FIRE PROTECTION

Fire protection solutions for structural steel & soffit protection

A Comprehensive Installation guide illustrating the various methods of Fixing ROCKWOOL BEAMCLAD®
ROCKWOOL BEAMCLAD® Systems
Contractors’ Fixing Guide

As part of the comprehensive FIREPRO® range of fire protection products, a new generation of dry fixing options has been added to the existing glued joint, pin and noggin systems. All have been tested or assessed to BS 476: Part 21: 1987.

This document explains and illustrates the installation methods using the six fixing options:

- Clip fix dry joint board system
- Stud welded pin dry joint board system
- Glued noggin dry joint board system
- Combined clip and stud welded pin dry joint system
- Stud welded pin glued jointed board system
- Glue fix noggin, glued jointed board system

Tested and approved for solid and cellular sections

ROCKWOOL BEAMCLAD® boards
Dense ROCKWOOL boards are available with facings of glass tissue and reinforced aluminium foil as well as plain product. Size: 2000 x 1200mm. Thicknesses: 25, 30, 35, 40, 45, 50, 55 and 60mm.

Scope
Contractors are required to install materials as tested and detailed in this brochure. In situations not covered by this brochure, ROCKWOOL will either recommend a suitable detail or assist in obtaining an independent Design Appraisal.

Applications
This Fixing Guide provides details of all of the standard boxed applications. It covers fixing centres and details of available facings and joint details. Dry board joints for up to 2 hours and Glued Joints up to 4 hours protection. Profiled application methods are also available with the glued joint systems – details available ROCKWOOL Technical Solutions.

Clip fix, dry joint board system
The ROCKWOOL push-fit clip system offers extremely fast application rates as no glue is required and no plant or equipment is needed. The clip is fitted onto the steel flange by pushing it until a definite, audible click is heard. Board-to-board edge joints are fixed with pigtail screws.

Glued noggin or stud welded pin, dry joint board systems
Welded pin and glued noggin fixing solutions with dry joints are extremely quick to apply, reduce system installation costs and eliminate the need for glue. Fixing centres are the same as for the glued systems.

Combination systems
A combination of stud welded pins to the top flange and friction fit clips to the bottom flange can be used with concrete decks.

Glued noggin fix and stud welded pin systems – Glued Joints
The glued joint ROCKWOOL BEAMCLAD® systems remain for the applications that require fire protection periods of up to 4 hours.

Figure 1 - Clip fix, dry joint board system

Benefits
- Simple to apply, dry push-fit
- Fast application rates
- No plant or equipment required
- Up to 2 hours fire protection
- Max. 2 hours A/V = 200
- Option of three finishes
- Easy system to repair, if damaged
- Clean, dry solution allowing other trades to work in same area during installation

Figure 2 - Clip fix, dry joint board system

Benefits
- Simple to apply, glued noggin, dry butt board joints
- Speed of installation increased
- Noggins spaced at 1000mm centres
- Tee- noggins of same thickness insulation used with web depths of over 533mm
- Up to 2 hours fire protection
- Easy system to repair, if damaged
- No masking of area required during installation
- Pigtail screws at 200mm centres in place of glued board joints

Figure 3 - Stud welded pin, dry joint board system

Benefits
- Fast to install, dry fix stud welded pin system
- Only dry joint stud welded pin solution
- Stud pin fixing centres at max. 600mm ctrs for top flange and max. 900mm for bottom flange
- Up to 2 hours fire protection
- Pigtail screws at max. 150mm centres in place of glued board joints
The unique ROCKWOOL BEAMCLAD® clip fixing system is designed for ultimate speed of application. Its design features allow it to be used with standard steel deck types. The ROCKWOOL BEAMCLAD® clip fixing solution can be used to provide 2, 3 and 4-sided beam protection for up to 2 hours*.

* 2 hour A/V limitation: 200m⁻¹

**Installation sequence**
- Friction fit the correct length clips (see A/V chart) onto the top and bottom flange tips at max. 600mm centres for the top flange (A) & max. 900mm centres for the bottom flange. (D) The first clip is positioned at max. 100mm in from the beam edge (B).
- Cut the ROCKWOOL BEAMCLAD® boards to suit the depth of the beam whilst allowing for the additional flange cover board thickness.
- Using the deck sofit as a guide, impale the ROCKWOOL BEAMCLAD® boards onto the clip legs, always starting at the top.
- Fit special ROCKWOOL BEAMCLAD® non-return washers onto the ROCKWOOL BEAMCLAD® clip legs and push washers tight to the insulation face.
- Apply pigtail screws horizontally at 150mm maximum centres, starting max. 75mm from the board’s vertical edge (C). Minimum screw length must be 2 x cover board thickness -5mm.
- Tape joints with foil tape or scrim tape if required.

**Selecting the thickness of ROCKWOOL BEAMCLAD® boards**

**Chart 1**
ROCKWOOL BEAMCLAD® clip system – Critical steel temperature 620°C, 3 sided protection for beams

**Chart 2**
ROCKWOOL BEAMCLAD® clip system – Critical steel temperature 550°C, 4 sided protection for beams & columns

**ROCKWOOL BEAMCLAD® thicknesses to be read with Chart 1 & 2**
The following key provides the required minimum thicknesses of ROCKWOOL BEAMCLAD® for the Section Factors given in the table.

A = 25mm - Use small clips
B = 30mm - Use small clips
C = 35mm - Use large clips
D = 40mm - Use large clips
ROCKWOOL BEAMCLAD® Systems
Contractors’ Fixing Guide

Typical details

Fixing pattern

3-sided box with ROCKWOOL BEAMCLAD® clip fixing

Dimensions
A = top flange clips at max. 600mm centres for 2000mm boards & 500mm centres if 1200mm board length used
B = clips at max. 100mm from edge of board (20mm min)
C = pigtail screws at max. 150mm centres, and max. 75mm from board edge
D = bottom flange clips at max. 900mm centres.

Combined clip and stud welded pin dry joint systems

With concrete decks it may be necessary to fix stud welded pins to the top flange in place of clips.

Figure 7 - 3-sided box
Dimensions
A = pins at max. 600mm centres
D = clips at max. 900mm centres
C = pigtail screws at max. 150mm centres
E = Steel supporting angle

Figure 8 - 3-sided box
W > 100mm

Figure 9 - 3-sided box
W < 100mm
A traditional stud welded pin solution with dry joints.

This dry fix pin solution can be used for 2, 3 and 4-sided beam protection for a period of up to 2 hours.

**Installation sequence**

- Clean the local area for pin welding and fix stud pin using arc or CD welds, ensuring a good contact has been achieved. Test weld by bending pin.
- Impale the ROCKWOOL BEAMCLAD® boards onto the stud welded pins using the deck soffit as a guide.
- Push 38mm diameter sprung steel non-return washers onto the exposed pin until tight to the cover board face. Crop pins as necessary.
- Fix pigtail screws along all board-to-board edge joints at 150mm maximum centres (c). Tape joints using aluminium foil tape or scrim, if required.

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### Chart 3

ROCKWOOL BEAMCLAD® stud welded pin dry joint system – Critical steel temperature 620°C, 3 sided protection for beams

<table>
<thead>
<tr>
<th>Section factor A/V (m⁻¹)</th>
<th>Fire resistance period (hours)</th>
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<tr>
<td>B</td>
<td>2</td>
</tr>
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<td>C</td>
<td>2.5</td>
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<tr>
<td>D</td>
<td>3</td>
</tr>
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<td>E</td>
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<td>F</td>
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### Chart 4

ROCKWOOL BEAMCLAD® stud welded pin dry joint system – Critical steel temperature 550°C, 4 sided protection for beams & columns

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<th>Section factor A/V (m⁻¹)</th>
<th>Fire resistance period (hours)</th>
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</thead>
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<tr>
<td>A</td>
<td>1.5</td>
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<td>B</td>
<td>2</td>
</tr>
<tr>
<td>C</td>
<td>2.5</td>
</tr>
<tr>
<td>D</td>
<td>3</td>
</tr>
<tr>
<td>E</td>
<td>3.5</td>
</tr>
<tr>
<td>F</td>
<td>4</td>
</tr>
</tbody>
</table>

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### ROCKWOOL BEAMCLAD® thicknesses to be read with Charts 3 & 4

The following key provides the required minimum thicknesses of ROCKWOOL BEAMCLAD® for the Section Factors given in the table.

- A = 25mm
- B = 30mm
- C = 35mm
- D = 40mm
- E = 45mm
- F = 50mm
- G = 55mm
- H = 60mm
ROCKWOOL BEAMCLAD® Systems
Contractors’ Fixing Guide

Typical details

Fixing pattern

3-sided box with stud welded pins
Dimensions
A = stud welded pins at max. 600mm centres for 2000mm board (500mm centres for 1200mm boards)
B = stud welded pins, 20mm min. from edge of board
C = pigtail screws at max. 150mm centres, and 75mm from edge of board
D = bottom flange stud welded pins at max. 900mm centres

2-sided box with stud welded pins
Dimensions
A = stud welded pins at max. 600mm centres for 2000mm board (500mm centres for 1200mm boards)
C = pigtail screws at max. 150mm centres
D = stud welded pins at max. 900mm centres for bottom flange

Figure 11 - 3-sided box
Figure 12 - 4-sided box

Figure 14

Figure 13

Figure 16 - 2-sided box

W limit is 100mm. Where W > 100mm a shelf angle or similar should be fixed to the wall

* For flange widths greater than 200mm, 2 rows of pins are required, each row approx. 25mm from flange tips.
A noggin solution which removes the necessity for glue to board-to-board and board-to-noggin joints. The board-to-board edge joints are fixed with pigtail screws at 200mm centres. The glued nogbins are at 1000mm fixing centres. This fixing solution can be used for 2, 3 and 4-sided beam protection for up to 2 hours.

**Installation sequence**

- Cut 120mm wide nogbins (C) to suit web depth, using same thickness material as the cover protection. For web depths of 500mm and above use either solid nogbins or ‘T’ shaped nogbins made from cover board thickness. These are then glued into position at 1000mm centres (D).
- Cut the ROCKWOOL BEAMCLAD® boards to suit the depth of the beam whilst allowing for the additional flange cover board thickness.
- Push board tight to deck soffit and fix pigtail screws through the coverboards and into the nogbins at maximum 100mm centres (B).
- Fix all board-to-board joints using pigtail screws at 200mm maximum centres (A). Minimum screw length must be 2 x cover board thickness – 5mm.

**Selecting the thickness of ROCKWOOL BEAMCLAD® board**

**Chart 5**
ROCKWOOL BEAMCLAD® glued noggin dry joint board system – Critical steel temperature 620°C, 3 sided protection for beams

**Chart 6**
ROCKWOOL BEAMCLAD® glued noggin dry joint board system – Critical steel temperature 550°C, 4 sided protection for beams & columns

**ROCKWOOL BEAMCLAD® thicknesses to be read with Charts 5 & 6**
The following key provides the required minimum thickness- es of ROCKWOOL BEAMCLAD® for the Section Factors given in the table.

- A = 25mm
- B = 30mm
- C = 35mm
- D = 40mm
- E = 45mm
- F = 50mm
- G = 55mm
- H = 60mm
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Typical details

Figure 17 - 3-sided box

Figure 18 - Tee-noggin arrangement for web depths of over 500mm. See over for Tee-noggin specification

Fixing pattern

Figure 19 - 3-sided box using glued noggins

Dimensions
A = pigtail screws at max. 200mm centres and 50mm max from edge of board
B = pigtail screws at max. 100mm centres into noggins
C = noggins of min. 120mm width
D = noggins at max. 1000mm centres
E = board length 2000mm

Figure 20 - 2-sided box using a combination of noggins and stud welded pins

Dimensions
A = welded pins at max. 900mm centres for 2000mm board (500mm centres for 1200mm boards)
B = welded pins at max. 100mm [min. 20mm] from board edge

Figure 21 - 2-sided box

Central row of welded pins* required at 900mm max. centres

Figure 22 - 2-sided box

W limit is 100mm. Where W >100mm a shelf angle or similar should be fixed to the wall

* For flange widths greater than 200mm, 2 rows of pins are required, each row approx. 25mm from flange tips.
The following two systems are well established having been used for many years. The application of FIREPRO® Glue enhances the fire performance over the Dry Joint Systems for the 2, 3 and 4 hour periods. The Glue Joint Systems are capable of providing up to 4 hours fire protection.

Fixing boards to noggins
Wherever three or four-sided protection is required, fixing to noggins is a practical option. No power supply is required.

Fixing boards with stud welded pins
Situations will always occur where noggins do not afford a practical choice, e.g. for two-sided box constructions or diverse perimeter bracketing.

Stud welded pins allow the installer a simple, tested alternative to noggins.

Installation sequence (noggin fix)

Fixing noggins
Cut 120mm wide noggins to suit web depth, using same thickness material as the cover protection. For web depths of 500mm and above use either solid noggins or ‘T’ shaped noggins. For stability purposes, it is recommended that the face of the ‘T’ noggin is made from the same thickness as the cover board but the thickness of the return into the web should be at least 50mm. These are then glued into position at 1000mm centres.

Fixing boards
- Apply FIREPRO® Glue liberally to face of noggins. Quickly apply vertical boards and secure with nails long enough to pierce full thickness of noggins before FIREPRO® glue forms a hardened surface.
- Apply glue continuously and liberally to all board interfaces. Tightly butt to adjoining boards and nail through edge joints with same length nails as for noggins, at 400mm maximum centres.

Installation sequence (stud welded pin fix)
- Fit stud welded pins [3mm diameter] as indicated opposite.
- A selection of pins should be mechanically tested by bending from the vertical and returning it to the original position.
- sprung steel non-return washers to secure boards.
- Apply FIREPRO® glue to all board-to-board joints.
- Offer up flange boards and nail through glued corner joints at 400mm maximum centres.
- If using faced boards, apply foil or scrim tape over joints for uniformity of appearance.

For additional fixing details not covered, please contact ROCKWOOL Technical Solutions.

For A/V charts, see Charts 3 and 4 (Stud Welded).
ROCKWOOL BEAMCLAD® Systems
Contractors’ Fixing Guide

Typical details

Figure 23 - 3-sided box
A noggins to project slightly beyond flange

Figure 24 - Full depth noggin or Tee-noggin
for web depths greater than 500mm

Fixing pattern

Figure 25 - Fixing method using glued noggins, nails and glued board-to-board joints
Dimensions
A = noggins at max. 1000mm centres
B = nails at max. 150mm centres
C = nails at max. 400mm centres (max. 30mm from edge of board joint)

Figure 26 - 3-sided box with stud welded pins
Dimensions
A = stud welded pins at 600mm for 2000mm board (500mm for 1200mm boards)
B = stud welded pins at max. 100mm (min. 20mm) from edge of board
C = nails at max. 400mm centres
D = stud welded pins at max. 900mm centres for 2000mm boards, 500mm centres for 1200mm boards, on bottom flange

*For flange widths greater than 200mm, 2 rows of pins are required, each row approx. 25mm from flange tips.

Stud welded pin fixing arrangement

Figure 27 - 2-sided box
W. Limit is 100mm. For W>100mm, a shelf angle or similar should be fixed to the wall

Figure 28 - 2-sided box
W. Limit is 100mm. For W>100mm, a shelf angle or similar should be fixed to the wall
ROCKWOOL BEAMCLAD® Systems
Contractors’ Fixing Guide

Selecting the thickness of ROCKWOOL BEAMCLAD® board for glued systems

**ROCKWOOL BEAMCLAD® thicknesses to be read with Charts 7, 8 and 9**

The following key provides the required minimum thicknesses of ROCKWOOL BEAMCLAD® for the Section Factors given in the tables. The boards can be applied in either one or two layers.

- A = 25mm
- B = 30mm
- C = 35mm
- D = 40mm
- E = 45mm
- F = 50mm
- G = 55mm
- H = 60mm
- I = 80mm
- J = 90mm
- K = 100mm
- L = 110mm

**Multi-layer applications**

When a protection thickness in excess of 60mm is required, this can be achieved by plying two or more layers of ROCKWOOL BEAMCLAD® together. Where practical, stagger the joints between each layer.

For welded pin applications, each layer should be retained using separate non-return washer, i.e. one washer per layer.

For glued noggin applications, attach the first layer to the noggin as previously detailed, then apply a 120mm wide band of glue to the outside face of the first layer at locations corresponding to the noggins.

Apply the outer layer of ROCKWOOL BEAMCLAD®, supporting the boards until the glue sets by using nails of sufficient length to penetrate completely through the noggins.

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**Chart 7**

Steel beam sections
ROCKWOOL BEAMCLAD® glued joint systems – Critical steel temperature 620°C

**Chart 8**

Steel beam sections
ROCKWOOL BEAMCLAD® glued joint systems – Critical steel temperature 550°C

**Chart 9**

Steel column sections
ROCKWOOL BEAMCLAD® glued joint systems
– Critical steel temperature 550°C
ROCKWOOL BEAMCLAD® Systems
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General notes

Board jointing

**Butted corner joints**
Butted corner joints are made with square edge boards and depending on the system employed, use either a dry joint with pigtail screws at 150mm or 200mm centres, or FIREPRO® Glue and nails at 400mm centres.

![Figure 29](image_url)

**Axial joints**
All axial joints are made with square butt edges, without nails. Glue is only required for glued board systems. Joints must be tightly butted.

![Figure 30](image_url)

For foil faced products, joints can be finished with Class ‘O’ foil tape.

**Noggins**
ROCKWOOL BEAMCLAD® boards can be fixed to noggins, cut from ROCKWOOL BEAMCLAD® offcuts.

The edges of the noggins are glued where they contact the steelwork. Once the noggins have set firmly, the cover boards are fixed in position with either pigtail screws or FIREPRO® Glue and nails. The thickness of the noggin is to be the same as that of the cover board used.

**Welded steel pins**
Boards are secured to stud welded pins with non-return washers.

Glue

FIREPRO® Glue is required between all board-to-board and board-to-noggin joints for glued systems, but only between noggin-to-steel joints for dry systems.

Applying FIREPRO® Glue on the external face of joints is bad practice.

Whatever noggin system is employed, the glue between noggin and steel must be allowed to set hard before cover boards are applied to the noggins. This will normally take about 4 hours at 20°C ambient temperature.

FIREPRO® Glue is supplied pre-mixed in 17 kg tubs.

Coverage rate will depend on the linear length of the joints, width of joint (board thickness) and joint depth. Assuming total, effective usage of the glue on site, the following table provides an approximate weight [kg] of glue per linear metre of joint, based on a glue depth of 1mm.

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<th>ROCKWOOL BEAMCLAD® thickness (mm)</th>
<th>Square butt joint</th>
<th>45° mitre joint</th>
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In practice, a degree of wastage would be expected and as such, it would be prudent to make an allowance for this when placing an order. As a very approximate guide, the coverage rate of a 17kg tub of FIREPRO® glue would be 35m² of applied board.
# Universal beams A/V table (as per 2006)

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<tr>
<th>Designation serial size</th>
<th>Mass per metre (kg)</th>
<th>Depth per section D (mm)</th>
<th>Width per section B (mm)</th>
<th>Thickness Flange web t (mm)</th>
<th>Flange T (mm)</th>
<th>Area of section (cm²)</th>
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For universal columns A/V table, please see ASFP Yellow Book.
Determining protection thickness

- The table opposite indicates the effect on A/V for three and four sided schemes
- Determine A/V factor from the table or by calculating for other exposure situations, ensuring the correct mass per metre is used
- Establish the period of fire protection required
- For A/V factors in excess of 260, contact ROCKWOOL for advice on both thicknesses and fixing methods preferred
- Bracing members: These do not generally require protection. If required as an essential element to the fire resistance, use A/V not greater than 200 m⁻¹
- Where steel beams are fixed to composite steel and concrete decks, the profiled re-entrant void may not need additional protection if allowances for board thickness or steelwork section factor are made

See the ASFP Yellow Book 1.7 for current independent guidance.

General notes for systems

- Ensure steel is free from grease, dust or loose particles where noggins are to be glued, pins welded or clips applied
- Dry off steelwork where large water droplets are present. Steel damp to the touch is acceptable.
- Ensure that all noggins have the correct friction fit. Avoid excessive interference that may cause noggins to bend.
- Fix additional noggins (if required) at beam ends, beam-to-beam joints and large penetrations. For stud welded pin and clip systems it may be necessary to introduce soldier noggins into webs behind board to board joints to increase stability of the system on steelwork with large web depths.
- For glued system options ensure that all noggin-to-beam, noggin to-board and board-to-board surfaces are glued, and that the required setting time is allowed
- Remove any excess glue for neatness
- Any localised board shaping to be made at the point of installation should be carried out with a sharp knife or fine-toothed saw
- Avoid ‘nuisance dust’ from cutting operations lying on boards prior to installation
- Always use sharp-edged cutting tools

- The length of all nails used should be at least twice the thickness of the board being fixed
- Pigtail screw length should be twice the thickness of the board being fixed, less 5mm
- All board to board joints must be tightly butted

Vapour barriers

Glass-reinforced aluminium foil-faced ROCKWOOL BEAMCLAD® A/F provides an excellent vapour seal. For integrity of the foil, all edges should be taped (with a minimum 75mm wide) plain foil tape. Idenden T 303 tape is recommended as being suitable. Taped joints also prevent damage to foil edges during construction.

Board joints (glued)

No glue is required where boards meet wall or soffit surfaces, except in cases where a temporary fix to flange faces may be advantageous to the work sequence. Close contact between boards at joints is always essential.

Painted steel

Painting of structural steelwork is not always essential for corrosion protection. BS 8202: Part 1: 1995 permits the use of unpainted steel which is both interior to the building and in an area which will be constantly heated.

ROCKWOOL BEAMCLAD® thickness

In selecting ROCKWOOL BEAMCLAD® thicknesses, due consideration must be given to the required period of fire resistance and the A/V value of the steel sections concerned.

Supply

ROCKWOOL BEAMCLAD® slabs are supplied on pallets, shrink-wrapped in polyethylene. Pigtail screws are available from ROCKWOOL stockists. Clip fix ROCKWOOL BEAMCLAD® clips are available from ROCKWOOL in boxes of 1000. ROCKWOOL BEAMCLAD® washers are available from ROCKWOOL in boxes of 2000. Welded pins and sprung steel non-return washers are available from external suppliers.

References

ROCKWOOL BEAMCLAD® systems are part of the ROCKWOOL FIREPRO® range of fire protection products ranging from cavity fire stops to blastwall solutions for oil rigs.