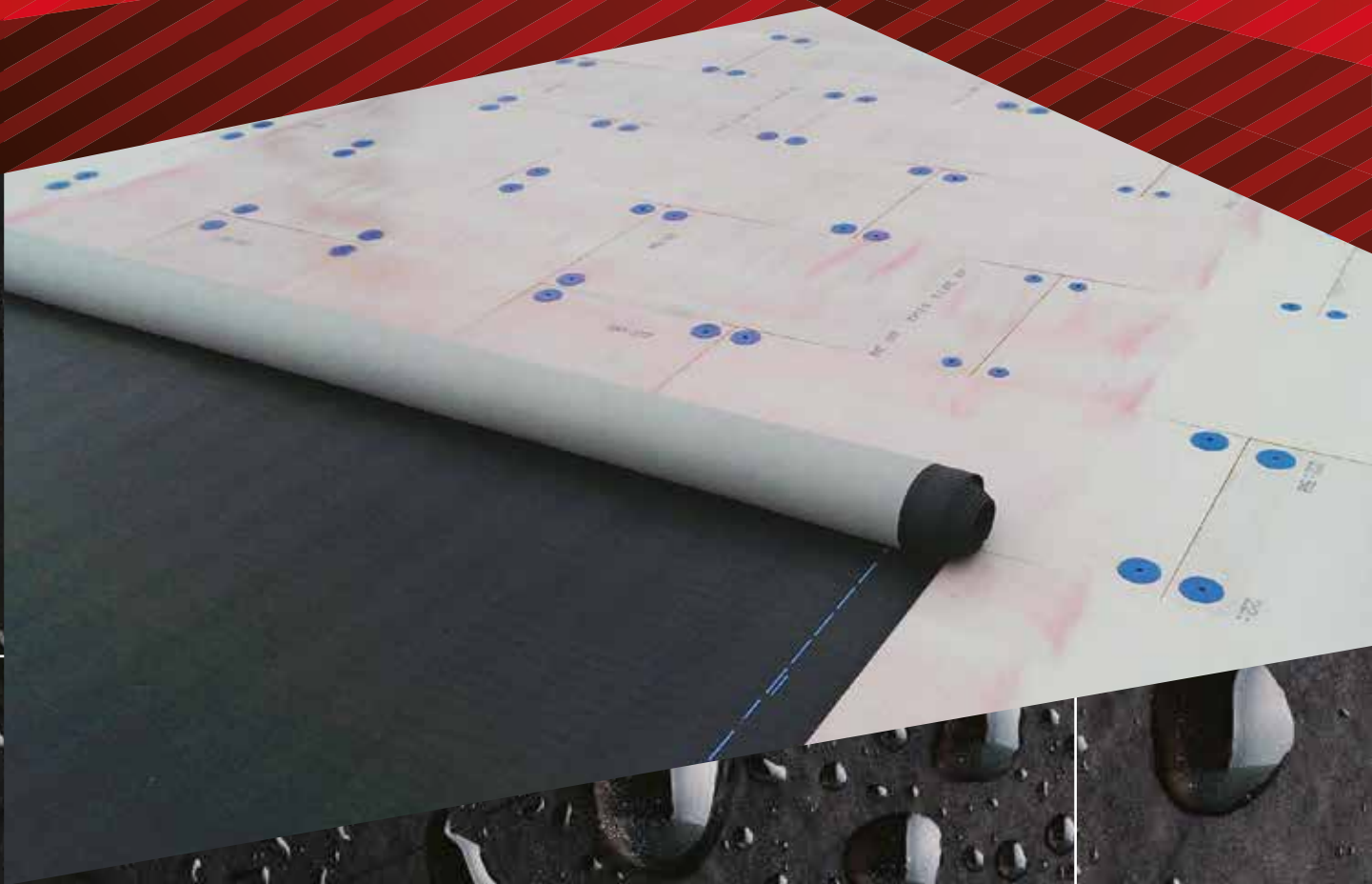


FIXER

FLAT ROOFING



FLAT ROOF INSULATION

FLAT ROOF SPECIFICATION GUIDE

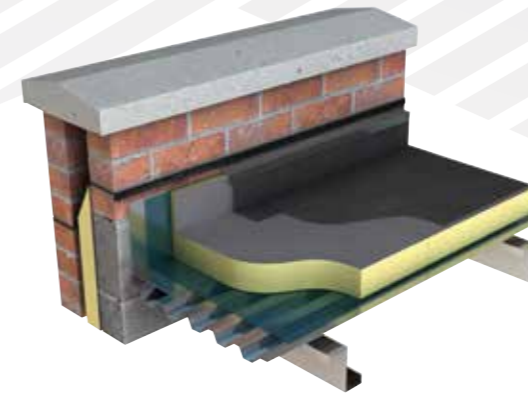
FLAT ROOF INSULATION

Our **PIR insulation boards** are the ideal solution across a variety of flat roofing applications, including single ply membranes, built-up felt, torch-on felt and mastic asphalt, with either concrete, steel or timber decks.

Our PIR products are available in a wide choice of thicknesses, with low thermal conductivity and high compressive strength. Crucially, our insulation boards can assist in meeting the required thermal regulations in new build and refurbishment projects.

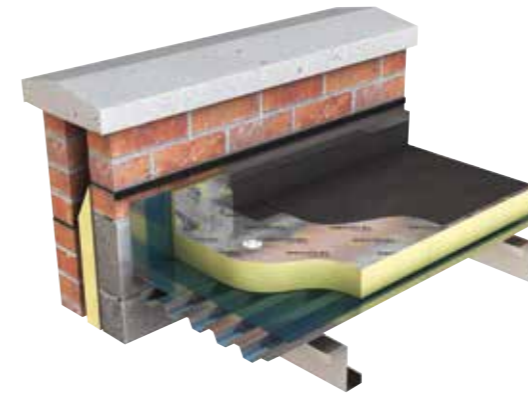


FIX-R Torch On Insulation Board



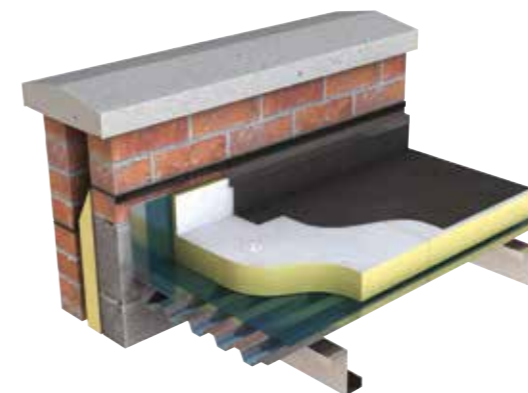
- High performance, rigid PIR insulation
- 0.024 W/mK lambda*
- High compressive strength
- Manufactured using a blowing agent with zero ODP (Ozone Depletion Potential) and low GWP (Global Warming Potential)

FIX-R Mechanically Fixed Insulation Board



- High performance PIR insulation
- 0.022 W/mK lambda
- High compressive strength
- Low global warming potential
- Zero ozone depletion potential

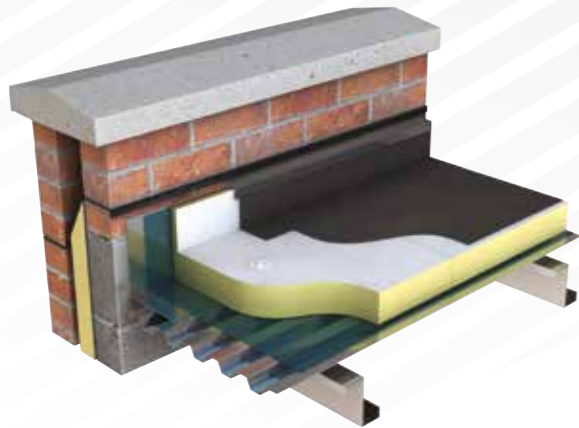
FIX-R Fully Bonded Insulation Board



- Durable, market-leading PIR insulation
- 0.024 W/mK lambda*
- High compressive strength
- Low Global Warming Potential
- Zero Ozone Depletion Potential

* Thickness dependent

FULLY BONDED INSULATION BOARD



Features

- Durable, market-leading PIR insulation
- 0.024 W/mK lambda*
- High compressive strength
- Low Global Warming Potential
- Zero Ozone Depletion Potential

Description

FIX-R Fully Bonded Insulation Board is a durable, market-leading PIR insulation board for built-up felt, mastic asphalt and single-ply membrane waterproofing systems.

This board benefits from high compressive strength and excellent dimensional stability that ensures the flat surface finish required to ensure optimum performance.

With FIX-R Fully Bonded Insulation Board, you are specifying a board that:

- Has a low thermal conductivity value (0.024 W/mK)*, providing an excellent thermal performance.
- When tested in accordance with BS 476-3:2004 and CEN/TS 1187:2012 achieved an EXT.F.AC rating.
- Compressive strength that exceeds 150kPa at yield and is suitable for loads associated with maintenance traffic on roofing systems.
- Is available in a range of thicknesses from 30mm - 160mm and in a board size of 1200mm x 600mm.
- Will not degrade or deteriorate when exposed to moisture, therefore maintaining its thermal performance.

* Thickness dependent

Applications

Warm flat roofs under:

- Built-up felt
- Single-ply waterproofing systems
- Mastic asphalt

Installation Guidelines

For full details of the installation of FIX-R Fully Bonded Insulation Board, please refer to the applications pages of the Specifier's Guide. See applications section for installation and handling.

Thermal Resistance

Thickness (mm)	R-value (m ² K/W)
25	0.96
30	1.15
40	1.50
50	1.90
60	2.30
70	2.65
80	3.20
90	3.60
100	4.00
110	4.40
120	5.00
130	5.40
140	5.80
150	6.25
160	6.65

Product Details

Thermal Conductivity	0.024 W/mK (thicknesses 120mm and above) 0.025 W/mK (thicknesses between 80mm and 119mm) 0.026 W/mK (thicknesses below 80mm)
Compression Strength	Exceeds 150kPa at yield
Moisture Vapour Resistance	Installed value of 15 MNs/g
Fire Performance	Class 1 BS 476 (Part 7)
Dimensions	1200mm (l) x 600mm (w) Available as tapered insulation board
Facing	Perforated mineral coated glass fibre tissue to both sides

Sustainable Solutions

FIX-R Fully Bonded Insulation Board has been designed and manufactured to result in the lowest environmental impact. This drives an 'A rating' in the BRE Green Guide 2008. FIX-R Fully Bonded Insulation Board is manufactured using a blowing agent with zero ODP (Ozone Depletion Potential) and low GWP (Global Warming Potential).

Specification Clause

The insulation shall be FIX-R Fully Bonded Insulation Board _____ mm thick for use in single ply membrane, built-up felt and mastic asphalt flat roofing applications, manufactured in accordance with an ISO 9001 quality management system and an ISO 14001 environmental management system. It should comprise a rigid polyisocyanurate (PIR) core faced on both sides with a gas tight alkali resistant facing. The product should be manufactured using a blowing agent with zero ODP and low GWP, and be CE marked in accordance with BS EN 13165. FIX-R Fully Bonded Insulation Board should be installed in accordance with FIX-R's recommendations.

Thermal Performance

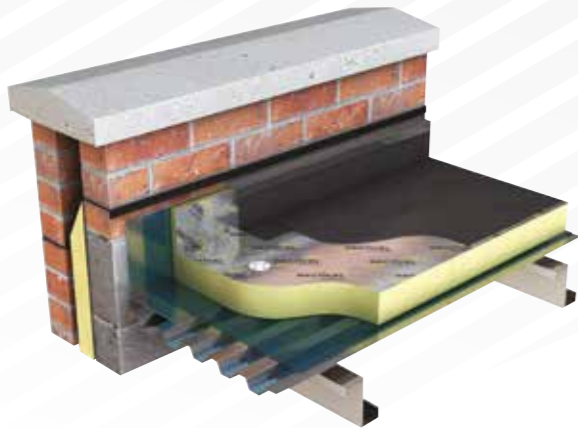
Typical U-values (W/m²K) achieved in common flat roof constructions

Warm Flat Roof

- Waterproofing
- FIX-R Fully Bonded Insulation Board
- Vapour control layer
- Structural deck
 - Timber deck: 18mm ply
 - Concrete deck: 150mm high density concrete
 - Metal deck: unsealed galvanised steel deck
- Ceiling
 - Timber deck: 150mm joists with plasterboard finish
 - Concrete and metal decks: 50mm timber battens with plasterboard finish

Product Thickness mm	Timber Deck		Metal and Concrete Deck	
	Ceiling	No Ceiling	Ceiling	No Ceiling
60	0.35	0.39	0.37	0.41
70	0.31	0.34	0.32	0.35
75	0.29	0.32	0.31	0.33
80	0.27	0.29	0.28	0.30
90	0.24	0.26	0.25	0.27
100	0.22	0.23	0.23	0.24
110	0.20	0.21	0.21	0.22
120	0.18	0.19	0.19	0.19
130	0.17	0.18	0.17	0.18
140	0.16	0.16	0.16	0.17
150	0.15	0.15	0.15	0.16
160 (80+80)	0.14	0.15	0.15	0.15
165 (90+75)	0.14	0.15	0.14	0.15
170 (90+80)	0.14	0.14	0.14	0.14
180 (90+90)	0.13	0.13	0.13	0.14
190 (100+90)	0.12	0.13	0.13	0.13
200 (100+100)	0.12	0.12	0.12	0.12
210 (120+90)	0.11	0.11	0.11	0.11
220 (120+100)	0.10	0.11	0.11	0.11
230 (130+100)	0.10	0.10	0.10	0.10
240 (120+120)	0.10	0.10	0.10	0.10

MECHANICALLY FIXED INSULATION BOARD



Features

- High performance PIR insulation
- 0.022 W/mK lambda
- High compressive strength
- Low global warming potential
- Zero ozone depletion potential

Description

FIX-R Mechanically Fixed Insulation Board is a high performance rigid PIR foam board for use in warm flat roofs under mechanically fixed single-ply membrane systems.

With dimensional stability and a super-flat surface, the board benefits from a high compression strength that exceeds 150kPa at yield and is suitable for loads associated with maintenance traffic on roofing systems.

With FIX-R Mechanically Fixed Insulation Board, you are specifying an insulation board that:

- Has a low thermal conductivity value (0.022 W/mK) providing an enhanced thermal performance.
- Compression strength exceeds 150kPa at yield.
- Has Class 1 fire performance in accordance with BS 476 (Part 7).
- Will not degrade or deteriorate if exposed to moisture, therefore maintaining its thermal performance.

Applications

- Warm flat roofs under mechanically fixed single-ply waterproofing systems.

Installation Guidelines

For full details of the installation of FIX-R Mechanically Fixed Insulation Board, please refer to the applications pages of the Specifier's Guide. See applications section for installation and handling.

Thermal Resistance

Thickness (mm)	R-value (m ² K/W)
60	2.70
70	3.15
75	3.40
80	3.60
90	4.05
100	4.50
110	5.00
120	5.45

Product Details

Thermal Conductivity	0.022 W/mK
Compression Strength	Exceeds 150kPa at yield
Moisture Vapour Resistance	Installed value of 100 MNs/g
Specific Heat Capacity	1.4kJ/kgK
Fire Performance	Class 1 BS 476 (Part 7)
Dimensions	2400mm (l) x 1200mm (w) Available as tapered insulation board
Facing	Multilayer coated aluminium on both sides

Sustainable Solutions

FIX-R Mechanically Fixed Insulation Board has been designed and manufactured to result in the lowest environmental impact. This drives our 'A rating' in the BRE Green Guide 2008 under element number 815320017. FIX-R Mechanically Fixed Insulation Board has a zero ODP (Ozone Depletion Potential) and a GWP (Global Warming Potential) rating of below 5.

Specification Clause

The insulation shall be FIX-R Mechanically Fixed Insulation Board _____ mm thick for use in single-ply membrane flat roofing applications, manufactured in accordance with an ISO 9001 quality management system and an ISO 14001 environmental management system. It should comprise a rigid polyisocyanurate (PIR) core faced on both sides with a gas tight multilayer composite aluminium foil facing. The product should have a GWP of below 5, a zero ODP and achieve a CE marking compliance to BS EN 13165. FIX-R Mechanically Fixed Insulation Board should be installed in accordance with FIX-R's recommendations.

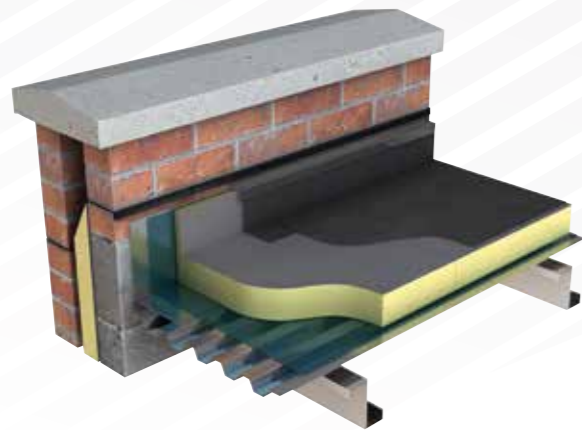
Thermal Performance

Typical U-values (W/m²K) achieved in common flat roof constructions Warm Flat Roof

- Waterproofing
- FIX-R Mechanically Fixed Insulation Board
- Vapour control layer
- Structural deck
 - Timber deck: 18mm ply
 - Concrete deck: 150mm high density concrete
 - Metal deck: unsealed galvanised steel deck
- Ceiling
 - Timber deck: 150mm joists with plasterboard finish
 - Concrete and metal decks: 50mm timber battens with plasterboard finish

Product Thickness mm	Timber Deck		Metal and Concrete Deck	
	Ceiling	No Ceiling	Ceiling	No Ceiling
60	0.31	0.34	0.32	0.35
70	0.27	0.29	0.28	0.30
75	0.25	0.27	0.26	0.28
80	0.24	0.26	0.25	0.26
90	0.22	0.23	0.22	0.24
100	0.20	0.21	0.20	0.21
110	0.18	0.19	0.19	0.19
120	0.17	0.18	0.17	0.18
130	0.16	0.16	0.16	0.17
140	0.15	0.15	0.15	0.15
150	0.14	0.14	0.14	0.14
160 (80+80)	0.13	0.13	0.13	0.13
165 (90+75)	0.12	0.13	0.13	0.13
170 (90+80)	0.12	0.13	0.14	0.13
180 (90+90)	0.11	0.12	0.12	0.12
190 (100+90)	0.11	0.11	0.12	0.11
200 (100+100)	0.10	0.11	0.11	0.11
210 (120+90)	0.10	0.10	0.11	0.10
220 (120+100)	0.10	0.10	0.10	0.10
230 (130+100)	0.09	0.09	0.09	0.09
240 (120+120)	0.09	0.09	0.09	0.09

TORCH ON INSULATION BOARD



Features

- High performance, rigid PIR insulation
- 0.024 W/mK lambda*
- High compressive strength
- Manufactured using a blowing agent with zero ODP (Ozone Depletion Potential) and low GWP (Global Warming Potential)

Description

FIX-R Torch On Insulation Board is a high performance, rigid PIR insulation board for use in warm flat roofs with bituminous torch-on felt waterproofing systems.

High compressive strength and excellent dimensional stability ensures the board benefits from the flat surface finish required to ensure optimum performance.

FIX-R Torch On Insulation Board is lightweight, easy to cut, handle and install and is also available in tapered forms to assist roof drainage.

With FIX-R Torch On Insulation Board, you are specifying a board that:

- Has a low thermal conductivity value (0.024 W/mK)*, providing an excellent thermal performance.
- When tested in accordance with BS 476-3:2004 and CEN/TS 1187:2012 achieved an EXT.F.AC rating.
- Compressive strength that exceeds 150kPa at yield.
- Will not degrade or deteriorate if exposed to moisture, therefore maintaining its thermal performance.

* Thickness dependent

Applications

Warm flat roofs under:

- Torch on bituminous waterproofing systems

Installation Guidelines

For full details of the installation of FIX-R Torch On Insulation Board, please refer to the applications pages of the Specifier's Guide. See applications section for installation and handling.

Thermal Resistance

Thickness (mm)	R-value (m ² K/W)
30	1.15
40	1.50
50	1.90
60	2.30
70	2.65
80	3.20
90	3.60
100	4.00
120	5.00
130	5.40
130mm will achieve a 0.18 w/m ² K U value on a typical timber deck construction	
140	5.80
150	6.25

Product Details

Thermal Conductivity	0.024 W/mK (thicknesses 120mm and above) 0.025 W/mK (thicknesses between 80mm and 119mm) 0.026 W/mK (thicknesses below 80mm)
Compression Strength	Exceeds 150kPa at yield
Moisture Vapour Resistance	Installed value of 15 MNs/g
Fire Performance	Euroclass F
Dimensions	1200mm (l) x 600mm (w)
Facing	Bitumen glass fleece on both sides

Sustainable Solutions

FIX-R Torch On Insulation Board has been designed and manufactured to result in the lowest environmental impact. This drives our 'A rating' in the BRE Green Guide 2008 under element number 1415320205. FIX-R Torch On Insulation Board has a zero ODP (Ozone Depletion Potential) and low GWP (Global Warming Potential).

Specification Clause

The insulation shall be FIX-R Torch On Insulation Board _____ mm thick for use in torch-on flat roofing applications, manufactured in accordance with an ISO 9001 quality management system and an ISO 14001 environmental management system. It should comprise a rigid polyisocyanurate (PIR) core faced on both sides with a bituminous glass fleece. The product should have a low GWP, zero ODP and achieve a CE marking compliance to BS EN 13165. FIX-R Torch On Insulation Board should be installed in accordance with FIX-R's recommendations.

Thermal Performance

Typical U-values (W/m²K) achieved in common flat roof constructions Warm Flat Roof

- Waterproofing
- FIX-R Torch On Insulation Board
- Vapour control layer
- Structural deck
 - Timber deck: 18mm ply
 - Concrete deck: 150mm high density concrete
 - Metal deck: unsealed galvanised steel deck
- Ceiling
 - Timber deck: 150mm joists with plasterboard finish
 - Concrete and metal decks: 50mm timber battens with plasterboard finish

Product Thickness mm	Timber Deck		Metal and Concrete Deck	
	Ceiling	No Ceiling	Ceiling	No Ceiling
60	0.35	0.39	0.37	0.41
70	0.31	0.34	0.32	0.35
75	0.29	0.32	0.31	0.33
80	0.27	0.29	0.28	0.30
90	0.24	0.26	0.25	0.27
100	0.22	0.23	0.23	0.24
110	0.20	0.21	0.21	0.22
120	0.18	0.19	0.19	0.19
130	0.17	0.18	0.17	0.18
140	0.16	0.16	0.16	0.17
150	0.15	0.15	0.15	0.16
160 (80+80)	0.14	0.15	0.15	0.15
165 (90+75)	0.14	0.15	0.14	0.15
170 (90+80)	0.14	0.14	0.14	0.14
180 (90+90)	0.13	0.13	0.13	0.14
190 (100+90)	0.12	0.13	0.13	0.13
200 (100+100)	0.12	0.12	0.12	0.12
210 (120+90)	0.11	0.11	0.11	0.11
220 (120+100)	0.10	0.11	0.11	0.11
230 (130+100)	0.10	0.10	0.10	0.10
240 (120+120)	0.10	0.10	0.10	0.10

TYPICAL INSTALLATION - GENERAL

FIX-R PIR insulation products in common flat roof applications.

Warm Roof Construction and Condensation Control

Fixing insulation on top of the roof deck means no ventilation is required. And because the roof structure is maintained at the internal temperature, the risk of harmful condensation is reduced. To ensure the optimum performance of the roof, a vapour control layer (VCL) should be installed on the warm side of the insulation, usually on the structural deck.

BS 5250:2011, the British Standard for the control of condensation in buildings, does not recommend installing insulation between timber joists as well as above the deck (a hybrid roof construction).

Overlaying Existing Roofs

For the thermal upgrade of existing buildings, existing bituminous waterproofing may be used as the VCL where it is in good condition and adequate bond strength with the roof deck remains. If in doubt, a suitable new vapour control layer needs to be installed. The specification of new insulation should be considered in conjunction with any insulation(s) already present in the roof build up.

Thermal Bridging

For optimum thermal efficiency and reduced heat loss, it is important to ensure continuity of the insulation layer with adjacent building elements. This means careful detailing at junctions between elements to minimise or eliminate thermal bridging and 'cold spots'. For example, at the junction of the roof and wall, packing the eaves with a compressible insulation will prevent thermal bridging as well as closing the cavity.

An insulation upstand should be provided around the perimeter of the roof at parapets. It should be at least 25mm thick and minimum 300mm in height from the deck. The wall insulation should also be continued to the height of the top of the upstand.

Wind Uplift

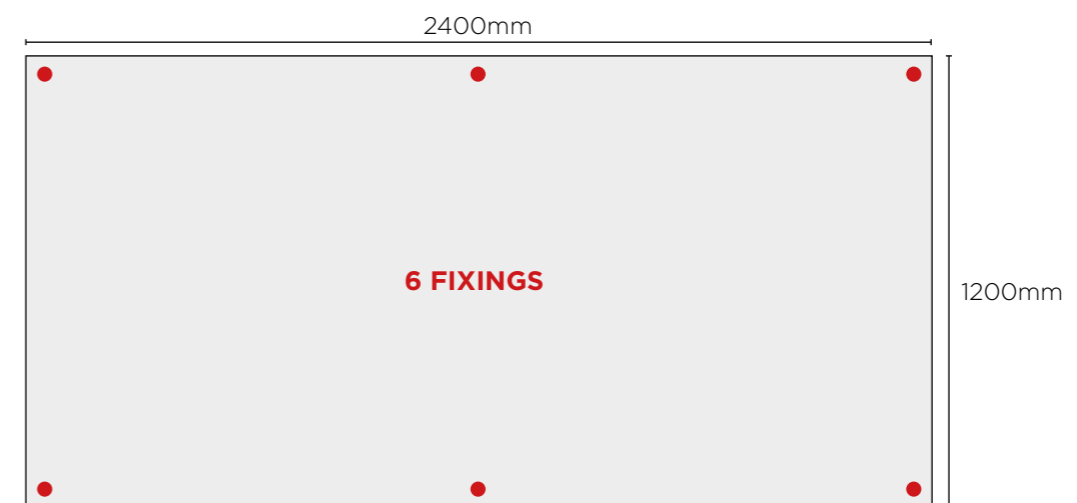
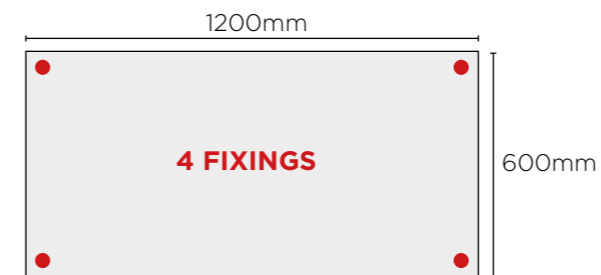
The wind uplift force exerted on a roof will vary according to wind speed, location, site topography, and building size and orientation. Wind loads and the requirement for additional fixings over the minimum should be calculated to BS 6399-2: 1997 or BS EN 1991-1-4 (UK National Annex).

Reference should be made to BS 6229 for adequate bonding of the vapour control layer.

Mechanical Fixing Pattern

The fixing pattern shows the minimum requirement for 1200mm x 600mm boards and 1200mm x 2400mm insulation boards. The number of fixings may vary and additional fixings may be required subject to project specific requirements determined by the wind load calculations.

- Four fixings for one board equates to a rate of 5.55/m².
- Six fixings for one board equates to a rate of 2.08/m².



Specifying Adhesives

PIR insulation is renowned for its chemical stability, although the foam core of boards can be softened if exposed to ketonic solvents. Non-ketonic polyurethane adhesives have no adverse effect on the foam; taping of board joints is not required when using polyurethane adhesives, as any excess adhesive running down between the board joints will not affect the exposed foam core. If in doubt, consult the adhesive manufacturer.

Roof Loading and Trafficking

FIX-R Insulation's flat roofing boards are suitable for loads associated with infrequent pedestrian maintenance traffic. Extra precautions should be taken in areas of heavier traffic, such as the use of walkways (consult membrane manufacturers for details). Take care to avoid damage to boards through impacts or concentrated loads.

When using ballasted and/or green roof systems, the roof structure must be designed to accept the additional dead load (minimum 80kg/m²).

Fire Performance

FIX-R Insulation's flat roofing boards will not prejudice the fire resistant properties of a roof and add no significant fire load to the building.

FIX-R Mechanically Fixed Insulation Board

When tested in accordance with BS 476-3: 2004, the rating achieved by FIX-R Mechanically Fixed Insulation Board will vary depending on the single ply membrane used.

FIX-R Fully Bonded Insulation Board

When tested to BS 476-3:2004, the product achieves an FAA rating when waterproofed with a 3-layer built-up felt covered with 10mm chippings. For other specifications it is advised to contact the manufacturer of the cap sheet for fire classification details. For single ply membranes the rating achieved will vary depending on the single ply membrane used.

FIX-R Torch On Insulation Board

When tested to ENV 1187:2002 Test 4, it achieves a BROOF (t4) rating on a plywood deck and with an IKO SBS Gold Seal cap sheet. For other specifications, contact the manufacturer of the waterproofing.

Roof Drainage

'Ponding' adds additional load to a roof, looks unsightly, and can shorten the lifespan of the roofing membrane. To ensure adequate drainage, any flat roof should have a minimum finished fall of 1:80. In reality, this means designing for twice the minimum fall to account for building inaccuracies, roof deflection and building settlement.

Tapered Systems

FIX-R Insulation's flat roofing boards are available as tapered systems. Tapered roofing insulation allows the necessary falls to be created where the roof structure does not. In refurbishment projects, it offers a simple solution to ponding issues at the same time as upgrading thermal performance.

MECHANICALLY FIXED SINGLE PLY MEMBRANE

FIX-R Mechanically Fixed Insulation Board

New Build

- Lay the specified VCL on the clean, dry deck. Ensure all laps are minimum 150mm and well-sealed, and turn up at the edge of the roof.
- If a fully-sealed metal deck is used, a separate VCL is not required.
- Mechanical fixing into a concrete deck may require pre-drilling of the deck.
- Install the FIX-R Mechanically Fixed Insulation Boards in a tightly-butted brick bond pattern, mechanically fixing them using a minimum of 6 fixings per board (see 'Wind Uplift' and 'Mechanical Fixing Pattern').
- On a metal deck, the insulation boards should either be laid with the long edges at right angles to the troughs to ensure the short ends are fully supported, or diagonally across the deck corrugations.
- Thermally broken telescopic tube fixings are recommended to reduce thermal bridging, each incorporating a 50mm square or circular washer and positioned within 50 to 150mm of board edges and corners.
- If the desired insulation thickness comprises two layers, board joints should be staggered and the thicker layer positioned outermost. One or two fixings can be used to secure the lower boards, prior to securing the top layer with the required number of fixings.
- Lay and fix the single ply membrane in accordance with manufacturer's instructions.

Refurbishment (Insulation Overlay)

- Where insulation is to be installed over existing waterproofing, it should be clean and dry and in appropriate condition to act as a VCL.
- If the condition of the existing waterproofing is poor, a separate VCL should be loose laid. Ensure all laps are minimum 150mm and well-sealed, and turn up at the edge of the roof.
- Install the FIX-R Mechanically Fixed Insulation Boards in a tightly-butted brick bond pattern, mechanically fixing them using a minimum of 6 fixings per board (see 'Wind Uplift' and 'Mechanical Fixing Pattern').
- Thermally broken telescopic tube fixings are recommended to reduce thermal bridging, each incorporating a 50mm square or circular washer and positioned within 50 to 150mm of board edges and corners.
- If the desired insulation thickness comprises two layers, board joints should be staggered and the thicker layer positioned outermost. One or two fixings can be used to secure the lower boards, prior to securing the top layer with the required number of fixings.
- Lay and fix the single ply membrane in accordance with manufacturer's instructions.

ADHERED SINGLE PLY MEMBRANE

FIX-R Fully Bonded Insulation Board

New Build

- Install the VCL on the clean, dry deck. If a fully-sealed metal deck is used, a separate VCL is not required.
- **For bonded build-ups:** bond a layer of coated roofing felt in hot bitumen, or with a proprietary adhesive. Where necessary, use a primer in accordance with manufacturer's instructions to ensure an adequate bond between the deck and the VCL. On a timber deck, a layer of coated roofing felt can also be nailed.
- **For mechanically fixed build-ups:** loose-lay the vapour control layer.
- Ensure all laps are minimum 150mm and well-sealed, and turn up at the edge of the roof.
- Install the FIX-R Fully Bonded Insulation Boards in a tightly-butted brick bond pattern, with the long edges at right angles to the edge of the roof, or laid diagonally across the deck. On a metal deck, the long edges should be at right angles to the troughs to ensure the short ends are fully supported, or laid diagonally across the deck corrugations.
- **For bonded build-ups:** mop hot bitumen over the VCL, or apply a suitable proprietary adhesive to manufacturer's instructions.
- **For mechanically fixed build-ups:** thermally broken telescopic tube fixings are recommended to reduce thermal bridging, each incorporating a 50mm square or circular washer and positioned within 50 to 150mm of board edges and corners. Use a minimum of 4 fixings per board (see 'Wind Uplift' and 'Mechanical Fixing Pattern').
- If the desired insulation thickness comprises two layers, board joints should be staggered and the thicker layer positioned outermost. Where mechanically fixing, one or two fixings can be used to secure the first layer of boards, prior to securing the top layer with the required number of fixings.
- Install the chosen waterproofing in accordance with the manufacturer's instructions and/or relevant British Standards.

Refurbishment (Insulation Overlay)

- Where insulation is to be installed over existing waterproofing, it should be clean and dry and in appropriate condition to act as a VCL.
- If the condition of the existing waterproofing is poor or adequate bond strength cannot be guaranteed, a new or separate VCL should be installed.
- **For bonded build-ups:** bond a layer of coated roofing felt in hot bitumen, or with a proprietary adhesive. Use a primer in accordance with manufacturer's instructions to ensure an adequate bond between the existing roof and the VCL.
- **For mechanically fixed build-ups:** loose-lay the vapour control layer.
- Ensure all laps are minimum 150mm and well-sealed, and turn up at the edge of the roof.
- Install the FIX-R Fully Bonded Insulation Boards in a tightly-butted brick bond pattern, with the long edges at right angles to the edge of the roof, or laid diagonally across the deck.
- **For bonded build-ups:** mop hot bitumen over the VCL, or apply a suitable proprietary adhesive to manufacturer's instructions.
- **For mechanically fixed build-ups:** thermally broken telescopic tube fixings are recommended to reduce thermal bridging, each incorporating a 50mm square or circular washer and positioned within 50 to 150mm of board edges and corners. Use a minimum of 4 fixings per board (see 'Wind Uplift' and 'Mechanical Fixing Pattern').
- If the desired insulation thickness comprises two layers, board joints should be staggered and the thicker layer positioned outermost. Where mechanically fixing, one or two fixings can be used to secure the first layer of boards, prior to securing the top layer with the required number of fixings.
- Install the chosen waterproofing in accordance with the manufacturer's instructions and/or relevant British Standards.

**POUR & ROLL /
BUILT-UP FELT****FIX-R Fully Bonded Insulation Board****New Build**

- Install the VCL on the clean, dry deck. If a fully-sealed metal deck is used, a separate VCL is not required.
- **For bonded build-ups:** bond a layer of coated roofing felt in hot bitumen, or with a proprietary adhesive. Where necessary, use a primer in accordance with manufacturer's instructions to ensure an adequate bond between the deck and the VCL. On a timber deck, a layer of coated roofing felt can also be nailed.
- **For mechanically fixed build-ups:** loose-lay the vapour control layer.
- Ensure all laps are minimum 150mm and well-sealed, and turn up at the edge of the roof.
- Install the FIX-R Fully Bonded Insulation Boards in a tightly-butted brick bond pattern, with the long edges at right angles to the edge of the roof, or laid diagonally across the deck. On a metal deck, the long edges should be at right angles to the troughs to ensure the short ends are fully supported, or laid diagonally across the deck corrugations.
- **For bonded build-ups:** mop hot bitumen over the VCL, or apply a suitable proprietary adhesive to manufacturer's instructions.
- **For mechanically fixed build-ups:** thermally broken telescopic tube fixings are recommended to reduce thermal bridging, each incorporating a 50mm square or circular washer and positioned within 50 to 150mm of board edges and corners. Use a minimum of 4 fixings per board (see 'Wind Uplift' and 'Mechanical Fixing Pattern').
- If the desired insulation thickness comprises two layers, board joints should be staggered and the thicker layer positioned outermost. Where mechanically fixing, one or two fixings can be used to secure the first layer of boards, prior to securing the top layer with the required number of fixings.
- Install the chosen waterproofing in accordance with the manufacturer's instructions and/or relevant British Standards.
- Venting layers should be loose-laid on the insulation boards prior to bonding the first layer of felt.

Refurbishment (Insulation Overlay)

- Where insulation is to be installed over existing waterproofing, it should be clean and dry and in appropriate condition to act as a VCL.
- If the condition of the existing waterproofing is poor or adequate bond strength cannot be guaranteed, a new or separate VCL should be installed.
- **For bonded build-ups:** bond a layer of coated roofing felt in hot bitumen, or with a proprietary adhesive. Use a primer in accordance with manufacturer's instructions to ensure an adequate bond between the existing roof and the VCL.
- **For mechanically fixed build-ups:** loose-lay the vapour control layer.
- Ensure all laps are minimum 150mm and well-sealed, and turn up at the edge of the roof.
- Install the FIX-R Fully Bonded Insulation Boards in a tightly-butted brick bond pattern, with the long edges at right angles to the edge of the roof, or laid diagonally across the deck.
- **For bonded build-ups:** mop hot bitumen over the VCL, or apply a suitable proprietary adhesive to manufacturer's instructions.
- **For mechanically fixed build-ups:** thermally broken telescopic tube fixings are recommended to reduce thermal bridging, each incorporating a 50mm square or circular washer and positioned within 50 to 150mm of board edges and corners. Use a minimum of 4 fixings per board (see 'Wind Uplift' and 'Mechanical Fixing Pattern').
- If the desired insulation thickness comprises two layers, board joints should be staggered and the thicker layer positioned outermost. Where mechanically fixing, one or two fixings can be used to secure the first layer of boards, prior to securing the top layer with the required number of fixings.
- Install the chosen waterproofing in accordance with the manufacturer's instructions and/or relevant British Standards.
- Venting layers should be loose-laid on the insulation boards prior to bonding the first layer of felt.

TORCH ON FELT

FIX-R Torch On Insulation Board

New Build

- Install the VCL on the clean, dry deck. If a fully-sealed metal deck is used, a separate VCL is not required.
- **For bonded build-ups:** torch-apply or adhere a layer of coated roofing felt. Use a primer in accordance with manufacturer's instructions to ensure an adequate bond between the deck and the VCL.
- **For mechanically fixed build-ups:** loose-lay the vapour control layer.
- Mechanical fixing into a concrete deck may require pre-drilling of the deck.
- Ensure all laps are minimum 150mm and well-sealed, and turn up at the edge of the roof.
- Install the FIX-R Torch On Insulation Boards in a tightly-butted brick bond pattern, with the long edges at right angles to the edge of the roof, or laid diagonally across the deck. On a metal deck the long edges should be at right angles to the troughs to ensure the short ends are fully supported, or laid diagonally across the deck corrugations.
- **For bonded build-ups:** mop hot bitumen over the VCL, or apply a suitable proprietary adhesive to manufacturer's instructions.
- **For mechanically fixed build-ups:** thermally broken telescopic tube fixings are recommended to reduce thermal bridging, each incorporating a 50mm square or circular washer and positioned within 50 to 150mm of board edges and corners. Use a minimum of 4 fixings per board (see 'Wind Uplift' and 'Mechanical Fixing Pattern').
- If the desired insulation thickness comprises two layers, board joints should be staggered and the thicker layer positioned outermost. Where mechanically fixing, one or two fixings can be used to secure the first layer of boards, prior to securing the top layer with the required number of fixings.
- Install the chosen waterproofing in accordance with the manufacturer's instructions and/or relevant British Standards.

Refurbishment (Insulation Overlay)

- Where insulation is to be installed over existing waterproofing, it should be clean and dry and in appropriate condition to act as a VCL.
- If the condition of the existing waterproofing is poor or adequate bond strength cannot be guaranteed, a new or separate VCL should be installed.
- **For bonded build-ups:** torch-apply or adhere a layer of coated roofing felt. Use a primer in accordance with manufacturer's instructions to ensure an adequate bond between the existing roof and the VCL.
- **For mechanically fixed build-ups:** loose-lay the vapour control.
- Ensure all laps are minimum 150mm and well-sealed, and turn up at the edge of the roof.
- Install the FIX-R Torch On Insulation Boards in a tightly-butted brick bond pattern, with the long edges at right angles to the edge of the roof, or laid diagonally across the deck.
- **For bonded build-ups:** mop hot bitumen over the VCL, or apply a suitable proprietary adhesive to manufacturer's instructions.
- **For mechanically fixed build-ups:** thermally broken telescopic tube fixings are recommended to reduce thermal bridging, each incorporating a 50mm square or circular washer and positioned within 50 to 150mm of board edges and corners. Use a minimum of 4 fixings per board (see 'Wind Uplift' and 'Mechanical Fixing Pattern').
- If the desired insulation thickness comprises two layers, board joints should be staggered and the thicker layer positioned outermost. Where mechanically fixing, one or two fixings can be used to secure the first layer of boards, prior to securing the top layer with the required number of fixings.
- Install the chosen waterproofing in accordance with the manufacturer's instructions and/or relevant British Standards.

MASTIC ASPHALT

FIX-R Fully Bonded Insulation Board

New Build

- Install the VCL on the clean, dry deck. If a fully-sealed metal deck is used, a separate VCL is not required.
- **For bonded build-ups:** bond a layer of coated roofing felt in hot bitumen, or with a proprietary adhesive. Where necessary, use a primer in accordance with manufacturer's instructions to ensure an adequate bond between the deck and the VCL. On a timber deck, a layer of coated roofing felt can also be nailed.
- **For mechanically fixed build-ups:** loose-lay the vapour control layer.
- Ensure all laps are minimum 150mm and well-sealed, and turn up at the edge of the roof.
- Install the FIX-R Fully Bonded Insulation Boards in a tightly-butted brick bond pattern, with the long edges at right angles to the edge of the roof, or laid diagonally across the deck. On a metal deck, the long edges should be at right angles to the troughs to ensure the short ends are fully supported, or laid diagonally across the deck corrugations.
- **For bonded build-ups:** mop hot bitumen over the VCL, or apply a suitable proprietary adhesive to manufacturer's instructions.
- **For mechanically fixed build-ups:** thermally broken telescopic tube fixings are recommended to reduce thermal bridging, each incorporating a 50mm square or circular washer and positioned within 50 to 150mm of board edges and corners. Use a minimum of 4 fixings per board (see 'Wind Uplift' and 'Mechanical Fixing Pattern').
- If the desired insulation thickness comprises two layers, board joints should be staggered and the thicker layer positioned outermost. Where mechanically fixing, one or two fixings can be used to secure the first layer of boards, prior to securing the top layer with the required number of fixings.
- Install the chosen waterproofing in accordance with the manufacturer's instructions and/or relevant British Standards.

Refurbishment (Insulation Overlay)

- Where insulation is to be installed over existing waterproofing, it should be clean and dry and in appropriate condition to act as a VCL.
- If the condition of the existing waterproofing is poor or adequate bond strength cannot be guaranteed, a new or separate VCL should be installed.
- **For bonded build-ups:** torch-apply or adhere a layer of coated roofing felt. Use a primer in accordance with manufacturer's instructions to ensure an adequate bond between the existing roof and the VCL.
- **For mechanically fixed build-ups:** loose-lay the vapour control.
- Ensure all laps are minimum 150mm and well-sealed, and turn up at the edge of the roof.
- Install the FIX-R Fully Bonded Insulation Boards in a tightly-butted brick bond pattern, with the long edges at right angles to the edge of the roof, or laid diagonally across the roof.
- **For bonded build-ups:** mop hot bitumen over the VCL, or apply a suitable proprietary adhesive to manufacturer's instructions.
- **For mechanically fixed build-ups:** thermally broken telescopic tube fixings are recommended to reduce thermal bridging, each incorporating a 50mm square or circular washer and positioned within 50 to 150mm of board edges and corners. Use a minimum of 4 fixings per board (see 'Wind Uplift' and 'Mechanical Fixing Pattern').
- If the desired insulation thickness comprises two layers, board joints should be staggered and the thicker layer positioned outermost. Where mechanically fixing, one or two fixings can be used to secure the first layer of boards, prior to securing the top layer with the required number of fixings.
- Install the chosen waterproofing in accordance with the manufacturer's instructions and/or relevant British Standards.

BUILDING REGULATIONS

England

PART L 2013

U-values are part of wider assessment criteria to meet the requirements of Part L as a whole. Other factors taken into account include: airtightness, door and window U-values, the heating system, and thermal bridging.

'Limiting U-values' are the worst acceptable level of performance, but designing to these values is unlikely to result in compliance. The 'notional building specification' is a recipe approach that will ensure compliance if all standards are met. Regulatory compliance should be assessed through the appropriate SAP (for domestic) or SBEM (for non-domestic) calculation software.

NEW BUILD: L1A - new dwellings; L2A - new buildings other than dwellings

		Floor	External Wall	Flat Roof	Pitched Roof	
					Sloped Ceiling	Flat Ceiling
L1A	Notional dwelling	0.13	0.18	0.13	0.13	0.13
	Limiting values	0.25	0.30	0.20	0.20	0.20
L2A	Notional building	0.22	0.26	0.18	0.18	0.18
	Limiting values	0.25	0.35	0.25	0.25	0.25

EXISTING PROPERTIES: L1B - existing dwellings; L2B - existing buildings other than dwellings

U-value requirements for existing buildings are unchanged from Part L 2010.

		Floor	External Wall	Flat Roof	Pitched Roof	
					Sloped Ceiling	Flat Ceiling
L1B & L2B	New element	0.22	0.28	0.18	0.18	0.16
	Retained element	0.25	0.30*	0.18	0.18	0.16

*Where insulation is installed internally or externally.

Wales

PART L 2014

U-values are part of wider assessment criteria to meet the requirements of Part L as a whole. Other factors taken into account include: airtightness, door and window U-values, the heating system, and thermal bridging.

'Limiting U-values' are the worst acceptable level of performance, but designing to these values is unlikely to result in compliance. The 'notional building specification' is a recipe approach that will ensure compliance if all standards are met. Regulatory compliance should be assessed through the appropriate SAP (for domestic) or SBEM (for non-domestic) calculation software.

NEW BUILD: L1A - new dwellings; L2A - new buildings other than dwellings

		Floor	External Wall	Flat Roof	Pitched Roof	
					Sloped Ceiling	Flat Ceiling
L1A	Notional dwelling	0.15	0.18	0.11	0.11	0.11
	Limiting values	0.18	0.21	0.15	0.15	0.15
L2A	Notional building	0.22	0.26	0.18	0.18	0.18

EXISTING PROPERTIES: L1B - existing dwellings; L2B - existing buildings other than dwellings

U-value requirements for existing buildings are unchanged from Part L 2010.

		Floor	External Wall	Flat Roof	Pitched Roof	
					Sloped Ceiling	Flat Ceiling
L1B	New element	0.18	0.21	0.15	0.15	0.15
	Retained element	0.25	0.30	0.18	0.18	0.16
L2B - all elements	Domestic*	0.18	0.21	0.15	0.15	0.15
	Limiting values	0.22	0.26	0.18	0.18	0.15

*Refers to buildings other than dwellings that are 'domestic' in character.

Scotland

SECTION 6 2015

U-values are part of wider assessment criteria to meet the requirements of Section 6 as a whole. The 'notional building specification' is a recipe approach that will ensure compliance if all standards are met. Regulatory compliance should be assessed through the appropriate SAP (for domestic) or SBEM (for non-domestic) calculation software.

DOMESTIC NEW BUILD

As well as U-values, the notional dwelling specifications for gas, LPG and oil fuel packages take into account: airtightness, door and window U-values, the heating system, and thermal bridging. They also include photovoltaics and waste water heat recovery. Specifying U-values therefore needs to be done in careful consideration with the entire dwelling package.

	Floor	External Wall	Flat Roof	Pitched Roof	
				Sloped Ceiling	Flat Ceiling
New domestic (notional dwelling)	0.15	0.17	0.11	0.11	0.11

EXISTING PROPERTIES

For extensions to existing dwellings, the required U-values for the new elements depend on the performance of the existing building:

- 'A' applies where the walls of the existing building have a U-value better than 0.70 and the roof better than 0.25, or will be upgraded to those levels as part of the works.
- The higher standards in 'B' apply where the walls of the existing building have a U-value poorer than 0.70 and the roof is poorer than 0.25.

Where existing domestic elements are to be altered or refurbished, the standards in 'A' apply.

		Floor	External Wall	Flat Roof	Pitched Roof	
					Sloped Ceiling	Flat Ceiling
Existing	A	0.18	0.22	0.18	0.18	0.15
Domestic	B	0.15	0.17	0.13	0.13	0.11

NON-DOMESTIC BUILDINGS - NEW AND EXISTING

For all building types, early consultation with Local Authority Building Standards is advised.

Non-domestic new build standards are based on heating/ventilation specification (natural or mechanical) and have different limiting values depending on type of building (e.g. shell construction where future occupancy/use is uncertain).

For existing buildings, a degree of flexibility is available depending on the feasibility of achieving U-value targets (e.g. in listed buildings). Again, early discussion Local Authority Building Standards is recommended.

FIX-R

FLAT ROOFING

FLAT ROOF INSULATION



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