UNILIN

ECO360

HIGH
THERMAL PERFORMANCE

LOW
EMBODIED CARBON

Bio Inside

As low as **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 as low as 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 as low as 0.020 W/mK

Bio-degradable packaging materials

Reduction of onsite waste

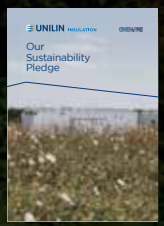
ONEHOME

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'.

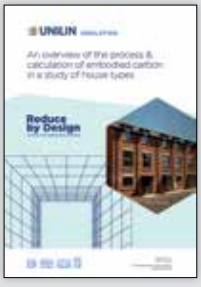
At Unilin we have developed a comprehensive understanding and learning tools that we share with our industry partners to allow the development of effective strategies to reduce Whole Life Carbon and encourage engagement with the concept.

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?

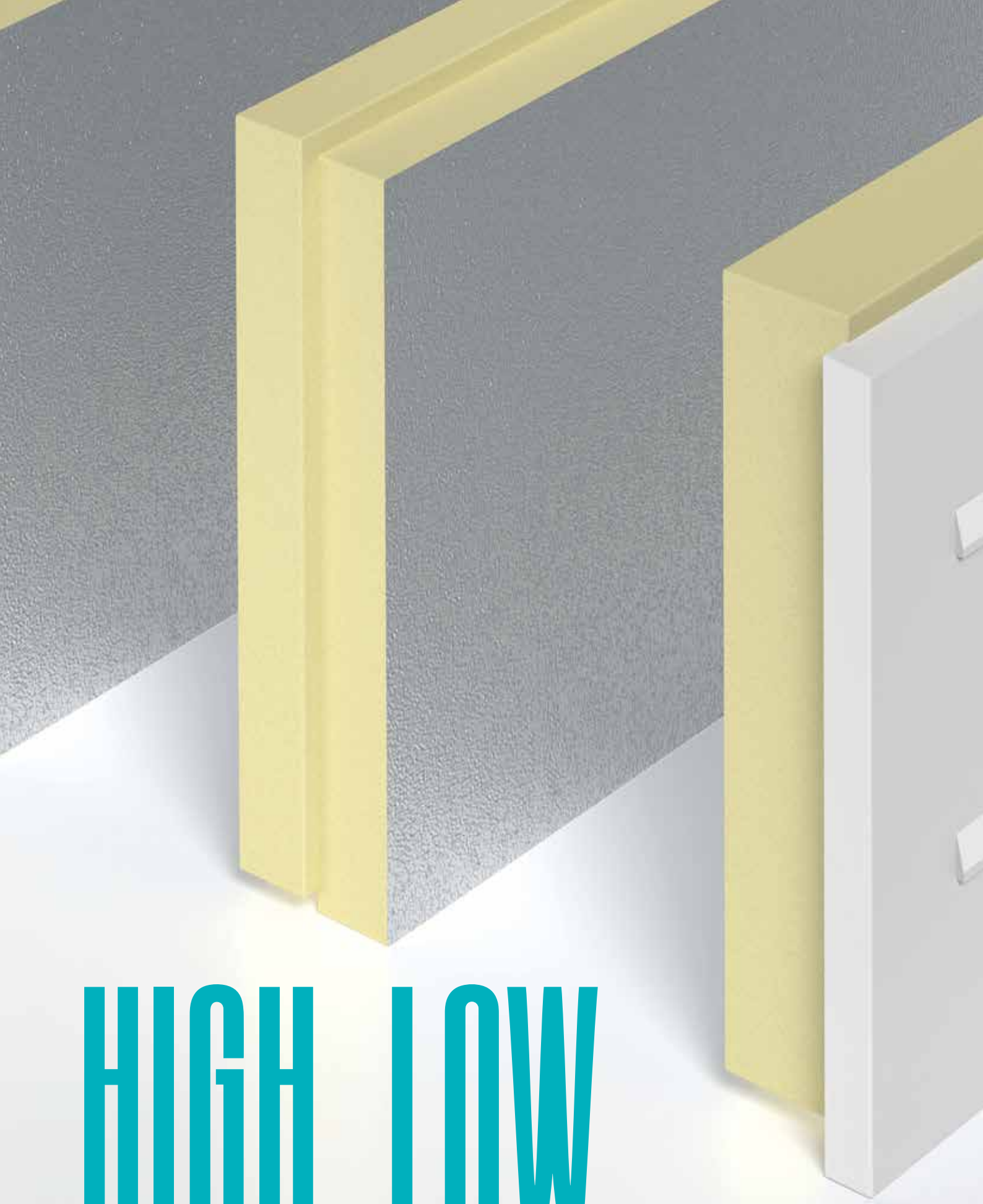
What materials should be accounted for? Does material specification measured meet the operation requirement targets?

These issues require greater understanding.



Embodied Carbon Report

Visit the Unilin Insulation website to download our updated 2023 edition of 'An overview of the process & calculation of embodied carbon in a study of house types'.



HIGH
THERMAL PERFORMANCE

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.

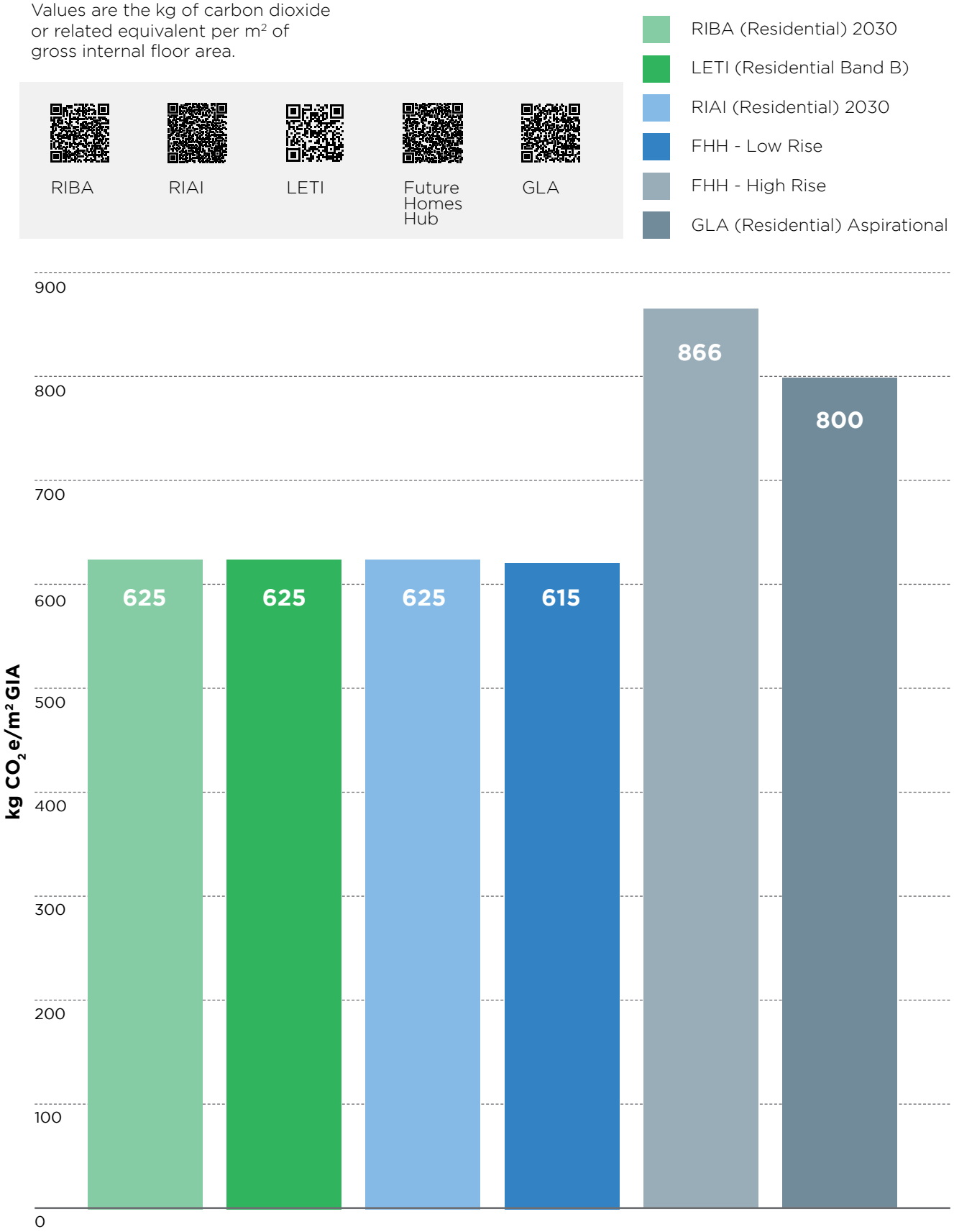
RIBA

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) was generated 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.

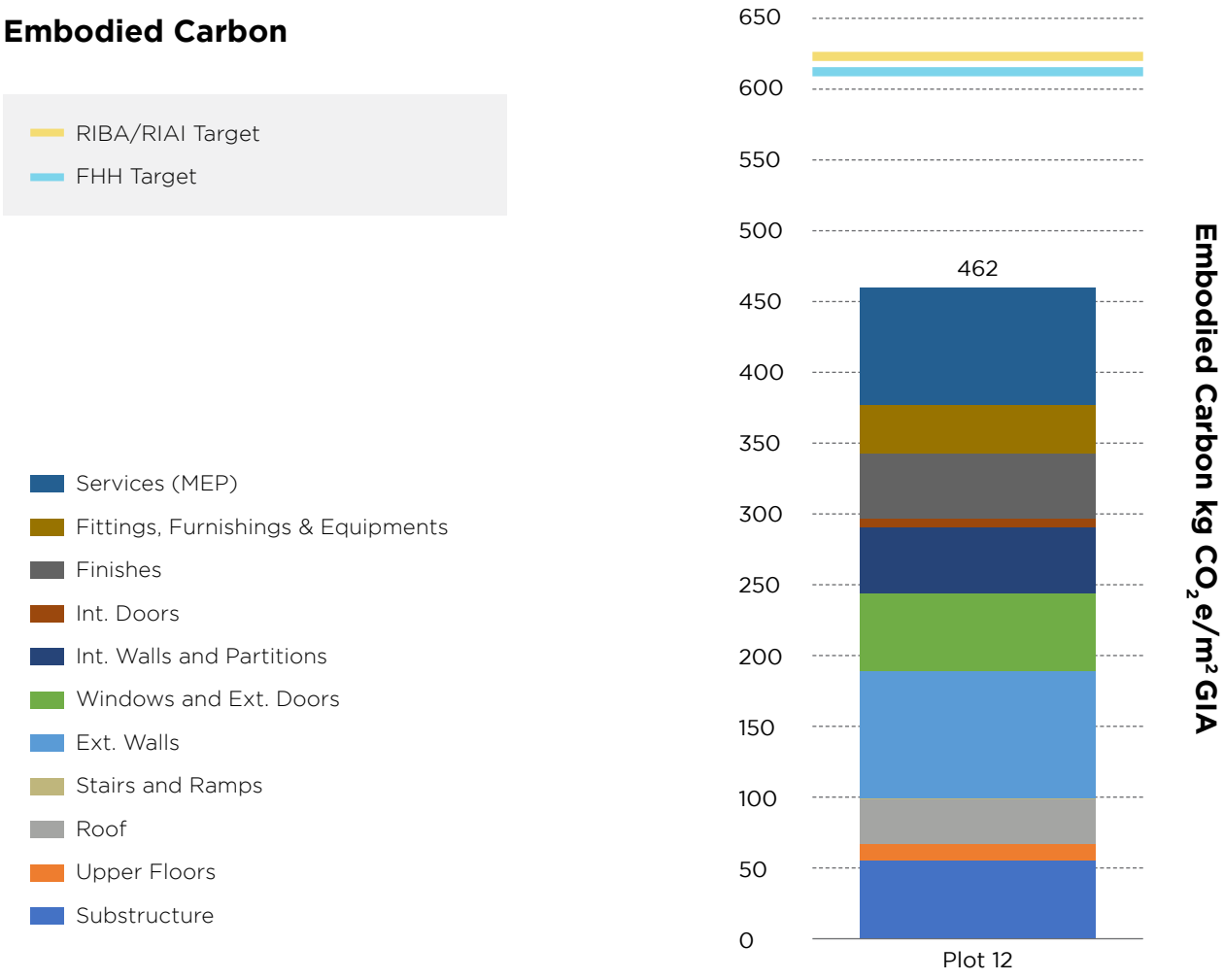
The specification met the Future Homes Standard. The materials specified and quantities taken within the calculation were provided by the project SAP Assessors and the project QS.

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 building'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/m²/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 process & calculation of embodied carbon in a study of house types'.

Richard Hatch Photography©

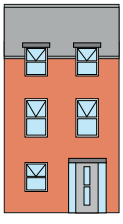
Example House Types

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 of 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.

Benefits

SHIPLAP JOINTING

- Bio-enhanced PIR insulation
- Enhanced thermal performance of 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 ECO/CT manufactured to EN 13165 :2012+ A2:2016 by Unilin Insulation, including corner boards and ancillary detail components, comprising of a rigid Polyisocyanurate (PIR) core between Composite foil facings with engineered HIPS outer skin. The ECO/CT _ _ _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. Uniclass 25 71 63 66.

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

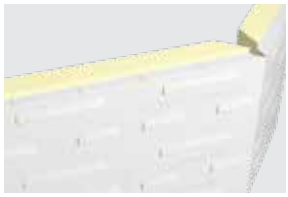
The resistance value of any thickness of Unilin insulation can be ascertained by simply dividing the thickness of the material (in metres) by its Agrément declared Lambda value, for example: Lambda 0.020 W/mK and thickness 105mm -> 0.105/0.020 -> R-Value = 5.25. In accordance with EN 13165, R-Values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

ECO/CT

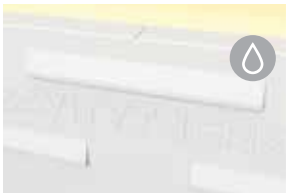
The Complete Cavity Wall System

Unilin offers preformed External and Internal Corner Panels 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

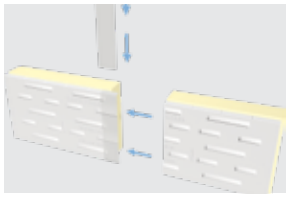


Preformed corner panels



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

U-Value calculations to EN ISO:6946 2017

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

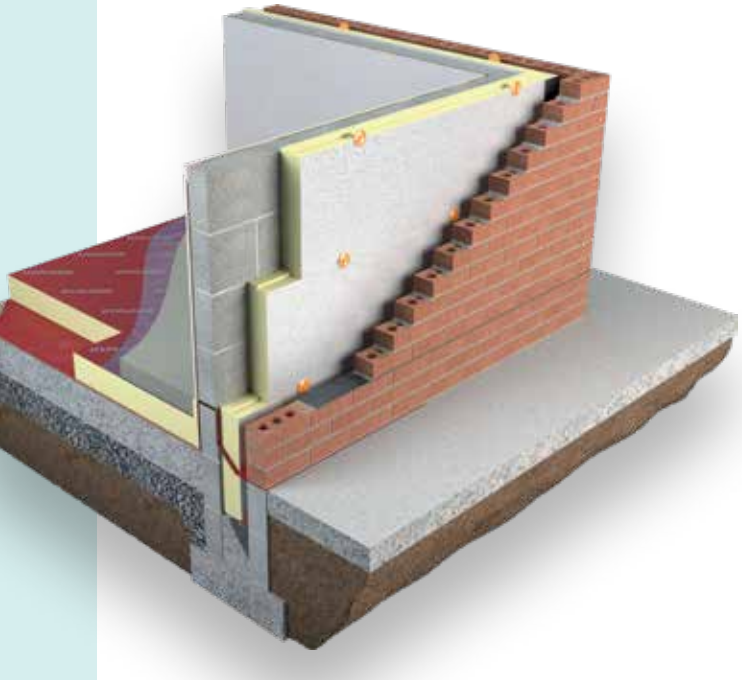
Cavity Wall 360 is a bio-enhanced partial fill wall insulation system. The system incorporates robust facings, engineered jointing details, preformed corners and has a Lambda of 0.020 W/mK.

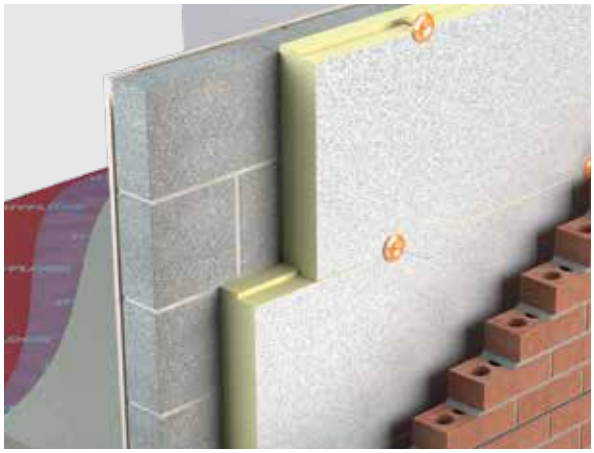
Cavity Wall 360 is an environmentally sound choice for Passive and low energy builds. It can achieve a Passive U-Value of 0.15 W/m²K in a traditional cavity wall. When building with Cavity Wall 360 a residual cavity is maintained, offering excellent protection against wind-driven rain.

Benefits

- Bio-enhanced PIR insulation
- Enhanced thermal performance of 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 ECO360 Cavity Wall ECO/CW manufactured to EN 13165 :2012+ A2:2016 by Unilin Insulation, comprising of a rigid modified Polyisocyanurate (PIR) core between textured foil facings and engineered shiplap jointing. The ECO/CW _ _ _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. Uniclass 25 71 63 66.

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 continuous layer of insulation, minimising the threat of Thermal Bridging and improving the overall U-Value of the wall.

3. The textured 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

U-Value calculations to EN ISO:6946 2017

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

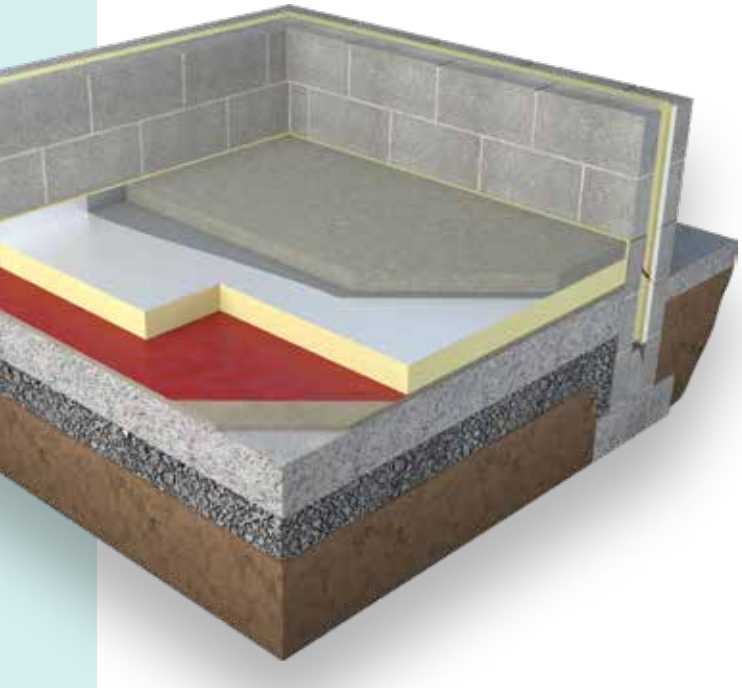
ECO/MA (FLOORS)

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

This bio-enhanced insulation will significantly improve the U-Value of new and existing floors. It combines high compressive strength with low thermal conductivity, providing suitable 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 thermal performance of 0.020 W/mK
- Halogen free
- Bio-degradable packaging
- High compressive strength
- Suitable for underfloor heating



Specification Clause
The floor insulation shall be ECO360 ECO/MA Floors manufactured to EN 13165 :2012+A2:2016 by Unilin Insulation, comprising of a rigid modified Polyisocyanurate (PIR) core between textured foil facings. The ECO/MA _ _ _mm with a declared Lambda value of 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, P10 45.
Uniclass 25 71 63 66.

NBS Plus

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, an effective detail is created.

2. ECO360 MA is 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

Table 1
ECO/MA (FLOORS) Insulation for Ground Supported Slab (U-Value calculations to EN ISO:13370 2017)

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 (U-Value calculations to EN ISO:13370 2017)

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

Table 3
ECO/MA (FLOORS) Hollow Core Slab (U-Value calculations to EN ISO:13370 2017)

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)

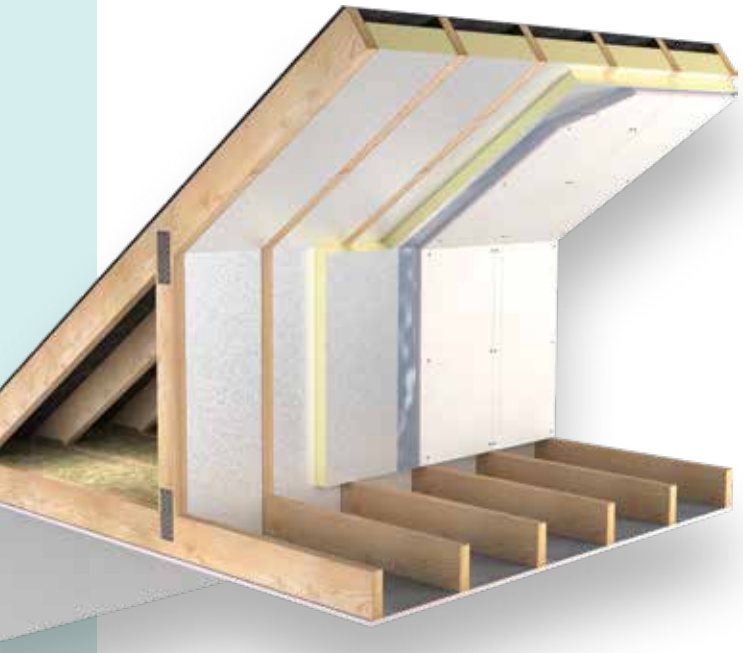
Bio-enhanced, superior performance PIR insulation suitable for pitched roofs (ventilated, hybrid or warm). **ECO360 MA** for roofs offers insulation performance with a thermal conductivity as low as 0.020 W/mK.

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

This bio-enhanced insulation combines high compressive strength with low thermal conductivity, providing a suitable solution for roof insulation. ECO360 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 thermal performance of 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 ECO/MA Roofs manufactured to EN 13165 :2012+ A2:2016 by Unilin Insulation, comprising of a rigid modified Polyisocyanurate (PIR) core between textured foil facings. The ECO/MA _ _ _mm with a declared Lambda value of 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, P10 50, P10 15.
Uniclass 25 71 63 66.

NBS Plus

Thermal Resistances

Thickness (mm)	R-Value (m^2K/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 (m^2K/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.

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

ECO/MA

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

Property & Units

Thermal Conductivity	0.020 - 0.023 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.

Typical U-Values

Table 1 (U-Value calculations to EN ISO:6946 2017)

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
			400mm	600mm
	100	50	0.16	0.15
	125	50	0.14	0.13
	150	50	0.13	0.12

Table 2 (U-Value calculations to EN ISO:6946 2017)

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
			400mm	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.

0.020 W/mK thermal conductivity

ECO360 BIO-ENHANCED PIR INSULATION

Sarking Warm Roof Construction

ECO/MA (SARKING)

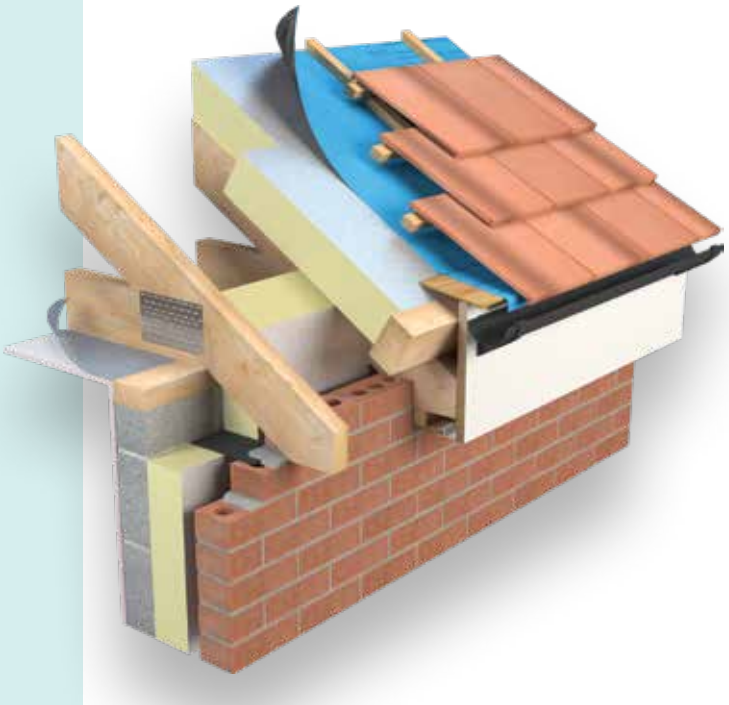
Bio-enhanced, superior performance PIR insulation suitable for Sarking Warm Roof construction. **ECO360 MA**, with a thermal conductivity of 0.020 W/mK, in a sarking warm roof application offers an environmentally conscious solution which provides improved detailing, speed of installation and a uniform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

This bio-enhanced insulation combines high compressive strength with low thermal conductivity, providing a suitable 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 thermal performance of 0.020 W/mK
- Halogen free
- Bio-degradable packaging
- Suitable for pitched roofs



Specification Clause

The pitched roof Sarking insulation shall be ECO360 ECO/MA Sarking manufactured to EN 13165 :2012+ A2:2016 by Unilin Insulation, comprising of a rigid modified Polyisocyanurate (PIR) core between textured foil facings. The ECO/MA _ _ _mm with a declared Lambda value of 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.
Uniclass 25 71 63 66.

NBS Plus

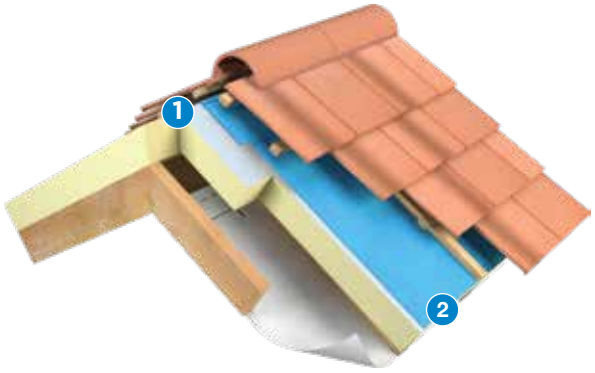
Thermal Resistances

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 (SARKING)



1. ECO/MA offers a practical on-site solution that results in a 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 (U-Value calculations to EN ISO:6946 2017)

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.

Notes

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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 14001:2015+A1:2024 certified Environmental Management System.

Environmental Product Declaration (EPD)

An Environmental Product Declaration or EPD for a construction product indicates a transparent 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 14025:2010 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 15804:2012+A2:2019 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 14001:2015+A1:2024, 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.

ISO 9001 Quality Management Systems
ISO 14001 Environmental Management Systems

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