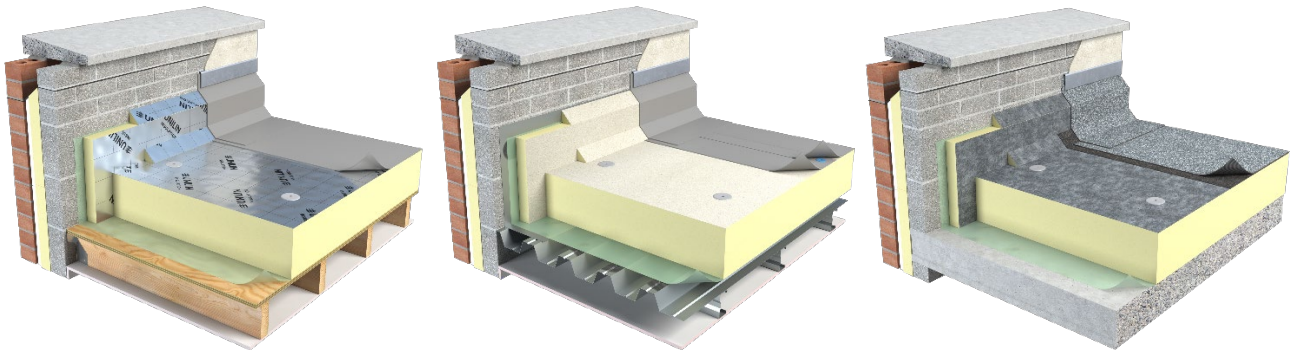
IRISH AGRÉMENT BOARD
CERTIFICATE NO. 23/0436
Unilin Insulation Ireland Ltd.
Kells Road, Navan,
Co. Meath, Ireland.
T: +353 (0)46 9066050
E: tech.ui@unilin.com
W: www.unilininsulation.ie

Unilin Insulation Flat Roof Products

NSAI Agrément (Irish Agrément Board) is designated by Government to issue European Technical Approvals.

NSAI Agrément Certificates establish proof that the certified products are **'proper materials'** suitable for their intended use under Irish site conditions, and in accordance with TGD Part D of the second schedule of the **Building Regulations 1997 and subsequent revisions.**



PRODUCT DESCRIPTION:

This Certificate relates to the following products:

- Unilin Insulation FR/ALU and TR/ALU for mechanically fixed single-ply systems (Detail Sheet 1);
- Unilin Insulation FR/MG and TR/MG for mechanically fixed single-ply, fully adhered single ply and built-up bitumen (Detail Sheet 2);
- Unilin Insulation FR/BGM and TR/BGM for mechanically fixed single-ply, fully adhered single ply and built up bitumen (Detail Sheet 3).

In the opinion of NSAI, the Unilin Insulation Flat Roof Products, as described in this Certificate and Detail Sheets, comply with the requirements of the Building Regulations.

USE:

The products are used as a thermal insulation layer and to create or improve falls on limited access concrete, timber or metal flat roof decks. They are for use in conjunction with a vapour control layer and a roof waterproofing membrane.

MANUFACTURE AND MARKETING:

Unilin Insulation Ireland Ltd.,
Kells Road,
Navan,
Co. Meath,
Ireland.
T: +353 (0)46 9066050
E: tech.ui@unilin.com
W: www.Unilin Insulation.ie

1.1 ASSESSMENT

Buildings incorporating the Unilin Insulation Flat Roof Products can meet the requirements of the following clauses of the Building Regulations:

Part D – Materials and Workmanship
D3 – Proper Materials
D1 – Materials and Workmanship
Unilin Insulation Flat Roof Products are comprised of 'proper materials', i.e. materials which are fit for their intended use and for the conditions in which they are to be used.

Part A – Structure
A1 – Loading

Part B – Fire Safety
B4 – External Fire Spread
Part B Vol 2 – Fire Safety
B9 – External Fire Spread

Part C – Site Preparation and Resistance to Moisture
C4 – Resistance to Weather and Ground Moisture

Part L – Conservation of Fuel and Energy
L1 – Conservation of Fuel and Energy

2.1 PRODUCT DESCRIPTION

The Unilin Insulation Roof Products are comprised of the following:

- FR/ALU: rigid polyisocyanurate (PIR) insulation board with a composite foil-facing on both sides;
- TR/ALU: tapered version of FR/ALU;
- FR/MG: rigid PIR mineral-coated glass fibre-faced insulation board;
- TR/MG: tapered version of FR/MG;
- FR/BGM: rigid PIR insulation board with a mineral-coated glass fibre facing on one side and a composite bitumen/glass fibre facing on the other;
- TR/BGM: tapered version of FR/BGM.

2.2 MANUFACTURE

The PIR insulation elements of the system are manufactured in accordance with the requirements of IS EN 13165[6].

2.2.1 Quality Control

Quality control checks are carried out on the incoming raw materials, during production and on the finished product. These checks include board dimensions, density, and compressive strength.

2.3 DELIVERY, STORAGE AND MARKING

Unilin Insulation Flat Roof Products are supplied palletised or on skids in labelled packs and shrink wrapped in polyethylene. Each pack carries a label bearing the CE Marking together with the product description, product characteristics (λ and R values), size, thickness, batch number and date of manufacture, the manufacturer's name, NSAI Agrément identification mark and NSAI Agrément Certificate number for the system.

The product packaging must not be considered adequate for outside protection. Ideally boards should be stored inside the building in a well ventilated area. If stored outside, the products should be stacked flat on a level base raised off the ground on skids and should be covered with a polythene sheet or protected from rain, snow and prolonged exposure to sunlight with weatherproof tarpaulins.

Boards should be protected in transit and in storage from damage caused by ropes and tie straps. Protect the boards during laying and before the application of the roof waterproofing or lay the roof covering at the same time as the boards. If the boards have been allowed to get wet, or damaged, they should not be used.

The boards must not be exposed to a naked flame or other ignition sources and must not be exposed to solvents or other chemicals.

Adequate protection and safety precautions should be taken when the products are being fitted on site.

2.4 INSTALLATION

Unilin Insulation Flat Roof Products are suitable for use on roof decks that are subject to maintenance traffic only. Walkways should be provided on roofs requiring regular pedestrian access. When the roof is complete, protective boarding should be laid if additional site work is to be carried out. The completed roof should not be used for storage of heavy materials or air conditioning plant. Such loads should be supported directly on the roof construction.

To prevent moisture being trapped on, or in the insulation it is essential to:

- protect the boards during laying, before the application of the roof waterproofing, or to lay the roof covering at the same time as laying the boards. However boards accidentally wetted, must be replaced or allowed to dry fully before application of the waterproof layer
- boards should be installed only when the ambient temperature is above 5ºC to prevent condensation.

Boards can be cut with a sharp knife or fine-toothed saw to fit around projections through the roof.

A comprehensive U-value calculation and condensation risk analysis should be carried out for all projects.

This Certificate does not contain a full set of installation instructions, but an overview of the procedures involved. For a full list of these instructions, refer to the Certificate holder's documentation. Should a conflict arise between this Certificate and the Certificate holder's documentation, this Certificate shall take precedence.

Specific installation instructions are contained in each Detail Sheet.

3.1 GENERAL

Unilin Insulation Flat Roof Products, when installed in accordance with this Certificate, are effective in reducing the U-value (thermal transmittance) of new and existing external flat roof constructions. It is essential that such roofs are designed and constructed to prevent moisture penetration having regard to the Driving Rain Index.

Roofs subject to the relevant requirements of the Building Regulations should be constructed in accordance with BS 6229[7].

Limited access roofs are defined for the purpose of this Certificate as those roofs subject only to pedestrian traffic for maintenance of the roof covering, cleaning of gutters, etc

Flat roofs are defined for the purpose of this Certificate as those roofs having a minimum finished fall of 1:80 and a maximum of 1:6 as defined in BS 6229.

For design purposes on flat roofs, twice the minimum finished fall should be assumed, unless a detailed analysis of the roof is available, including overall and local deflections, direction of falls etc.

When profiled decking is used, the product will need to span across the ribs. Maximum permissible spans between ribs for the different product thicknesses shall not exceed that specified in BS4841-4[15].

Underlays and membranes must be approved by the manufacturer and CE marked for such use. Underlays should be installed within the limits of this Certificate.

The boards are designed to be installed by a competent general builder, or a contractor, experienced with this type of product.

3.2 THERMAL PERFORMANCE

Calculations of thermal transmittance (U value) should be carried out in accordance with I.S. EN ISO 6946[10] and BRE Report BR 443[14] using the declared thermal conductivity values (λD) taken from the as assessed certificate holders DOP values.

The U value of a completed roof will depend on the thickness of insulation used, the number and type of fixings and the insulating value of other roof components/layers. Example U values of roofs incorporating the product are shown in Detail Sheets 1- 3 of this certificate.

3.3 STRENGTH AND STABILITY

The resistance to wind uplift depends on many factors peculiar to each project. The effect of wind loading should be calculated in accordance with IS EN 1991-1-4[9] using the appropriate basic wind speed shown on the map in Diagram 1 of TGD, Part A of the Building Regulations.

When installed on suitable flat roof decks, using appropriate fixings and/or adhesive, the product can adequately transfer maintenance traffic loads

When installed in accordance with this Certificate, and the manufacturer's instructions, the Unilin Insulation Flat Roof Products shall be designed and fixed to have sufficient resistance to wind uplift.

The roof construction must be structurally sound and have sufficient strength and stability to resist all dead, imposed and wind loads. It must also have adequate resistance to the pull-out forces created by the wind forces acting on the specified fixings used.

The suitability of the substrate to accept the adhesive bond or mechanical fixings must be established before installation. Mechanical fixings must be checked before installation by carrying out in-situ pull-out or pull-through tests to determine the minimum safe working load the fixings can resist. The advice of the Certificate holder should also be sought in respect of the type and number of fixings to be used.

For the adhesive-bonded application, the substrate must be free of dust and dry, and the installation must be in accordance with the instructions of the adhesive manufacturer. The surface of the substrate must have sufficient cohesive strength to resist the calculated wind load acting upon the structure.

When adhering is the chosen method for the insulation or waterproofing, adhesion between the insulation product and VCL, and between the product and overlay, must be adequate to resist the effects of wind suction and thermal cycling likely to be experienced under normal conditions.

In areas where high wind speeds can be expected, additional mechanical fixings should be considered and the advice of a suitably qualified Chartered Engineer should be sought as to the method of fixing as defined in the relevant clauses of I.S. EN 1991-1-4[9].

Roof waterproof covering systems (see section 4.4 for suitable types) must be applied in accordance with the relevant Agrément Certificates or manufacturer's guidance.

For design purposes, the product may be assumed to have an allowable compressive strength as detailed in the client's applicable DOP.

The Unilin Insulation Flat Roof Products have not been assessed for use with permanent distributed or concentrated loads, such as air conditioning units, mechanical plants, water tanks, etc. Such loads should be supported directly on the roof construction. The product is not suitable for use when permanent roof access is required.

When profiled decking is used, the product will need to span across the ribs. The Certificate holder should be contacted for guidance on the maximum permissible spans between ribs for the different product thicknesses.

When maintenance of the roof waterproofing is required, protective boarding should be laid over the roof surface to avoid concentrations of loads.

3.4 MAINTENANCE

The product, once installed, does not require any regular maintenance and has suitable durability provided the roof waterproof layers are inspected and maintained at regular intervals

3.5 RESISTANCE TO MOISTURE

Unilin Insulation Flat Roof Products are of a closed cell structure, which does not allow water uptake by capillary action. When used in accordance with this Certificate, the products present no significant risk of water penetration.

Unilin Insulation Flat Roof Products will not be adversely affected by rain during installation for a limited time period or by wind driven snow or rain penetrating the tiling in service.

3.6 CONDENSATION RISK

The Unilin Insulation Flat Roof Products referred to in this Certificate are unlikely to be affected by surface or interstitial condensation, provided the boards are installed in accordance with the Certificate holders instructions. For the purposes of assessing the risk of interstitial condensation, the insulation core vapour resistivity may be taken as approximately 344 MN·s·g–1 ·m–1.

When insulating buildings, the recommendations of BS 5250[5] should be followed to minimise the risk of condensation within the building elements and structures. Roofs should incorporate a VCL below the product that is compatible both with the product and the waterproofing system. Advice should be sought from the Certificate holder.

To minimise moisture entering the roof, the VCL shall have sealed and lapped joints and must be turned up around the insulation and bonded to the waterproofing finish. The Certificate holder should be contacted for the purpose of calculating a project specific condensation risk analysis.

Roofs will adequately limit the risk of surface condensation when the thermal transmittance (U value) does not exceed 0.35 W·m–2 ·K–1 at any point and the junctions with other elements are designed in accordance with the Certificate holders instructions. Roofs will adequately limit the risk of surface condensation when the thermal transmittance (U value) does not exceed 1.2 W·m–2 ·K–1 at any point. Guidance may be obtained from BS5250[5], Annex H. Additional information can be found in BRE Report BR 262 [16] .

3.7 RESISTANCE TO SOLVENTS, FUNGI AND RODENTS

Unilin Insulation Flat Roof Products do not promote infestation, as there is no food value in the materials used. They also resist attack by mould and microbial growth. The insulation is not resistant to some solvent-based adhesive systems, particularly those containing methyl ethyl keytone. Adhesives containing such solvents should not be used in association with the boards. Boards which have been in contact with harsh solvents, petrol, mineral oil or acids, or boards that have been damaged in any other way should not be used.

3.8 MATERIALS IN CONTACT WITH ELECTRICAL WIRING

Electrical installations should be in accordance with IS 10101[4]. It is recommended that cables should not be buried in the insulation and carried in a conduit. In relation to recessed spotlights and other luminaries, IS 10101[4] requires they be not less than the minimum distances from combustible materials as specified in the standard.

3.9 DURABILITY

Unilin Insulation flat roof products are rot proof and durable. When used as thermal insulation as part of a roof system and installed in accordance with this Certificate and the manufacturer's instructions, the Unilin Insulation flat roof products should have a life at least as long as that of a roof waterproofing covering. The products durability also depends upon the supporting structure and the conditions of use.

4.1 BEHAVIOUR IN FIRE

Combustibility – Unilin Insulation FR/ALU, TR/ALU, FR/MG and TR/MG are classified as Class E to IS EN 13501-1[8]. Unilin Insulation FR/BGM and TR/BGM do not have a fire classification. Refer to the Certificate Holders DOP (see CL.4.6 of this certificate) for the declared Reaction to Fire classifications for the ALU, MG and BGM products. The boards are combustible and must be protected from naked flames and other ignition sources during and after installation.

The resistance to fire exposure of a built-up roofing system will be dependent on the fire performance of the combined individual components and cannot be predicted from the classification of the insulation alone. The classification of a specific roof system must be confirmed by reference to the requirements of the documents supporting the national Building Regulations.

From submitted fire test reports a system comprising:
18 mm OSB/3 supporting deck, 3mm VCL layer, 50 or 150 mm thick FR/MG insulation board, 2.8mm reinforced bitumen underlay and 4.3mm SBS bitumen water proofing membrane, can be classified as BROOF(t4) in accordance with I.S. EN 13501-5[8].

The designation of other roof build-ups should be confirmed by test or assessment.

4.2 THERMAL PERFORMANCE

Refer to the Certificate Holders DOP (see CL.4.6 of this certificate) for the declared thermal conductivity values for the ALU, MG and BGM products. The aged/design thermal conductivity 'λ90/90' value' of the Unilin Insulation Flat Roof Products have been measured in accordance with I.S. EN 12667[1] (see Table 1 of each Detail Sheet).

The required maximum U-values for roofs can be obtained using the Unilin Insulation Flat Roof Products. The U-value of a completed roof will depend on the thickness of insulation used, the number and type of fixings, and the insulating value of other roof components/layers. Sample U-value are given in each Detail Sheet.

4.3 LIMITING THERMAL BRIDGING

Care must be taken in the overall design and construction of junctions with other elements and openings to minimise thermal bridges and air infiltration.

The linear thermal transmittance 'Ψ-Value' (Psi) describes the heat loss associated with junctions and around openings. Junction design used with Unilin Insulation Flat Roof Products have been assessed and when detailed in accordance with this Certificate can meet the requirements of Appendix D of TGD Part L of the Building Regulations.

When all bridged junctions within a building comply with the requirements of Table D1 to D6 of TGD to Part L, the improved 'y' factor of 0.08 can be entered into the DEAP building energy rating (BER) calculation. If all junctions can be shown to be equivalent or better than Acceptable Construction Details published by the DECLG, then the values published in Appendix D apply.

Where either of the above options are shown to be valid, or when the required values cannot be achieved, all relevant details should be recorded on the 'Certificate of Compliance' for that project for use in future BER calculations.

'ψ' values for other junctions outside the scope of this Certificate should be assessed in accordance with BRE IP1/06[2] and BRE BR 497[3] in accordance with Appendix D of TGD to Part L of the Building Regulations.

4.4 TESTS

Tests were carried out and the results assessed to determine:

- Behaviour under variations in temperature (unrestrained)
- Behaviour under distributed load and increased temperature
- Effect of concentrated load on cantilevered parts
- Bowing under the effect of a thermal gradient
- Behaviour on exposure to moisture
- Tensile strength perpendicular to faces
- Wind uplift
- Density
- Compressive strength
- Dimensional stability under specified temperature and humidity conditions

4.5 OTHER INVESTIGATIONS

(i) The manufacturing process was examined including methods adopted for quality control, and details were obtained of the quality and composition of the materials used.

(ii) Independent test data was evaluated in the context of Irish roofing practice, including a thermal conductivity (fresh and aged) review of the products and a review of the risk of interstitial condensation when these products are used.

4.6 CE MARKING

The manufacturer has taken responsibility of CE marking the Unilin Insulation Flat Roof Products in accordance with harmonised European Standard IS EN 13165[6]. The NSAI assessment was performed against the Certificate holders Declaration of Performance (DoP) listed below, which should be referenced for the essential characteristic values of the MG, ALU and BGM products assessed.

- Thin-R Flat Roof ALU product:
  - **UK_DOP_FR/ALU_Jan2023_v1**
- Thin-R Flat Roof MG board product
  - **UK_DOP_FR/MG_Jan2023_v1**
- Thin-R Flat Roof BGM product:
  - **UK_DOP_FR/BGM_Jan2023_v1**

5.1 National Standards Authority of Ireland ("NSAI") following consultation with NSAI Agrément has assessed the performance and method of installation of the product/process and the quality of the materials used in its manufacture and certifies the product/process to be fit for the use for which it is certified provided that it is manufactured, installed, used and maintained in accordance with the descriptions and specifications set out in this Certificate and in accordance with the manufacturer's instructions and usual trade practice. This Certificate shall remain valid for five years from date of latest revision so long as:

(a) the specification of the product is unchanged.

(b) the Building Regulations and any other regulation or standard applicable to the product/process, its use or installation remains unchanged.

(c) the product continues to be assessed for the quality of its manufacture and marking by NSAI.

(d) no new information becomes available which in the opinion of the NSAI, would preclude the granting of the Certificate.

(e) the product or process continues to be manufactured, installed, used and maintained in accordance with the description, specifications and safety recommendations set out in this certificate.

(f) the registration and/or surveillance fees due to NSAI are paid.

5.2 The NSAI Agrément mark and certification number may only be used on or in relation to product/processes in respect of which a valid Certificate exists. If the Certificate becomes invalid the Certificate holder must not use the NSAI Agrément mark and certification number and must remove them from the products already marked.

5.3 In granting Certification, the NSAI makes no representation as to;

(a) the absence or presence of patent rights subsisting in the product/process; or

(b) the legal right of the Certificate holder to market, install or maintain the product/process; or

(c) whether individual products have been manufactured or installed by the Certificate holder in accordance with the descriptions and specifications set out in this Certificate.

5.4 This Certificate does not comprise installation instructions and does not replace the manufacturer's directions or any professional or trade advice relating to use and installation which may be appropriate.

5.5 Any recommendations contained in this Certificate relating to the safe use of the certified product/process are preconditions to the validity of the Certificate. However the NSAI does not certify that the manufacture or installation of the certified product or process in accordance with the descriptions and specifications set out in this Certificate will satisfy the requirements of the Safety, Health and Welfare at Work Act, or of any other current or future common law duty of care owed by the manufacturer or by the Certificate holder.

5.6 The NSAI is not responsible to any person or body for loss or damage including personal injury arising as a direct or indirect result of the use of this product or process.

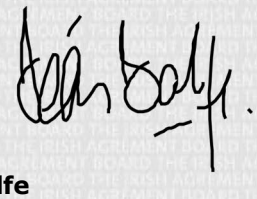
5.7 Where reference is made in this Certificate to any Act of the Oireachtas, Regulation made thereunder, Statutory Instrument, Code of Practice, National Standards, manufacturer's instructions, or similar publication, it shall be construed as reference to such publication in the form in which it is in force at the date of this Certification.

NSAI Agrément

This Certificate No. **23/0436** is accordingly granted by the NSAI to **Unilin Insulation Ireland Ltd**. on behalf of NSAI Agrément.

Date of Issue:**22nd February 2023**

Signed



Seán Balfe
Director of NSAI Agrément

Readers may check that the status of this Certificate has not changed by contacting NSAI Agrément , NSAI, 1 Swift Square, Northwood, Santry, Dublin 9, Ireland. Telephone: (01) 807 3800. Fax: (01) 807 3842. www.nsai.ie

NSAI Agrément

Bibliography

[1] IS EN 12667:2001 *Thermal performance of building materials and products – Determination of thermal resistance by means of guarded hot plate and heat flow meters method – Products of high and medium thermal resistance.*

[2] BRE IP1/06 *Assessing the effects of thermal bridging at junctions and around openings.*

[3] BRE BR 497 *Conventions for calculating linear thermal transmittance and temperature factors.*

[4] IS 10101:2020+AC1:2020 *National rules for electrical installations (incorporating Corrigendum 1:2020).*

[5] BS 5250:2011+A1:2016 *Code of practice for control of condensation in buildings.*

[6] IS EN 13165:2012 *Thermal insulation products for buildings – Factory made rigid polyurethane foam (PU) products – Specification.*

[7] BS 6229:2018 *Code of practice for flat roofs with continuously supported flexible waterproof coverings.*

[8] IS EN 13501-1:2018 *Fire classification of construction products and building elements – Part 1: Classification using data from reaction to fire tests.*

[9] IS EN 1991-1-4:2005 *Eurocode 1: Actions on structures: General actions: Wind actions (including Irish National Annex).*

[10] IS EN ISO 6946:2017 *Building components and building elements – Thermal resistance and thermal transmittance – Calculation method.*

[11] IS EN 1991-1-1:2002 *Eurocode 1: Actions on structures – Part 1-1: General actions – Densities, self-weight, imposed loads for buildings (including Irish National Annex).*

[12] BS 8217:2005 *Reinforced bitumen membranes for roofing – Code of practice.*

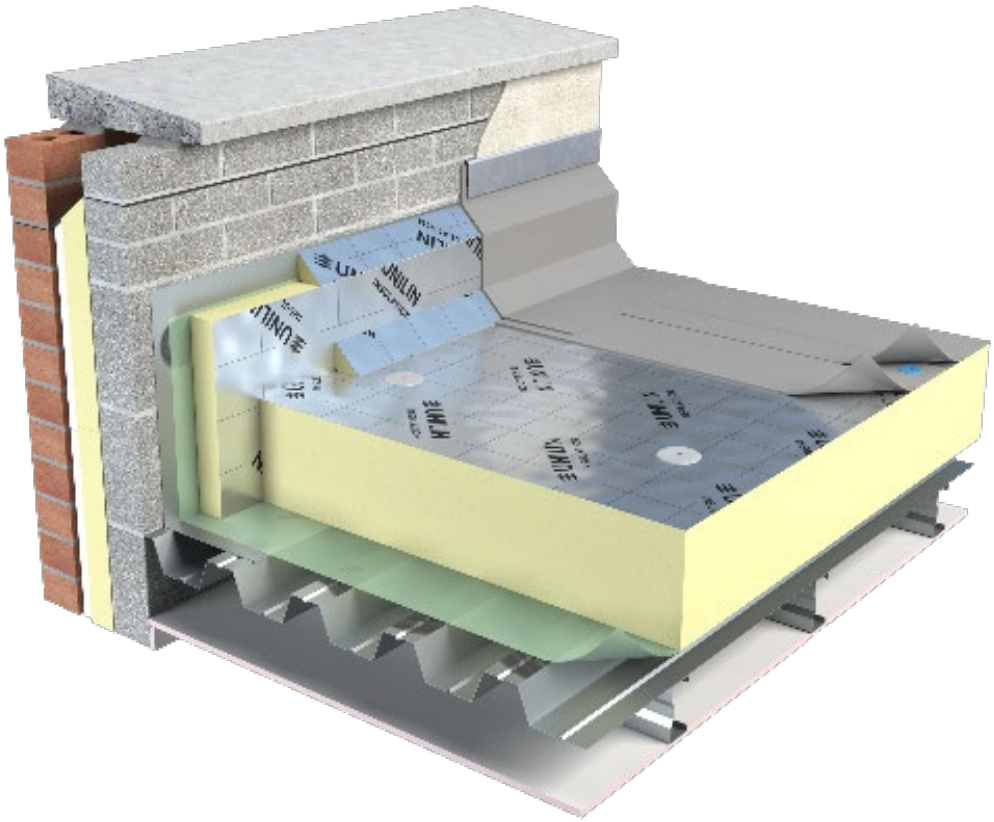
[13] BS 8218:1998: *Code of practice for mastic asphalt roofing.*

[14] BRE Report BR 443

[15] BS4841-4: 2021 6th Edition: *Rigid polyisocyanurate (PIR) and polyurethane (PUR) products for building end-use applications - Part 4: Specification for laminated boards (roofboards) with autoadhesively or separately bonded facings for use as roofboard thermal insulation under non-bituminous single-ply roofing membranes.*

[16] BR 262: *Thermal Insulation : avoiding risks*.

Unilin FR/ALU & TR/ALU



PRODUCT DESCRIPTION

This Detail Sheet relates to Unilin Insulation FR/ALU and TR/ALU, a rigid thermoset polyisocyanurate foil-faced insulation for use as a thermal insulation layer and to create or improve falls on limited access (access limited to maintenance only) concrete, metal or timber flat roof decks, for use on domestic and non-domestic buildings, as defined in NSAI Agrément Certificate 2-/0---. It is for use in conjunction with a vapour control layer , a single ply roof waterproofing membrane, and fixings, incorporating countersunk washers, which are outside the scope of this certificate.

INSTALLATION

Reference should be made to the relevant parts of Section 2 to 4 of this certificate (NSAI Agrément Certificate 2-/0---) and the Certificate Holders installation documentation regarding the installation/application of the FR/ALU and TR/ALU insulation as part of a complete flat roof build-up, including the following :

Vapour Control Layer

The approved water vapour control layer should be laid with 150mm sealed laps, which are turned up at any vertical upstand. When the insulation boards have been positioned, the laps are turned over and sealed, prior to the roof finish being completed.

Laying (Metal/Timber Deck)

The boards should be laid over the vapour control layer in a break bonded pattern. On profiled metal decks, the long edges of the boards should be laid at right angles to the corrugations and all board joints must be fully supported on a rib. The boards are generally secured by approved mechanical fixings in accordance with the Certificate holders documentation.

Laying (Concrete Deck)

The boards are laid over the vapour control layer in a break bonded pattern and secured with approved mechanical fixings or secured under a ballasted system. Care should be taken to ensure that the concrete deck is graded to the correct falls, dry, clean and free from any projections or gaps.

Fixings

The specification for fixing boards will vary with the location, roof height/area and topographical data. Generally with 2400mm x 1200mm boards, a minimum of 6 fixings are adequate, located between 50mm and 150mm from all edges, (210mm on tapered boards) additional fixings may be placed along the centre line. Additional fixings around the roof perimeter may also be required. Countersunk washers, 50mm in diameter, shall be used with each fixing. The requirement for extra fixings should be assessed in accordance with I.S. EN 1991-1-4[9].

Single Ply Membrane

The product is for use with a mechanically fixed single-ply roof waterproofing system. This membrane shall be laid and mechanically fixed in accordance within the limitations imposed by that manufacturer (outside the scope of this certificate).

Nominal Characteristics	
Length and width (mm)	1200 x 600 or 2400 x 1200
Thickness (mm)	25 to 165 (in 5mm increments)
Compressive strength at 10% compression (kPa)	150
Density (kg·m$_{-3}$)	32
Edge profile	Squared, rebated
Boards are also available in a tapered version (TR/ALU) for falls of 1:80 and 1:60 (1200 x 1200mm)	

Table 1: Product Nominal Characteristics

Constructions with Galvanised Steel Fixings			
U-value (W/m^{2}K)	**Insulation thickness[1] (mm)**		
	Concrete[2,3]	**Timber[2,4]**	**Metal[2,5]**
0.13	190[6]	190[6]	190[6]
0.15	160	160	170[6]
0.16	150	150	160
0.18	140	130	140
0.20	120	120	125
0.25	100	90	100

1. Nearest available thickness.
2. Includes 5 galvanised steel insulation fixings per m^2 with a 4.8mm diameter.
3. 150mm concrete decking 1.33W/m/K, VCL, 1.5mm waterproofing membrane.
4. 12.5mm plasterboard, 150mm timber joists (13.5%)/air cavity (87.5%), 18mm plywood decking, VCL, 1.5mm waterproofing membrane.
5. Metal deck, VCL, 1.5mm waterproofing membrane.
6. Two layers of insulation to make total thickness.
7. The above sample U-values are based on the Certificate Holders DoP declared thermal conductivity values. See Cl. 4.6 of this certificate.

Constructions with Stainless Steel Fixings			
U-value (W/m^{2}K)	**Insulation thickness[1] (mm)**		
	Concrete[2,3]	**Timber[2,4]**	**Metal[2,5]**
0.13	170	160	170[6]
0.15	150	140	150
0.16	140	130	140
0.18	120	120	125
0.20	110	100	110
0.25	90	80	90

1. Nearest available thickness.
2. Includes 5 stainless steel insulation fixings per m^2 with a 4.8mm diameter.
3. 150mm concrete decking 1.33W/m/K, VCL, 1.5mm waterproofing membrane.
4. 12.5mm plasterboard, 150mm timber joists (12.5%)/air cavity (87.5%), 18mm plywood decking, VCL, 1.5mm waterproofing membrane.
5. Metal deck, VCL, 1.5mm waterproofing membrane.
6. Two layers of insulation to make total thickness.
7. The above sample U-values are based on the Certificate Holders DoP declared thermal conductivity values. See Cl. 4.6 of this certificate.

Table 2: Sample U-value Calculations

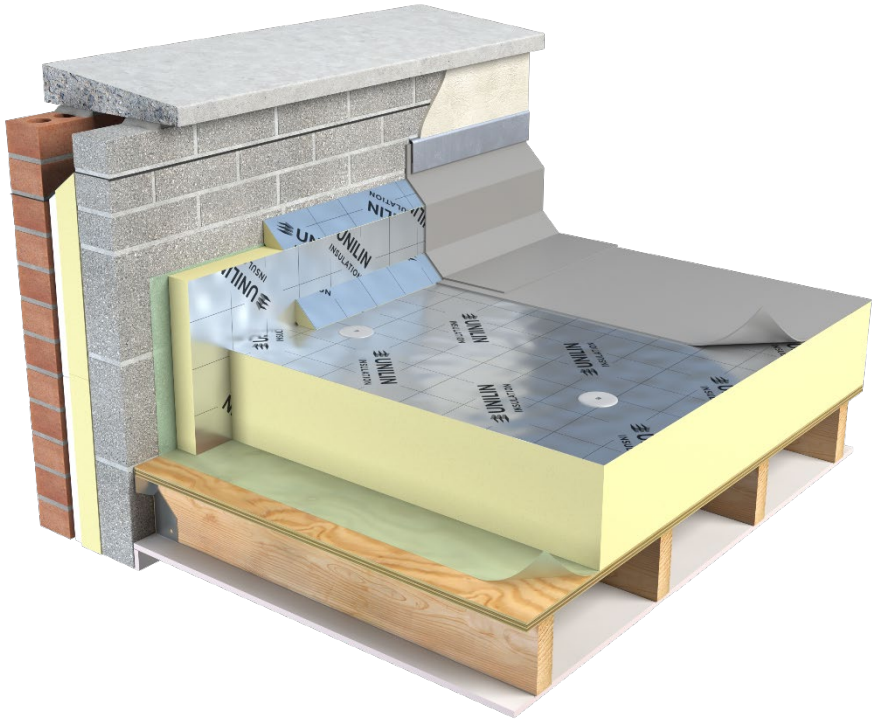


Figure 1: Unilin Insulation FR/ALU onto Timber Deck

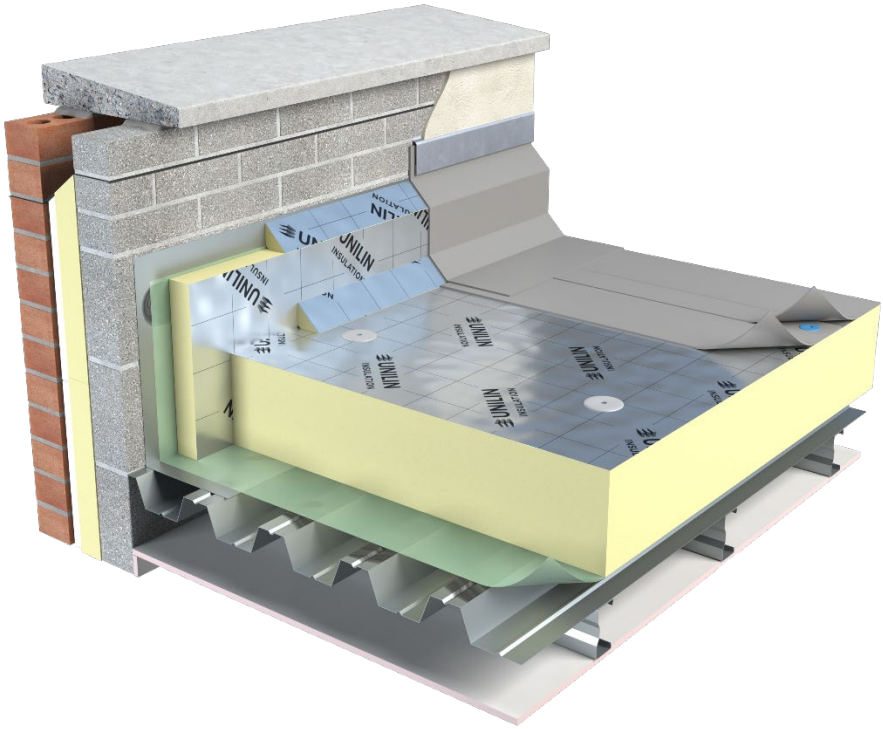


Figure 2: Unilin Insulation FR/ALU onto Metal Deck

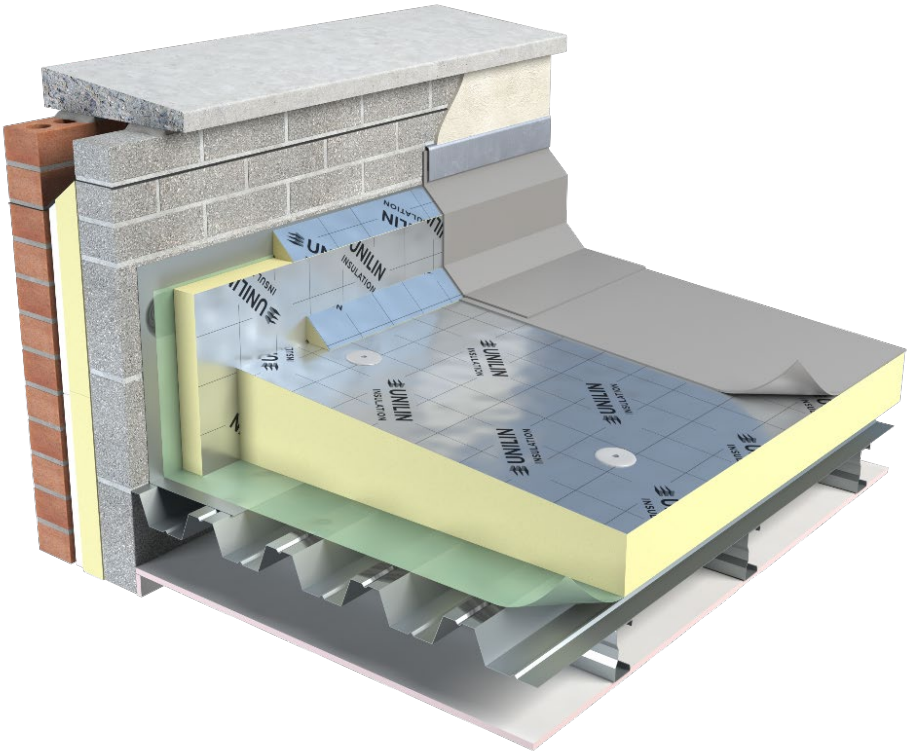
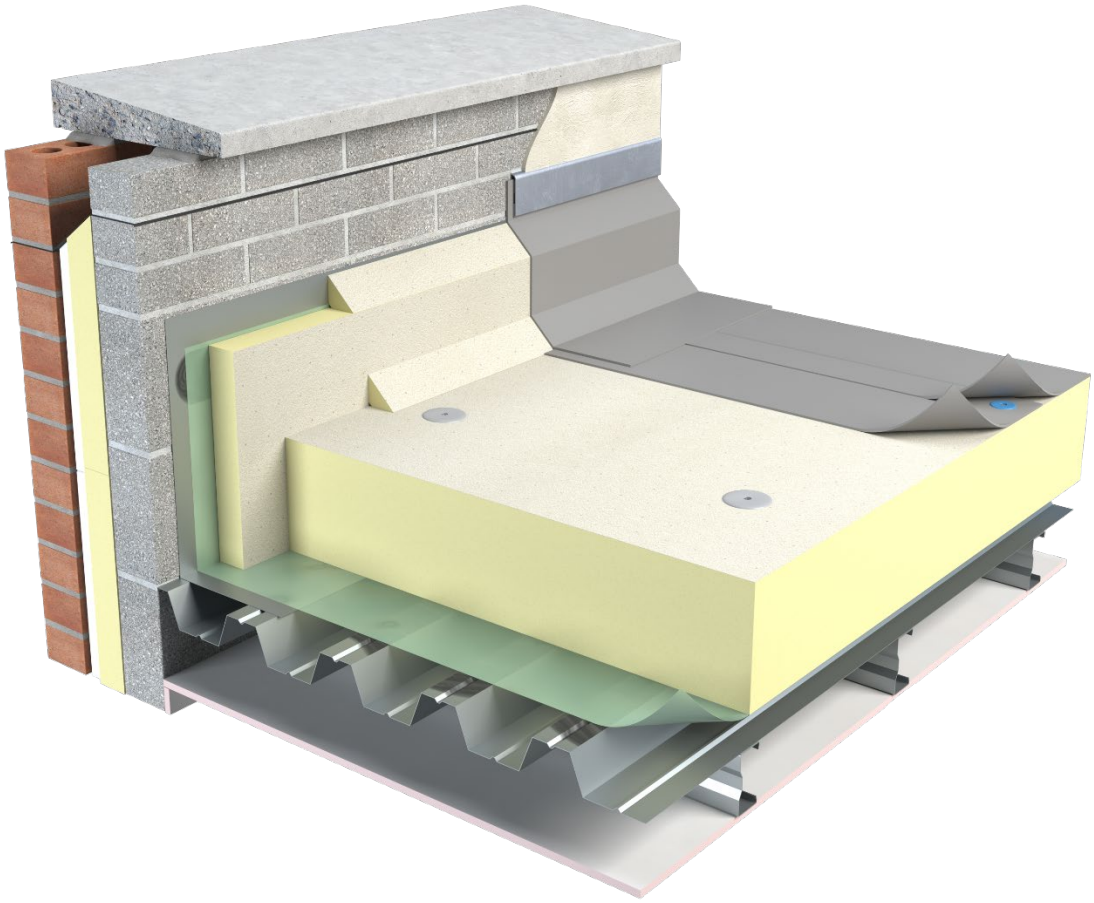


Figure 3: Unilin Insulation TR/ALU onto Metal Deck

Unilin FR/MG & TR/MG



PRODUCT DESCRIPTION

This Detail Sheet relates to Unilin Insulation FR/MG and TR/MG, a rigid thermoset polyisocyanurate mineral-coated glass fibre-faced insulation for use as a thermal insulation layer and to create or improve falls on limited access (access limited to maintenance only) concrete, metal or timber flat roof decks, for use on domestic and non-domestic buildings, as defined in NSAI Agrément Certificate 2-/0---. It is used in conjunction with a vapour control layer and mechanically-fixed or adhesively-bonded roof waterproofing membrane, which are outside the scope of this certificate.

INSTALLATION

Reference should be made the relevant parts of Section 2 to 4 of this certificate (NSAI Agrément Certificate 2-/0---) and the Certificate Holders installation documentation regarding the installation/application of the FR/MG and TR/MG insulation as part of a complete flat roof build-up, including the following :

Vapour Control Layer

The approved water vapour control layer should be laid with 150mm sealed laps, which are turned up at any vertical upstand. When the insulation boards have been positioned, the laps are turned over and sealed to the waterproof finish at all edges and penetrations such as roof lights.

Where the vapour control layer is to be bonded to the boards, sufficient adhesion to the substrate should be made to ensure correct resistance to wind uplift. The Certificate holder should be contacted for details.

Laying (Metal/Timber Deck)
If adhering the VCL and insulation boards, the deck should be prepared and treated with a suitable primer before applying the VCL. The advice of the Certificate holder should also be sought in respect of a suitable primer.

The boards should be laid over the vapour control layer in a break bonded pattern. On profiled metal decks, the long edges of the boards should be laid at right angles to the corrugations and all board joints must be fully supported on a rib.

For adhered systems, a reinforced VCL is fully bonded to the metal deck using a polyurethane adhesive or a suitable solvent-based adhesive, and the insulation boards applied, fully embedded into it, in a brick bonded pattern.

The thickness of the roof board used depends on the width of the rib openings of the metal deck.

Laying (Concrete Deck)
Decks should be dry and clean of debris and laid to correct fall, where necessary, applying an appropriate levelling compound. The boards can be secured using approved mechanical fixings or adhesive, with boards laid with a break bonded pattern. Joints should be closely butted.

If adhering the VCL and insulation boards, the whole deck should be treated with a suitable primer. The VCL is fully bonded with hot bitumen, a polyurethane adhesive or a suitable solvent based adhesive (with the laps sealed), and the boards applied fully embedded into it, in a brick bonded pattern The advice of the Certificate holder should also be sought where required.

Partially Bonded Built-Up Systems
Partially bonded built-up felt waterproofing should be laid where required in accordance with BS 8217[12].

Fully Adhered Systems
FR/MG is suitable for use with most fully adhered single-ply waterproofing membranes. Board joints and abutments should be taped subject to the approved adhesive system being used. A fleeced backed membrane may be required with the system being used – the Certificate holder should be contacted for details.

Fixings
The boards can be secured to concrete, metal and timber decks by means of mechanical fixings.

Depending on the fixings specification chosen, quantity and pattern of fixings will vary with the location, roof height/width and topographical data. Generally with 1200mm x 600mm boards a minimum of 4 fixings are adequate, located between 50mm and 150mm from all edges, additional fixings may be placed along the centre line. A minimum of six fixings per 1200 mm by 1200 mm tapered board are recommended, sited 210 mm from all edges. Additional fixings around roof perimeter may be required. Countersunk wasters, 75mm in diameter, should be used with each fixing. The requirement for extra fixings should be assessed in accordance with IS EN 1991-1-1[11]

Nominal Characteristics	
Length and width (mm)	1200 x 600, 1200 x 1200 or 2400 x 1200
Thickness (mm)	25 to 165 (in 5 mm increments)
Compressive strength at 10% compression (kPa)	150
Density (kg·m$_{-3}$)	32
Edge profile	Squared, rebated
Boards are also available in a tapered version (TR/MG) for falls of 1:80 and 1:60 (1200 x 1200mm)	

Table 1: Product Nominal Characteristics

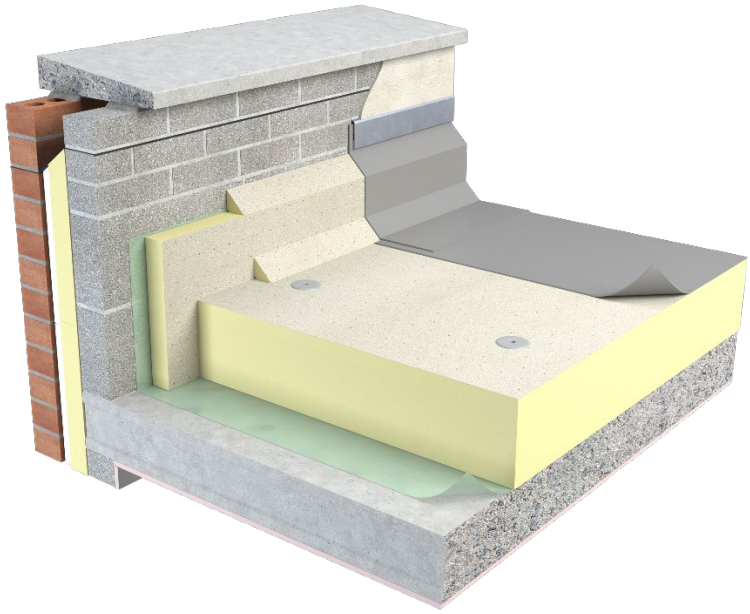


Figure 1: Unilin Insulation FR/MG onto Concrete Deck

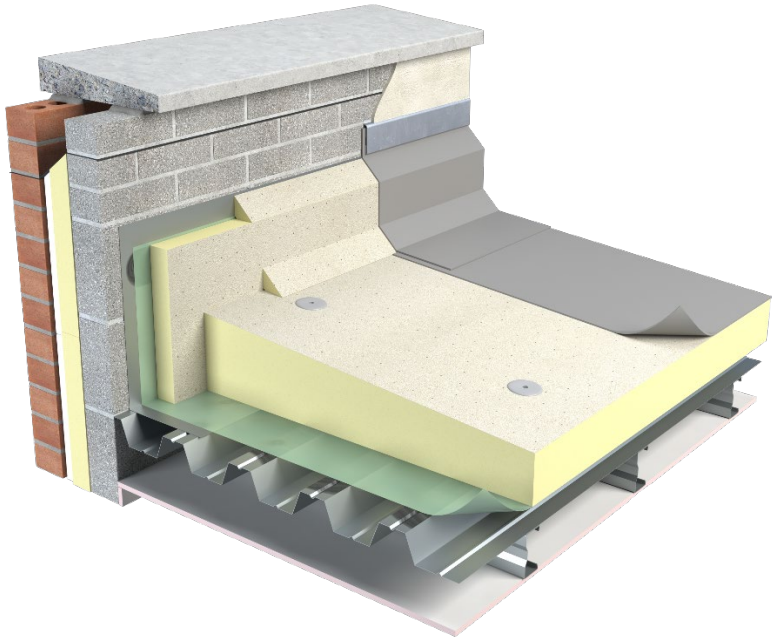


Figure 1: Unilin Insulation TR/MG onto Metal Deck

Constructions with Galvanised Steel Fixings			
U-value (W/m^2K)	Insulation thickness[1] (mm)		
	Concrete[2,3]	Timber[2,4]	Metal[2,5]
0.13	210[6]	200[6]	210[6]
0.15	180[6]	170[6]	190[6]
0.16	170[6]	160	170[6]
0.18	150	140	150
0.20	130	120	140
0.25	110	100	110

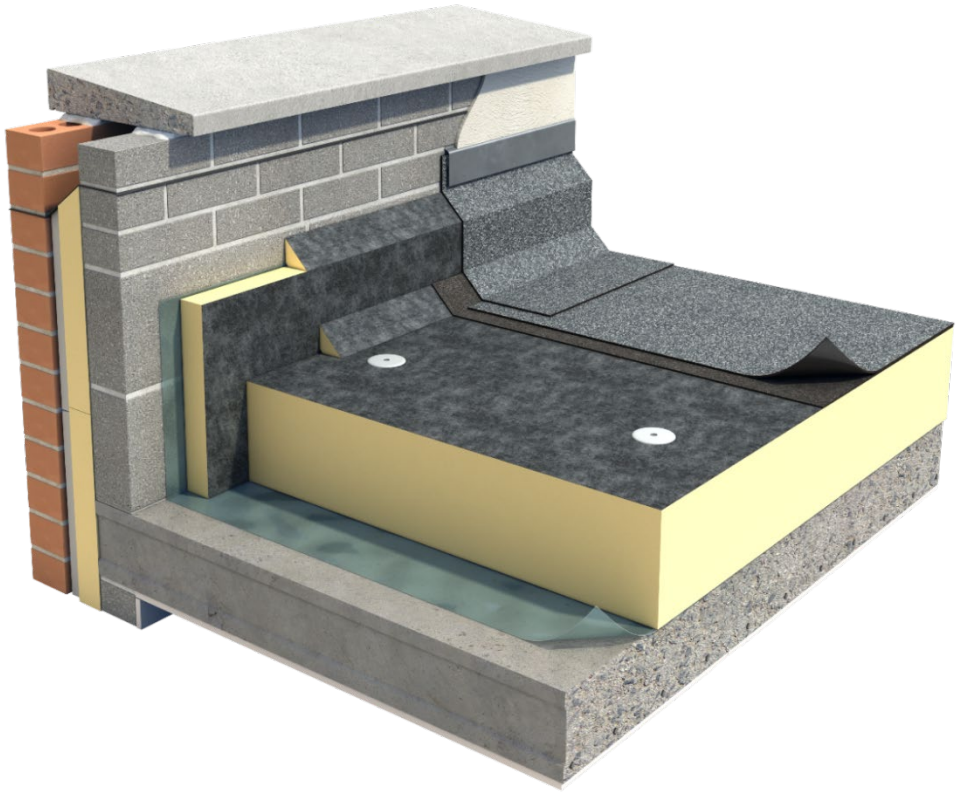
1. Nearest available thickness.
2. Includes 5 galvanised steel insulation fixings per m^2 with a 4.8mm diameter.
3. 150mm concrete decking 2.5W/m/K, VCL, 1.5mm waterproofing membrane.
4. 12.5mm plasterboard, 150mm timber joists (13.5%)/air cavity (87.5%), 18mm plywood decking, VCL, 1.5mm waterproofing membrane.
5. Metal deck (not included in calculation), VCL, 1.5mm waterproofing membrane.
6. Two layers of insulation to make total thickness
7. The above sample U-values are based on the Certificate Holders DoP declared thermal conductivity values. See Cl. 4.6 of this certificate.

Constructions with Stainless Steel Fixings			
U-value (W/m^2K)	Insulation thickness[1] (mm)		
	Concrete[2,3]	Timber[2,4]	Metal[2,5]
0.13	190[6]	180[6]	200[6]
0.15	160	150	160
0.16	150	140	150
0.18	130	130	140
0.20	120	120	120
0.25	100	90	100

1. Nearest available thickness.
2. Includes 5 stainless steel insulation fixings per m^2 with a 4.8mm diameter.
3. 150mm concrete decking 2.5W/m/K, VCL, 1.5mm waterproofing membrane.
4. 12.5mm plasterboard, 150mm timber joists (12.5%)/air cavity (87.5%), 18mm plywood decking, VCL, 1.5mm waterproofing membrane.
5. Metal deck (not included in calculation), VCL, 1.5mm waterproofing membrane.
6. Two layers of insulation to make total thickness.
7. The above sample U-values are based on the Certificate Holders DoP declared thermal conductivity values. See Cl. 4.6 of this certificate.

Table 2: Sample U-value Calculations

Unilin FR/BGM & TR/BGM



PRODUCT DESCRIPTION

This Detail Sheet relates to Unilin Insulation FR/BGM and TR/BGM, a rigid thermoset polyisocyanurate insulation board with a mineral-coated glass fibre facing on one side and a composite bitumen/ glass fibre facing on the other. It is suitable for use as a thermal insulation layer and to create or improve falls on limited access (access limited to maintenance only) concrete, metal or timber flat roof decks, for use on domestic and non-domestic buildings, as defined in NSAI Agrément Certificate 2-/0---. It is used in conjunction with a vapour control layer and mechanically-fixed or adhesively-bonded roof waterproofing membrane, which are outside the scope of this certificate.

INSTALLATION

Reference should be made the relevant parts of Section 2 to 4 of this certificate (NSAI Agrément Certificate 2-/0---) and the Certificate Holders installation documentation regarding the installation/application of the Unilin Insulation FR/BGM and TR/BGM insulation as part of a complete flat roof build-up, including the following :

Vapour Control Layer

Decks should be primed before the application of the hot bitumen used to bond the vapour control layer. Reference should be made to BS 8217[12] when applying the vapour control layer. The vapour control layer should be carried past the insulation and sealed to the waterproof finish at all edges and penetrations such as roof lights. .

Laying (Metal Deck)

If adhering the VCL and insulation boards, the deck should be prepared and treated with a suitable primer before applying the VCL. The advice of the Certificate holder should also be sought in respect of a suitable primer.

For adhered systems, a reinforced VCL is fully bonded to the metal deck using a polyurethane adhesive or a suitable solvent-based adhesive, and the board should be in a break bonded pattern

Unilin FR/BGM & TR/BGM

On metal decks, the boards should be laid break bonded into hot bitumen (max temperature 240°C) mopped or poured over the vapour control layer or a suitable adhesive. The boards can also be mechanically fixed, or the mineral coated glass fibre facer (MG) can be adhered with other suitable adhesives. Fixing heads should be sealed with bitumen.

Laying (Concrete Deck)
Ensure concrete decks are laid to provide correct falls to outlets and are clean, dry and without projections where necessary, applying an appropriate levelling compound. If adhering the VCL and insulation boards, the whole deck should be treated with a suitable primer. The advice of the Certificate holder should also be sought in respect of a suitable primer. The vapour control layer should be fully bonded to the deck and the board should be laid into the hot bitumen or suitable solvent-based(adhesive on the vapour control layer in a break bonded pattern. The boards can also be mechanically fixed, or the mineral coated glass fibre facer (MG) can be adhered with other suitable adhesives Fixing heads should be sealed with bitumen.

Laying (Timber Deck)
On plywood decks, the boards should be fully bedded in hot bitumen, or secured using a suitable solvent-based adhesive in a brick bonded pattern over a continuous vapour control layer which has been nailed or bonded to the deck. The boards can also be mechanically fixed, or the mineral coated glass fibre facer (MG) can be adhered with other suitable adhesives. Fixing heads should be sealed with bitumen.

Fixing

The boards are fixed in the same manner as the FR/MG and TR/MG boards (see Detail Sheet 2). The requirement for extra fixings should be assessed in accordance with IS EN 1991-1-1[11]

Bitumen Based Built-Up Roofing Systems

Technical guidance from the appropriate bitumen waterproofing manufacturer should be sought as to assure proper installation of the bonded built-up roofing system.

Fire

Each contract should be assessed for suitability of torch-on applications. The suitability of materials, substrates and specifications should be assessed before commencement. Application of the torch-on system should be undertaken only be fully trained personnel with appropriate fire precautions and fire extinguishing equipment available at hand. All timber roof components, and most insulation materials, are combustible and will be vulnerable to a naked flame. These materials may be hidden from view and due attention should be given and all precautions taken. This is the responsibility of the operatives.

Nominal Characteristics	
Length and width (mm)	1200 x 600, 1200 x 1200 or 2400 x 1200
Thickness (mm)	25 to 165 (in 5 mm increments)
Compressive strength at 10% compression (kPa)	150
Density (kg·m$_{-3}$)	32
Edge profile	Squared, rebated
Boards are also available in a tapered version (TR/MG) for falls of 1:80 and 1:60 (1200 x 1200mm)	

Table 1: Product Nominal Characteristics

Constructions with Galvanised Steel Fixings			
U-value (W/m²K)	Insulation thickness[1] (mm)		
	Concrete[2,3]	Timber[2,4]	Metal[2,5]
0.13	210[6]	200[6]	210[6]
0.15	180[6]	170[6]	190[6]
0.16	170[6]	160	170[6]
0.18	150	140	150
0.20	130	120	140
0.25	110	100	110

1. Nearest available thickness.
2. Includes 5 galvanised steel insulation fixings per m² with a 4.8mm diameter.
3. 150mm concrete decking 2.5W/m/K, VCL, 1.5mm waterproofing membrane.
4. 12.5mm plasterboard, 150mm timber joists (12.5%)/air cavity (87.5%), 18mm plywood decking, VCL, 1.5mm waterproofing membrane.
5. Metal deck (not included in calculation), VCL, 1.5mm waterproofing membrane.
6. Two layers of insulation to make total thickness.
7. The above sample U-values are based on the Certificate Holders DoP declared thermal conductivity values. See Cl. 4.6 of this certificate.

Constructions with Stainless Steel Fixings			
U-value (W/m²K)	Insulation thickness[1] (mm)		
	Concrete[2,3]	Timber[2,4]	Metal[2,5]
0.13	190[6]	180[6]	200[6]
0.15	160	150	160
0.16	150	140	150
0.18	130	130	140
0.20	120	120	120
0.25	100	90	100

1. Nearest available thickness.
2. Includes 5 stainless steel insulation fixings per m² with a 4.8mm diameter.
3. 150mm concrete decking 2.5W/m/K, VCL, 1.5mm waterproofing membrane.
4. 12.5mm plasterboard, 150mm timber joists (13.5%)/air cavity (87.5%), 18mm plywood decking, VCL, 1.5mm waterproofing membrane.
5. Metal deck (not included in calculation), VCL, 1.5mm waterproofing membrane.
6. Two layers of insulation to make total thickness.
7. The above sample U-values are based on the Certificate Holders DoP declared thermal conductivity values. See Cl. 4.6 of this certificate.

Table 2: Sample U-value Calculations

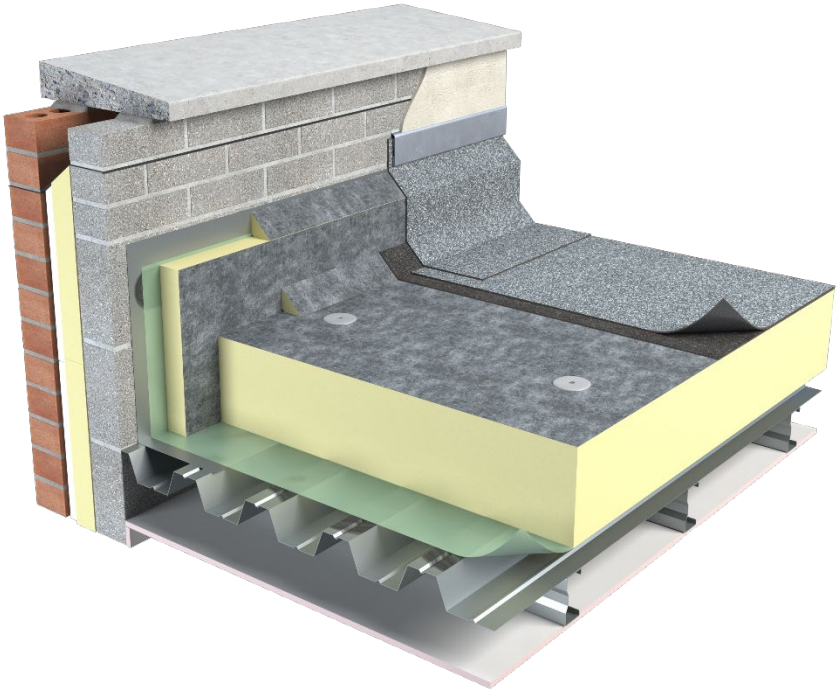


Figure 1: Unilin Insulation FR/BGM onto Metal Deck

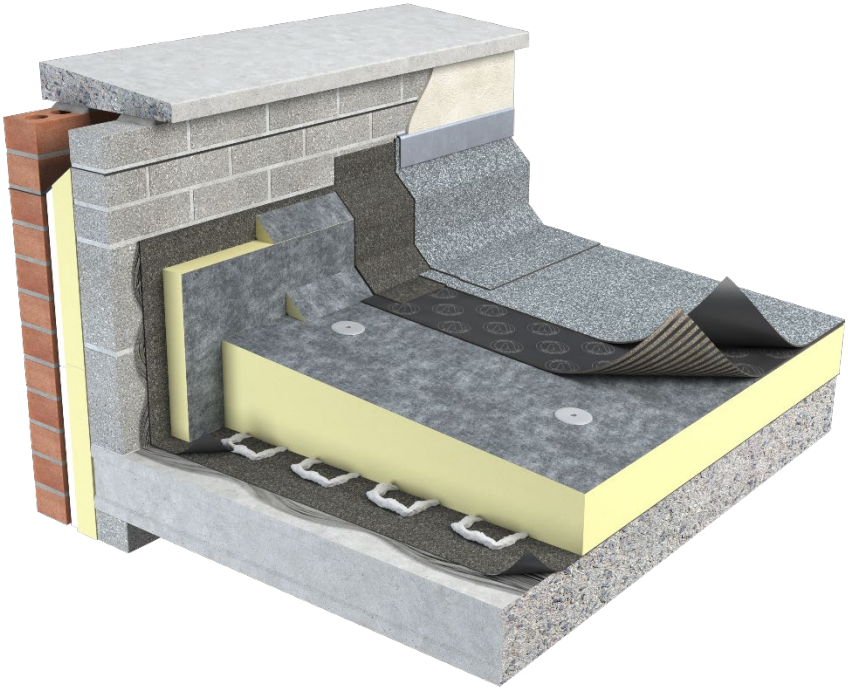


Figure 2: Unilin Insulation TR/BGM onto Concrete Deck