SUSTAINABILITY STATEMENT

Erection of a new one-bedroom,
two-storey dwelling.
17 Marlborough Rd, London, N22 8NB
(Access via Thorold Road)
11.09.2024

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INTRODUCTION

This sustainability statement outlines the design and construction principles for the proposed two-storey, one-bedroom dwelling at the rear of 17 Marlborough Road, with access via Thorold Road. The development not only incorporates measures to enhance environmental performance and reduce energy, water, and material consumption in line with the London Plan and Local Plan requirements but also promises to significantly contribute to the local ecosystem.

This statement sets out the approach the applicant proposes to adopt to ensure that the proposal meets high sustainability standards. This statement will demonstrate that this proposed development will meet the requirements of policies

ENERGY CONSERVATION AND CARBON EMISSIONS

It is recognised that the generation of energy to heat, light, and cool buildings is responsible for approximately half of the total CO2 emissions of the UK. Part L of the Building Regulations requires a minimum energy efficiency standard in new and refurbishment development; however, this development intends to go beyond this.

As a first step in dealing with carbon emissions arising from energy use within buildings, it is essential to consider designing energy efficiency measures as part of the construction and refurbishment of the buildings as these can be difficult and disruptive to retrofit in the future and this will also reduce the amount of energy required by a building.

Reduction of heat loss is a crucial element of this. The proposal consists of insulation within floors, roofs and walls that will exceed the minimum standards required under Part L1 (Conservation of Fuel and Power) of the Building Regulations, as will the U-Values for new glazing and doors.

An air-tight building will also play a significant part in reducing heat loss via the external envelope and, coupled with adequate ventilation to ensure internal air quality, is an essential element in energy-efficient building design. Accordingly, attention will be given to potential areas of air ingress, such as where services enter the residential unit and seal around window units.

The use of energy design is essential, but in this context will remain the same as there will be no alteration to opening areas for the building. Where artificial light is required, the focus will be on providing energy-efficient lighting systems as appropriate to locational requirements.

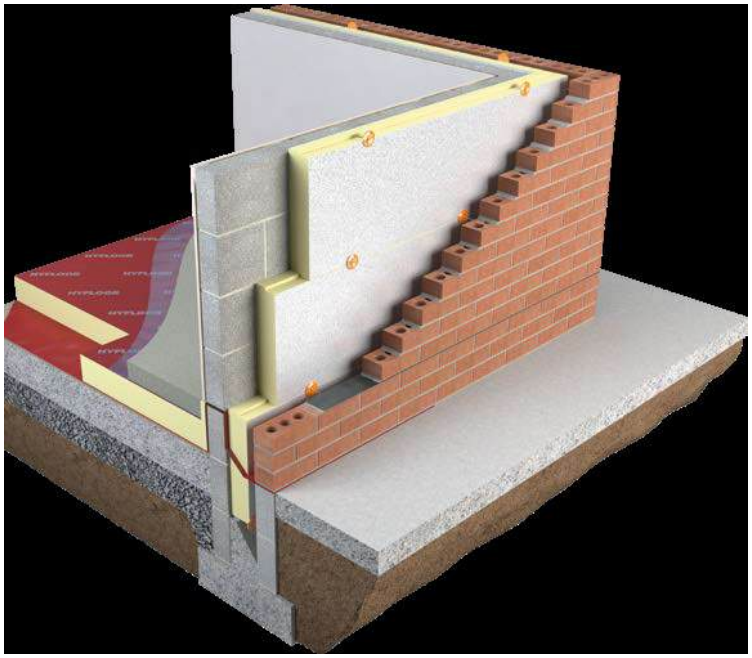
The option to utilise solar energy technologies has also been considered. Using energy-conscious design principles and a fabric-first approach means that the building should remain energy efficient for its entire lifetime, within the context of the dwelling and the overall requirement for energy input is reduced for heating and hot water.

ENERGY EFFICIENCY AND INSULATION

The proposed dwelling has been designed to minimise heat loss and maximise energy efficiency. To ensure compliance with Part L of the Building Regulations, U-values have been calculated in consultation with an SAP assessor.

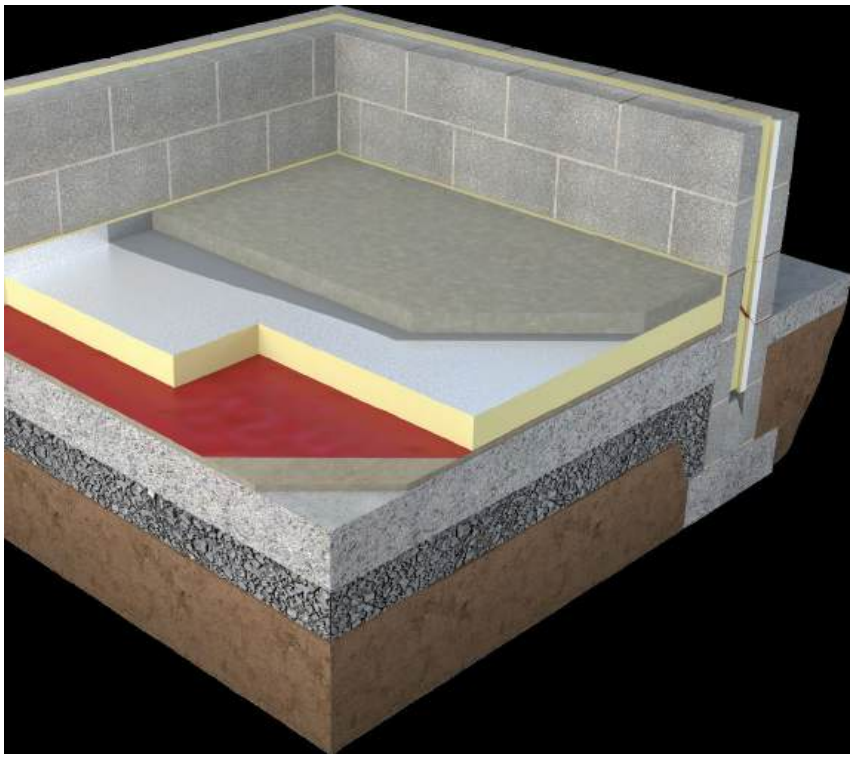
The construction will meet the following U-values:

Walls: 0.18 W/m²K, using full-fill cavity insulation with 110mm Unilin Cavity Therm CT/PIR insulation. (Appendix D)



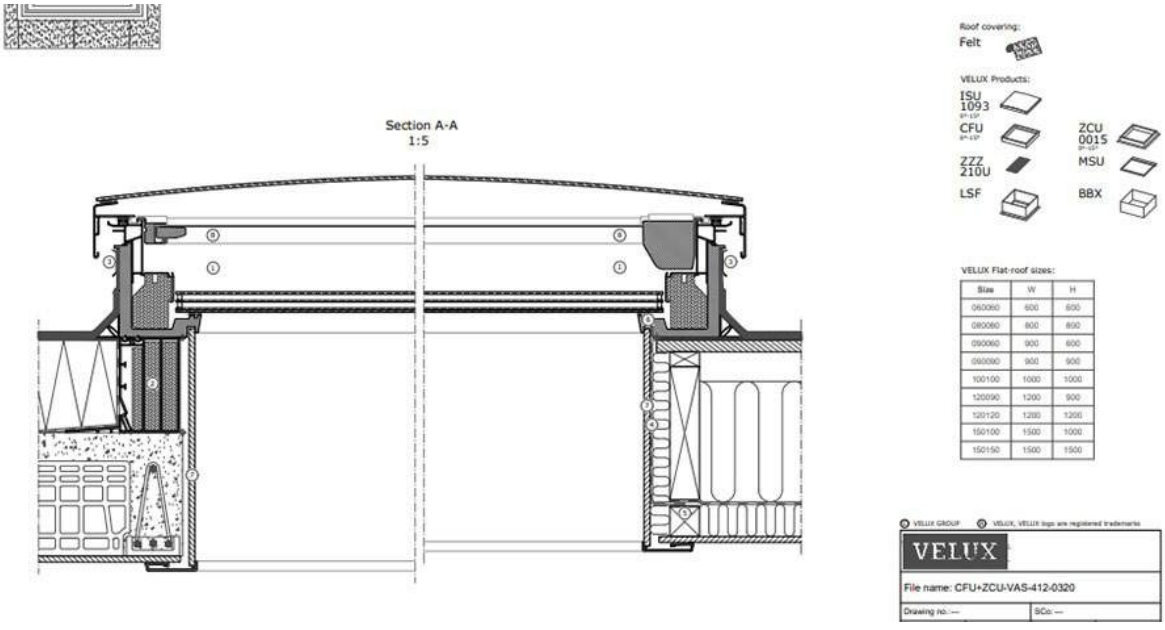
Roof: 0.11 W/m²K, achieved through a combination of 100mm and 110mm Unilin insulation layers, totalling 210mm. (Appendix E)

Floor: 0.13 W/m²K, utilising 130mm thick Unilin insulation.(Appendix C)



Windows: Double glazing with a minimum U-value of 1.4 W/m²K.

Rooflight: Minimum U-value of 1.8 W/m²K.



These measures will ensure the building exceeds current energy efficiency standards, helping to reduce heating and cooling demands and promising significant long-term cost savings.

SUSTAINABLE DESIGN FEATURES

The following sustainable design features have been incorporated into the proposed development, both internally and externally:

1. *Green Sedum Roof*

A green roof will help manage stormwater runoff, improve insulation, and enhance biodiversity. The green sedum roof will contribute to Sustainable Drainage Systems (SuDS) by absorbing rainwater, reducing surface water runoff, and preventing localised flooding. The roof's capacity to retain water will ease pressure on the local drainage system.

The sedum layer will enhance thermal insulation, reducing heat loss in winter and heat gain in summer. This natural insulation lowers energy demand for heating and cooling, reducing the building's carbon footprint. A green roof encourages local biodiversity by providing habitat for birds, bees, and other pollinators, contributing to a healthier urban ecosystem. Green roofs help absorb air pollutants and contribute to cooling urban areas by reducing the urban heat island effect.

2. *LIFX Energy-Efficient Lighting*

LIFX energy-efficient light bulbs will be installed throughout the dwelling, reducing electricity consumption.

LIFX energy-efficient LED light bulbs consume significantly less electricity than traditional incandescent or halogen bulbs, reducing the household's energy demand and associated carbon emissions. These bulbs have a much longer lifespan, which reduces the need for frequent replacements, lowering material waste and maintenance costs over time. LIFX bulbs can be controlled remotely, allowing for greater flexibility in managing lighting. This optimises energy use by ensuring lights are only used when needed.

3. *EM Ceramic Pipes for Water Treatment*

These pipes will enhance water quality by naturally filtering and treating water, providing a healthier water supply. EM (Effective Microorganisms) ceramic pipes improve water quality by reducing harmful substances and promoting beneficial microorganisms in water systems. This leads to cleaner and healthier water for household use. EM ceramics are a sustainable water treatment method that requires no energy input or chemicals, making it an environmentally friendly solution. EM ceramics can help reduce limescale buildup in plumbing, improving the longevity of the system and appliances while reducing the need for harsh chemical cleaners.

4. *Mirror Infrared Panels (Bathroom)*

These energy-efficient heating panels will provide a low-energy solution for heating in the bathroom.

Infrared panels are highly energy efficient, converting nearly all electricity into heat. They provide instant warmth without heating the air, offering health benefits such as improving circulation, relieving joint pain, and reducing mould and damp issues. This ensures the well-being of the future occupants.

5. *Clay Plastering for Internal Surfaces*

Natural clay plaster will regulate humidity, improve air quality, and offer a sustainable alternative to traditional plastering methods.

Clay plaster is an environmentally friendly, non-toxic material that provides a sustainable alternative to conventional plaster. It has a low embodied energy and can be sourced from renewable resources. Clay plaster naturally regulates indoor humidity by absorbing excess moisture and releasing it when the air is dry. This helps maintain a healthy indoor environment and reduces the likelihood of condensation and mould growth. Clay plaster is free of harmful chemicals and VOCs (volatile organic compounds), contributing to healthier indoor air quality for occupants.

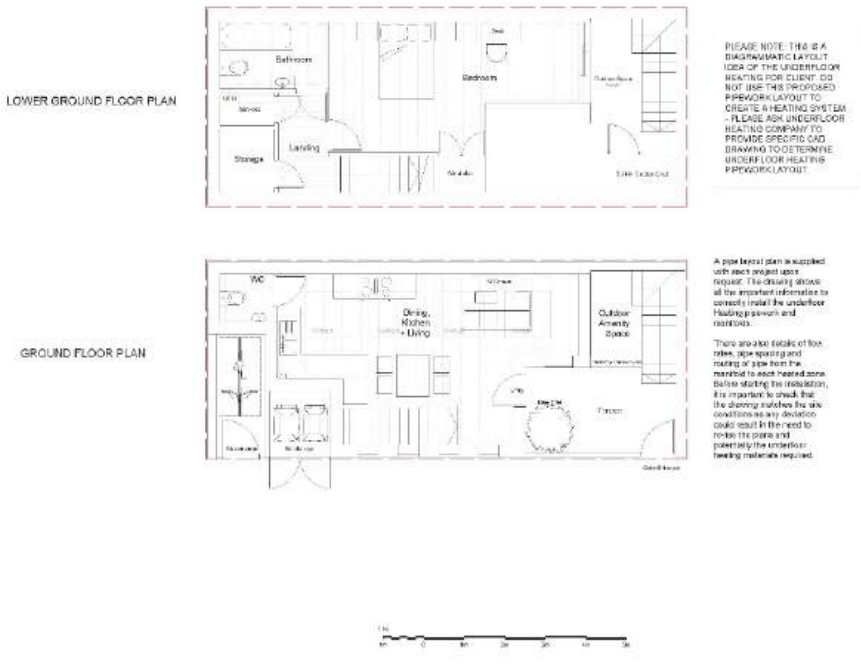
6. *Permeable Paving with Resin Bound Porous Surface*

The external paving will be constructed with permeable materials, ensuring that rainwater can naturally infiltrate the ground, reducing flood risk and improving water management. The permeable paving system will allow rainwater to filter through the surface, reducing runoff and promoting natural groundwater recharge. This aligns with SuDS principles and reduces the risk of flooding. Resin-bound paving is durable, resistant to cracking, and requires minimal maintenance, offering long-term sustainability and cost savings. The paving provides an attractive, smooth, and seamless finish, enhancing the outdoor spaces around the development while ensuring environmental performance.

7. Underfloor Heating (UfH)

A highly efficient underfloor heating system will be installed. This system works at lower temperatures than traditional radiators, thereby reducing energy consumption.

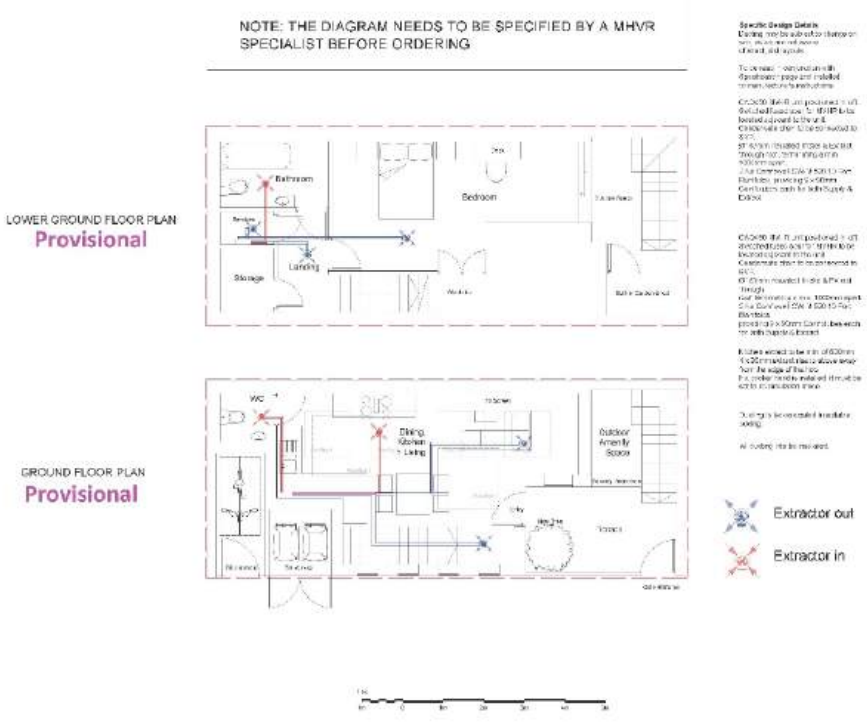
Underfloor heating systems operate at lower temperatures than traditional radiators, making them more energy-efficient. They provide even heat distribution, reducing the overall energy demand for house heating. By eliminating the need for bulky radiators, underfloor heating provides more usable wall space and enhances the interior's aesthetic appeal. The system also provides comfortable, even heat distribution across rooms. Once installed, underfloor heating systems require little maintenance, ensuring long-term sustainability and lower operating costs. (Appendix B)



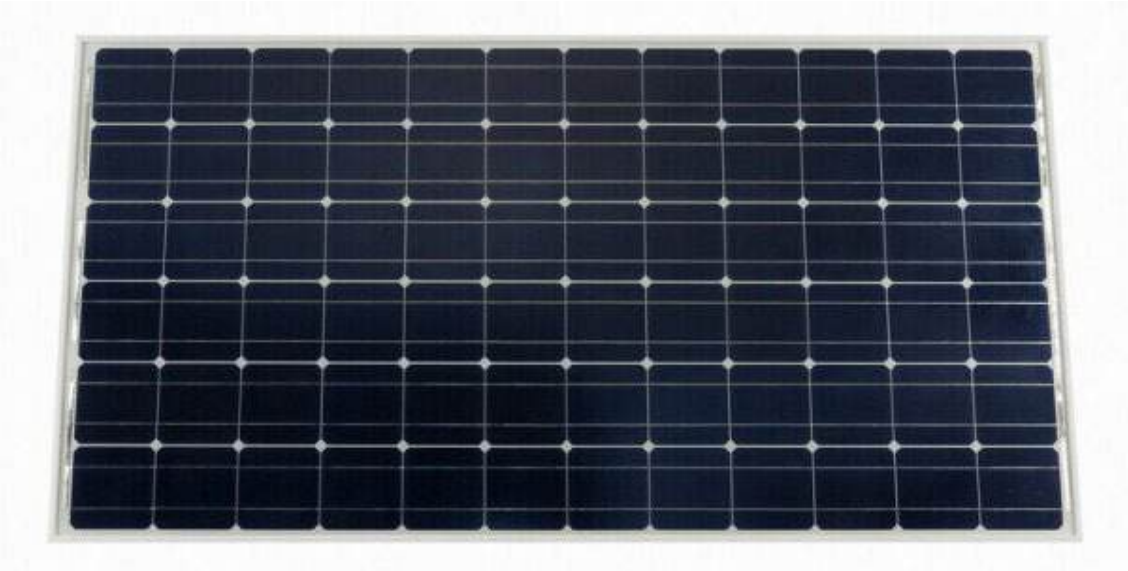
8. Mechanical Ventilation with Heat Recovery (MVHR)

This system will recover heat from the air extracted from the building, improving energy efficiency by reducing the need for additional heating.

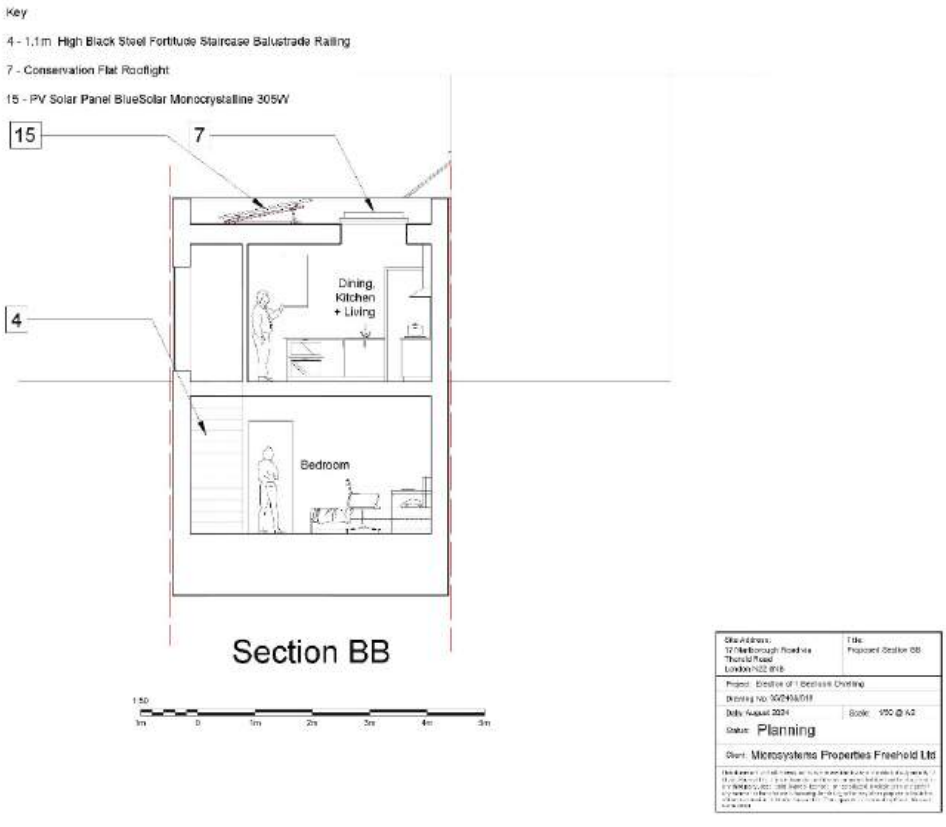
The MVHR system recovers heat from the exhaust air and uses it to warm the fresh incoming air, significantly reducing the energy required for heating the home. This leads to lower energy consumption and reduced heating costs. MVHR systems provide a constant supply of fresh, filtered air, which improves indoor air quality by removing pollutants, allergens, and moisture, reducing the risk of condensation and mould. The MVHR system helps maintain a stable indoor temperature and humidity, creating a more comfortable and healthy living environment. (Appendix A)



9. PV Solar Panel BlueSolar Monocrystalline 305W



The Victron Energy 305W-20V Mono Solar Panel (1640 x 992 x 35mm) is a high-efficiency monocrystalline module designed to promote sustainable energy solutions by harnessing solar power. Its compact design and reliable performance make it an ideal choice for both residential and commercial applications, enabling users to reduce their carbon footprint while benefiting from clean, renewable energy. By converting sunlight into electricity, this panel contributes to lowering dependency on fossil fuels, reducing greenhouse gas emissions, and supporting a transition to a more sustainable and eco-friendly energy system.



MATERIALS AND CONSTRUCTION

The flooring will be constructed using a beam and block system, which provides good thermal performance and durability, ensuring a long-lasting and sustainable construction solution.

To meet the minimum U value of 0.13 W/m²K, remove topsoil and vegetation and apply weed killer. If required by Building Control, provide 50mm concrete ground cover.

The underside of the beams must be at least 150mm above the top of the ground. PCC beams must be supplied and fixed according to the beam manufacturer's plan, layout, and details (details and calculations must be sent to Building Control for approval before works commence).

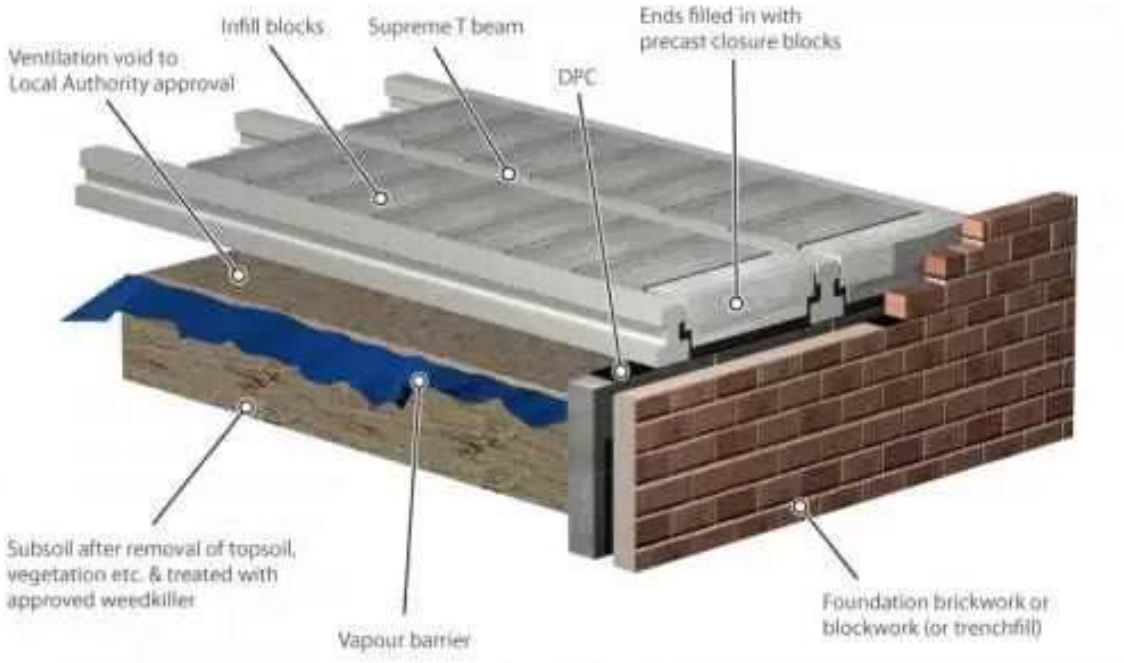
The beam must have a minimum bearing of 100mm onto DPC and load-bearing walls. Provide concrete blocks to BS EN 772-2, wet and grout all joints with a 1:4 cement/sand mix, and provide double beams below non-load-bearing partitions.

Lay a 1200g DPM/radon barrier over the beam and block floor, with 300mm laps double welted and taped at joints and service entry points using radon gas-proof tape.

Lay floor insulation over DPM, with 150mm Celotex XR4000 applied as a rigid material. To avoid thermal bridging, 25 mm insulation should continue around floor perimeters.

Lay a 500g separating layer over insulation, provide a 75mm sand/cement screed over it, and prepare for floor finishes as required. The top surface of the ground cover under the building shall be above the finished level of the adjoining ground.

Provide cross-ventilation of the underfloor to the outside air by ventilators in at least two opposite external walls of the building. Ventilation openings shall have an opening area of 1500mm² per metre run of perimeter wall or 500mm² per square metre of floor area, whichever is greater. Sleeper walls shall be of honeycombed construction or have provision for ventilation distribution.



WATER USE

Following sustainable water use guidelines, water-saving features such as water-efficient fixtures and fittings will be implemented within the dwelling. The installation of water butts for rainwater harvesting will further support water conservation efforts, and the use of EM Ceramic Pipes will contribute to efficient water management.

Following Approved Document G2, the estimated water consumption is at most 125 litres per person daily. Water Efficiency will be calculated using the 'Water Efficiency Calculator for New Dwellings', and the results will be submitted to building control before works commence on site.

Water calculation to comply with Code for Sustainable Home Level 3/4 as the local Planning Authority stipulates. Example calculation below;

WC 5/3 (dual flush)
Taps (excluding kitchen taps) 4
Baths 180
Shower 8
Kitchen sink taps 6
Washing machine 8.17 (not supplied)
Dishwasher 1.25 (not supplied)
Water recycling 0 (not supplied)
Predicted per capita consumption (Code) 103.28
Waste arising from the construction process has been an area of focus for some years now, with the industry making good strides in reusing and reducing materials, which not only helps the environment but also engenders significant cost savings for developers.

The appointed contractor for the scheme will be encouraged to develop a comprehensive site waste management plan (SWMP) prior to the start of construction, reflecting the recognition that the reduction of waste begins in the design and ordering stage of a project and carries on through to the sign-off of the building. This SWMP will set targets and procedures for the sorting, reusing, and recycling construction waste into defined waste groups, either on-site or through a licensed contractor at a waste transfer station

The generation of waste continues beyond the end of the construction process, and adequate provision will be supplied to the proposed residential units and externally to the rear of the dwelling to allow for the sorting of general waste from recyclable materials.

Pollution can occur in various guises, and attempts will be made to design out or mitigate against a several issues are identified below.

Light pollution will be countered using external lighting, which only involves energy-efficient fittings, daylight detectors and angling/capping to prevent unnecessary glare. This idea will also be kept to a minimum.

TREE CHARACTERISTICS AND ENVIRONMENTAL CONTRIBUTIONS

The Amelanchier alnifolia 'Obelisk' is a deciduous, small, upright tree known for its slender growth habit, attractive spring blossoms, and striking autumn foliage. It provides several ecological and environmental benefits that make it an ideal choice for urban development:

The Amelanchier 'Obelisk' tree can be incorporated into a sustainable drainage system (SuDS), supporting water management during development.

The tree's root system can help absorb and slow down surface water runoff, reducing the risk of localised flooding. This is particularly valuable in urban areas where impermeable surfaces dominate. By absorbing rainwater and improving infiltration, the tree contributes to sustainable water management and reduces the pressure on drainage infrastructure.

The Amelanchier 'Obelisk' root system helps stabilise the soil, preventing erosion, which can be a risk in urban development. This benefit aligns with the broader goals of SuDS, which aim to maintain natural drainage patterns and improve groundwater recharge.

Urban trees, including the Amelanchier 'Obelisk', improve air quality by absorbing nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and particulate matter. By filtering these pollutants through its leaves and bark, the tree contributes to cleaner air, benefiting the health of residents and the surrounding community.

CONCLUSION

The proposed two-storey dwelling incorporates a range of sustainable design and construction measures to ensure it meets the environmental performance goals set out by the Haringey Local Plan and London Plan. These features, combined with high levels of insulation and energy-efficient systems, will result in a building that is both environmentally responsible and compliant with current regulations, contributing positively to the local area's sustainability objectives.

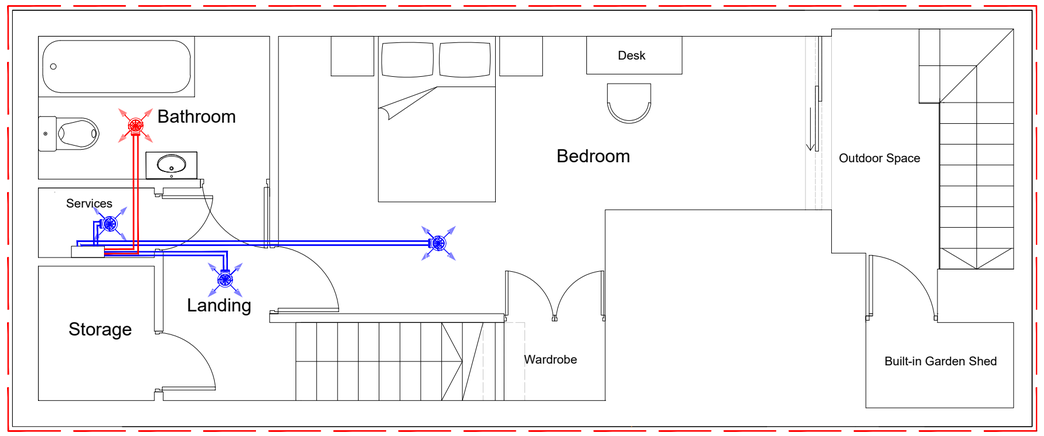
The proposed sustainable design features also offer a range of environmental, economic, and social benefits. Each feature contributes to the development's sustainability by improving energy efficiency, reducing resource consumption, enhancing indoor air quality, and supporting biodiversity. Together, these measures ensure that the house will meet current building regulations and sustainability standards and provide long-term value for the residents and the local environment.

APPENDIX A – MVHR LAYOUT DIAGRAM

NOTE: THE DIAGRAM NEEDS TO BE SPECIFIED BY A MHVR SPECIALIST BEFORE ORDERING

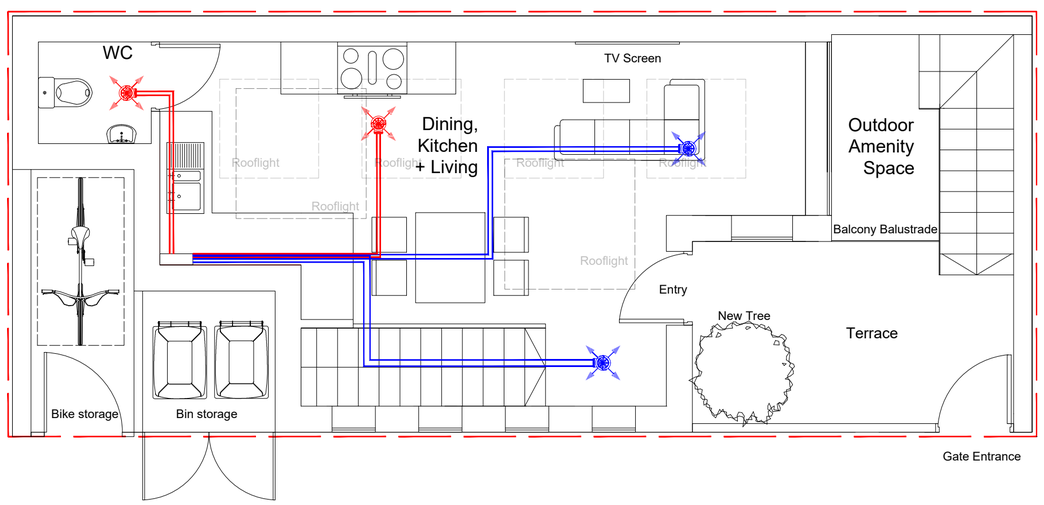
LOWER GROUND FLOOR PLAN

Provisional



GROUND FLOOR PLAN

Provisional



1:50

1m 0 1m 2m 3m 4m 5m

Specific Design Details
Ducting may be subject to change on site, as we are not aware of exact joist layouts.

To be read in conjunction with Specification page and installed to manufacturer's instructions.

CAQ450 MVHR unit positioned in loft.
Switched fused spur for MVHR to be located adjacent to the unit.
Condensate drain to be connected to SVP.
Ø180mm insulated Intake & Extract through roof, terminating a min. 1000mm apart.
2 No Comfowell CW-M 520 10 Port Manifolds, providing 9 x 90mm Comfotubes each for both Supply & Extract.

CAQ450 MVHR unit positioned in loft.
Switched fused spur for MVHR to be located adjacent to the unit.
Condensate drain to be connected to SVP.
Ø180mm insulated Intake & Extract through
roof, terminating a min. 1000mm apart.
2 No Comfowell CW-M 520 10 Port Manifolds,
providing 9 x 90mm Comfotubes each for both Supply & Extract.

Kitchen extract to be min. of 600mm 4 x 90mm extract rise to above away from the edge of the hob.
If a cooker hood is installed, it must be set to re-circulation mode.

Ducting to be concealed in suitable boxing.

All ducting into be insulated.

Extractor out

Extractor in

Site Address: 17 Marlborough Road via Thorold Road London N22 8NB	Title: Proposed Mechnical Ventilation Heat Recovery Unit
Project: Erection of 1 Bedroom Dwelling	
Drawing No: 05/2407/021	
Date: August 2024	Scale: 1/50 @ A2
Status: Planning	
Client: Microsystems Properties Freehold Ltd	

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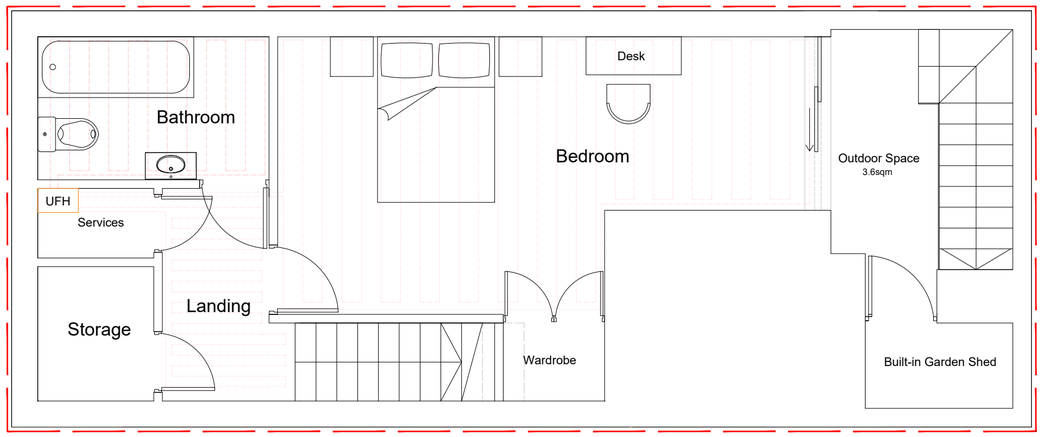
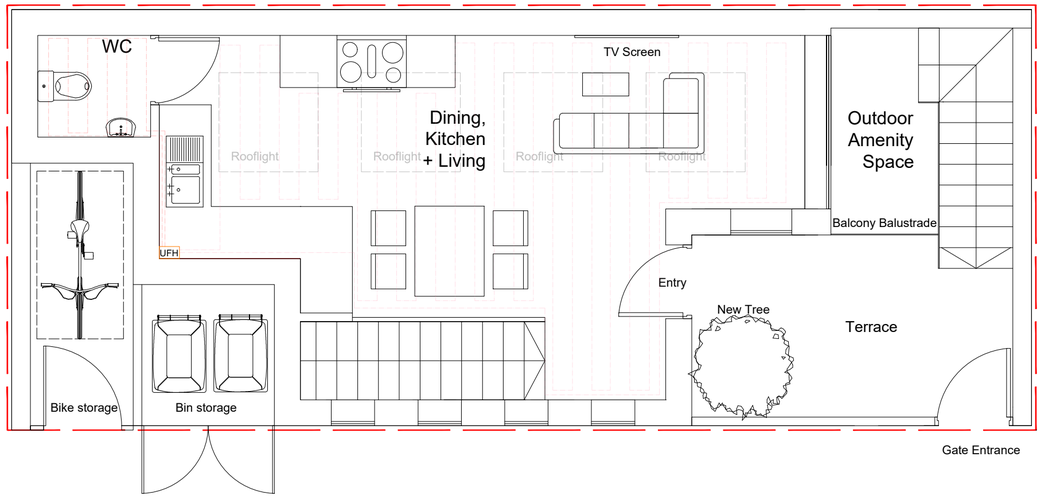
APPENDIX B – UNDERFLOOR HEATING LAYOUT DIAGRAM

LOWER GROUND FLOOR PLAN



PLEASE NOTE: THIS IS A DIAGRAMMATIC LAYOUT IDEA OF THE UNDERFLOOR HEATING FOR CLIENT. DO NOT USE THIS PROPOSED PIPEWORK LAYOUT TO CREATE A HEATING SYSTEM - PLEASE ASK UNDERFLOOR HEATING COMPANY TO PROVIDE SPECIFIC CAD DRAWING TO DETERMINE UNDERFLOOR HEATING PIPEWORK LAYOUT.

GROUND FLOOR PLAN



A pipe layout plan is supplied with each project upon request. The drawing shows all the important information to correctly install the underfloor Heating pipework and manifolds.

There are also details of flow rates, pipe spacing and routing of pipe from the manifold to each heated zone. Before starting the installation, it is important to check that the drawing matches the site conditions as any deviation could result in the need to revise the plans and potentially the underfloor heating materials required.

1:50

1m 0 1m 2m 3m 4m 5m

Site Address: 17 Marlborough Road via Thorold Road London N22 8NB	Title: Proposed Underfloor Heating Layout Diagram
Project: Erection of 1 Bedroom Dwelling	
Drawing No: 05/2407/022	
Date: August 2024	Scale: 1/50 @ A2
Status: Planning	
Client: Microsystems Properties Freehold Ltd	

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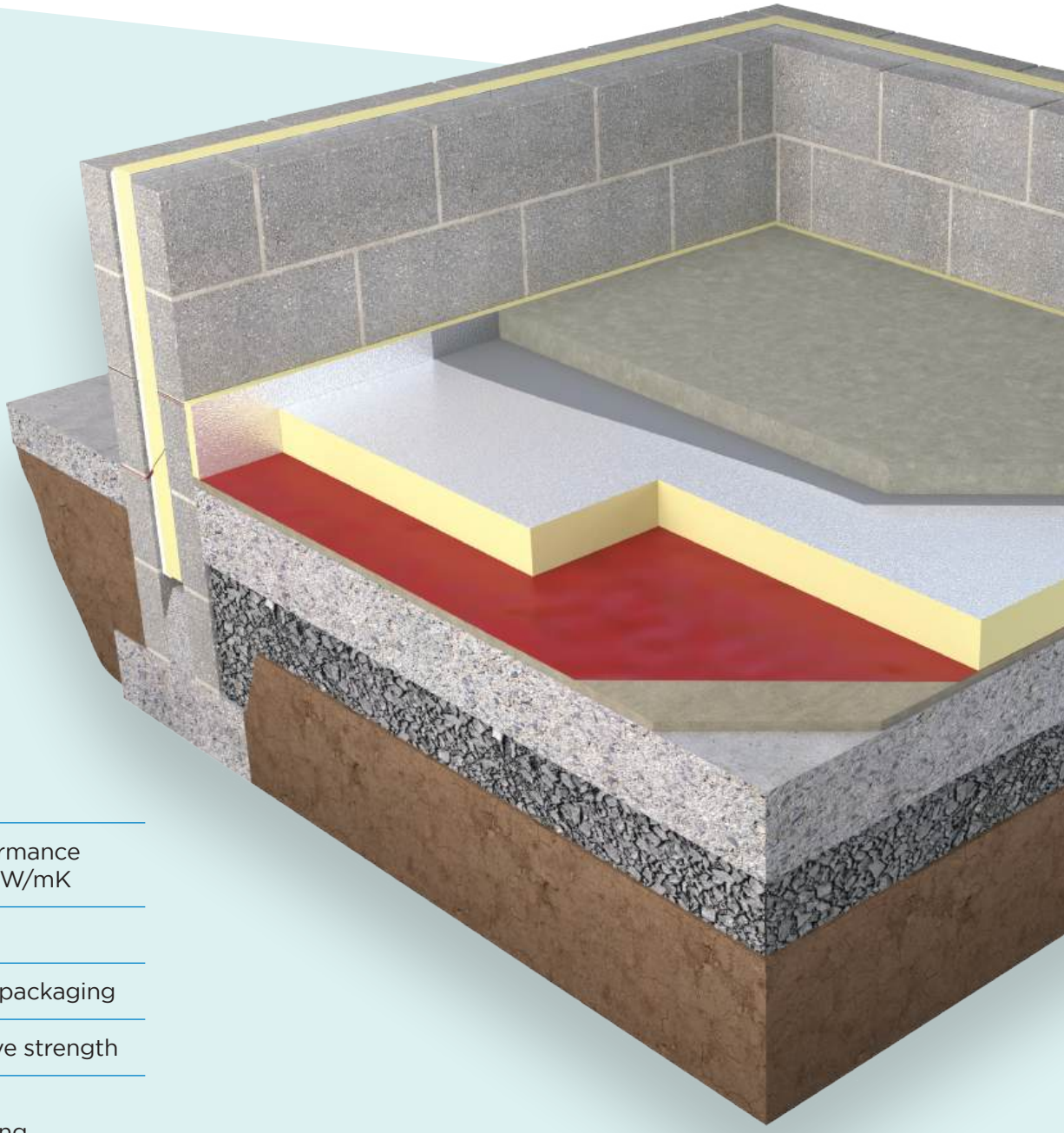
APPENDIX C – SUSPENDED FLOOR INSULATION

ECO360 BIO-ENHANCED PIR INSULATION

Solid & Suspended Floors

ECO/MA (FLOORS)



- Enhanced performance as low as 0.020 W/mK
- Halogen free
- Bio-degradable packaging
- High compressive strength
- Suitable for underfloor heating

UNILIN INSULATION

ECO360 BIO-ENHANCED PIR INSULATION
Solid & Suspended Floors

ECO/MA (FLOORS)

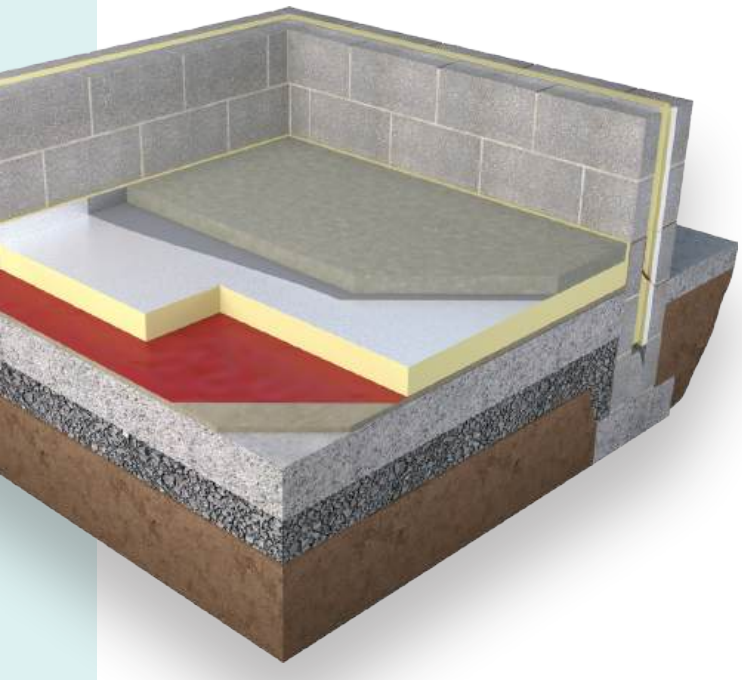
Bio-enhanced, superior performance PIR insulation suitable for solid and suspended floors. **ECO360 MA** for floors offers excellent insulation performance with a thermal conductivity of 0.020 W/mK.

This bio-enhanced insulation will significantly improve the U-Value of new and existing floors. It is lightweight, easy to install and combines high compressive strength with low thermal conductivity, providing a high performance solution for floor insulation.

It offers a bio-enhanced formulation which is halogen free. The product packaging is bio-degradable and the overall content has been reduced significantly.

Benefits

- Bio-enhanced PIR insulation
- Enhanced performance as low as 0.020 W/mK
- Halogen free
- Bio-degradable packaging
- High compressive strength
- Suitable for underfloor heating



Specification Clause

The floor insulation shall be ECO360 MA Floors manufactured to EN 13165 by Unilin Insulation, comprising a rigid modified Polyisocyanurate (PIR) core with textured robust low emissivity foil facings. The ECO360 MA_ _ _mm with a declared Lambda value as low as 0.020 W/mK to achieve a U value of __ _ _W/m2K for the floor element. To be installed in accordance with instructions issued by Unilin Insulation.

Refer to NBS clause M10 290, M10 40, M13 260 M13 40.

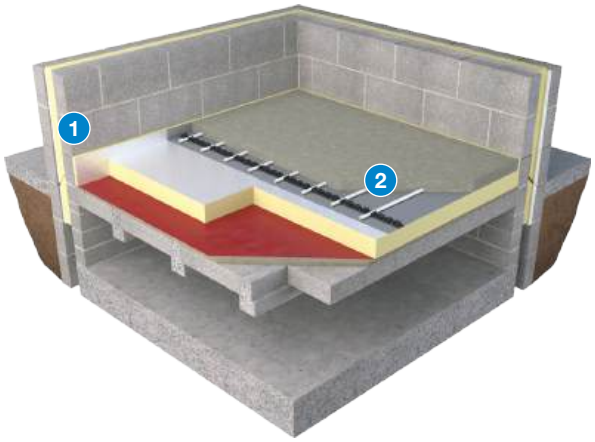
Thermal Resistances

Thickness (mm)	R-Value (m^2K/W)
100	5.0
125	6.25
150	7.5

Resistance ‘R’ Values

The resistance value of any thickness of Unilin insulation can be ascertained by simply dividing the thickness of the material (in metres) by its agrément declared Lambda value, for example: Lambda 0.020 W/mK and thickness 100mm -> 0.100/ 0.020 -> R-Value = 5.0. In accordance with EN 13165, R-Values should be rounded down to the nearest 0.05 (m^2K/W).

ECO/MA (FLOORS)



1. Good detailing at the wall/floor junction is essential in reducing Thermal Bridging. By placing an upstand of Unilin Perimeter Strip (XO/STR at 0.021 W/mK) insulation with a minimum 25mm thickness around the external and internal wall/floor junctions, a robust detail is created.

2. ECO360 MA is lightweight and suitable for use with underfloor heating. Thanks to its thickness to performance ratio, it allows for reduced insulation thickness. The boards should be laid with closely butted joints, laid staggered with a break bonded pattern and fitted tightly at edges and around any service penetrations.

Note: This product has the strength and thermal properties required to reach the high performance U-Values specified in the Building Regulations.

ECO/MA

Length (mm)	2400
Width (mm)	1200
Thickness (mm)	100, 125, 150

Property & Units

Thermal Conductivity	0.020 (W/mK)
Compressive Strength	>150 (kPa)
Reaction to Fire	NPD

Unilin Declaration of Performance (DoP) for this product is available for download from our website.

INSTALLATION GUIDELINES

ECO/MA (FLOORS)

Below Concrete Slab

1. Lay and level the hardcore in layers 150mm min/ 250mm max and compact well.
2. Sand blind base to create a level surface and to protect DPM.
3. The damp proof membrane (DPM), normally 1200g polythene or radon barrier, should be laid over the blinding, tape lapped joints to prevent passage of ground moisture. Carry DPM up to the wall to meet and seal with the DPC course. Contact the membrane manufacturer for further guidance on installation and best practice.
4. Lay the ECO360 MA for floors across the DPM. If two layers are required, lay the boards in a staggered jointed pattern. Closely butt all edges.
5. Place Unilin Perimeter Strips (XO/STR) around floor perimeter to provide robust detailing in order to reduce Thermal Bridging. Ensure top of perimeter strip is level with top of floor finish. Seal around any service penetrations.
6. Lay a thin gauge polythene sheet, to act as a separating layer, over the insulation with 150mm lap joints. VCL should be taped at the joints to ensure a continuous separating layer, as per BRE GBG 45 “Insulating Ground Floors”.
7. If underfloor heating is required, lay pipes and clip to the insulation boards through the separating layer. Follow UFH manufacturer’s guidelines.
8. Pour and compact concrete slab to required finish floor level.

Below Floor Screed

1. Lay and level the concrete slab, allowing sufficient time to dry out, as per BS 8203.
2. Beam and block floors may need a levelling screed or grouting to ensure base level. Refer to manufacturer’s guidelines.
3. The damp proof membrane (DPM), normally 1200g polythene or radon barrier, should be laid over the blinding, tape lapped joints to prevent passage of ground moisture. Carry DPM up to the wall to meet and seal with the DPC course. Contact the membrane manufacturer for further guidance on installation and best practice.
4. Lay the ECO360 MA for floors boards across the DPM. If two layers are required, lay the boards in a staggered jointed pattern. Closely butt all edges.
5. Place Unilin Perimeter Strips (XO/STR) around floor perimeter to provide robust detailing in order to prevent Thermal Bridging. Ensure top of perimeter strip is level with top of floor finish. Seal around any service penetrations.
6. Lay a thin gauge polythene sheet, to act as a separating layer, over the insulation with 150mm lap joints. Separating layer should be taped at the joints to ensure a continuous separating layer, as per BRE GBG 45 “Insulating Ground Floors”.
7. If underfloor heating is required, lay pipes and clip to the insulation boards through the separating layer. Follow manufacturer’s guidelines.
8. Pour screed according to screed manufacturer’s guidelines.

Suspended Timber Floor

1. Install joists in the normal manner, ensuring adequate ventilation.
2. Measure gaps between joists and cut ECO360 MA for floors to size, allowing for variations in joist spacings.
3. Mechanically fasten treated timber battens to the joists, allowing for correct thickness of insulation. Galvanised nails or saddle clips may also be used, ensuring nails are left 40mm proud of the joists.
4. Install ECO360 MA for floors between joists with joints tightly butted and seal any gaps with expanding foam.
5. If two insulation layers are required, lay the boards in a staggered jointed pattern, also sealing any gaps with expanding foam.
6. Floor boards should be laid directly to the joists.

ACDs must be followed to ensure that installation is in accordance with current Building Regulations and accounted for in the energy calculation.

THERMAL PERFORMANCE

ECO/MA (FLOORS)

Typical U-Values

CERTIFICATE CS/nnnn-n
U Value Competency Scheme

Table 1
ECO/MA (FLOORS) Insulation for Ground Supported Slab

Build up:

- 65mm screed
- Separating layer Polythene sheet
- ECO360 MA with perimeter strip
- DPM 1200 gauge polythene or radon barrier
- Concrete slab

Perimeter/Area Ratio

Thickness (mm) 0.30	0.40	0.50	0.60	0.70	0.80	Target U-Value
-	-	-	-	-	-	**0.18**
-	100	100	-	-	-	**0.15**
-	-	125	125	125	125	**0.13**

Table 2
ECO/MA (FLOORS) Beam & Block Suspended Floor

Build up:

- 65mm screed
- Separating layer Polythene sheet
- ECO360 MA with perimeter strip
- Beam and block

Perimeter/Area Ratio

Thickness (mm) 0.30	0.40	0.50	0.60	0.70	0.80	Target U-Value
-	-	-	-	-	-	**0.18**
100	100	-	-	-	-	**0.15**
125	125	125	125	125	-	**0.13**

THERMAL PERFORMANCE

ECO/MA (FLOORS)

Typical U-Values

CERTIFICATE CS/nnnn-n
U Value Competency Scheme

Table 3
ECO/MA (FLOORS) Hollow Core Floor

Build up:

- 65mm screed
- Separating layer Polythene sheet
- ECO360 MA with perimeter strip
- Hollow core slab

Perimeter/Area Ratio

Thickness (mm)	0.30	0.40	0.50	0.60	0.70	0.80	Target U-Value
	-	-	-	-	-	-	**0.18**
	-	100	100	100	-	-	**0.15**
	-	125	125	125	125	125	**0.13**

HANDLING, CUTTING & STORAGE

Unilin insulation should be stored off the ground, on a clean, flat surface and must be stored under cover. The polythene wrapping is not considered adequate protection for outside exposure. Care should be taken to protect the insulation in storage and during the build process.

The insulation boards can be readily cut using a sharp knife or fine toothed saw. Ensure tight fitting of the insulation boards to achieve continuity of insulation as asked for within the ACDs. Appropriate PPE should be worn when handling insulation. Please refer to Health & Safety data sheets on our website.

The boards are wrapped in bio-degradable film and each pack is labelled with details of grade/type, size and number of pieces per pack.

Durability

Unilin Insulation products are stable, rot proof, provide no food value to vermin and will remain effective for the lifetime of the building, depending on specification and installation. Care should be taken to avoid contact with acids, petrol, alkalis and mineral oil. When contact is made, clean materials in a safe manner before installation.

Expect more Knowledge

Unilin Insulation, formerly Xtratherm, is one of the UK's largest manufacturers and suppliers of insulation. We have a 20-plus year history of working in partnership with construction professionals to close the gap between design and as-built performance.

FREE
One-to-one advice

Higher standards of fabric performance call for greater adherence to best practice detailing. To achieve this and to 'close the gap' between design and build, we provide a dedicated Technical Team, all qualified to the highest standards of competency in U-Value calculation and condensation risk analysis.

Here to support you

- BRE listed Thermal Bridging Detailing
- BRE Trained Modelling
- BBA/TIMSA calculation competent
- Warranted Calculations available
- Immediate technical response
- SAP Qualified
- Insulation systems to deliver real onsite performance

Get in touch

T: +44 (0) 371 222 1055 **E:** info.ui@unilin.com **unilininsulation.co.uk**

UNILIN INSULATION

Unilin Insulation UK Ltd
Park Road, Holmewood
Chesterfield, Derbyshire
United Kingdom
S42 5UY

t. +44 (0) 371 222 1033
e. info.ui@unilin.com

unilininsulation.co.uk

ISO 45001 Occupational Health & Safety Management Systems
ISO 9001 Quality Management Systems
ISO 14001 Environmental Management Systems

UK_ECO/MA(FLOORS)_Jan2023_v1

The Sustainable Solution

Specifying Unilin Insulation is a real commitment to minimising energy consumption, harmful CO_2 emissions and their impact on the environment. Using our products is one of the most effective ways to reduce energy consumption – in fact, after just eight months the energy they save far outweighs the energy used in their production. In addition, our manufacturing facilities operate to an ISO 14001 certified Environmental Management System.

Environmental Product Declaration (EPD)

An Environmental Product Declaration or EPD for a construction product indicates a transparent, robust and credible step in the pursuit and achievement of real sustainability in practice, it is a public declaration of the environmental impacts associated with specified life cycle stages of that product. Unilin EPDs have been independently verified in accordance with EN 15804+A2:2019 and ISO 14025 accounting for stages of the LCA from A1 to A3, with options A4-A5 and modules C1-C4 and D included. The process of creating and EPD allows us to improve performance and reduce resource wastage through improvements in product design and manufacturing efficiency. They play a crucial role in manufacturing and construction and are increasingly asked for by industry.

EPDs and BREEAM

BREEAM is primarily trying to encourage designers to take EPDs into consideration when specifying products. BREEAM requires EPDs to be verified by a third-party. For the Mat 02 category, points are awarded based on whether EPDs are generic, manufacturer-specific, or product-specific. Non 3rd party verified EPDs to EN 15804 cannot be accepted. All of Unilin EPDs are externally verified.

Responsible Sourcing

Unilin has BES 6001 certification for responsible sourcing. The second BREEAM credit under that category is based on responsibly-sourced materials – at least 80% of the total insulation used in roofs, walls, ground floors and services must meet any of tier levels 1 to 6 in the BREEAM table of certification schemes. Our Environmental Management System is certified under EN ISO 14001, and our raw materials come from companies with similarly certified EMS (copies of all certificates are available for BREEAM assessments). This level of responsible sourcing meets tier level 6 in the BREEAM table.

Good workmanship and appropriate site procedures are necessary to achieve expected thermal and airtightness performance. Installation should be undertaken by professional tradespersons. The example calculations are indicative only, for specific U-Value calculations contact Unilin Insulation Technical Support. Unilin technical literature, Agrément certifications and Declarations of Performance are available for download on the Unilin Insulation website. The information contained in this publication is, to the best of our knowledge, true and accurate at the time of publication but any recommendations or suggestions which may be made are without guarantee since the conditions of use are beyond our control. Updated resources may be available on our websites. All images and content within this publication remain the property of Unilin Insulation.

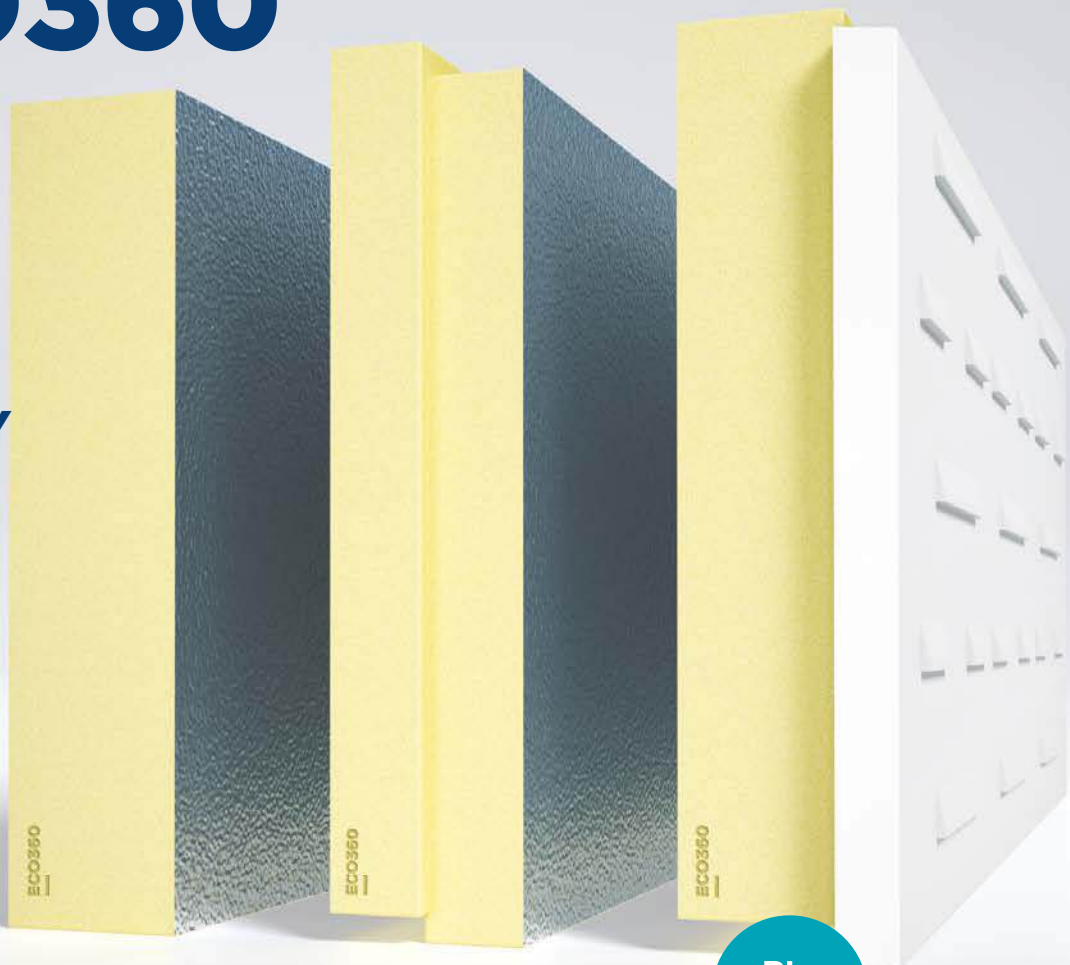
APPENDIX D – CAVITY WALL INSULATION

UNILIN INSULATION

ECO360

HIGH
THERMAL EFFICIENCY

LOW
EMBODIED CARBON



Bio Inside

0.020 W/mK

ECO360

The Strategy
At Unilin we realise that the Climate Emergency necessitates an accelerated drive for reducing our own environmental impact and the impact of the projects we work on.

Whole Life Carbon must be addressed in construction through the measurement and reduction of operational energy and embodied carbon.

The ECO360 strategy is a commitment by Unilin to continually review and improve the sustainable credentials of our product offering to meet those sustainability targets.

The Product
Our ECO360 Range sees pioneering environmental improvements in the manufacturing, delivery and use of PIR insulation.

- Bio-enhanced formulation
- Improved thermal performance of 0.020 W/mK
- Bio-degradable packaging materials
- Halogen free formulation
- Part of a design solution to achieve RIBA/RIAI Climate Challenge 2030, LETI Standards and the Future Homes Hub targets.

Bio-enhanced insulation

Part of a solution to meet Climate Challenge 2030 and LETI Targets

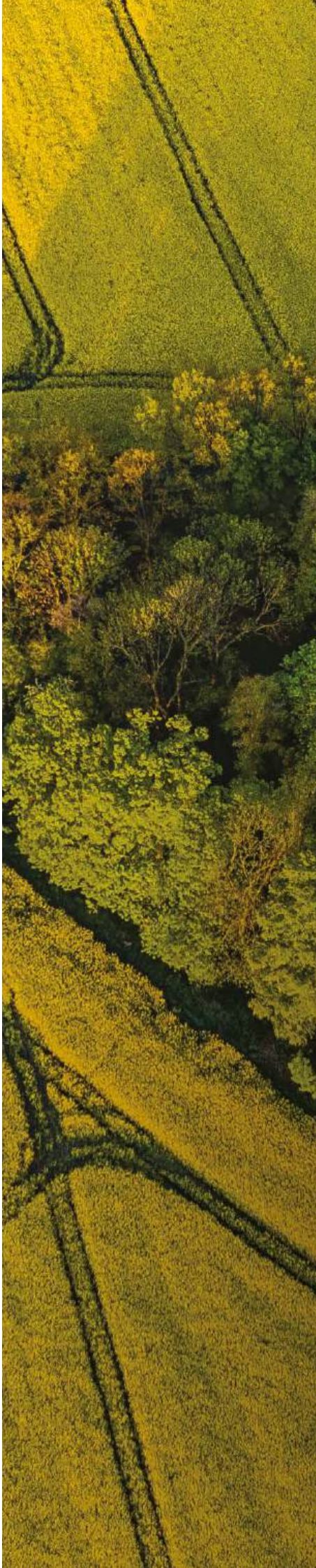
More than 50% reduction in packaging materials

Halogen free formulation

Improved thermal performance of 0.020 W/mK

Bio-degradable packaging materials

Reduction of onsite waste



ONEHOME

At Unilin Group, sustainability is our top priority. We take responsibility for protecting our planet. But being sustainable means more. It is also about the quality of life of those who buy our products: our customers. And creating a sustainable working environment for our employees.

As part of the global group of Unilin companies, we are now able to deliver even more by combining our efforts across the world for even greater environmental impact under Unilin's ONEHOME strategy.

One Home targets real change and is backed by investment to make our sustainability pledges a reality. It will help us deliver environmental improvements to our products, our operations and in how we do business.

As a company, we are committed to science based targets (SBTs) and we will work with industry and communities to learn and share knowledge. We will adapt to deliver a more sustainable future for our families and the communities in which we work and live.

For more information on Unilin Insulation's sustainability goals look for our Sustainability Pledge online.

Environmental targets for projects

Both energy performance and embodied carbon reduction must be tackled on construction projects to address the Climate Emergency.

Unilin has played a major part in developing the understanding and strategies needed to reduce operation energy in new build homes. We have been instrumental in creating tools and sharing our knowledge that helps deliver optimal fabric energy performances and better understanding of concepts such as U-values and thermal bridging calculation.

As the construction industry drives building performance towards nZEB, Future Homes and Passive standards for 2025-2030, attention now turns to focus on 'Whole Life Carbon'.

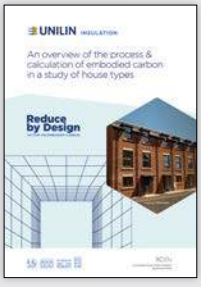
At Unilin we have developed a comprehensive understanding and learning tools that we share with our industry partners to allow the development of effective strategies to reduce Whole Life Carbon and encourage engagement with the concept.

Manufacturers have been producing EPDs (Environmental Performance Declarations) for many years, but understanding the part material choice plays in the overall impact of a building has been lacking.

What part does an EPD play in a Life Cycle Assessment, the methodology used to calculate Whole Life Carbon?

What materials should be accounted for? Does material specification measured meet the operation requirement targets?

These issues require greater understanding.



Embodied Carbon Report

Visit the Unilin Insulation website to download our updated 2023 edition of 'An overview of the calculation of embodied carbon for 4 house types'.

HIGH THERMAL EFFICIENCY

LOW EMBODIED CARBON

Reaching the targets

Governments are in the process of setting ambitions to help the construction sector improve reporting on embodied carbon.

Recent policy documents launched by RIBA/RIAI, LETI, and the Future Homes Hub have given the construction industry a pathway to better understanding of the concept of Whole Life Carbon and most importantly their indicative targets for embodied carbon now allow industry to engage and improve on both material performance and whole building carbon to strive towards and achieve those targets.

Those organisations that have set embodied carbon targets to provide a benchmark for LCAs (Life Cycle Assessments). In all published guidance, the calculation method is drawn from the RICS (Royal Institute of Chartered Surveyors) methodology. (RICS information paper IP 32/2012).

There are differences in guidance from these organisations. Some refer to **upfront carbon** and others **whole life carbon.**

PRODUCT STAGE	Raw material supply	A1
	Transport	A2
	Manufacturing	A3
CONSTRUCTION ON PROCESS STAGE	Transport from the gate to the site	A4
	Assembly	A5
USE STAGE	Use	B1
	Maintenance	B2
	Repair	B3
	Replacement	B4
	Refurbishment	B5
	Operational energy use	B6
	Operational water use	B7
END OF LIFE STAGE	De-construction demolition	C1
	Transport	C2
	Waste processing	C3
	Disposal	C4
BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES	Reuse - Recovery - Recycling potential	D

Upfront carbon is the emissions associated with the raw material extraction and processing, the energy used by the factory in producing the products, transporting materials to site, and constructing the building. This would encompass life stages A1-A5.

Whole Life Carbon assessments measure the carbon emissions over the whole life cycle of the building. From the extraction of the raw material to create the products to their disposal or reuse at their end of life. All life stages including transport, construction, maintenance and replacements are accounted for. Stages A1 to D.

Embodied Carbon Targets

Values are the kg of carbon dioxide or related equivalent per m^2 of gross internal floor area.

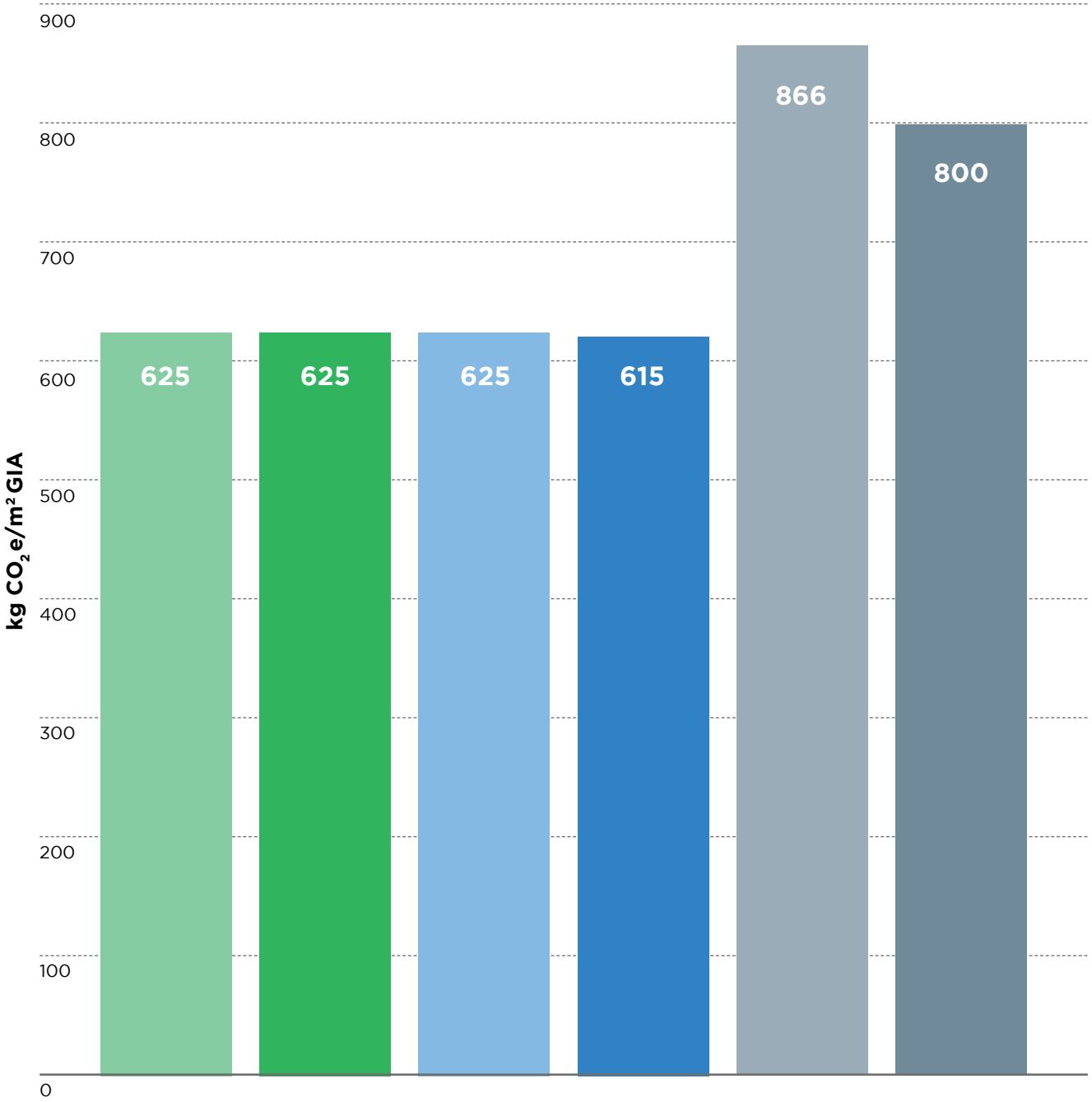
RIBA

RIAI

LETI

Future Homes Hub

GLA



CASE STUDY:

Project 80 Collaboration

The Centre for Future Homes – A case study for FHS and Whole Life Carbon

In collaboration with Tricas Construction, Birmingham City University and select industry suppliers including Unilin Insulation, Midland Heart Housing Association's Project 80 has been built to the Future Homes Standard (FHS) 3 years in advance of the 2025 legislation's introduction using masonry construction.

The development of high-quality social homes is not connected to the gas grid and designed to provide between 75% to 80% reduction in operational carbon.

The homes are subject of an extensive programme of evaluation by a team at Birmingham City University. The programme considered the following aspects -

- Project Design and Implementation – Design changes and modifications to the way the homes were built.
- Costing, economics and carbon accounting – The resources required to create new homes needed to be cost efficient and balanced against economic and environmental impact. The on-cost in construction, occupation and environmental impact were all assessed.
- Building performance and modelling – Changes made to achieve the Future Homes Standard and performance gaps were addressed with real data.
- User Satisfaction and learning analysis – The occupant is central to the success of the home. Different needs of a diverse population with different lifestyles and capabilities is accounted for.
- Evaluation of industry implications, whole life, economics and preparation – Changes to create Future Homes have long term implications for the whole industry. New skills, working practices, products, supply chains and maintenance practices were considered.

- **A whole life carbon assessment of one plot (Plot 12) to act as an introduction to the subject and to encourage engagement with Whole Life Carbon.**

The Case Study Calculation:
Plot 12, Project 80

The calculation methodology specifies that as part of the LCA process each building element is to be broken down into its components for which embodied carbon factors need to be sourced.

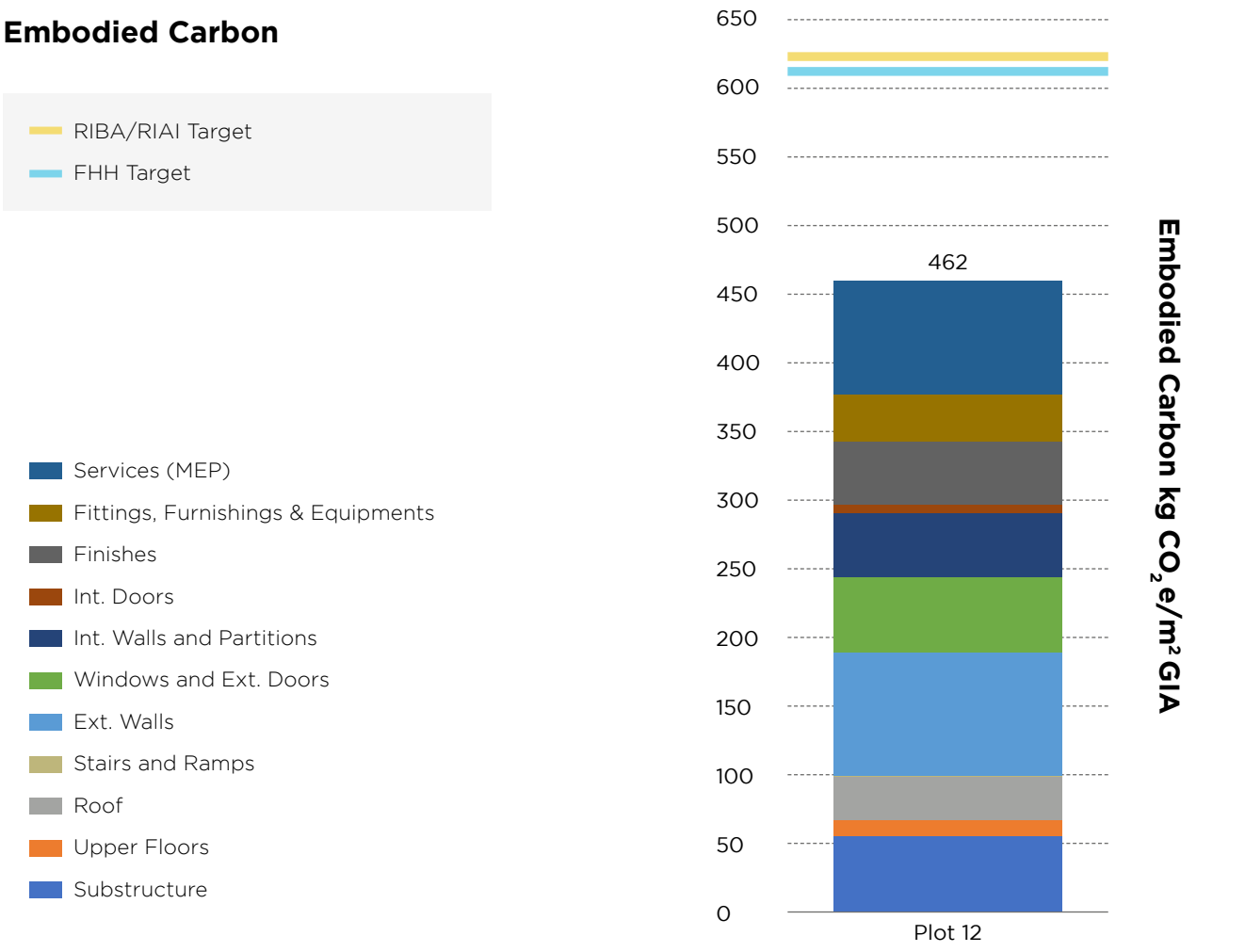
The specification met the Future Homes Standard. The materials specified and quantities taken within the calculation were provided by the project SAP Assessors and the project QS.

The software used for the LCA was the BRE certified One Click LCA tool.

Applicable verified EPDs were used where available, then as per convention local data was included. If neither of the first two were possible regional data was used.

The life cycle of the building was modelled over 60 years (There is a strong and valid case for modelling the extended life time expectancy of masonry construction beyond 100 years this should be considered in further policy development). Birmingham City University oversaw the calculation process.

Embodied Carbon



Conclusion

The results show that the calculated embodied carbon for Plot 12 achieved those targets indicated by the Future Homes Hub and other benchmarks.

The study highlights the necessity for verified data and EPDs to be used where at all possible.

The use of generic data has a significant detrimental impact on the embodied carbon calculation.

It further highlights the fact that there have been improvements in the availability of data but emphasized the need for clear guidance and for more verified and up to date EPDs for specific manufacturers products.

The Centre for Future Homes recognises the efforts made by those bodies who are setting benchmarks for whole life carbon, highlighting the need for collaboration within the construction sector to encourage engagement with the subject.

For further info:

Included within the assesment:
Floor joists, Metal joist hangers, Flooring chipboard, Roof timber, Roof strap ties, Roof trusses, Dormer sheathing plywood, UPVC fascia, Roof tiles, Lead flashing, Roof insulation below rafters, Roof insulation between rafters, External UPVC Doors, Timber doors, External blockwork, Mortar, Brickwork, Cavity wall insulation, Wall dpc, Cavity tray dpc, Steel lintel, Cavity closer, Steel window cill, Ceramic tiles, Interior paint, Floor screed, Skirting boards, Vinyl flooring, External wall plasterboard, External wall plaster, Cavity filling concrete, Concrete strip foundations, Foundation blockwork, Foundation mortar, Ground level plinth, Floor membrane, Floor insulation, Concrete beams, (Block and beam floor), Concrete blocks, (Block and beam floor), Internal blockwork, Internal blockwork mortar, Internal timber studs, Acoustic insulation, Internal wall plasterboard, Internal wall plaster, Timber staircase, Staircase handrail, Kitchen work surface, Chipboard cabinet, Cabinet doors, Toilets, Wash basins, Shower tray, Bath, Tap water pipes, ASHP piping, Water cylinder, ASHP, Radiators, Double glazed windows, Bathroom extractor fan, Shower head, Kitchen sink, Bath and basin mixers

Life Cycle Assessments

A Life Cycle Assessment (LCA) measures the impact a product or service has on the environment throughout its lifetime.

In the construction sector an LCA is used to measure how buildings will impact on the environment.

Through optimising the building design and using materials efficiently Whole Life Carbon can be reduced through operational energy reduction and embodied carbon reduction.

A product's verified LCA is called an EPD (Environmental Product Declaration) and should be considered within the final construction specification when all other materials used are also accounted for.

Environmental Product Declaration
EPDs are created in accordance with EN15804. The impact of the product is measured from the extraction of raw material used to create it all the way through to its end of life and reuse if applicable. The life cycle is broken down into 5 key stages and each stage measures the environmental impact of each action related to that stage.

A1-A3 - Product Stage
The product stage measures impacts relating to raw material extraction and supply, transportation of the raw material to the manufacturing site and the manufacturing process.

A4-A5 - Construction Stage
This stage covers the transport of the product to site and any related energies required for assembly on site.

B1-B7 - Use Stage
The use stage gauges the impact of the product use, maintenance, repair, replacement and refurbishment throughout its lifetime. This stage also measures, any energy or water consumed in use.

C1-C4 - End of Life Stage
This assesses emissions due to the process of deconstruction and demolition, transportation of the material to disposal, waste processing and the product's disposal.

D - Reuse Stage
Any potential benefits for the reuse, recovery or recycling of the material after its end of life are included in this section.

All EPDs previously had at a minimum to be "Cradle to Gate" which means that life stages A1-A3 are included though with the relatively recent publication of the EN 15804 standard, EN 15804+A2 more EPDs are being classified as "Cradle to Grave" which measure all life stage of the product.

EPDs have multiple properties referenced and measured within them, they are complex. As a result they can be difficult to interpret and compare. Their impact is best measured when included within a buidling's Life Cycle Assessment.

EPDs are specific to a product and the manufacturing location. EPDs are valid for 5 years.

Dun Laoghaire Passive Build @dlrArchitects
Photography @DonalMurphy

Specification targets

Towards Future Homes Standard and nZEB

Unilin Insulation's Technical Team can assist you to achieve the targets seen as effective in addressing environmental considerations. Our current report on achieving the targets laid down in the Climate Challenge 2030 and other industry papers targets U-Values and material specifications to assist in meeting those goals. The ECO360 range allows for Passive U-Values to be achieved in the thinnest, most lean constructions minimising all material use. We work with architects, technologists, contractors and trades providing calculations, understanding and onsite training.

> The climate emergency demands urgent action and leadership by architects and the wider construction industry: "We must act now, ensuring that new and retrofit buildings deliver net zero whole life carbon in advance of any future regulation."
>
> **RIBA Climate Challenge** 2030

Comparison between new Part L and Future Homes Standard for Semi-Detached House

	Part L 2013[1]	Part L 2021[2]	Future Homes Standard[3]	Climate Challenge 2030[4]	LETI[4]	Future Homes Hub[4]
Primary Energy From SAP for lights and space and water heating	80.40	52.78	53.61	34.45	34.45	34.45
Operational energy ($kWh/m^2/y$) – Space heating only	40.03	44.45	17.89	11.09	11.09	11.09
Floor	0.13	0.13	0.11	0.11	0.11	0.11
External wall	0.18	0.18	0.15	0.15	0.15	0.15
Roof	0.13	0.11	0.11	0.11	0.11	0.11
Windows	1.4	1.2	0.8	1.2	1.2	1.2
Doors	1.2	1.0	1.0	1.0	1.0	1.0
Thermal bridging	0.022	0.023	0.024	0.024	0.024	0.024
Air permeability	5	5	5	5	5	5
Heating system	Gas boiler	Gas boiler	Heat pump (Default)	Heat pump[4]	Heat pump[4]	Heat pump[4]
Ventilation	Natural	Natural	Natural	Natural	Natural	Natural
WWHR	Yes	Yes	N/A	N/A	N/A	N/A
PV	N/A	Yes	N/A	N/A	N/A	N/A
Embodied Carbon ($kgCO_2e/m^2$)	N/A	N/A	N/A	<625	<625	<615

[1]Calculations based on guidance in SAP 2012 manual, [2]Calculations based on guidance in SAP 10.2 manual, [3]Calculations based on guidance in FHS consultation document using SAP 10.2 manual, [4]Calculated based on the details including specific heat pump in the Unilin Embodied Carbon Report.

Embodied Carbon Report

Visit the Unilin Insulation website to download 'An overview of the calculation of embodied carbon for 4 house types'.

Richard Hatch Photography©

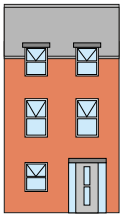
Example House Types

Detached house
GIA 186.1m²

Mid-terrace house
GIA 82.4m²

Semi-detached house
GIA 98.9m²

Apartment block
GIA 1724m²



Project 80
GIA 96.5m²

Halogen free formulation

ECO360 BIO-ENHANCED PIR INSULATION

Full Fill Cavity Walls

ECO/CT

An engineered system providing added resilience against increases in wind-driven rain resulting from climate change.

ECO/CT is a bio-enhanced high performance composite board of enhanced PIR with a Lambda value as low as 0.020 W/mK for full fill cavity wall applications.

ECO/CT offers all of the unique benefits of our full fill built-in wall insulation system along with pioneering environmentally sensitive features that form part of the solution to meet both the Climate Challenge 2030 and Low Energy Transformation Initiative (LETI) targets. When built into a traditional 110-150mm cavity using standard foundation widths, building skills and local materials ECO/CT achieves U-Values as low as 0.12 W/m²K depending on the block type used. An environmentally conscious solution to low energy design, that results in traditional homes that meet the 2030 Climate Challenge targets.

SHIPLAP JOINTING

Benefits

- Bio-enhanced PIR insulation
- Enhanced thermal performance as low as 0.020 W/mK
- Halogen free
- Bio-degradable packaging
- Moisture directed to outer surface
- Fully engineered jointing
- Fully recyclable HIPs facer provides wind-driven rain protection
- Wide range of system compatible accessories that build to a system
- Reduced packaging materials

Specification Clause

The built-in full fill cavity wall insulation shall be ECO360 CavityTherm manufactured to EN 13165 by Unilin Insulation, including corner boards and ancillary detail components, comprising of a rigid Polyisocyanurate (PIR) core between foil facings with engineered HIPS outer skin. The ECO360 CavityTherm _ _ _mm with a declared Lambda value of 0.020 W/mK to achieve a U-Value of __ _ _W/m²K for the wall element. To be installed in accordance with instructions issued by Unilin Insulation.

Refer to NBS clause F30 150, F30 12.

NBS Plus

Thermal Resistances

Insulation Thickness (mm)	R-Value (m²K/W)
105	5.25
120	6.00
145	7.25

*add 5mm for engineered facer for total thickness

Resistance 'R' Values

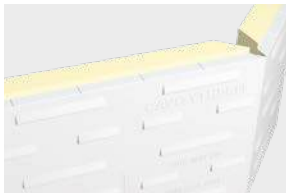
The resistance value of any thickness of Unilin insulation can be ascertained by simply dividing the thickness of the material (in metres) by its Agrément declared lambda value, for example: Lambda 0.020 W/mK and thickness 105mm -> 0.105/0.020 -> R-Value = 5.25. In accordance with EN 13165, R-Values should be rounded down to the nearest 0.05 (m²K/W).

ECO/CT

The Complete Cavity Wall System

Unilin offers preformed Corner Panels (XT-CT/CN) as part of the ECO360 range. We also offer a range of accessories that are compatible for use with ECO/CT.

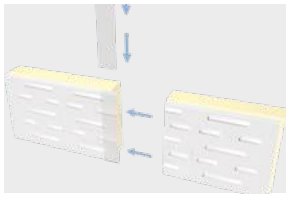
Included with Cavity Wall System



Preformed corner panels

Integral rain barrier

Cavity Wall System compatible with:



Jointing strip

Service void panels

Hockey stick insulation

Cavity tray channel

For installation guidelines, please refer to the individual brochures on our website.

ECO/CT

Length (mm)	1200
Width (mm)	450
Thickness (mm)	110, 125, 150

*Overall product thickness

Property & Units

Thermal Conductivity	0.020 (W/mK)
Compressive Strength	>120 (kPa)
Reaction to Fire	Euroclass F

Unilin Declaration of Performance (DoP) for this product is available for download from our website.

Typical U-Values

IRL U-Values

Build up:

- Plaster
- 100mm inner leaf blockwork
- ECO/CT
- Unventilated cavity
- 100mm block outer leaf
- Render

Block Thermal Conductivity

Thickness (mm)	1.13
105 (110 O/A)	0.17
120 (125 O/A)	0.15
145 (150 O/A)	0.13

UK U-Values

Build up:

- Plasterboard on dabs
- 100mm inner leaf blockwork
- ECO/CT
- Unventilated cavity
- Brick

Block Thermal Conductivity

Thickness (mm)	0.11	0.15	0.46	1.13
110	0.15	0.16	0.17	0.17
125	0.14	0.14	0.15	0.15
150	0.12	0.12	0.12	0.13

Note: U-Values are indicative only. Please contact our technical department for a calculation suited to your specific project.

Bio-degradable packaging

ECO360 BIO-ENHANCED PIR INSULATION

Partial Fill Cavity Walls

ECO/CW

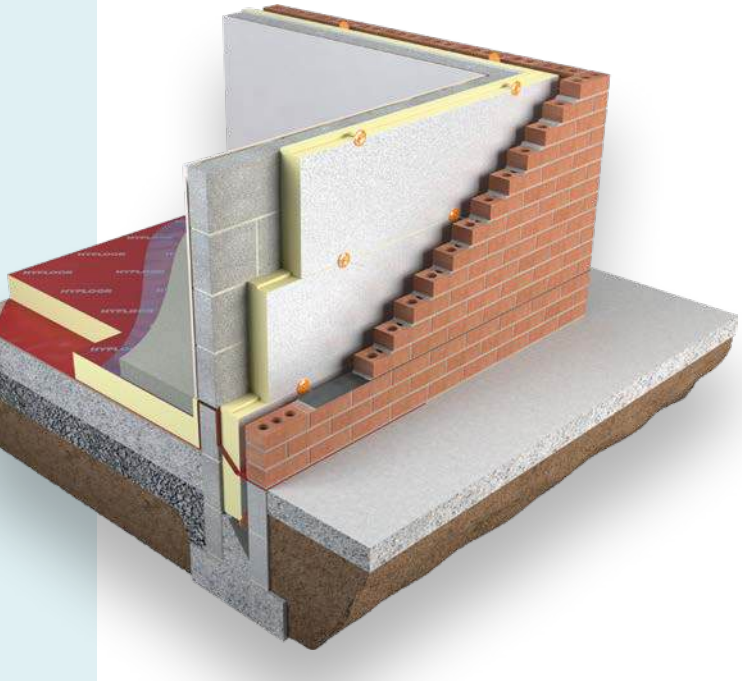
Cavity Wall 360 is a bio-enhanced partial fill wall insulation system. The system incorporates robust facings, engineered jointing details, preformed corners and has a Lambda of 0.020 W/mK.

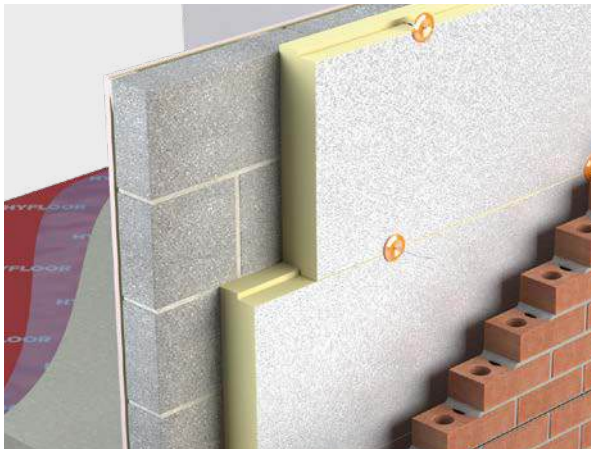
Cavity Wall 360 is an environmentally sound choice for Passive and low energy builds. It can achieve a Passive U-Value of 0.15 W/m²K in a traditional cavity wall. When building with Cavity Wall 360 a residual cavity is maintained, offering excellent protection against wind-driven rain.

Benefits

- Bio-enhanced PIR insulation
- Enhanced performance as low as 0.020 W/mK
- Halogen free
- Bio-degradable packaging
- Clear cavity maintained
- Lower Lambda value for improved U-Values

SHIPLAP JOINTING





Specification Clause

The partial fill cavity wall insulation shall be ECO/CW Cavity Wall manufactured to EN 13165 by Unilin Insulation, comprising of a rigid modified Polyisocyanurate (PIR) core with textured robust low emissivity foil facings and engineered shiplap jointing. The ECO/CW Cavity Wall _ _ _mm with a declared Lambda value of 0.020 W/mK to achieve a U-Value of _ _ _W/m²K for the wall element. To be installed in accordance with instructions issued by Unilin Insulation.

Refer to NBS clause F30 155, F30 12.

NBS Plus

Thermal Resistances

Thickness (mm)	R-Value (m²K/W)
100	5.0
110	5.5

Resistance 'R' Values

The resistance value of any thickness of Unilin insulation can be ascertained by simply dividing the thickness of the material (in metres) by its Agrément declared lambda value, for example: Lambda 0.020 W/mK and thickness 100mm -> 0.100/0.020 -> R-Value = 5.0. In accordance with EN 13165, R-Values should be rounded down to the nearest 0.05 (m²K/W).

ECO/CW

1. Cavity Wall 360 System includes an optional preformed corner panel that folds to 90 degrees to effectively insulate a junction that is normally vulnerable to Thermal Bridging and cold spots.

2. Engineered jointing offers a practical on-site solution that results in a more robust continuous layer of insulation, minimising the threat of Thermal Bridging and improving the overall U-Value of the wall.

3. The textured robust low emissivity foil facing on Cavity Wall 360 improves the thermal performance of the wall. The residual cavity is the most effective method of preventing wind-driven rain penetrating a wall from the outside. A residual cavity is the air space that remains when Cavity Wall 360 is placed against the inner leaf of the cavity of a wall.

Note: The recommended residual cavity width required is 50mm in accordance with UK Building Regulations.

For installation guidelines, please refer to the individual brochures on our website.

ECO/CW

Length (mm)	1200
Width (mm)	450
Thickness (mm)	100, 110

Property & Units

Thermal Conductivity	0.020 (W/mK)
Compressive Strength	>120 (kPa)
Reaction to Fire	Euroclass F

Unilin Declaration of Performance (DoP) for this product is available for download from our website.

Typical U-Values

IRL U-Values

Build up:

- Plaster
- 100mm inner leaf blockwork
- ECO/CW
- Unventilated cavity (low E)
- 100mm block outer leaf
- Render

Block Thermal Conductivity

Thickness (mm)	1.13
100	0.16
110	0.15

UK U-Values

Build up:

- Plasterboard on dabs
- 100mm inner leaf blockwork
- ECO/CW
- Low E unventilated cavity
- Brick

Block Thermal Conductivity

Thickness (mm)	0.11	0.15	0.46	1.13
100	0.14	0.15	0.16	0.16
110	0.13	0.14	0.14	0.15

Note: U-Values are indicative only. Please contact our technical department for a calculation suited to your specific project.

ECO360 BIO-ENHANCED PIR INSULATION
Solid & Suspended Floors

ECO/MA (FLOORS)

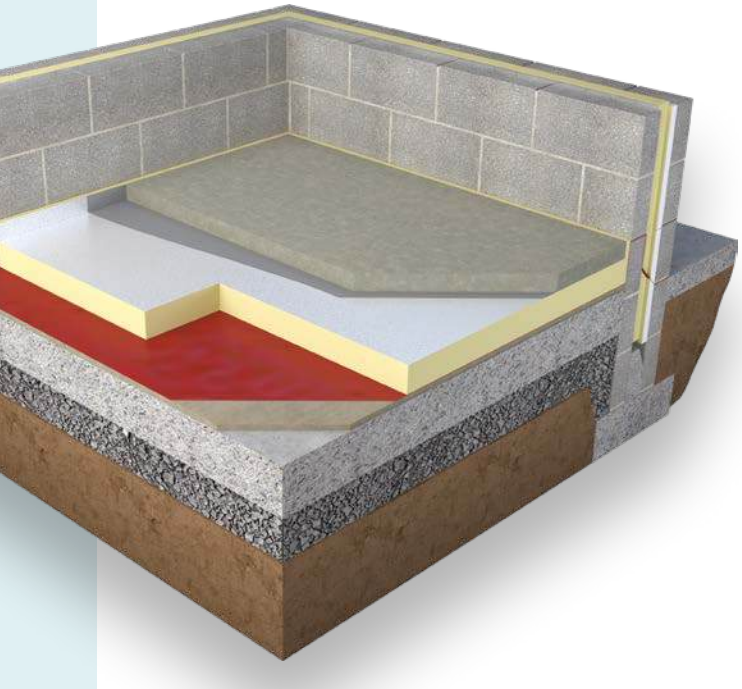
Bio-enhanced, superior performance PIR insulation suitable for solid and suspended floors. **ECO360 MA** for floors offers excellent insulation performance with a thermal conductivity of 0.020 W/mK.

This bio-enhanced insulation will significantly improve the U-Value of new and existing floors. It is lightweight, easy to install and combines high compressive strength with low thermal conductivity, providing a high performance solution for floor insulation.

It offers a bio-enhanced formulation which is halogen free. The product packaging is bio-degradable and the overall content has been reduced significantly.

Benefits

- Bio-enhanced PIR insulation
- Enhanced performance as low as 0.020 W/mK
- Halogen free
- Bio-degradable packaging
- High compressive strength
- Suitable for underfloor heating



Specification Clause

The floor insulation shall be ECO360 MA Floors manufactured to EN 13165 by Unilin Insulation, comprising of a rigid modified Polyisocyanurate (PIR) core with textured robust foil facings. The ECO360 MA_ _ _mm with a declared Lambda value as low as 0.020 W/mK to achieve a U value of ___ _ _W/m²K for the floor element. To be installed in accordance with instructions issued by Unilin Insulation.

Refer to NBS clause M10 290, M10 40, M13 260 M13 40.

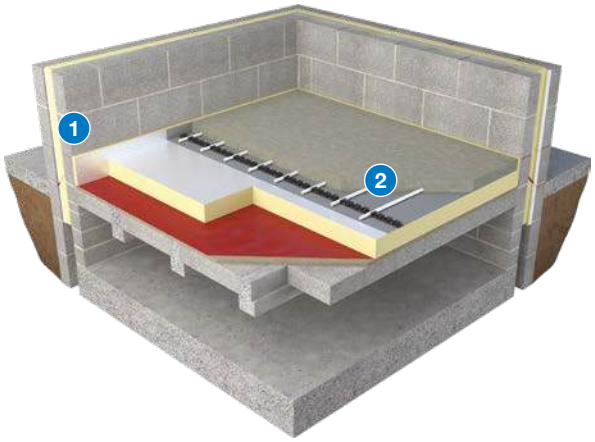
Thermal Resistances

Thickness (mm)	R-Value (m²K/W)
100	5.0
125	6.25
150	7.5

Resistance 'R' Values

The resistance value of any thickness of Unilin insulation can be ascertained by simply dividing the thickness of the material (in metres) by its Agrément declared lambda value, for example: Lambda 0.020 W/mK and thickness 100mm -> 0.100/ 0.020 -> R-Value = 5.0. In accordance with EN 13165, R-Values should be rounded down to the nearest 0.05 (m²K/W).

ECO/MA (FLOORS)



1. Good detailing at the wall/floor junction is essential in reducing Thermal Bridging. By placing an upstand of Unilin Perimeter Strip (XO/STR at 0.021 W/mK) insulation with a minimum 25mm thickness around the external and internal wall/floor junctions, a robust detail is created.

2. ECO360 MA is lightweight and suitable for use with underfloor heating. Thanks to its thickness to performance ratio, it allows for reduced insulation thickness. The boards should be laid with closely butted joints, laid staggered with a break bonded pattern and fitted tightly at edges and around any service penetrations.

Note: This product has the strength and thermal properties required to reach the high performance U-Values specified in the Building Regulations.

For installation guidelines, please refer to the individual brochures on our website.

ECO/MA

Length (mm)	2400
Width (mm)	1200
Thickness (mm)	100, 125, 150

Property & Units

Thermal Conductivity	0.020 (W/mK)
Compressive Strength	>150 (kPa)
Reaction to Fire	Euroclass F

Unilin Declaration of Performance (DoP) for this product is available for download from our website.

THERMAL PERFORMANCE

ECO/MA (FLOORS)

Typical U-Values

BBA CERTIFICATE CS/nnnn-n
U Value Competency Scheme

Table 1
ECO/MA (FLOORS) Insulation for Ground Supported Slab

Build up:

- 65mm screed
- Separating layer Polythene sheet
- ECO360 MA with perimeter strip
- DPM 1200 gauge polythene or radon barrier
- Concrete slab

Perimeter/Area Ratio

Thickness (mm) 0.30	0.40	0.50	0.60	0.70	0.80	Target U-Value
-	-	-	-	-	-	**0.18**
-	100	100	-	-	-	**0.15**
-	-	125	125	125	125	**0.13**

Table 2
ECO/MA (FLOORS) Beam & Block Suspended Floor

Build up:

- 65mm screed
- Separating layer Polythene sheet
- ECO360 MA with perimeter strip
- Beam and block

Perimeter/Area Ratio

Thickness (mm) 0.30	0.40	0.50	0.60	0.70	0.80	Target U-Value
-	-	-	-	-	-	**0.18**
100	100	-	-	-	-	**0.15**
125	125	125	125	125	-	**0.13**

Note: U-Values are indicative only. Please contact our technical department for a calculation suited to your specific project.

THERMAL PERFORMANCE

ECO/MA (FLOORS)

Typical U-Values

CERTIFICATE CS/nnnn-n
U Value Competency Scheme

Table 3
ECO/MA (FLOORS) Hollow Core Slab

Build up:

- 65mm screed
- Separating layer Polythene sheet
- ECO360 MA with perimeter strip
- Hollow core slab

Perimeter/Area Ratio

Thickness (mm)	0.30	0.40	0.50	0.60	0.70	0.80	Target U-Value
	-	-	-	-	-	-	**0.18**
	-	100	100	100	-	-	**0.15**
	-	125	125	125	125	125	**0.13**

Enhanced performance as low as 0.020 W/mK

ECO360 BIO-ENHANCED PIR INSULATION
Pitched Roofs

ECO/MA (ROOFS)

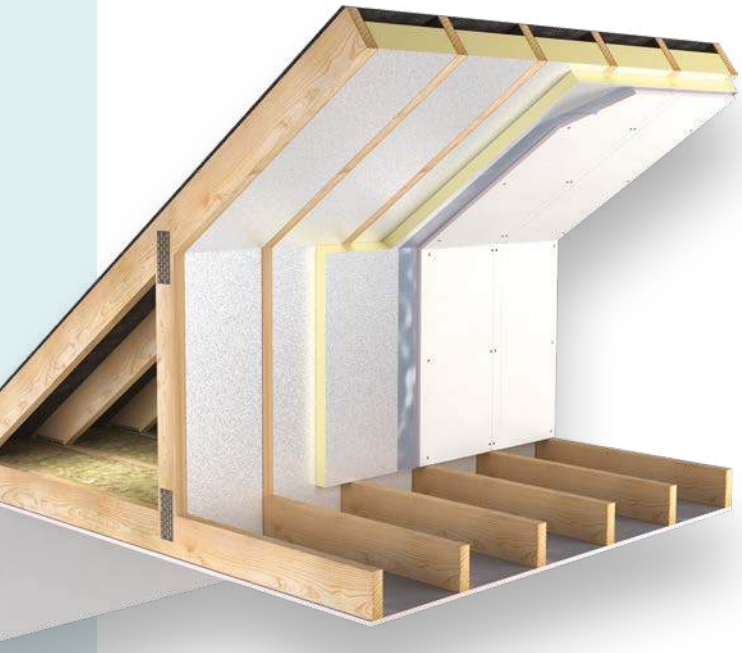
Bio-enhanced, superior performance PIR insulation suitable for pitched roofs (ventilated, hybrid or warm). **ECO360 MA** for roofs offers excellent insulation performance with a thermal conductivity of 0.020 W/mK.

Using pioneering environmentally conscious technology, ECO360 MA in roof applications will reduce heat loss while also delivering excellent Thermal Bridging details.

This bio-enhanced insulation is lightweight, easy to install and combines high compressive strength with low thermal conductivity, providing a high performance solution for roof insulation. ECO 360 MA is a halogen free insulant whose overall packaging has been significantly reduced. The minimal packaging is also bio-degradable.

Benefits

- Bio-enhanced PIR insulation
- Enhanced performance as low as 0.020 W/mK
- Halogen free
- Bio-degradable packaging
- High compressive strength
- Suitable for pitched roofs
- Reduced packaging materials



Specification Clause

The pitched roof insulation shall be ECO360 MA Roofs manufactured to EN 13165 by Unilin Insulation, comprising of a rigid modified Polyisocyanurate (PIR) core with textured low emissivity foil facings. The ECO360 MA _ _ _mm with a declared Lambda value as low as 0.020 W/mK to achieve a U-Value of __ _ _W/m²K for the roof element. To be installed in accordance with instructions issued by Unilin Insulation.

Refer to NBS clause P10 140, K11 695, K11 55.

NBS Plus

Thermal Resistances

Thickness (mm)	R-Value (m²K/W)
50	2.15
100	5.0
125	6.25
150	7.5

Resistance ‘R’ Values

The resistance value of any thickness of Unilin insulation can be ascertained by simply dividing the thickness of the material (in metres) by its Agrément declared lambda value, for example: Lambda 0.020 W/mK and thickness 100mm -> 0.100/ 0.020 -> R-Value = 5.0. In accordance with EN 13165, R-Values should be rounded down to the nearest 0.05 (m²K/W).

ECO/MA (ROOFS)

1. In a conventional ventilated roof, a 50mm clear ventilation gap should be maintained between the insulation and the roofing felt. In certain instances, where a breather membrane is used instead of standard roofing felt, the ventilation gap may be dispensed with. Refer to manufacturer's guidelines.

ECO/MA

Length (mm)	2400
Width (mm)	1200
Thickness (mm)	50, 100, 125, 150

Property & Units

Thermal Conductivity	As low as 0.020 W/mK
Compressive Strength	>150 (kPa)
Reaction to Fire	Euroclass F

Unilin Declaration of Performance (DoP) for this product is available for download from our website.

For installation guidelines, please refer to the individual brochures on our website.

Typical U-Values

Table 1

Build up:

- Tiles
- Battens
- Breathable membrane
- Air layer between rafters (Low Emissivity)
- ECO/MA between rafters
- ECO/MA below rafters
- Vapour control layer
- Plasterboard
- Plaster skim

Thickness (mm)	Thickness Between (mm)	Thickness Below (mm)	Rafter Centres 400mm	Rafter Centres 600mm
100		50	0.16	0.15
125		50	0.14	0.13
150		50	0.13	0.12

Table 2

Build up:

- Tiles
- Battens
- Breathable membrane
- Air layer between rafters (Low Emissivity)
- ECO/MA over rafters
- ECO/MA between rafters
- Vapour control layer
- Plasterboard
- Plaster skim

Thickness (mm)	Thickness Over (mm)	Thickness Between (mm)	Rafter Centres 400mm	Rafter Centres 600mm
100		100	0.12	0.11
125		100	0.1	0.1
150		100	0.1	0.09
100		125	0.1	0.1
125		125	0.09	0.09
150		125	0.08	0.08
150		-	0.13	0.13

Note: U-Values are indicative only. Please contact our technical department for a calculation suited to your specific project.

Excellent 0.020 W/mk thermal conductivity

ECO360 BIO-ENHANCED PIR INSULATION

Sarking Warm Roof Construction

ECO/MA (SARKING)

Bio-enhanced, superior performance PIR insulation suitable for Sarking Warm Roof construction. **ECO360 MA**, with a thermal conductivity as low as 0.020 W/mK, in a sarking warm roof application offers an environmentally conscious solution which provides improved detailing, speed of installation and a uniform plane to accommodate more efficient detailing.

This bio-enhanced insulation is lightweight, easy to install and combines high compressive strength with low thermal conductivity, providing a high performance solution for roof insulation.

ECO360 MA is halogen free and the product packaging is bio-degradable while the overall packaging content has been reduced significantly.

Benefits

- Bio-enhanced PIR insulation
- Enhanced performance as low as 0.020 W/mK
- Halogen free
- Bio-degradable packaging
- Suitable for pitched roofs

Specification Clause

The pitched roof Sarking insulation shall be ECO360 MA Sarking manufactured to EN 13165 by Unilin Insulation, comprising of a rigid modified Polyisocyanurate (PIR) core with textured robust low emissivity foil facings. The ECO360 MA _ _ _mm with a declared Lambda value as low as 0.020 W/mK to achieve a U value of __ _ _W/m²K for the roof element. To be installed in accordance with instructions issued by Unilin Insulation.

Refer to NBS clause P10 140, K11 695, K11 55.

NBS Plus

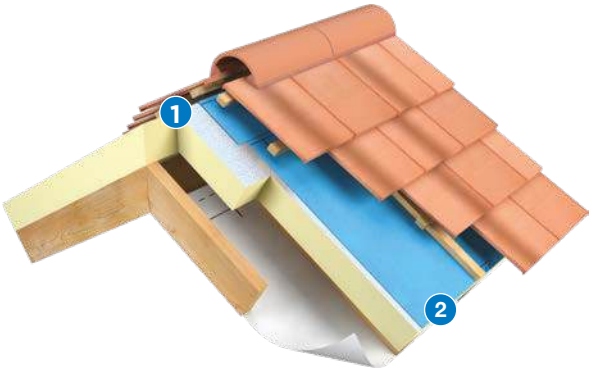
Thermal Resistances

Thickness (mm)	R-Value (m²K/W)
100	5.0
125	6.25
150	7.5

Resistance 'R' Values

The resistance value of any thickness of Unilin insulation can be ascertained by simply dividing the thickness of the material (in metres) by its Agrément declared lambda value, for example: Lambda 0.020 W/mK and thickness 100mm -> 0.100/ 0.020 -> R-Value = 5.0. In accordance with EN 13165, R-Values should be rounded down to the nearest 0.05 (m²K/W).

ECO/MA (SARKING)



1. ECO/MA offers a practical on-site solution that results in a more robust continuous layer of insulation, minimising the threat of Thermal Bridging and improving the overall U-Value of the roof.

2. Detailing with breather membranes and vapour control membranes can be more accurately achieved with insulation in a single plane. Adding an additional layer of Unilin ECO/MA between the counter battens minimises fixing length and improves the overall U-Value of the roof.

For installation guidelines, please refer to the individual brochures on our website.

ECO/MA

Length (mm)	2400
Width (mm)	1200
Thickness (mm)	100, 125, 150

Property and Units

Thermal Conductivity	0.020 (W/mK)
Compressive Strength	>150 (kPa)
Reaction to Fire	Euroclass F

Unilin Declaration of Performance (DoP) for this product is available for download from our website.

THERMAL PERFORMANCE

ECO/MA (SARKING)

Typical U-Values (IRL)

Build up:

- Tiles
- Battens
- Breather membrane
- ECO/MA over rafters (Lambda 0.020 W/mK)
- ECO/MA between rafters (Lambda 0.023 W/mK)
- Air layer
- Plasterboard

Thickness Between (mm)	Thickness Over (mm)	Rafter Centres	
Thickness (mm)		400mm	600mm
-	150	0.13	0.13
-	125	0.14	0.14
50	150	0.11	0.10
50	125	0.12	0.12
50	100	0.14	0.14

Note: U-Values are indicative only. Please contact our technical department for a calculation suited to your specific project.

ECO/MA (SARKING)

Typical U-Values (UK)

Build up:

- Tiles
- Battens
- Breathable membrane
- ECO/MA over rafters
- ECO/MA between rafters
- Air layer between rafters (Low Emissivity)
- Vapour control layer
- Plasterboard
- Plaster skim

Thickness Between (mm)	Thickness Over (mm)	Rafter Centres	
		400mm	600mm
100	100	0.12	0.11
100	125	0.1	0.1
100	150	0.1	0.09
125	100	0.1	0.1
125	125	0.09	0.09
125	150	0.08	0.08
-	150	0.13	0.13

Thickness (mm)

Note: U-Values are indicative only. Please contact our technical department for a calculation suited to your specific project.

HANDLING, CUTTING AND STORAGE

Unilin insulation should be stored off the ground, on a clean, flat surface and must be stored under cover. The polythene wrapping is not considered adequate protection for outside exposure. Care should be taken to protect the insulation in storage and during the build process.

The insulation boards can be readily cut using a sharp knife or fine toothed saw. Ensure tight fitting of the insulation boards to achieve continuity of insulation as asked for within the ACDs. Appropriate PPE should be worn when handling insulation. Please refer to Health & Safety data sheets on our website.

The boards are wrapped in bio-degradable film and each pack is labelled with details of grade/type, size and number of pieces per pack.

Durability

Unilin Insulation products are stable, rot proof, provide no food value to vermin and will remain effective for the lifetime of the building, depending on specification and installation. Care should be taken to avoid contact with acids, petrol, alkalis and mineral oil. When contact is made, clean materials in a safe manner before installation.

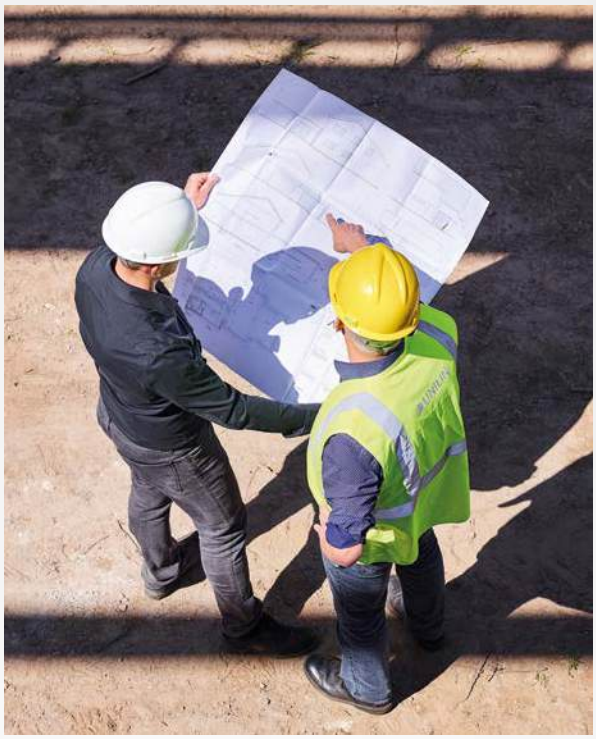
Learn, improve and change

We are committed to developing and promoting sustainable low energy design in construction.

Unilin Technical Services have developed in-depth knowledge in the calculation of Whole Life Carbon from the production of EPDs to the calculation of Life Cycle Analysis using OneClick software to the standards laid down by RIBA/LETI/RIAI/FHH.

We have a range of CPD presentation on the subject and will make available to those architects, developers, product manufacturers and universities that are on the path to better understanding of the road to a more sustainable construction future.

Please contact our Technical Team developing a better understanding of the subject matter within this publication.



UNILIN INSULATION

Unilin Insulation Ireland Ltd
Liscarton Industrial Estate
Kells Road, Navan
Co. Meath, Ireland
C15 NP79

t. +353 (0) 46 906 6000
e. info.ui@unilin.com

unilininsulation.ie

Unilin Insulation UK Ltd
Park Road, Holmewood
Chesterfield, Derbyshire
United Kingdom
S42 5UY

t. + 44 (0) 371 222 1033
e. info.ui@unilin.com

unilininsulation.co.uk

EPD IRELAND

ISO 9001 Quality Management Systems
ISO 14001 Environmental Management Systems

The Sustainable Solution

Specifying Unilin Insulation is a real commitment to minimising energy consumption, harmful CO_2 emissions and their impact on the environment. Using our products is one of the most effective ways to reduce energy consumption – in fact, after just eight months the energy they save far outweighs the energy used in their production. In addition, our manufacturing facilities operate to an ISO 14001 certified Environmental Management System.

Environmental Product Declaration (EPD)

An Environmental Product Declaration or EPD for a construction product indicates a transparent, robust and credible step in the pursuit and achievement of real sustainability in practice, it is a public declaration of the environmental impacts associated with specified life cycle stages of that product. Unilin EPDs have been independently verified in accordance with EN 15804+A2:2019 and ISO 14025 accounting for stages of the LCA from A1 to A3, with options A4-A5 and modules C1-C4 and D included. The process of creating an EPD allows us to improve performance and reduce resource wastage through improvements in product design and manufacturing efficiency. They play a crucial role in manufacturing and construction and are increasingly asked for by industry.

EPDs and BREEAM

BREEAM is primarily trying to encourage designers to take EPDs into consideration when specifying products. BREEAM requires EPDs to be verified by a third-party. For the Mat 02 category, points are awarded based on whether EPDs are generic, manufacturer-specific, or product-specific. Non 3rd party verified EPDs to EN 15804 cannot be accepted. All of Unilin EPDs are externally verified.

Responsible Sourcing

Unilin has BES 6001 certification for responsible sourcing. The second BREEAM credit under that category is based on responsibly-sourced materials – at least 80% of the total insulation used in roofs, walls, ground floors and services must meet any of tier levels 1 to 6 in the BREEAM table of certification schemes. Our Environmental Management System is certified under EN ISO 14001, and our raw materials come from companies with similarly certified EMS (copies of all certificates are available for BREEAM assessments). This level of responsible sourcing meets tier level 6 in the BREEAM table.

Good workmanship and appropriate site procedures are necessary to achieve expected thermal and airtightness performance. Installation should be undertaken by professional tradespersons. The example calculations are indicative only, for specific U-Value calculations contact Unilin Insulation Technical Support. Unilin technical literature, Agrément certifications and Declarations of Performance are available for download on the Unilin Insulation website. The information contained in this publication is, to the best of our knowledge, true and accurate at the time of publication but any recommendations or suggestions which may be made are without guarantee since the conditions of use are beyond our control. Updated resources may be available on our websites. All images and content within this publication remain the property of Unilin Insulation.

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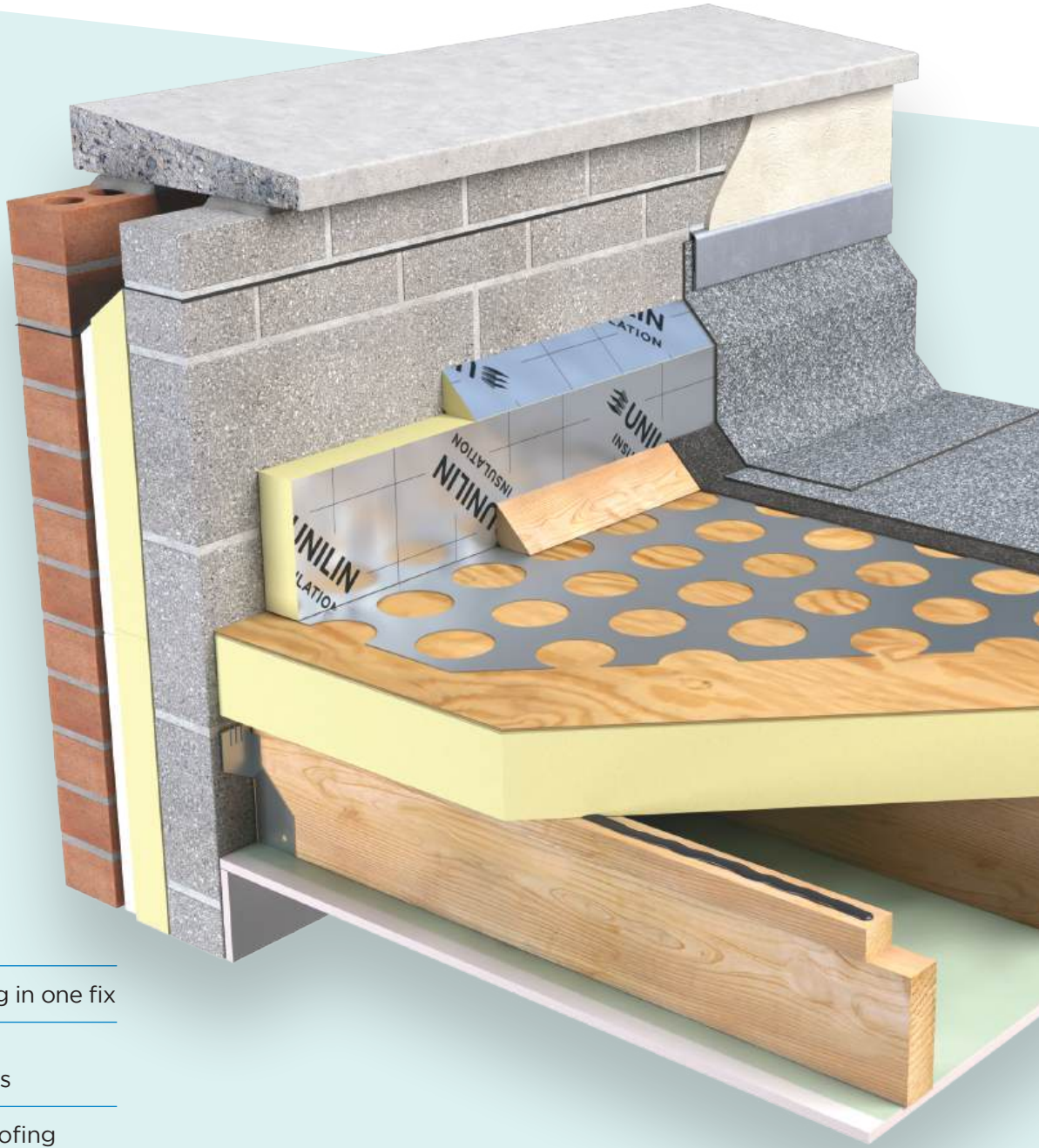
APPENDIX E – FLAT ROOF INSULATION

FLAT ROOF TOTAL FLAT ROOF SOLUTIONS

Thermal Ply High Performance PIR and Plywood Composite

FR/TP



Insulation & decking in one fix

For new & refurbishment roofs

Rapid weather proofing

UNILIN INSULATION

FLAT ROOF TOTAL FLAT ROOF SOLUTIONS

Thermal Ply High Performance PIR and Plywood Composite

FR/TP

Flat Roof Thermal Ply is a composite insulated panel of Unilin Polyisocyanurate core with a composite foil face, bonded to 6mm WBP grade plywood. It is designed to provide high levels of thermal insulation and decking in one operation for new and refurbishment of flat roof applications.

Benefits

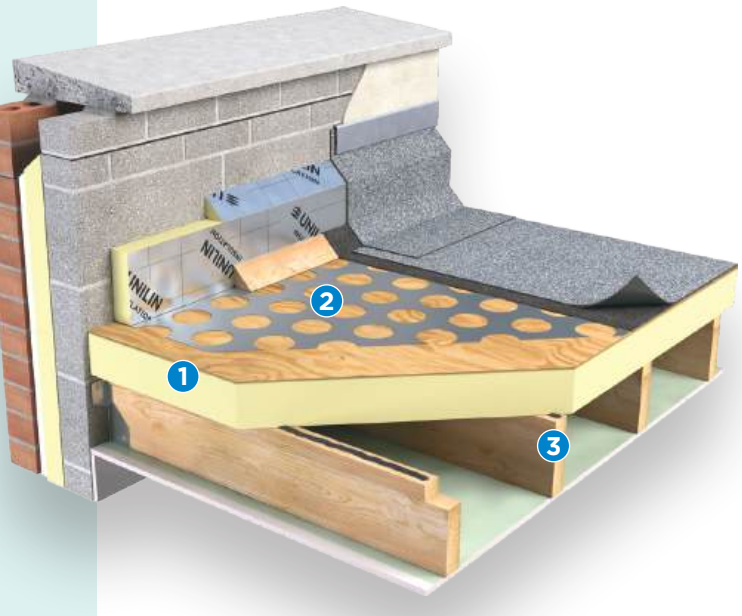
- Insulation & decking in one fix
- For new & refurbishment roofs
- Rapid weather proofing
- An Environmental Product Declaration (EPD), certified by IGBC is available for this product insulation. Please contact technical support for further details.

Roof Design

Consideration should be given to the recommendations of BS 4841: Part 3 and the certification of the chosen membrane manufacturer.

Falls

The fall on a flat roof should be constant and steep enough to ensure that rainfall does not pond.



Fire Performance

The fire rating, when tested to EN 13501-5 and BS 476 Part 3 'External Fire Exposure Roof Test', will be dependent upon the waterproofing system.

Specification Clause

The flat roof insulation shall be Unilin Insulation Thin-R FR-TP manufactured to EN 13165 by Unilin Insulation, comprising a rigid Polyisocyanurate (PIR) core between low emissivity foil facings bonded onto 6mm WBP Plywood. To be installed in accordance with instructions issued by Unilin Insulation.

Refer to NBS clause J41 10, J41 420, J21 420, J21 10, J21 5.

1. Unilin Thermal Ply is faced to the under side with a gas-tight foil facer, bedding the panel onto a bed of mastic creates a continuous vapour control layer.
2. It provides a high level of thermal insulation and decking in one application.
3. A second layer may be added between the joists to increase the thermal performance of the roof or to allow a reduction in the thickness of material over the joists. If using insulation between joists the VCL should be placed to the underside of the joists. The insulation layer between the joists must be kept tight to the underside of the deck/insulation above.

FLAT ROOF

FR/TP

A warm roof application with all the insulation above the joists is considered best practice. Where insulation between the joists is required to reduce the overall height please note the insulation above the deck should have a higher thermal resistance than that of the insulation between the joists. Contact the Unilin Insulation technical team for further guidance.

The boards should be fixed to a minimum of 50mm thick joists at 600mm centres max with the plywood uppermost.

Boards should be staggered and butted. Each edge should have a minimum bearing of 20mm on joist.

All edges should be supported - add noggings where necessary. Stagger fixings where boards are butted.

Boards should be embedded in vapour resistant mastic to provide a vapour control layer in conjunction with foil facing.

Mastic should be laid wide enough to facilitate 2 panel edges and be continuous around all edges.

The boards should be fixed with low profile screw fixings, placed at 200mm centres around the perimeter of the boards and at 300mm centres along any intermediate supports.

All fixings should penetrate the joists by a minimum of 35mm and be placed 12mm from the edge of the insulation, and no further than 50mm from any corners.

Care should be taken to ensure that the heads of any fixings are flush with the plywood surface and not over-driven.

The roof should be fire protected to the underside by applying a layer of plasterboard or other approved material.

Thermal Ply is suitable for maintenance traffic loadings only.

FR/TP

Length (mm)	2400
Width (mm)	1200
Thickness* (mm)	56, 76, 86, 96, 106, 116

*Thickness includes 6mm plywood

Property & Units

Density (Foam Core)	32 kg/m^3
Compressive Strength	>150kPa@10% Compression
Thermal Conductivity	0.022 W/mK

Typical U-Values

Construction	Thickness (mm)	U-Value (W/m^{2}K)
Timber deck	146mm*	0.15
Timber deck	116mm*	0.18
Timber deck	106mm*	0.20

*6mm plywood included in thickness
Installed over joists and plasterboard below - all edges supported.

The given U-Values are indicative only. Default fixings have been used to calculate the U-Value. For comprehensive calculations on all deck types, please contact Unilin Technical Support.

HANDLING, CUTTING & STORAGE

Unilin insulation should be stored off the ground, on a clean, flat surface and must be stored under cover. The polythene wrapping is not considered adequate protection for outside exposure. Care should be taken to protect the insulation in storage and during the build process.

The insulation boards can be readily cut using a sharp knife or fine toothed saw. Ensure tight fitting of the insulation boards to achieve continuity of insulation as asked for within the ACDs. Appropriate PPE should be worn when handling insulation. Please refer to Health & Safety data sheets on our website.

The boards are wrapped in polythene packs and each pack is labelled with details of grade/type, size and number of pieces per pack.

Durability

Unilin Insulation products are stable, rot proof, provide no food value to vermin and will remain effective for the lifetime of the building, dependent on specification and installation. Care should be taken to avoid contact with acids, petrol, alkalis and mineral oil. When contact is made, clean materials in a safe manner before installation.

Expect more Knowledge

Unilin Insulation, formerly Xtratherm, is one of the UK's largest manufacturers and suppliers of insulation. We have a 20-plus year history of working in partnership with construction professionals to close the gap between design and as-built performance.

FREE
One-to-one advice

Higher standards of fabric performance call for greater adherence to best practice detailing. To achieve this and to 'close the gap' between design and build, we provide a dedicated Technical Team, all qualified to the highest standards of competency in U-Value calculation and condensation risk analysis.

Here to support you

- BRE listed Thermal Bridging Detailing
- BRE Trained Modelling
- BBA/TIMSA calculation competent
- Warranted Calculations available
- Immediate technical response
- SAP Qualified
- Insulation systems to deliver real onsite performance

Get in touch

T: +44 (0) 371 222 1055 **E:** info.ui@unilin.com **unilininsulation.co.uk**

UNILIN INSULATION

Unilin Insulation UK Ltd
Park Road, Holmewood
Chesterfield, Derbyshire
United Kingdom
S42 5UY

t. +44 (0) 371 222 1033
e. info.ui@unilin.com

unilininsulation.co.uk

BBA CERTIFICATE CS/nnnn-n U Value Competency Scheme

bre

ASSOCIATE MEMBER SPRA Single Ply Roofing Association

LRWA Liquid Roofing and Waterproofing Association

NFRC THE NATIONAL FEDERATION OF ROOFING CONTRACTORS LIMITED

ISO 45001 Occupational Health & Safety Management Systems
ISO 9001 Quality Management Systems
ISO 14001 Environmental Management Systems

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The Sustainable Solution

Specifying Unilin Insulation is a real commitment to minimising energy consumption, harmful CO_2 emissions and their impact on the environment. Using our products is one of the most effective ways to reduce energy consumption – in fact, after just eight months the energy they save far outweighs the energy used in their production. In addition, our manufacturing facilities operate to an ISO 14001 certified Environmental Management System.

Environmental Product Declaration (EPD)

An Environmental Product Declaration or EPD for a construction product indicates a transparent, robust and credible step in the pursuit and achievement of real sustainability in practice, it is a public declaration of the environmental impacts associated with specified life cycle stages of that product. Unilin EPDs have been independently verified in accordance with EN 15804+A2:2019 and ISO 14025 accounting for stages of the LCA from A1 to A3, with options A4-A5 and modules C1-C4 and D included. The process of creating an EPD allows us to improve performance and reduce resource wastage through improvements in product design and manufacturing efficiency. They play a crucial role in manufacturing and construction and are increasingly asked for by industry.

EPDs and BREEAM

BREEAM is primarily trying to encourage designers to take EPDs into consideration when specifying products. BREEAM requires EPDs to be verified by a third-party. For the Mat 02 category, points are awarded based on whether EPDs are generic, manufacturer-specific, or product-specific. Non 3rd party verified EPDs to EN 15804 cannot be accepted. All of Unilin EPDs are externally verified.

Responsible Sourcing

Unilin has BES 6001 certification for responsible sourcing. The second BREEAM credit under that category is based on responsibly-sourced materials – at least 80% of the total insulation used in roofs, walls, ground floors and services must meet any of tier levels 1 to 6 in the BREEAM table of certification schemes. Our Environmental Management System is certified under EN ISO 14001, and our raw materials come from companies with similarly certified EMS (copies of all certificates are available for BREEAM assessments). This level of responsible sourcing meets tier level 6 in the BREEAM table.

Good workmanship and appropriate site procedures are necessary to achieve expected thermal and airtightness performance. Installation should be undertaken by professional tradespersons. The example calculations are indicative only, for specific U-Value calculations contact Unilin Insulation Technical Support. Unilin technical literature, Agrément certifications and Declarations of Performance are available for download on the Unilin Insulation website. The information contained in this publication is, to the best of our knowledge, true and accurate at the time of publication but any recommendations or suggestions which may be made are without guarantee since the conditions of use are beyond our control. Updated resources may be available on our websites. All images and content within this publication remain the property of Unilin Insulation.