2018
cold rolled products
technical manual
INTRODUCTION

COLD ROLLED PRODUCTS

are specifically designed for use within most types of buildings as secondary supports for cladding materials. Hi-SPAN offers a comprehensive range of Purlins, Rails, C-Channels, Eaves Beams and associated accessories. Hi-SPAN has for many years, maintained its position as one of the UK’s leading suppliers of cold rolled products to the construction industry.

Design

With over 50 years experience within the construction industry Hi-SPAN has been at the forefront of design and development of cold rolled products. An experienced Research and Development committee continually strive to improve and update the Hi-SPAN range of products and services. This together with a fully comprehensive Technical Helpdesk of experienced designers on hand to answer your queries, Hi-SPAN offer its clients the most economic solutions to cold rolled design. Contact technical@hi-span.com or telephone 01953 603081 to order your free design suite or for further information from the Technical Helpdesk.

Bespoke Sections

For the past fifteen years Hi-SPAN as well as enhancing our existing product range has introduced a Bespoke Section service. “Z” “C” and Eaves sections can be produced (within certain guidelines) to customer’s specific dimensions, in addition we have the capability of blanking and punching wide coil (1.0 – 3.0mm gauges) and press-braking profiles up to 4,000m in length to specific customer orders. On all sections, hole patterns can be punched to order and can be of varying sizes depending on the specification. Blanking cut lengths from wide coil is a very cost effective method of production and as a result we can offer very competitive prices on these products. Please contact the Sales team on sales@hi-span.com or telephone 01953 603081 for further information.

Detailing and Ordering

Our own Hi-Detail software is available free of charge and is specifically aimed at clients who do not use the 3-D CAD detailing packages. Hi-Detail has been designed to be exceptionally user friendly and allows the user to detail our complete range of sections and accessories, which can then be emailed directly to us. A Cam data file is then generated and fed directly into the manufacturing system to further reduce customers’ lead times. Hi-SPAN cold rolled sections are also available through the 3-D detailing packages, Tekla and Graitec - Autodesk Advanced Steel. Please contact the Sales team on sales@hi-span.com or telephone 01953 603081 for further information.

Quality, Service & CE Marking

Hi-SPAN has earned a deserved reputation within the industry for its excellent personal service. Whilst having BS EN ISO 9001 quality management certification, Hi-SPAN Ltd has implemented Factory Production Control system B and the category of Execution Class 4 to apply due diligence to the necessary requirements of BS EN 1090-1, enabling Hi-SPAN Ltd to CE mark components for use in structures in compliance with the Construction Products Regulation.

Sustainability

As members of the BCSA Sustainability Charter, Hi-SPAN is committed to supporting and furthering it’s sustainable development throughout all departments and business activities. Steel is 100% recyclable. Use of recycled steel does not compromise the quality of new steel produced from it. By addressing key issues such as CO2 emissions, product design, recycling of unwanted or waste materials and prudent use of all resources, we intend to remain committed to effectively and responsibly managing our environmental and health and safety arrangements.

Software

The new Hi-SPAN design software has been developed in conjunction with the SCI (Steel Construction Institute). All of the standard Hi-SPAN section sizes have had their properties updated in strict accordance with BS EN 1993-1-3. Equally all design methodology has been modernised and is fully compliant with the latest Eurocodes. Wind Load assessments to BS EN 1991-1-4, incorporating BRvere databases, can directly apply loads to your design. Also Snow Drifts can be analysed to BS EN 1991-1-3 automatically positioning purlins to achieve the most economical designs.

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**EAVES BEAM SYSTEMS**
A versatile structural element combining the functions of an eaves beam and a side sheeting rail
Pages 31-34

**PURLIN SYSTEMS**
A complete range of roof cladding support systems including sleeved, butted, heavy end bay and unrestrained
Pages 7-18

**CHANNEL SYSTEMS**
C-Channels are used in a multitude of ways including floor beams, ceiling supports and window trimmers
Pages 37-40

**Hi-WALL SYSTEMS**
Introducing a new range of systems which quickly and efficiently create external walls and partition walls
Pages 43-44

**HORIZONTAL CLADDING**
A complete range of wall cladding support systems including all anti-sag requirements
Pages 21-28

**RAIL SYSTEMS**
A variety of sections needed to support the ever increasing requirements of horizontal cladding systems
Pages 23-24
Sleeved Purlin System
Butted Purlin System
Heavy End Bay Purlin System
Unrestrained Purlin System
Monopitch, Flat & Curved Roof Systems
Tiled, Steep & Green Roof Systems
Anti-Sag Systems
Brickwork Straps and Service Clips
Material Weight Guide
The Sleeved Purlin System is by far the most popular of the zed purlin systems available from Hi-SPAN. Purlins attain a high degree of continuity over the supports by employing connecting sleeves over the joints. This means that design bending moments are distributed evenly along the building length, resulting in smaller section sizes and valuable economies achieved. In the various possible arrangements of single and double span purlins, the Hi-SPAN sleeved system offers the customer low material costs, practical on-site advantages during erection, and excellent building performance thereafter.

**Double Span Joint Arrangement**
This system combines single and double span purlins with their joints staggered and sleeved. The provision of a sleeve at the un-jointed connections over the penultimate support is required.

**Single Span Joint Arrangement**
Apart from the penultimate support this system has sleeves at alternate joint positions. Purlins must be continuous over a minimum of two spans using a sleeve, in order to create an end bay situation. Sleeve arrangement as shown, using single span purlins.

**Standard Punching Patterns**
These layouts do not imply that all sections are suitable.

<table>
<thead>
<tr>
<th>Span Length</th>
<th>Purlin Overhang</th>
<th>Purlin Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overhang C of Rafters</td>
<td>Dim b, Dim c, Dim r</td>
<td></td>
</tr>
</tbody>
</table>

- Spans up to 7.5m (single span)
  - Sag Bar Holes @ Mid-Span Threaded = 14 Ø

- Spans up to 7.5m (double span)
  - Sag Bar Holes @ Mid-Span Threaded = 14 Ø
  - Sleeves Required In Penultimate Bay

- Spans up to 9.5m (single span)
  - Sag Bar Holes @ Mid-Span Threaded = 14 Ø

**Non Standard Punching Patterns**
Additional holes on the standard punchlines will be made as detailed. Non-standard punchlines can be incorporated at no extra charge.

- Butted designs do not require continuity through sleeves.
- Cleats for butted purlins are non-standard and therefore produced by the fabricator.
- Maximum purlin length = 15m

The Butted Purlin System requires no sleeves at the joints between the purlins and is the simplest form of purlin construction.

Utilising, in the main, single span purlins, this system is employed principally on agricultural buildings, where design criteria, particularly with regards to deflection, are less stringent. In other classes of building when this form of construction cannot be avoided, appropriate consideration should be given to this aspect at the design stage.

**Butted Joint Arrangement**
This system can occasionally involve notched end connections to the purlins due to height restrictions imposed by the Architect. Non-standard cleats are therefore required. Hi-SPAN are capable of incorporating notched ends to both Z sections and C channels, on receipt of details.
The Heavy End Bay System is the most cost-effective purlin system to be made available from Hi-SPAN. A minimum of five equal bays is required for the system to perform economically with the use of heavier end bay sections. Sleeves are required at every purlin/rafter connection, including any double span purlins. The system offers an economical solution to the use in long span multi-bay buildings, because considerable savings can be made in using lighter inner bay purlins, with the added advantage of simple erection procedure.

Single Span Joint Arrangement
End bay purlins and the penultimate sleeves are manufactured from heavier gauge material as shown. Greater end bay moments are then accommodated by the larger section sizes, allowing lighter gauge sections to be designed for the inner bays.

Non Standard Punching Patterns
Additional holes on the standard punchlines will be made as detailed. Non standard punchlines can be incorporated at no extra charge.

Standard Punching Patterns
These layouts do not imply that all sections are suitable.

Spans up to 7.5m (single span)

Spans up to 7.5m (single span)

Spans up to 9.5m (single span)

Spans up to 9.5m (single span)

For Anti Sag Details See Page 13 - 14
For Sleeve Details See Page 49 - 51

The Unrestrained Purlin System caters for the wide range of standing-seam and secret-fix cladding systems now available that do not provide adequate lateral restraint to the top flange of the purlin. It is therefore necessary to replace standard sag bars with angle strut braces. Used in conjunction with rigid apex ties in duo-pitched roofs and appropriate diagonal bracing in mono-pitch roofs, allowable loads for all purlin systems are given in the load tables which are available on the website.

Where a liner tray capable of providing adequate lateral restraint to the purlin top flange is used in conjunction with standing-seam cladding, the standard sleeved system can be used.

Restraints
With non-restraining cladding sag bars must be replaced with rigid fix struts in order to restrain the top and bottom flange.

For Gauge Line Details See Page 49 - 51
For Cleat Details See Page 47 - 48

Detailers Notes
• A Heavy End Bay system requires sleeves at every joint.
• The sleeve at the penultimate bay must always be the largest section size.

Detailers Notes
• The Unrestrained purlin system requires rigid-fix struts in place of all sag bars.
• Holes for struts and apex ties are 14Ø.
Monopitch Roof System 5 - 25°

If no support can be provided by connection between the uppermost purlin and the main steelwork at mid-span or third points (according to span), we recommend our standard diagonal tie wires are used, fixed at both ends with bracing brackets and a rigid fix strut, between the top two purlins.

Positive-Fix Detail
Where there is an adequate hot rolled member at the eaves, Hi-SPAN strut members can be used utilising the flexibility of both FB and AC cleats, as shown. This alleviates the necessity for diagonal bracing.

Flat Roof System 0 - 5°
When a roof pitch is less than 5 degrees, rigid-fix struts are used in place of sag bars as the more robust restraint is capable of resisting a small compressive force that may occur with this system. As a further precaution we recommend an additional set of diagonal braces with a reversed orientation as shown in the diagram below.

Curved Roofs
The bracing system required for a curved roof depends upon the purlin arrangement. Where the purlins are equally spaced about the ridge the standard bracing for a duo-pitch roof can be used. If the purlins are spaced unevenly, then the roof should be treated as two separate mono-pitch systems. Therefore each side of the roof has its own set of struts and diagonals.

Steep Roof System + 25°
For roof pitches greater than 25° diagonal bracing members are mandatory. These are capable of transmitting the in-plane component of the load. All sag bars are to be replaced with rigid fix struts. Standard purlin cleats may need to be stiffened or replaced by purpose-made cleats (by others) capable of supporting the in-plane shear load. In addition attention must be paid to the presence of adequate shear strength in the fixing between all the timber rafters and the supporting zed purlins. Again rigid apex ties are required across the apex.

Fibre Cement Sheets:
When designing supports for fibre cement sheets please consider an increased deflection limit of 1/220 as recommended by the manufacturers. Please follow all the manufacturers installation procedures.

Tiled / Mansard / Green Roof Systems
Due to increased bi-axial banding caused by the weight of these finishes, we recommend using our rigid fix strut members in place of sag bars. The apex purlins should be tied using the rigid apex tie (see page 14). The top two purlins require diagonal tie wires and brackets. Additional bracing will be required for every 6.0m of roof. Each timber rafter must be positively secured to each line of purlins by a bolted or screwed fixing detail capable of transmitting the appropriate in-plane shear load. At the ridge, timber rafters should be joined across the apex or securely fixed to a suitable ridge board.
Tubular Sag Bars
Sag bars are used to restrain the bottom flange of a purlin in order to reduce its effective length when exposed to uplift conditions. Where download is critical, with a relatively small uplift the sag bars contribute very little to the structural integrity of the roof. In these situations it is possible to design the section without sag bars. When doing this, care should be taken during the erection of the cladding panels as the purlins are untied between supports, temporary bracing may then be necessary. This addition is left to the cladders discretion.

Threaded Sag Bars
These 19mm diameter flow-coat galvanised and lacquered seamless tubular sag bars are preferred by many consultants and structural engineers: not only for visual effect, but also from a structural point of view. For use with zed purlins up to and including 255 mm deep and on roof pitches of up to 25°. They are sturdy (0.9mm thick) and the zinc plated 12mm dia. threaded end spigots with nut and washer provide a positive fixing. (They are available in three standard lengths 20mm, 32mm and 100mm).

Rigid Fix Struts
Manufactured from sturdy 50 x 50 x 2mm thick angle sections with rivetted end cleats, the rigid fix struts can be used where additional lateral and torsional restraint to purlins and rails is necessary.

It is mandatory to employ the rigid fix strut in place of tubular sag bars in a variety of situations.
- Roof pitches less than 5 degrees
- Tiled or Green roof construction
- Roof pitches above 25 degrees
- Unrestricted roofs
- Diagonally braced purlins
- Where purlin centres exceed 2.35m
- Section sizes above 255mm deep

Rigid Apex Tie
The rigid apex tie is made from a thicker angle than the struts for added strength. AC cleats are used either end allowing for roof pitches up to 30°. For steeper roof slopes please contact our Technical Department. Please note, the rigid apex tie should always be used for the 309 and 359 purlin series.

Tubular Apex Tie
These are made from the same material as our standard sag bars and are manufactured to suit the configuration of the ridge purlins. Please note that the minimum distance to a bend is 113mm, and that the maximum angle of bend is 25°.

Sag Bar Configuration

Anti-Sag Requirements

<table>
<thead>
<tr>
<th>Roof Type</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>A metres</th>
<th>Apex</th>
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</thead>
<tbody>
<tr>
<td>Flat</td>
<td>Strut</td>
<td>Diags</td>
<td>Strut</td>
<td>18</td>
<td>N/A</td>
</tr>
<tr>
<td>Duopitch 5 - 25°</td>
<td>Sag Bar</td>
<td>N/A</td>
<td>Sag Bar</td>
<td>18</td>
<td>Tubular</td>
</tr>
<tr>
<td>Unrestricted 5 - 25°</td>
<td>Strut</td>
<td>N/A</td>
<td>Strut</td>
<td>18</td>
<td>Rigid</td>
</tr>
<tr>
<td>Monopitch 5 - 25°</td>
<td>Strut</td>
<td>Diags</td>
<td>Sag Bar</td>
<td>18</td>
<td>N/A</td>
</tr>
<tr>
<td>Steep Slope 25°+</td>
<td>Strut</td>
<td>Diags</td>
<td>Strut</td>
<td>14</td>
<td>Rigid</td>
</tr>
<tr>
<td>Tiled &amp; Green Roofs</td>
<td>Strut</td>
<td>Diags</td>
<td>Strut</td>
<td>6</td>
<td>Rigid</td>
</tr>
</tbody>
</table>

For Gauge Line Details See Page 49 - 51
For Cleat Details See Page 47 - 48

For Anti-Sag Requirements Per Span Please Contact Our Technical Department
Rafter Stays
Our standard 50 x 50 x 2mm thick angles are ideal for use as rafter stays in most situations and can be cut to any length up to a maximum of 3m. Standard sleeve holes should be used when fixing the stay to the purlin; however non-standard fixing holes can be added where necessary in order to achieve an optimum rafter stay angle of approximately 45°. In situations where stays are used to restrain lattice girders or deep UB sections, it may be necessary to use larger angle sections. Please note all stay requirements are to be in accordance with the structural engineers design.

Diagonal Bracing
Diagonal braces are manufactured from seven separate strands of wire rope with an adjustable threaded end, and a fixed ‘ball type’ end swaged to the wires. For purlin systems diagonal braces are required for flat, monopitch, tiled and steep roof systems. Where diagonal tie wires are needed struts must be used in place of sag bars to resist any compressive forces, should they occur.

As an alternative to the wire rope brace system, we can also offer a tubular diagonal brace system.

Bracing Bracket
Bracing brackets are manufactured to suit standard slopes of 37½°. When using the ‘ball type’ washer as per the above detail, the angle can be decreased to a minimum of 27½° or increased to a maximum of 47½°.

Rigid Bracing Bracket
Where there are excessive down slope loads due to high dead loads and steep pitches, 8mm thick material is used. Also where the diagonal angles exceed or are less than the specified max/min slope, rigid bracing brackets should be used.

Clearer Rail
Manufactured from 2.0mm pre-galvanised material in 3050mm lengths, these are cut and punched to your requirements. Simple jointing sleeves complete with bolts are provided. All the holes are 18 diameter and are slotted for ease of erection.

Cantilever Details
Cantilevered purlins can be used to create small canopies to gable end elevations. Where these are encountered the purlin member must be continuous over the backing span and the cantilever. This helps to minimise deflections to the recommended limits. Clearer angle fixed to the top and bottom of the cantilevered purlin will provide stability and resist rotation. For overhangs greater than 500mm please contact our Technical Department.
Brick Built Structures

Where purlins are to be supported directly on brick walls, particular care must be taken with regard to positioning and alignment of the purlins prior to being built-in. The use of false rafters, fitted with standard purlin cleats, is of considerable assistance in this respect. Sleeved joints should be used where purlins are continuous over intermediate walls. When single span purlins cannot be avoided, please consult our Technical Department.

Provision should be made at all supports to restrain purlins against wind uplift by the use of rod or flat anchor straps. Particular attention should be given to gable verges, where ‘local zone’ values for wind uplift loading should be used for anchor strap design.

Service Clips

Services are often hung from the secondary steelwork in a variety of ways. Hi-SPAN would recommend web fixings or wrap around fixings for loads in excess of 15kg for our sections ranging up to 1.8mm thick, and in excess of 30 kg for our heavier gauge range. When lighter loads require support various forms of clip are available, as shown below. Confirmation of the purlin capacity in a point load condition is always required.

Please note clip load capacities published by the manufacturers may exceed the load capabilities of the section. Please contact our Technical Department for further information.

### Material Weight Guide

**Web Fix** (**Recommended**)

**Wraparound Fix**

**Flange Fix**

**Lip Fix**

#### Steel Cladding

<table>
<thead>
<tr>
<th>Material Thickness (mm)</th>
<th>Weight (kg/m²)</th>
<th>Weight (kN/m²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.00</td>
<td>7.90</td>
<td>0.077</td>
</tr>
<tr>
<td>0.30</td>
<td>3.30</td>
<td>0.033</td>
</tr>
<tr>
<td>0.45</td>
<td>4.80</td>
<td>0.048</td>
</tr>
<tr>
<td>0.50</td>
<td>5.40</td>
<td>0.054</td>
</tr>
<tr>
<td>0.60</td>
<td>6.00</td>
<td>0.060</td>
</tr>
<tr>
<td>0.70</td>
<td>6.70</td>
<td>0.067</td>
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#### Aluminium Cladding

<table>
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<th>Material Thickness (mm)</th>
<th>Weight (kg/m²)</th>
<th>Weight (kN/m²)</th>
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</thead>
<tbody>
<tr>
<td>0.60</td>
<td>1.90</td>
<td>0.019</td>
</tr>
<tr>
<td>0.70</td>
<td>2.40</td>
<td>0.024</td>
</tr>
<tr>
<td>1.30</td>
<td>4.10</td>
<td>0.041</td>
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#### Double Skin Aluminium With Insulation Core

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<th>Material Thickness (mm)</th>
<th>Weight (kg/m²)</th>
<th>Weight (kN/m²)</th>
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</thead>
<tbody>
<tr>
<td>0.60</td>
<td>1.10</td>
<td>0.011</td>
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<tr>
<td>0.80</td>
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<td>0.014</td>
</tr>
<tr>
<td>1.00</td>
<td>1.70</td>
<td>0.017</td>
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#### Fibre-Cement Cladding

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<th>Material Thickness (mm)</th>
<th>Weight (kg/m²)</th>
<th>Weight (kN/m²)</th>
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<tbody>
<tr>
<td>0.60</td>
<td>17.00</td>
<td>0.170</td>
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<tr>
<td>0.80</td>
<td>24.00</td>
<td>0.240</td>
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#### Over Purlin Lining

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<tr>
<th>Material Thickness (mm)</th>
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<th>Weight (kN/m²)</th>
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<tr>
<td>9.00</td>
<td>11.20</td>
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<td>12.00</td>
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<tr>
<td>15.00</td>
<td>22.20</td>
<td>0.222</td>
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#### Mineral Insulation Board On Steel Tensile

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<th>Material Thickness (mm)</th>
<th>Weight (kg/m²)</th>
<th>Weight (kN/m²)</th>
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<tbody>
<tr>
<td>30.00</td>
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</tr>
<tr>
<td>50.00</td>
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#### Polystyrene Foam

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<tr>
<th>Material Thickness (mm)</th>
<th>Weight (kg/m²)</th>
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<tr>
<td>10.00</td>
<td>0.80</td>
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</tr>
<tr>
<td>30.00</td>
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#### Hardwood Deck

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<thead>
<tr>
<th>Material Thickness (mm)</th>
<th>Weight (kg/m²)</th>
<th>Weight (kN/m²)</th>
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<tr>
<td>25.00</td>
<td>17.20</td>
<td>0.172</td>
</tr>
<tr>
<td>50.00</td>
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#### Screed

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</thead>
<tbody>
<tr>
<td>20.00</td>
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#### Asphalt

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<th>Material Thickness (mm)</th>
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<th>Weight (kN/m²)</th>
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</thead>
<tbody>
<tr>
<td>10.00</td>
<td>25.53</td>
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#### Bitumen Roofing Felts

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<thead>
<tr>
<th>Material Thickness (mm)</th>
<th>Weight (kg/m²)</th>
<th>Weight (kN/m²)</th>
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</thead>
<tbody>
<tr>
<td>3.50</td>
<td>0.034</td>
<td>0.000</td>
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</tbody>
</table>

#### Chippings

<table>
<thead>
<tr>
<th>Material Thickness (mm)</th>
<th>Weight (kg/m²)</th>
<th>Weight (kN/m²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>20.00</td>
<td>0.130</td>
<td>0.130</td>
</tr>
</tbody>
</table>

#### Timber Battening

<table>
<thead>
<tr>
<th>Material Thickness (mm)</th>
<th>Weight (kg/m²)</th>
<th>Weight (kN/m²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.00</td>
<td>7.10</td>
<td>0.070</td>
</tr>
<tr>
<td>18.00</td>
<td>11.20</td>
<td>0.112</td>
</tr>
</tbody>
</table>

#### Plywood

<table>
<thead>
<tr>
<th>Material Thickness (mm)</th>
<th>Weight (kg/m²)</th>
<th>Weight (kN/m²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.50</td>
<td>6.00</td>
<td>0.060</td>
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</tbody>
</table>

#### Timber Joists, Rafters & Battens

<table>
<thead>
<tr>
<th>Assumed Density (kg/m³)</th>
<th>Material Thickness (mm)</th>
<th>Weight (kg/m²)</th>
<th>Weight (kN/m²)</th>
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</thead>
<tbody>
<tr>
<td>540</td>
<td>38 x 50</td>
<td>0.03</td>
<td>0.003</td>
</tr>
<tr>
<td>540</td>
<td>38 x 100</td>
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<tr>
<td>540</td>
<td>50 x 100</td>
<td>0.06</td>
<td>0.006</td>
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<tr>
<td>540</td>
<td>50 x 150</td>
<td>0.08</td>
<td>0.008</td>
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<tr>
<td>540</td>
<td>50 x 200</td>
<td>0.10</td>
<td>0.010</td>
</tr>
<tr>
<td>540</td>
<td>50 x 250</td>
<td>0.12</td>
<td>0.012</td>
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</table>

#### Tile Weights

<table>
<thead>
<tr>
<th>Material Thickness (mm)</th>
<th>Weight (kg/m²)</th>
<th>Weight (kN/m²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.70</td>
<td>7.10</td>
<td>0.070</td>
</tr>
<tr>
<td>1.40</td>
<td>14.20</td>
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#### Sedum / Green Roof

<table>
<thead>
<tr>
<th>Material Thickness (mm)</th>
<th>Weight (kg/m²)</th>
<th>Weight (kN/m²)</th>
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</thead>
<tbody>
<tr>
<td>20.00</td>
<td>14.00</td>
<td>0.140</td>
</tr>
</tbody>
</table>

#### Lead

<table>
<thead>
<tr>
<th>Material Thickness (mm)</th>
<th>Weight (kg/m²)</th>
<th>Weight (kN/m²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.50</td>
<td>35.00</td>
<td>0.350</td>
</tr>
</tbody>
</table>

#### The above information is for general guidance only and Hi-SPAN accept no liability for the accuracy of the figures, where exact weights are required, reference to manufacturers’ own data should be sought.
RAIL SYSTEMS

21  Sleeved Rail System
22  Butted Rail System
23  Horizontal Cladding VCR & WCP System
24  Horizontal Cladding Top Hat System
25  Firewall System
26  Window Trimmers
27-28 Anti-Sag Systems
In the Sleeved Rail System the rails run past the faces of the columns. The section depth of the rail plus the clearance required for a standard fixing cleat determine the minimum dimension from the column face to the inside of the vertical cladding. Joints in the rails are sleeved to give continuity, allowing the use of more economical sections and giving an improved deflection performance.

**Double Span Joint Arrangement**
This system combines single and double span rails with their joints staggered and sleeved. The provision of a sleeve at the un-jointed connections over the penultimate support is required.

**Single Span Joint Arrangement**
Apart from the penultimate support this system has sleeves at alternate joint positions. Rails must be continuous over a minimum of two spans using a sleeve in order to create an end bay situation. (Sleeve arrangement as shown, using single span rails).

**Non Standard Punching Patterns**
Additional holes on the standard punch lines will be made as detailed. Non standard punch lines can be incorporated at no extra charge.

---

The Butted Rail System gives the engineer more freedom to specify the line of the vertical cladding in relation to the column face, regardless of the depth of the side rail. As the rails are single spans, simply supported between the columns, they can be positioned to suit architectural details, rather than be governed by the section depth of continuous rail systems that must pass across the column faces. 

Note: Where damage to finishes might arise from the effects of deflection in side rails, or where rails are intended to provide lateral restraint to the tops of brick walls, deflection design checks should be carried out, with the use of the Hi-SPAN Design Suite.

**Butted Joint Arrangement**
This system can occasionally involve notched connections to the rails due to width restrictions imposed by the Architect. Non standard cleats are therefore required. Alternatively an angle filler can be used to bridge the gap between the rails, as shown.

---

**Standard Punching Patterns**
These layouts do not imply that all sections are suitable.

**Details Notes**
- Holes for struts & apex ties are 14Ø, all others are 18Ø.
- There is a standard 10mm gap between the rail & the column line.
- Sleeves are inverted rail sections.
- Between two separate rails there is always a 6mm gap.

**Spans up to 6.5m (single span)**
- Rail Length
- Strut Holes @ Mid-Span = 14 Ø
- Rail Overhang

**Spans up to 7.5m (double span)**
- Rail Length
- Strut Holes @ Third-Span = 14 Ø
- Rail Overhang

**Spans up to 8.5m (single span)**
- Rail Length
- Strut Holes @ Quarter-Span = 14 Ø
- Rail Overhang

**Details Notes**
- Butted designs do not require continuity through sleeves.
- Cleats for butted rails are non-standard and therefore produced by the fabricator.

**Spans over 6.5m up to 8.5m**
- Rail Length
- Strut Holes @ Mid-Span = 14 Ø

**Spans over 8.5m up to 9.5m**
- Rail Length
- Strut Holes @ Third-Span = 14 Ø

For Anti Sag Details See Page 27 - 28
For Sleeve Details See Page 49 - 51

For Gauge Line Details See Page 49 - 51
For Cleat Details See Page 47 - 48

*All The Above Details Are Applicable To The C-Channel Butted Rail System*
The Window Channel Pressing has been introduced to provide an economic alternative to vertical channel sections with cleats. The WCP section acts as an intermediate support, the VCR has a larger 140mm fixing face to accommodate two panels at joint positions. These joints usually occur at column positions, where the VCR can be fixed directly to the column using hot rolled cleats, by others. Alternatively, the following cleats can be arranged to suit any Hi-SPAN rail configuration. These are also used when the joint line falls within the span.

### Vertical Cladding Rails

The Vertical Cladding Rail section used in conjunction with the Window Channel Pressing provide a suitable solution to the increasing need for horizontal cladding support. The section also utilises a thicker material gauge, therefore removing the need for lips, which reduces manufacturing costs.

### Maximum Span

The WCP and VCR section sizes have been designed to suit standard 1.8m rail centres. They have the capacity to span up to 2.0m but beyond this we recommend you contact our Technical Department.

### Notch Details

The details shown are our standard notch dimensions required when installing WCP’s into any of the Hi-SPAN range of section sizes. Variations to these standard notches can also be manufactured upon receipt of details.

### Non-Standard VCR’s & WCP’s are available upon request, please contact our Technical Department

---

The Top Hat section offers a more economical solution for secondary supports to horizontal cladding. This is achieved by using a trapezoidal profiled section to span across multiple rails, to a maximum of 4.0m. After this the introduction of a sleeve is required. Savings are made through reduction in cleats as the section bolts directly to the outer flange of the rails, cost effective profile with low manufacturing costs; and quicker erection procedures because of reduced member numbers.

The Top Hat section is available in two sizes, TH70 and TH140. The TH70 has a 70mm fixing face and is used for intermediate support to the cladding panels between joints. The TH140 has a 140mm fixing face as recommended by cladding manufacturers for panel joint connections.
Firewall Sleeves
To conform to the Building Regulations it is sometimes necessary to provide a fire resistant wall construction.
A number of wall cladding systems are available for use in this context, which can be used in conjunction with unprotected cold rolled side rails.
In order to minimise the effect of expansion of the rails on the integrity of the wall construction single span butt end rails can be used with slotted cleat connections. Alternatively slots can be punched into the rail sections trimming with increased end clearance.
By using this method savings are made on the cleat manufacture without compromising the effectiveness of the expansion mode.
To assist the expansion movement of the rail under fire conditions, thermoplastic washers should be fitted between the bolt head and the rail interface.
The wall cladding construction employed will determine the period of fire resistance. This information should be obtained from the appropriate cladding manufacturers. Please ensure that the cladding manufacturers requirements are adhered to.

For Gauge Line Details See Page 49 - 51

For Firewall Sleeve Dimensions See Page 49 - 51

Firewall System

Window Openings
When windows are called for in side and gable cladding, Hi-SPAN C-Channels provide an ideal solution for window headers, sills and trimmers.

Window Channel Pressings
For window jambs and headers. The Hi-SPAN WCPS are ideal members. If rail centres exceed the height of the window, a WCP can be used to form a header or sill.

Counter Formed Plate Detail
In order to avoid countersunk cleats to strut members above or below windows, CFP plates can be used. These plates have oversized 32mm diameter holes which accommodate a standard 18mm diameter counter formed hole in the channel section. The bolt thread continues through the plate to the strut cleat, where it is fixed.

Window Trimmers

Connection

Structural
Headers, Sills and Trimmers

For Window Trimmer Dimensions See Page 49 - 51

Series

A

B

C

D

E

156

130

500

35

225

70

176

150

500

35

225

70

206

180

740

35

300

70

238

210

740

35

300

70

268

210

940

35

400

70

309

260

1340

35

600

70

359

304

1530

35

695

70

Firewall Sleeve

Where rails are affixed to the eaves beam the eaves member will require fire protection.

Where eaves beams do not provide support to the rails no further steps need to be taken.

Uneven Bay Layout

In situations where there is an uneven number of bays a single line of Hi-SPAN firewall sleeves will be required in order to achieve continuity and avoid expensive single span end bay rails. Even bays can adopt a standard single span sleeved system, with a slotted connection to the non-sleeved end.

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Anti-Sag Systems
These are necessary to ensure that the rails line level along the length of the building and also provide torsional restraint to the unrestrained flange.

The system consists of a continuous line of struts at either mid, third or quarter points along the rail span. In order to support the rails against vertical deflection diagonal tie wires are required. Where a hot rolled structural member of adequate strength is used as an eaves beam, the anti-sag system can be suspended from it therefore removing the necessity of the wires.

Additional Diagonals
Further sets of diagonal bracings are required at the following dimensions. Dim H = 10m for metal cladding and 7.5m for fibre cement.

Rigid-Fix Struts
Rigid-fix struts are manufactured from 2.0mm pre-galvanised material, which is connected either end to ST cleats.

Anti-Sag Requirements
Restrains should be provided to suit the various span and sheeting conditions shown in the table below. For other forms of cladding please consult our Technical Department.

<table>
<thead>
<tr>
<th>Spans Up To</th>
<th>Metal Sheeting</th>
<th>Fibre Cement Sheeting</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.0m</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>4.5m</td>
<td>Mid-Span</td>
<td>Mid-Span</td>
</tr>
<tr>
<td>6.5m</td>
<td>Mid-Span</td>
<td>½ span points</td>
</tr>
<tr>
<td>8.0m</td>
<td>½ span points</td>
<td>½ span points</td>
</tr>
<tr>
<td>10.0m</td>
<td>½ span points</td>
<td>N/A</td>
</tr>
</tbody>
</table>

For Gauge Line Details See Page 49 - 51
For Cleat Details See Page 47 - 48

Column Stays
Our standard 50 x 50 x 2mm thick angles are ideal for use as column stays in most situations, and can be cut to any length up to a maximum of 3m. Standard sleeve holes should be used when fixing the stay to the rail; however non-standard fixing holes can be added where necessary in order to achieve an optimum column stay angle of about 45°.

In situations where stays are used to restrain deep UB sections, it may be necessary to use larger angle sections. Please consult our Technical Department.

Rail Configuration
Metal sheeting is normally fixed using self tapping screws, as shown. Where fibre cement sheeting is specified, rails should always be fixed with the external flange facing upwards, in order for the hook bolts to wrap around the inner flange.

For Cleat Details See Page 47 - 48

Anti-Sag Systems
Rails RAILS

Diagonal Bracing
Diagonal braces are manufactured from seven separate strands of wire rope with an adjustable threaded end and a fixed ‘ball type’ and swaged to the wires. For all rail systems diagonal braces are required to support the rails against sagging under their own self-weight about the minor axis. Where struts can be fixed back to an adequate hot rolled eaves member, the diagonal braces are not required. With a strut anti-sag system the diagonals can be placed anywhere in the bay, but we recommend between the bottom lines of rails as this will aid erection.

Additional sets of diagonal braces are needed according to the meterage of cladding they must support. As a rule each set can support up to 10m of metal cladding, or 7.5m of fibre cement sheeting. After this further braces are required. (As an alternative to the wire rope brace system, we can also offer a tubular diagonal brace system). The bracing bracket fixed to the cleat attached to the column must use the holes closest to the column, whereas the bracket that fixes to the centre of the rail should fix to the outer holes closest to the cleat.

Bracing Bracket
Bracing brackets are manufactured to suit standard slopes of 37½°. When using the ‘ball type’ washer as per the above detail, the angle can be decreased to a minimum of 27½° or increased to a maximum of 47½°.

Additional sets of diagonal braces are needed according to the meterage of cladding they must support. As a rule each set can support up to 10m of metal cladding, or 7.5m of fibre cement sheeting. After this further braces are required. (As an alternative to the wire rope brace system, we can also offer a tubular diagonal brace system). The bracing bracket fixed to the cleat attached to the column must use the holes closest to the column, whereas the bracket that fixes to the centre of the rail should fix to the outer holes closest to the cleat.
EAVES BEAM SYSTEMS

31  Fixing Details
32  Hanger Details
33  Eaves Brace Sets
34  Restraint Requirements & Cleats
Eaves Beams

The Hi-SPAN Eaves Beam is a versatile structural element combining the functions of an eaves purlin and a side sheeting rail, column tie and gutter support. Designed to cater for spans up to 12.0m, it is available in four depths of varying thicknesses with an angled top flange giving a choice of roof slopes 0°, 5°, 10°, 15°, 22.5°, and 30°.

All design calculations are based on a single span condition therefore removing any need for continuity between spans. Loading combinations and section properties are all calculated in accordance with BS 5950: Part 5: 1998.

Web and flange holes can be manufactured with counter formed holes in order to suit flush face details.

Flush Face Detail

Outstand Detail

Standard Punching Patterns

This layout does not imply that all sections are suitable.

Eaves Hanger Struts

Side rail systems are normally supported on their weak axis by the inclusion of diagonal tie wires. Occasionally it is possible to hang side rails from the bottom flange of the eaves beam, therefore removing the necessity for the wires. For this reason a stiffening cleat is incorporated in the Eaves Brace Set, see page 33.

When an eaves beam is used to support the side rail system, it becomes an essential part of the wall system, and therefore will require the protection in a fire boundary wall situation.

Typically the hanger strut is used where there is only one number side rail below the eaves beam, and it is not possible to incorporate the diagonal tie wire system.

Eaves Soffit Detail

When a situation arises that requires a flush finish to the soffit it may be necessary to omit the bolt in the bottom flange hole. The stiffening cleat provides additional strength to the eaves member when supporting vertical loads as explained above. If the soffit detail is flush with the bottom flange of the eaves beam there is no longer a vertical load to support and therefore the fixing is no longer required.

For Gauge Line Details See Page 51
For Cleat Details See Page 34

For Gauge Line Details See Page 51
For Cleat Details See Page 34
EAVES BEAMS  Eaves Brace Sets

Eaves Brace Sets
Restrainment to the eaves beam is required within the span, either at mid-span, third or quarter points according to design requirements. This can be evaluated using the Hi-SPAN Design Suite. With each brace set a stiffening cleat is needed to provide rigidity to the web of the member. The eaves brace member is fixed back to the first purlin up the slope, this construction reduces the effective span of the eaves member against horizontal wind forces. The inclusion of the brace set also helps to resist torsion on the eaves beam when the gutter is positioned outside of the building envelope. Section sizes calculated using the Hi-SPAN Design Suite assume that the compression flange of the eaves beam is fully restrained by the sheeting or gutter member.

Eaves Tie Type BW1
The eaves tie type BW1 is suitable where there is a boundary wall gutter directly on top of the eaves beam. Due to the nature of this construction the standard restraint between the eaves beam and the purlin is no longer possible. An additional angle cleat is required in order to offset the restraint member below the gutter sole. This particular detail can vary greatly between jobs and it is ultimately the detailers responsibility to ensure that the sole of the gutter does not clash with the restraint member.

Eaves Tie Type EG1
The eaves gutter 1 restraint is a suitable eaves beam restraint where the gutter sits on the outer face of the building envelope. This particular restraint is suitable for roof pitches up to and including 15°.

Eaves Tie Type EG2
Where the roof pitch exceeds 15° the eaves gutter 2 restraint is required. This suits the sag bar configuration as shown on page 14, where the sag bars are positioned from the top gauge line holes to the bottom.

For further Eaves Beam details please contact the Hi-SPAN Technical Department.

Eaves Beam Brace Set Cleats
The following cleats used in various combinations can develop the strut systems shown on the opposite page. These are capable of restraining roof slopes up to 30°, beyond this please consult our Technical Department.

Eaves Beam Restraint Requirement
The restraint requirement for each eaves beam situation is displayed on the calculation sheet provided by the Hi-SPAN Design Suite. If this information is not available the following recommendations should be adhered to.

- Up to 6.100m: 1 No. Restraint
- 6.100m - 8.500m: 2 No. Restraints
- Over 8.500m: 3 No. Restraints

Cleat DIM B DIM C DIM D DIM E
A15 100 67 33 175
A17 100 87 33 195
A20 103 116 31 225
A23 100 146 34 255
A25 112 146 32 265
A30 112 196 32 315
A35 112 241 32 360

Cleat DIM B DIM C DIM D
EB17 84 62 37
EB20 100 70 45
EB24 116 78 53
EB28 146 93 68

Cleat (Supplied as untreated steel) (Galvanised after manufacture)
ED ED17 84 42
ED20 100 53
ED24 116 53
ED28 146 53

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For further Eaves Beam details please contact the Hi-SPAN Technical Department.
Mezzanine Floor System
Ceiling Channel System
Brickwork Restraints, Parapets & Compound Sections
Door & Window Trimmers
Mezzanine Floor Beams
H-SPAN C-Channels are a comprehensive range of channels for a diversity of applications. Primarily for use within mezzanine floors, C-Channel sections can also be applied in many other circumstances such as door framing, self-tilting, window trimming, brickwork rests, parapet rails and side rails.

The mezzanine floor beam depths of 127, 220, 270, and 290mm are all colored for within the range, together with C-Channel depths of 150, 170, 205, 230, 255, 305 and 350mm, which are fully compatible with our Z purlin and rail sections. While the mezzanine floor beams, are normally punched with 18 diameter holes as standard, 14 diameter holes are also available in these sections, together with the option of counter formed holes.

Threaded Sag Bars
These 19mm diameter flow-coat galvanised and lacquered seamless tubular sag bars are preferred by many consultants and structural engineers: not only for visual effect, but also from a structural point of view. They are sturdy sag bars are preferred by many consultants and structural engineers: not only for visual effect, but also from a structural point of view. They are sturdy and washer provide a positive fixing. (They are available in three standard (0.9mm thick) and the zinc plated 12mm dia. threaded end spigots with nut and washer provide a positive fixing. (Typically spars less than 3.50m do not require washers).

Restraint Requirements
As the bottom flange of the C-Channel is usually unanchored, we recommend that a H-SPAN tubular sag rod not be fitted. Where possible the channels should face toe to toe with the restraint situated in the lower gauge line holes. (Typically spars less than 3.50m do not require restraints).

C-Channel. Non standard cleats provide an adequate fixing to the flange of the hot rolled member to project far enough beyond the holes in the standard MFB cleat restrains, parapet rails and side rails. Please ensure that the span design due to floor depth restrictions. Please ensure that the beam depth is less than the span depth to avoid lateral movement of the ceiling grid.

Single Span Design
The single span design is more commonly used than the double span design due to floor depth restrictions. Please ensure that the holes in the standard MFB cleat project far enough beyond the flange of the hot rolled member to provide an adequate fixing to the C-Channel. Non standard cleats are available.

Double Span Design
The double span design is used when there is no depth restrictions within the floor zone. The benefit of a continuous member is reduced deflections, which in turn can reduce the section size and therefore cost. Standard punch cleats can be used for this system, please see page 47-48 for details.

MF B Floor Cleats
When H-SPAN C-Channels are used as mezzanine floor beams the MFB cleats should be used at the supports. The cleats are manufactured from a thicker material than the trimmer cleats to support the higher shear loads associated with floors.

When a double span system is used, hot rolled cleats are needed in order to support the web of the channel. Fixings directly through the bottom flange of the channel to the supporting member is not recommended. PC Cleats can be utilised for this.

SC cleats can be used for this system, please consult our Technical Department. Where ceiling channels can be continuous, i.e. lead to the underside of the supporting steelwork, the sleeved system may be adopted, and allowable loads taken from the values given in the load tables for purline carrying non-restraining cladding.

If channels are to be used in ceiling support grids suspended from pitched roof portal frames, or other high level steelwork by means of hangers, please consult our Technical Department.

Restraint Requirements
As neither the top flange or the bottom flange of a ceiling support channel is restrained, we recommend using a rigid-fix strut between members. These are situated at either mid-span or third points, according to bay size.

Ceiling Channels
In response to the frequent use of H-SPAN channels as part of the ceiling support grid, load tables have been prepared for single span ceiling channels (available on the Hi-SPAN Design Disc). These provide maximum allowable loads (based on a load factor of 1.6) restricted to the deflection limits indicated.

As with non-restraining cladding systems, the top flanges of ceiling channels are unrestrained, and lateral restraint must be provided by the use of angle strut braces. (See page 13 for details). Where ceiling channels can be continuous, i.e. lead to the underside of the supporting steelwork, the sleeved system may be adopted, and allowable loads taken from the values given in the load tables for purline carrying non-restraining cladding.

If channels are to be used in ceiling support grids suspended from pitched roof portal frames, or other high level steelwork by means of hangers, please consult our Technical Department.

Restraint Requirements
As neither the top flange or the bottom flange of a ceiling support channel is restrained, we recommend using a rigid-fix strut between members. These are situated at either mid-span or third points, according to bay size.

Trimming Cleats
When additional trimming channels are needed Hi-SPAN TC cleats can be used at supports. They are referenced by the standard gauge line of the section size being used.
Brickwork Restraints
Hi-SPAN C-Channels can be used to restrain small block/brickwork walls. The channels sit directly on top of the wall and are connected using sliding anchors. The wall will provide support to the channel about its weak axis, and the channel will restrain the wall against horizontal wind forces. Where walls are erected after the channels, temporary propping will be needed until the wall is in place.

When designing brickwork restraints using the Hi-SPAN Design Suite, consideration must be made to the higher deflection limits required by both block and brickwork walls. Restraint must be provided to the outer flange of the channel by a positive fixing to the overlapping cladding.

Parapet Channels
Many buildings are designed to incorporate a parapet to the perimeter to hide the ridge from view. The parapet has a horizontal coping which can require fixing to the internal face, external face and over the top of the parapet. Hi-SPAN C-Channels are capable of fulfilling all of this criteria. They come in a range of depths to suit practically all parapet dimensions. Horizontal C-Channels can be designed and detailed using the Hi-SPAN Design and Detailing Suite. To order your free copy please visit our website at www.hi-span.com.

Compound Sections
Back to back channels can be used in a variety of applications. For example eaves ties, bracing members and posts. Valuable cost and weight savings can be made when utilising these light weight members. The entire C-Channel range can be used for any of these purposes offering a variety of solutions, please contact our Technical Department for further information.

Door & Window Trimmers
C-Channel sections are ideal members for framing both doors & windows. With the web orientated towards the opening a flush clean surface is available to affix the door and window frames. By using standard trimmer cleats that suit the C-Channel gauge lines, accompanied by CFP plates to accommodate the counter-sunk holes, various arrangements are achievable.
Infill Panel System

The Infill Panel System is designed to sit between the structural frame. Header rails and base rails are fixed directly to the frame with vertical studs spanning between them. Header and base rails are pressed members and are available in up to 4.0mm thicknesses. Stud members are predominantly rolled sections and are available in up to 15.0mm thicknesses.

With non-load bearing panels a slotted deflection header is required in place of the header rail. This member has vertical slots along its length which allow movement of the rail about the stud fixing when the structural frame deflects. Slotted deflection headers are available throughout the entire range of stud sections. A slot should be specified when detailing these sections.

Where openings occur in a panel it may be necessary to stiffen the framing members. Compound members can be manufactured by fixing a stud member inside a header rail. For further details please contact the Technical Department.

Continuous Panel System

The Continuous Panel System requires vertical studs fixed to cleats on the outside of the structural frame. As with the infill panels the studs are designed to carry lateral wind loads only.

Deflection of the structural frame is not transferred to the studs by the inclusion of vertical slots on the hot rolled cleats (by others). The S section stud range is well suited to many different wall types and depths. Each depth has its own range of flange widths and thicknesses, ensuring the most economical design solution can be achieved for each situation.

For further information on Hi-Wall stud systems and recommended installers please contact the Hi-SPAN Technical Department.
TECHNICAL SECTION

47-48  Cleat Details

49  Section Properties Z Section

50  Section Properties C Section

51  Section Properties E Section & C Section
**CLEAT DETAILS**

**MFB241**
- Dim A: 285
- Dim B: 241
- Dim C: 22
- Dim D: 196
- Dim E: 196
- Dim G: 130

**MFB116**
- Dim A: 160
- Dim B: 116
- Dim C: 22
- Dim D: 116
- Dim E: 120
- Dim G: 120

**MFB87**
- Dim A: 131
- Dim B: 87
- Dim C: 22
- Dim D: 87
- Dim E: 110
- Dim G: 110

**MFB67**
- Dim A: 111
- Dim B: 67
- Dim C: 22
- Dim D: 67
- Dim E: 110
- Dim G: 110

**MFB50**
- Dim A: 94
- Dim B: 50
- Dim C: 22
- Dim D: 50
- Dim E: 110
- Dim G: 110

**ST25**
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- Dim D: 25
- Dim E: 285
- Dim G: 241

**ST20**
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**ST17**
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- Dim B: 87
- Dim C: 32
- Dim D: 17
- Dim E: 156
- Dim G: 241

**ST15**
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- Dim B: 67
- Dim C: 32
- Dim D: 15
- Dim E: 127
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- Dim B: 41
- Dim C: 41

**AC17**
- Dim A: 87
- Dim B: 51
- Dim C: 51

**AC20**
- Dim A: 116
- Dim B: 66
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**AC23**
- Dim A: 146
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**AC35**
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- Dim C: 18
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- Dim E: 75

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- Dim C: 19
- Dim D: 120
- Dim E: 105

**VR25**
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**VR30**
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- Dim C: 32
- Dim D: 140
- Dim E: 170

**VR35**
- Dim A: 22
- Dim B: 241
- Dim C: 32
- Dim D: 140
- Dim E: 215

**PC35**
- Dim A: 241
- Dim B: 62
- Dim C: 10mm

**PC23**
- Dim A: 146
- Dim B: 50
- Dim C: 8mm

**PC20**
- Dim A: 116
- Dim B: 53
- Dim C: 8mm

**PC25**
- Dim A: 146
- Dim B: 62
- Dim C: 8mm

Please Note: The MFB50 cleat can be used to suit the gauge lines of a WCP

Please Note: The C17 series require off-gauge punching and the TC50 cleat when used as trimmers

(CF) (Supplied as untreated steel)

(CF) (Galvanised after manufacture)

(CF) (Primed finish)

(CF) (Primed finish)
### Section Dimensions

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