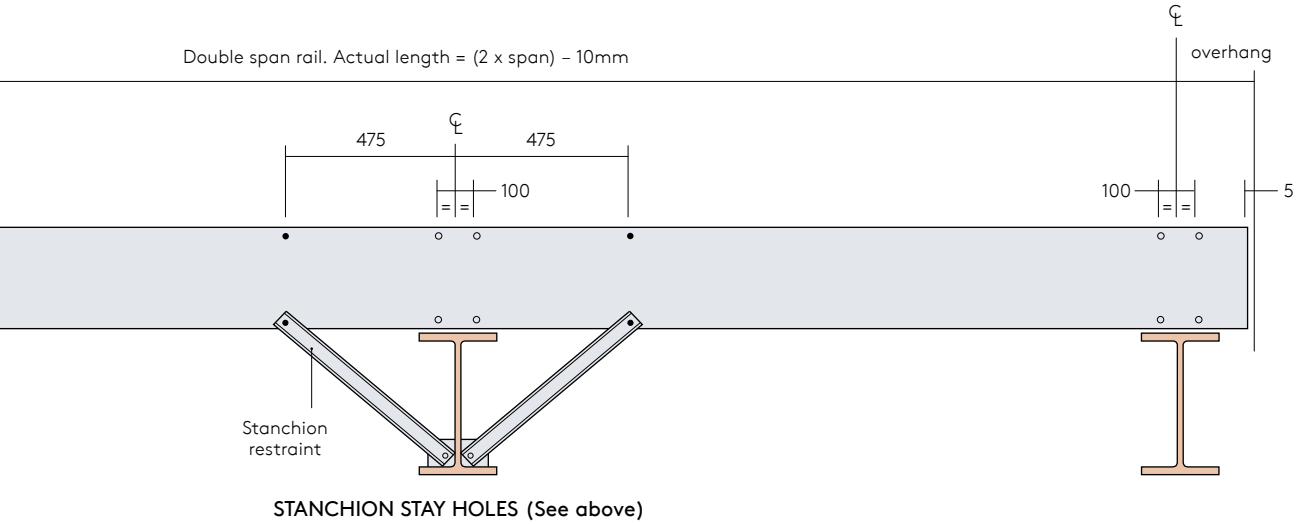


Notch Details

	Section	Min. (mm)	Max. (mm)
Notch Length	All	30	250
Notch Depth	145	11	46
	175	11	61
	205	11	76
	235	11	76
	265	11	76
	300	11	76
	350	11	76

For maximum notch depth please contact our Customer Service Department





STANCHION STAY HOLES (See above)

Inverness College, UHI Inverness, UK

Education

Project Type:
College Building, New Build

Architect:
BDP

Installer:
BHC Ltd

Products Used:
- Multibeam
- Multichannel

M&S Super Warehouse, Bradford, UK

Distribution

Project:
1,000,000 ft² logistics hub for leading fashion, food and home products retailer, Marks & Spencer.

Architect:
Stephen George & Partners

Installer:
Barrett Steel Buildings Ltd

Product Used:
- Multibeam

Monarch Airlines Hangar,Birmingham, UK

Infrastructure

Project Type:
Aircraft hangar to hold multiple aircraft, enabling Monarch Airlines to repair not just its own fleet, but other planes too if required.

Architect:
D5 Architects

Installer:
The Monk Bridge Construction Company

Product Used:
- Multibeam

Silverstone Pit Lane

Sport & Leisure

Project Type:
Pit and paddock complex that includes new garages, a race control building, media centre, hospitality and VIP spectator zones, and a primary paddock.

Architect:
HOK Sports Architect

Installer:
Barrett Steel Buildings Ltd

Product Used:
- Multibeam
- Multideck

Design Software

Kingspan Toolkit software has become the leading cold rolled steel purlins, rails, channels and composite deck design software in the industry. It is now used by over 1500 practices in the UK and includes the design of cold rolled steel products, CAD details and much more.

Toolkit 8

It provides design solutions to both British Standards (BS) and Eurocodes (EC) for Multibeam and Multichannel purlins and rails, in the same software package.

Note: Users should regularly clear there browser cache to ensure they are using the latest software version. Contact your IT team for assistance. Details of software updates are shown on the software login page of our website.

Toolkit 8 includes:

- Interactive mapping including a 'site look up' facility for automated snow and wind loading calculations.
- Wind loading to BS EN 1991-1-4 with UK national annexes or BS6399-2.
- Calculation of wind loads on buildings and structures.
- Design wind speeds and dynamic pressures automation.
- Automatic determination of ground roughness, altitude and topography factors.
- Automatic site exposure calculation to give optimum results.
- Site parameters override to enable use in other global locations.
- Snow loading to BS EN 1991-1-3 with UK national annexes or BS6399-3.
- Enhanced analysis of snow and service loading.
- Full set of load combination and partial load factors to BS and EC.

Toolkit 7

This design software is still available and can be downloaded to your PC.

Note: new Toolkit users must also download a Toolkit 7 patch and the Multideck stand alone software.

Toolkit 7 includes the design software for:

- Multideck composite floor systems (see above regarding updated version).
- Multichannel rails, Mezzanine floor joists, single and compound stanchions, and posts.
- Multibeam purlins and side rails to British Standards including BreVe wind analysis.
- Detailing wizard for ordering and reviewing Multibeam and Multichannel sections and components.
- The content of Tekla detailing transfer.

On installing Toolkit 7, the system will prompt for a pass key for BreVe which is obtainable from Kingspan Structural Products. No key will be required if installing the Toolkit 7 patch.

Multideck
We have issued an update to the Multideck design software, which now includes the new, upgraded Multideck 50-V3 floor decking system (with gauges from 0.85mm to 1.2mm). Existing Toolkit 7 users - please install the new, stand-alone Multideck software to override your existing version. New users - please install both the Multideck and Toolkit 7 design software packages.

Kingspan Structural Products now offers a bespoke design service for Multideck composite steel decking systems, providing Eurocode designs to suit projects in the Republic of Ireland and the UK. To utilise this service please visit **http://www.kingspanpanels.co.uk/structural/software/eurocode**.

Composite Beam Design Software
Kingspan Structural Products' latest design software provides a simple online tool for the design of composite steel beams using it's Multideck 50, Multideck 60 and Multideck 80 composite steel decking systems to meet the requirements of either BS EN 1994-1: 2004 (Eurocode 4) or BS 5950 Part 3 1990 + A1: 2010, using just one stud per trough in many design cases.

The new software offers design solutions for secondary beams supporting uniformly distributed loads and primary beams supporting point laods at both mid and third points of the span. During the construction stage the secondary beam compression flange is assumed to be fully restrained by the Multideck system, whilst the primary beam compression flange is assumed to be restrained at the relevant load application points.

Kingspan Structural Products - CPD
Kingspan Structural Products has developed a CPD Seminar which reviews the history of structural materials used in construction with particular focus on the evolution of steel.

The CPD discusses the different components used in steel structure and explores issues which may need to be considered when specifying structural materials. These include designing to Eurocodes or British Standards and the consideration of sustainability and Health & Safety. It also provides a comparison of cold rolled structural materials available in the current market, paying particular attention to different types of purlins.

For further information or to arrange a CPD, please contact us on 01944 712000 or email **MarketingStructural@kingspan.com**

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www.kingspanpanels.co.uk/structural

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For the product offering in other markets please contact your local sales representative or visit www.kingspanpanels.com

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