marmox

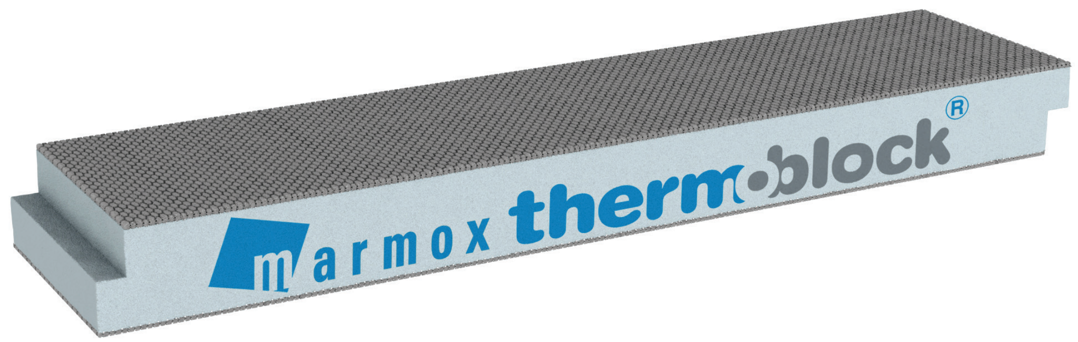
thermoblock

Reduce heat loss at the base of walls

Solves cold bridging at the wall–floor junction

marmox thermoblock

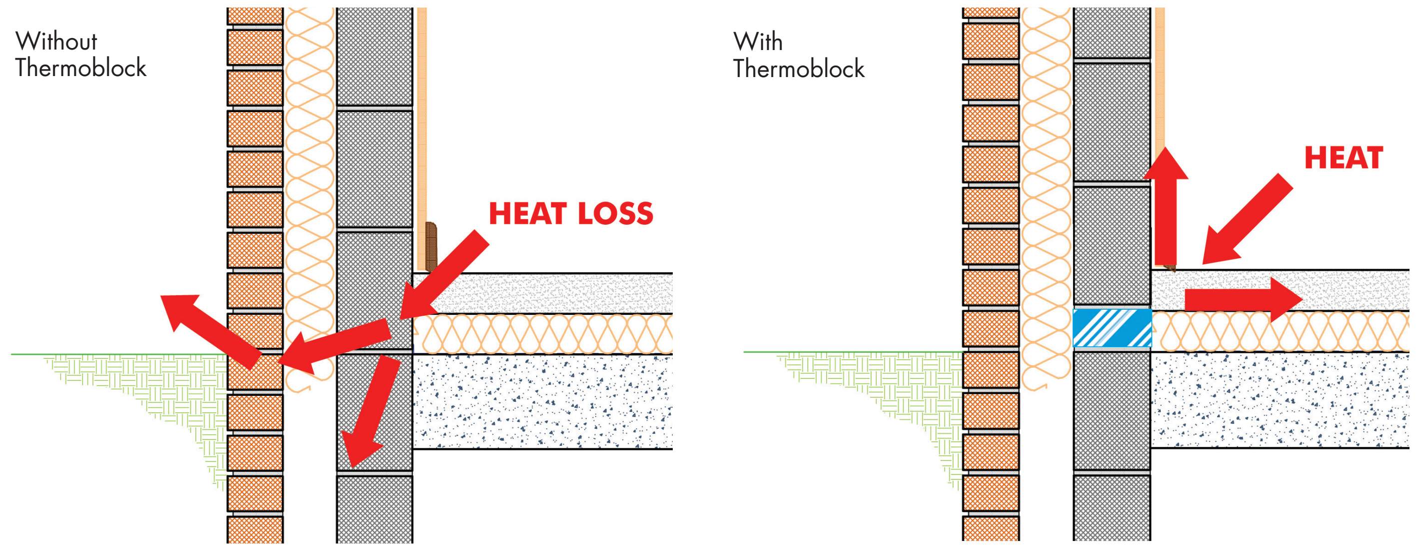
Reduce heat loss at the base of walls



What is Thermoblock for?

Cold bridges occur where the wall meets the floor but until recently it was impossible to place insulation under a supporting wall because the insulation would have been crushed. It was for this reason that Marmox Thermoblock was developed.

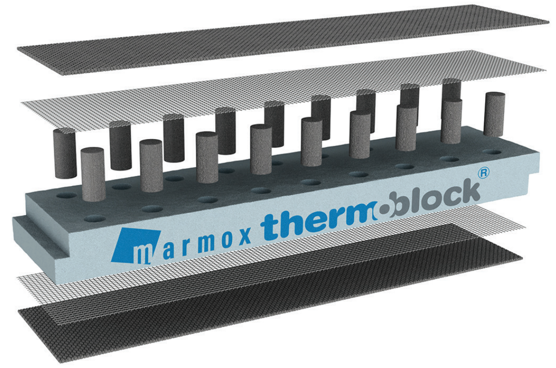
Thermoblock is a block of load-bearing insulation material with a thermal conductivity of 0.047W/mK strong enough to withstand a load of 9N/mm². Its function is to eliminate or reduce the thermal bridge at the wall to floor junction.



Marmox Thermoblock is used in masonry AND timber-framed AND steel-framed walls.

What a Thermoblock is

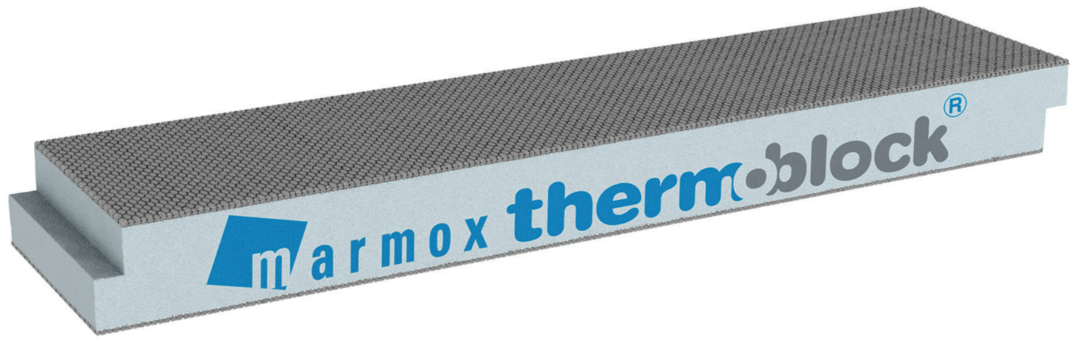
The standard Marmox Thermoblock comprises of a 60mm thick core of fire resistant XPS insulation encasing two rows of high strength, low conductive, epoxy-concrete columns. These are fixed to the top and bottom surfaces of the block, which are 2.5mm thick layers of fibre reinforced polymer concrete incorporating the latest innovation in building technology – Carbon Nano Tubes.



What a Thermoblock is not

A Thermoblock is NOT a thermal block/aerated block/AAC/aircrete block which are lightweight thermally insulating building blocks. Marmox Thermoblock is a thermal bridging block, typically used at the base of a wall made of thermal, aerated blocks, specifically to eliminate the cold bridge.

marmox
thermoblock
Reduce heat loss at the base of walls

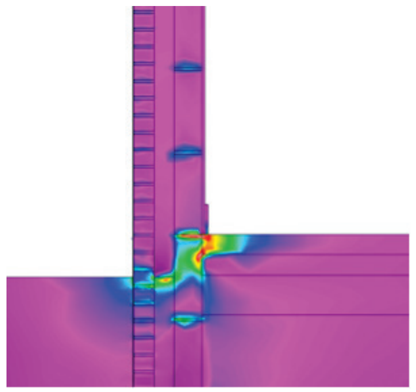


Why Thermoblock should be used

Comply with building regulations

As buildings become more energy efficient with better insulation it is important to address the thermal bridge at the wall floor junction which can contribute up to 30% of a building's total heat loss.

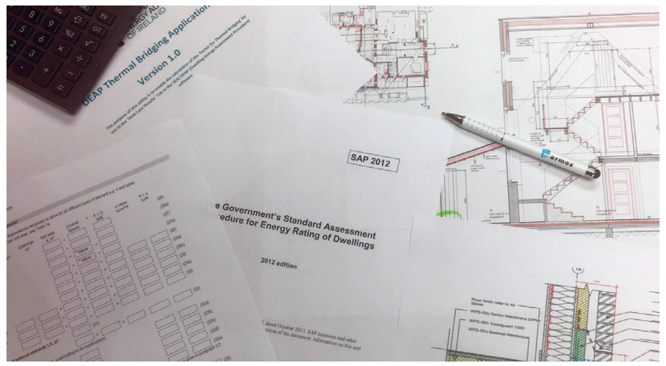
With approximately 40% of all the world's greenhouse gases coming from buildings, by reducing or eliminating thermal bridges, these greenhouse gas emissions can be reduced by almost a third.



Taking the lead from the EU's Energy Performance and Buildings Directive, all building regulations in the UK and Ireland now state the following:

"The building fabric should be continuous over the whole building envelope and constructed so that there are no reasonably avoidable thermal bridges in the insulation layers caused by gaps in the various elements."

Marmox Thermoblock fully satisfies this requirement. It typically connects the wall insulation to the floor insulation by insulating below the supporting wall - it provides a layer of insulation with the compressive strength of a load carrying block.



The heat loss through thermal bridges is accounted for in the SAP and SBEM, or in Ireland the DEAP and NEAP energy assessment calculation. This combines all the individual ψ values into a single Y value which is then added to the U value to give the total energy loss.

Each thermal bridge in a building will have its own ψ value but the thermal bridge at the wall to floor junction is easily the most significant one with a ψ value usually in excess of all the other thermal bridges put together.

Not addressing the wall to floor junction could result in that the building not meeting regulations.

Lower heating costs and reduce greenhouse gas emissions

Studies have shown that the cost to heat an average home can be reduced by approximately £200 by incorporating Marmox Thermoblock in the wall to floor junction detail thereby removing or reducing that thermal bridge.

Clearly, such an effective method in reducing a building's energy consumption will have a positive contribution in reducing CO_2 emissions from power stations and consequently in global warming.

A healthier, more comfortable building

A thermal bridge at the base of a wall will cause that wall's surface to be colder. When there is little air movement, the chances of surface condensation and subsequently mold growth occurring are greatly increased. Mold growth is not only unsightly but can exacerbate health issues such as asthma and respiratory diseases. In drawing heat out of the wall, surface condensation can reduce the effectiveness of the wall insulation.

Building Regulations require f_{Rsi} or the surface temperature factor to be greater than 0.75 in homes or greater than 0.5 in non-residential properties to ensure there will be no mold growth. Incorporating Marmox Thermoblock at the base of the internal wall will almost always result in f_{Rsi} values in excess of 0.75.

Generally, the most significant non-repeating thermal bridges in buildings is at the wall to floor junction of the perimeter walls. Thermoblocks are typically used at the base of perimeter walls although they can be used in other locations as well

A selection of junction details incorporating Marmox Thermoblock have been thermally modelled by the BRE and presented as the following document.

This report provides third party accredited (BRE) thermal performance (ψ values) and temperature factors (f_{Rsi} values) which can be used without the need for any further assessments in **SAP**, **SBEM** or **DEAP** calculations.

bre

Certificate of Approval
Certificate Number: JTD1002 Issue: 02

Marmox UK Ltd
Caxton House
101 Hopewell Drive
Chatham
Kent
ME5 7NP

Having complied with the requirements of the following:

SD 227: Rev.0
Certified Thermal Details and Products Scheme

is authorised to use the BRE Global Certification Mark in association with the following:

Products

Model	Description	Reference No.
Marmox: Thermoblock • 100 mm • 140 mm	Structural insulation block	600023 to 600030

Please see Appendix for additional details

This certificate and appendix is maintained and held in force through periodic review and verification.

Signed for BRE Global Ltd.	John Holden BGM	13 August 2015 Date of Issue	31 July 2015 Date of First Issue	31 July 2018 Reassessment date

This certificate and appendix remains the property of BRE Global Ltd and is issued subject to terms and conditions (for details visit www.breglobal/checkterms).
To check the validity of this certificate please visit www.bregloballistings/check or contact us.
BRE Global Ltd., Garston, Watford WD25 9XX.
T: +44 (0)333 321 8811 F: +44 (0)1923 664603 E: enquiries@breglobal.com

BF1583A Rev. 0.0 Page 1 of 2 © BRE Global Ltd, 2015

These junction details with the corresponding thermal and condensation values are free to download at:

www.bre.co.uk/certifiedthermalproducts/

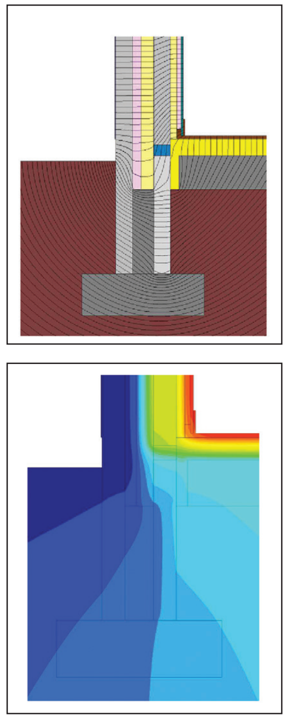
BRE modelled detail	BRE reference	ψ value (W/m.K)	f_{Rsi} temperature factor
Masonry Cavity Wall junction with a concrete slab	6000023 6000024	0.031 (100mm) 0.030 (140mm)	0.94
Masonry Cavity Wall junction with a block and beam floor	6000025 6000026	0.038 (100mm) 0.042 (140mm)	0.95
Timber Frame Wall junction on concrete slab	6000030	0.039 (140mm)	0.92
Timber Frame wall junction with a suspended timber floor	6000029	0.079 (140mm)	0.91
Masonry Cavity Wall junction with a suspended timber floor	6000027 6000028	0.081 (100mm) 0.085 (140mm)	0.88

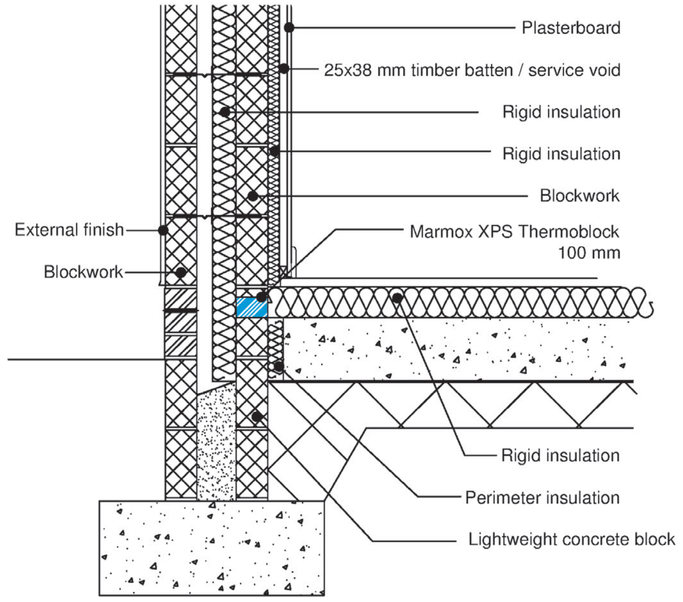
Specifications of the three highlighted models are shown in the following pages.

Other common examples of where to use are:

- Underneath a concrete slab, below a timber frame
- Underneath a solid wall
- Underneath a door threshold
- Internal and party wall junction to the floor
- Wall junctions with non-ground floors
- Roof eave to wall junction
- At the base of parapets

BRE detail 600023





Using 100mm Marmox Thermoblock with 100mm wide aerated concrete/ AAC blocks.

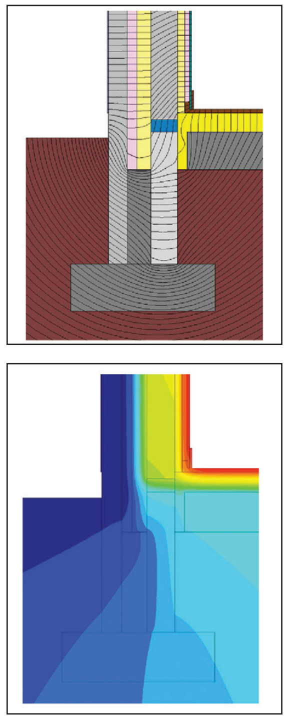
ψ value = 0.031

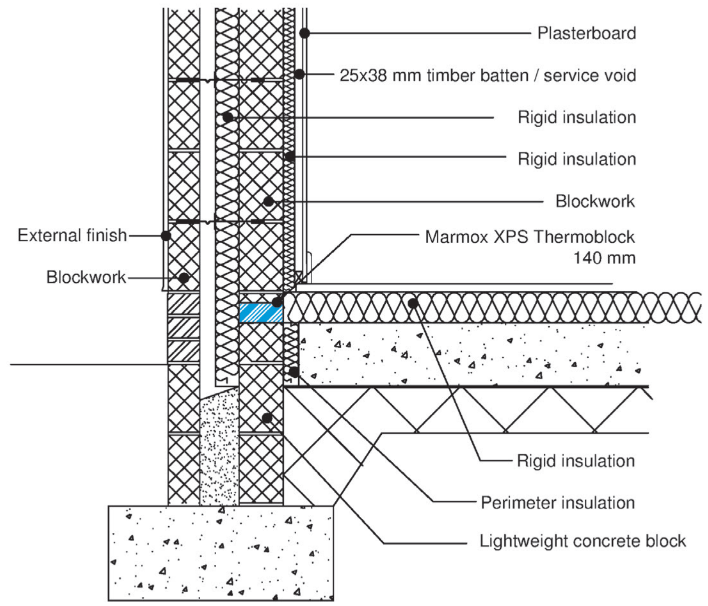
f_{Rsi} = 0.94

Typical Specification: A single course of Marmox Thermoblock: 600mm(l) x 100/140/215mm(w) x 65mm(ht) is the starter course for the inner leaf of the wall in place of the bottom row of blocks. Thermoblock is fixed to the floor with normal mortar which is also used to lay subsequent courses of bricks/blocks on top. If using lightweight blocks, this initial layer of mortar should be 15mm.

Variation:

BRE detail 600024





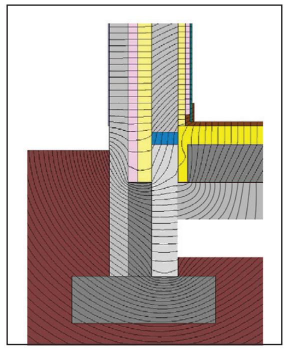
Using 140mm Marmox Thermoblock with 140mm wide aerated concrete/ AAC blocks.

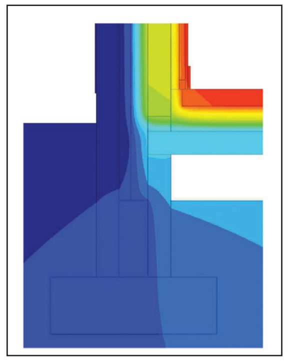
ψ value = 0.030

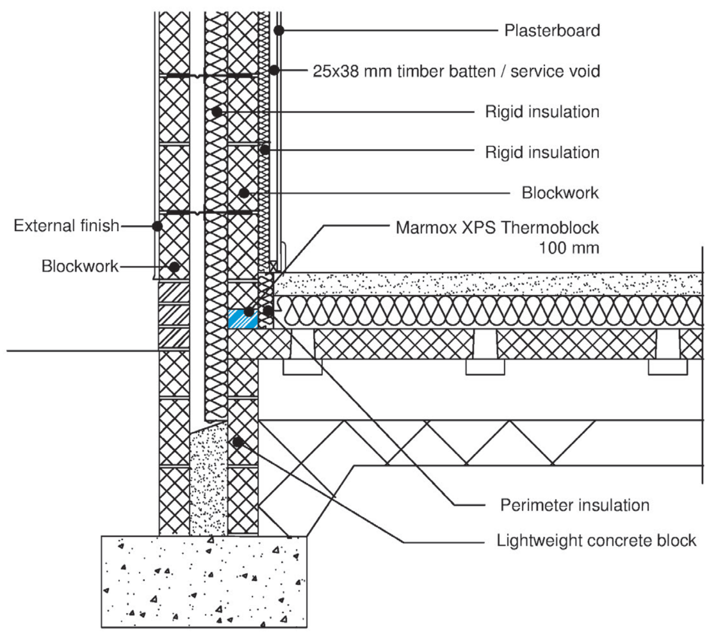
f_{Rsi} = 0.94

2. Masonry Cavity Wall junction with a block and beam floor

BRE detail 600025







Using 100mm Marmox Thermoblock with 100mm wide aerated concrete/ AAC blocks.

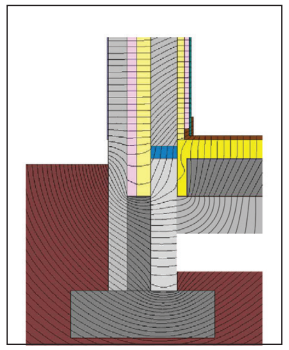
Ψ value = 0.038

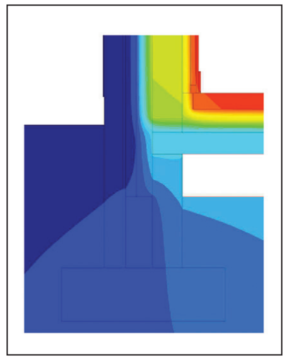
f_{Rsi} = 0.95

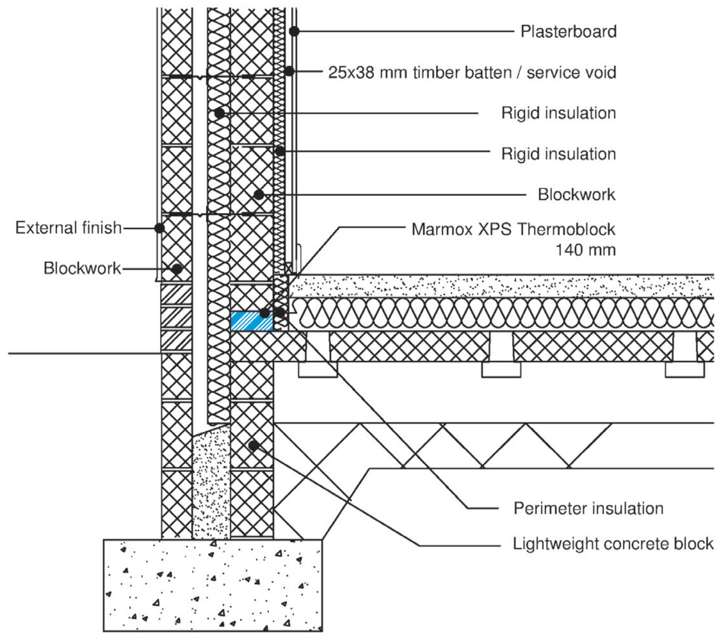
Typical Specification: A single course of Marmox Thermoblock: 600mm(l) x 100/140/215mm(w) x 65mm(ht) is the starter course for the inner leaf of the wall in place of the bottom row of blocks. Thermoblock is fixed to the floor with normal mortar which is also used to lay subsequent courses of bricks/blocks on top. If using lightweight blocks, this initial layer of mortar should be 15mm.

Variation:

BRE detail 600026







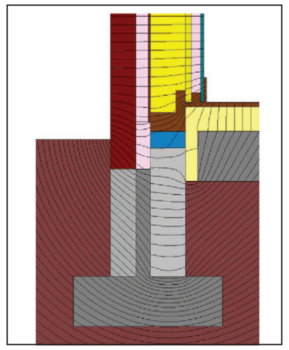
Using 140mm Marmox Thermoblock with 140mm wide aerated concrete/ AAC blocks.

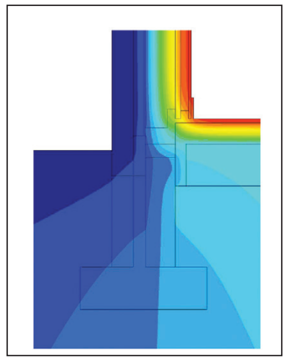
Ψ value = 0.042

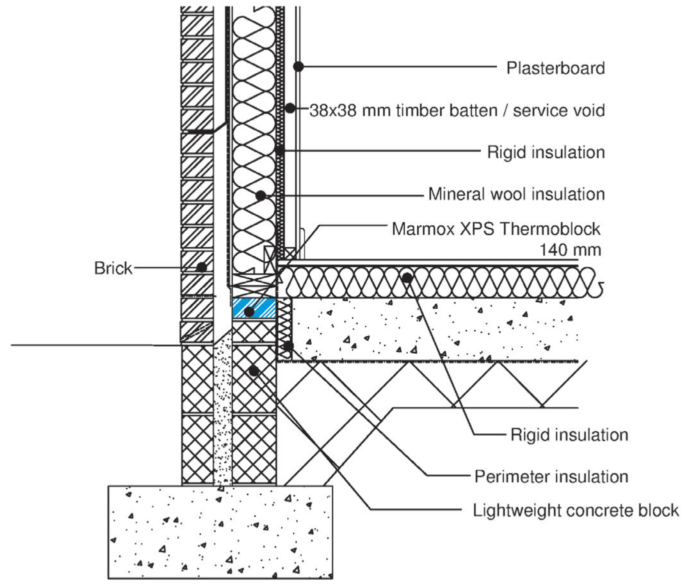
f_{Rsi} = 0.95

3. Timber Frame Wall junction on ground floor

BRE detail 600029







Using 140mm Marmox Thermoblock with 140mm wide timber frame.

Ψ value = 0.039

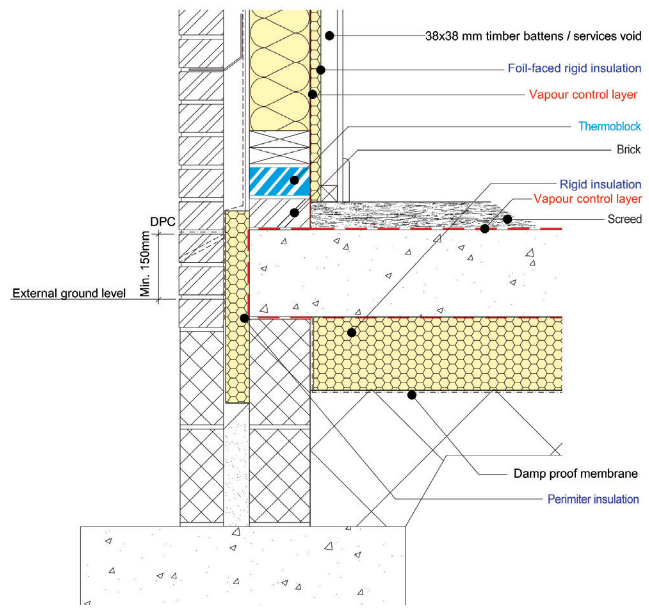
f_{Rsi} = 0.92

Typical Specification – Under sole plate, directly on the concrete slab / foundation blocks: One course of Marmox Thermoblock (600mm x 100mm/140mm/215mm x 65mm) is laid onto the slab/foundation blocks with conventional sand/cement mortar. Thermoblocks are sealed together with Marmox sealant on the stepped edges to provide a waterproof barrier. Sole plate is fixed mechanically to the floor using bolts placed through the middle of the Thermoblock (halfway across its width) into the concrete/blocks below.

Alternative Specification – The Thermoblock layer may be laid on top of a row of bricks/blocks to raise the height and ensure that the DPM is not pierced by the fixing bolts: One course of Marmox Thermoblock (600mm x 100mm/140mm/215mm x 65mm) is laid onto the layer of blocks/bricks with conventional sand/cement mortar. Thermoblocks are sealed together with Marmox sealant on the stepped edges to provide a waterproof barrier. Sole plate is fixed mechanically using bolts placed through the middle of the Thermoblock (halfway across its width) into the layer of blocks/bricks below.

Additional fixing instructions

1. Fixing bolt can only pass through the middle of the Thermoblock where there are no concrete columns.
2. Ensure that the sole plate is not narrower than the Thermoblock.
3. Prior to inserting the bolt, squirt sufficient Marmox sealant into the hole to waterproof it.
4. Apply a single ribbon of Marmox sealant to the surface of the Thermoblock so it seals to the underside of the sole plate.
5. If bricks are used beneath the Thermoblock blocks (Alternative Specification), they must be solid bricks, without hollows or with holes, so that the bolts which pass through the Thermoblock have something to anchor in to.

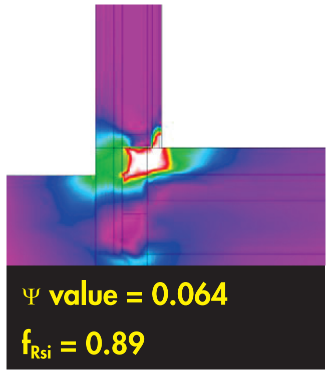


Reduce heat loss at the base of walls

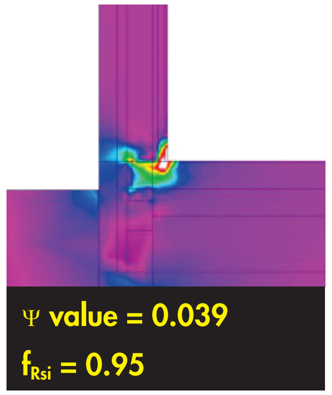
In-house Specifications

The following specifications include thermally modelled ψ values for specific details with specific materials so should not be assumed to cover all variants.

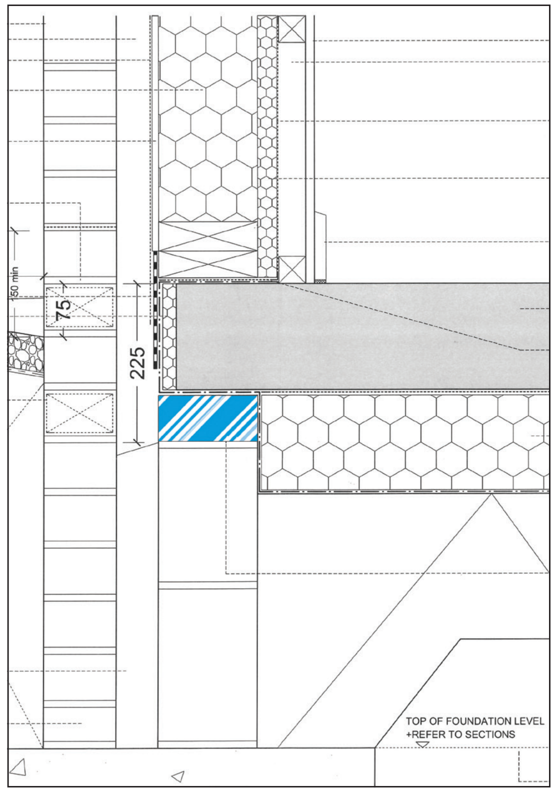
1. Underneath a concrete slab, below a timber frame



Heat flux **without** Thermoblock



Heat flux **with** Thermoblock



Product Type: 140mm Marmox XPS Thermoblock

Junction Type: Wall to Ground floor (insulation below slab)

Specification: A single course of Marmox Thermoblock: 600mm(l) x 100/140/215mm(w) x 65mm(ht) is fixed using normal mortar on to top of the foundation blocks (inner leaf) directly underneath the load bearing concrete slab on which the timber frame is fixed.

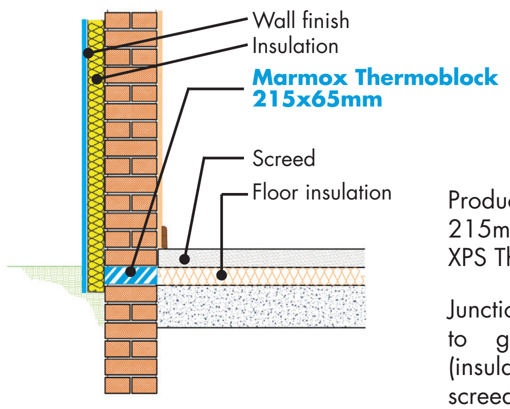
Additional fixing instructions

The compressive strength of Thermoblock is 9N/mm² – ensure this conforms with the requirements of the foundation wall blocks.

The foundation blocks below the Thermoblock must not be narrower than the width of the Thermoblock.

The edge of concrete slab above must be no more than 15mm away from the edge of the Thermoblock.

2. Underneath a solid wall

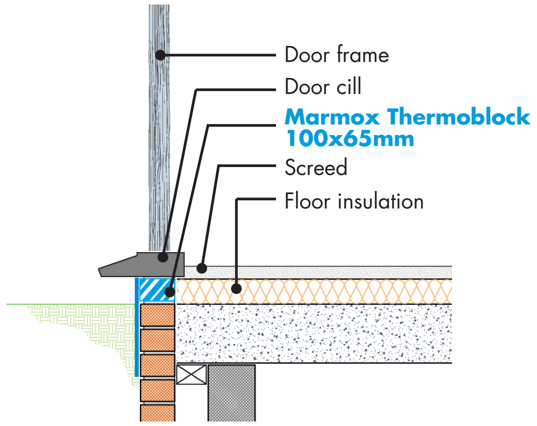


Product Type: 215mm Marmox XPS Thermoblock

Junction Type: Wall to ground floor (insulation below screed)

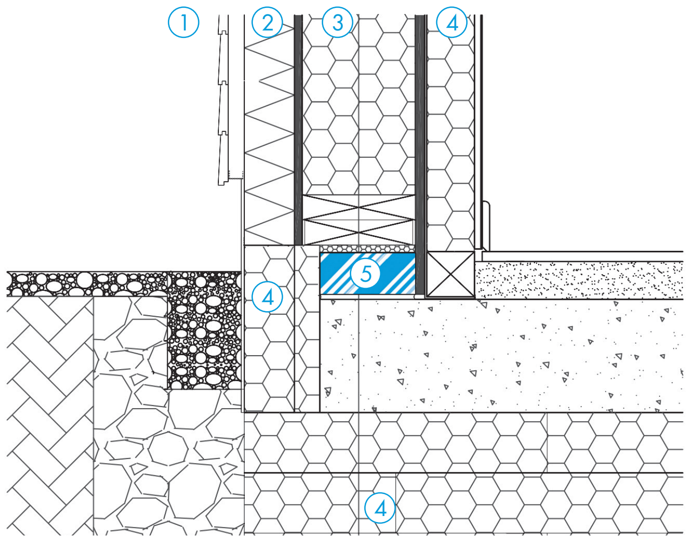
Marmox Thermoblock does not absorb water so can therefore be used in a damp environment with no effect on its insulation. To protect the floor insulation from moisture, ensure that the block edges are sealed together using Marmox sealant. Thermoblocks can be in contact with the soil but to discourage damage by rodents, the vertical surfaces should be protected, typically with a render.

3. Underneath a threshold



Marmox Thermoblock is suitable to use in the outer skin provided that its sides are protected from sunlight. The frame is mechanically fixed to the brickwork underneath the with a bolt or screw passing through the middle of the Thermoblock. Provided that the frame imposes its load evenly over the whole width of the Thermoblock, it may overhang the Thermoblock. Marmox sealant seals the Thermoblock to the frame.

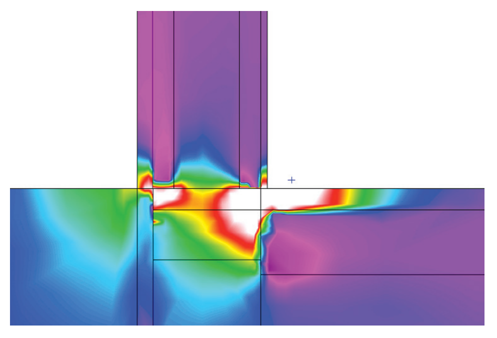
4. Achieving ψ value of 0.01W/mK on a Passivhaus design



Marmox Thermoblocks are often incorporated into Passivhaus designs such as the example here. In addition to having a primary energy demand less than 120kWh/m², very low U values, to achieve Passivhaus or zero carbon standards, the buildings need to be effectively thermal bridge free which means having a ψ value no more than 0.01W/mK. When used in the following design, Thermoblock resulted in making the junction a thermal bridge free.

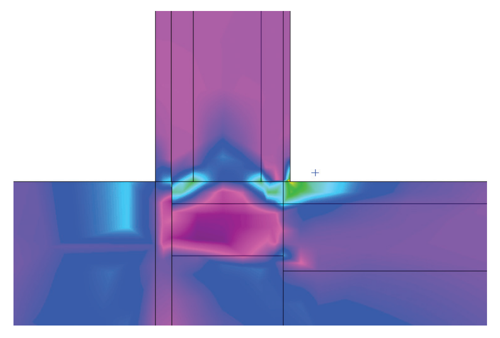
1. Timber cladding
2. Breathable external insulation
3. Insulating timber frame
4. Rigid phenolic insulation
5. Marmox Thermoblock
   215mm wide, 100mm high

5. At the base of an ICF wall



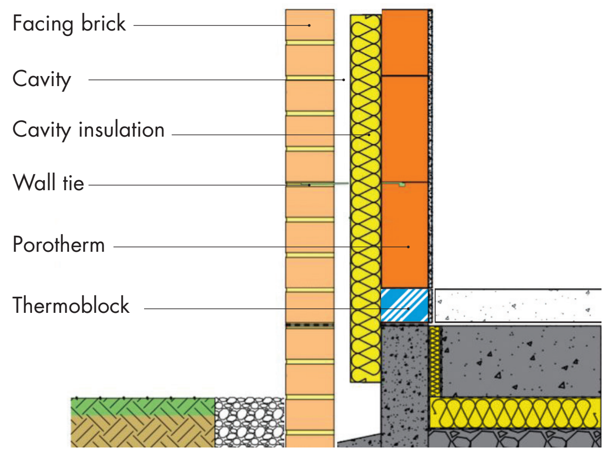
The ψ value of a typical ICF wall on a concrete slab is 0.15W/mK.

Incorporating a Thermoblock at the base reduces this typically to 0.09W/mK



Specification: If the ICF unit is designed so that the width of the concrete component inside is at least the same width as the Thermoblock, the ICF unit is laid directly on top of the Thermoblock. For example, a 170mm wide ICF unit incorporates a 120mm wide section of concrete. This can be placed onto a 100mm wide Thermoblock but not a 140mm wide Thermoblock. If the width of the concrete component inside the ICF is narrower than the Thermoblock width, a starter course of aircrete is incorporated.

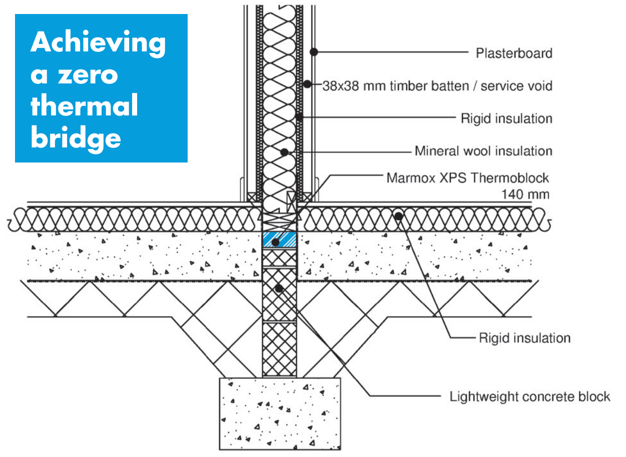
6. Use with cellular clay blocks



Specification: The cellular clay block (e.g. Porotherm T8) is fixed onto the Thermoblock with 12mm bricklayers mortar (min. mean compressive strength of 25 N/mm²). The cellular clay brick wall is laid directly on top of the Thermoblock if the combined dead and imposed load is <2N/mm². For loads in excess of 2N/mm², an aircrete block is laid on the Thermoblock to form the starter course of the cellular clay block wall.

7. Internal wall

Achieving a zero thermal bridge



Specification: A timber frame partition wall is mechanically fixed to the foundation blocks/concrete slab through the centre of the Thermoblock. The width of the wall is the same width as the Thermoblock. Fixings are placed every 600mm and the interface is sealed with Marmox sealant. The Thermoblock course should not be directly adjacent to the floor insulation on both sides of the wall. The Thermoblock should either be adjacent to the screed level or used in combination with a proprietary insulated fire stop.

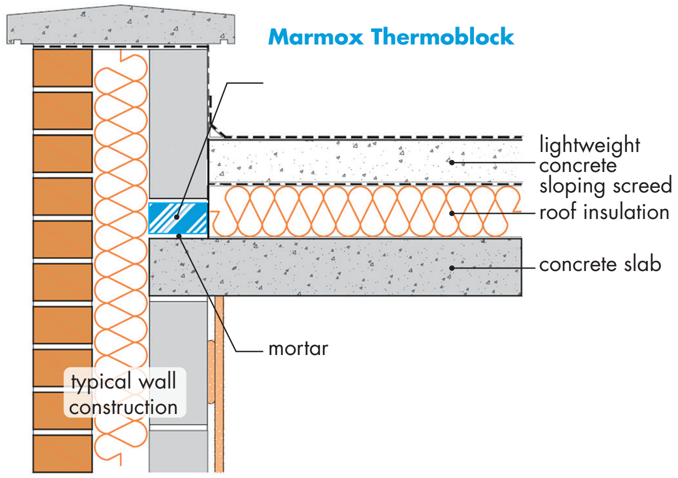
8. Base of parapets

Parapet walls can act as thermal fins accounting for significant heat loss since, in many situations, it has not been possible to integrate a thermal break between the inner leaf of the parapet wall with the inner leaf of the room below. A layer of Marmox Thermoblock can be safely and efficiently placed at the base of the external section.

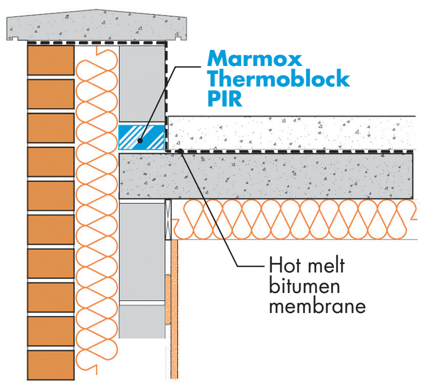
Standard application

Heat can be lost from a room below a flat or sloping roof that supports a parapet wall. In addition to wasting energy, parapet walls can result in condensation and mold growth on the walls underneath.

In most designs, the normal XPS Thermoblock is suitable, there is just one specific application when a variant needs to be used.



Hot melt bitumen membrane



If applying a hot-melt bitumen membrane to a roof junction with a parapet wall using a flame torch, Marmox Thermoblock-PIR should be specified as this version is resistant to distortion which the standard block may experience if in contact with the flame gun. The PIR version has a slightly lower thermal conductivity (0.041W/mK), is 53mm high and like the standard version a compressive strength of 9N/mm².

Important Installation Advice

Sealing the blocks together

Marmox sealant should be used to seal the ends of the Thermoblocks together to prevent moisture creeping up between blocks and to ensure air tightness of the building.

Not an alternative to aircrete blocks

Thermoblock should be used with, not instead of lightweight aircrete / thermal / AAC blocks. These blocks typically provide λ values between 0.11W/m.K (for 3.6N blocks) to 0.22W/m.K (for 7.3N blocks) whereas the Marmox Thermoblock's λ value is 0.047 W/m.K.

Not an alternative to a DPM

Although when sealed together Thermoblock creates a permanent waterproof barrier, a Damp Proof Membrane must be applied to the detail as though the Thermoblock were simply another normal block in the wall. The DPM can be fixed above or below the Thermoblock layer.

Can a Thermoblock be laid on top of each other?

No. All independent testing has been carried out with just one course of Thermoblock – we are unable to provide a characteristic compressive strength when more than one layer is used.

In nearly all situations, the 65mm high version is sufficient in reducing the y value however a 100mm high version of Thermoblock is also available if necessary.

What is fixed above or below the Thermoblock must NOT be narrower

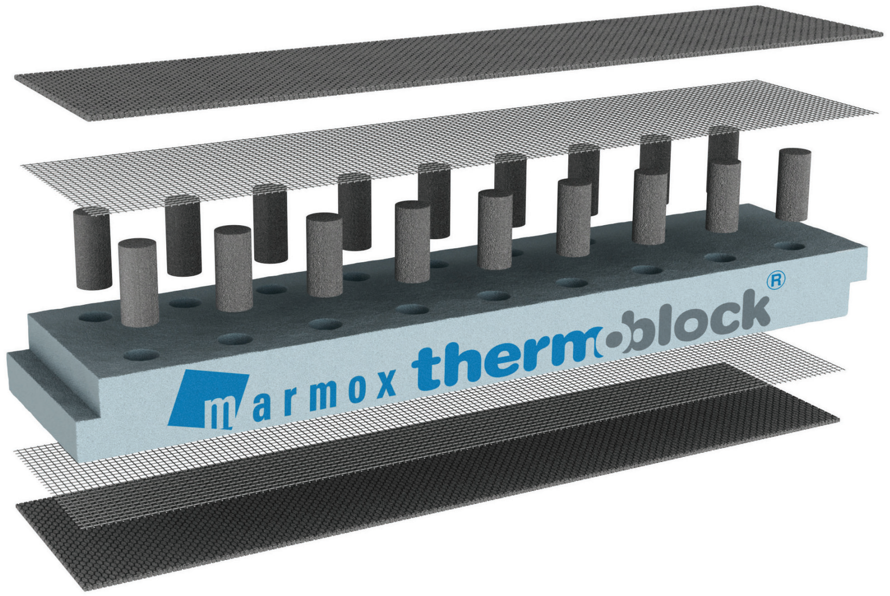
Thermoblock derive their strength from rows of concrete columns located along each side. What is sitting on top of a Thermoblock must therefore distribute its weight evenly over both sides. In other words, what's on top (and below) the course of Thermoblock must not be narrower than the width of the Thermoblock.

Can it be used as a Cavity Barrier?

No, if used to bridge two combustible insulation materials the core material could melt creating a conduit for flame to enter one living space from another. Therefore a cementitious covering such as a cement board should be fixed to one of the sides.

How are Thermoblocks installed?

Thermoblock can be cut on site using a brick saw, or through the polystyrene-only sections with a hand-saw. They are laid using ordinary bricklayers' mortar.



marmox thermoblock

Reduce heat loss at the base of walls

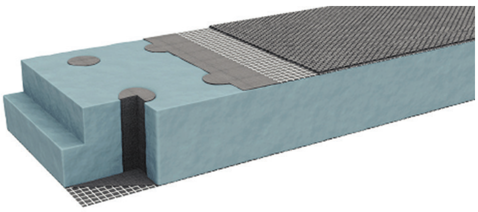
Table of characteristics

Property	Units	European Standard	Standard Thermoblock	Extra thick Thermoblock	Thermoblock PIR (Parapet)
Total Thickness	mm	EN 823	65	100	53
Thickness of insulation	mm	EN 823	60	95	47
Width	mm	EN 822	100	100	100
			140	140	140
			215	215	
Length	mm	EN 822	600	600	600
Weight	kg	EN 822	100mm = 1.6 140mm = 1.9 215mm = 2.5	100mm = 2.2 140mm = 2.6 215mm = 4.0	100mm = 1.4 140mm = 1.7
Thermal conductivity (λ) of insulant	W/m.K	EN 12664 EN 13165	0.028	0.028	0.026
Thermal conductivity of (λ) of support columns	W/m.K	EN 12667	0.130	0.130	0.130
Thermal conductivity of (λ) of slurry coating	W/m.K	EN 10456	1.15	1.15	1.15
Effective thermal conductivity of (λ) of insulation core	W/m.K	EN 12664/5/7	0.047	0.047	0.041
Vertical thermal resistance (R) of insulation core	m^2K/W	EN 12667	1.4	2.1	1.1
Declared compressive strength (f_b)	N/mm^2	EN 772-1	9.0	9.0	9.0
Characteristic compressive strength (f_k)	N/mm^2	EN 771-4	100mm = 6.6 140mm = 8.0 215mm = 8.0	100mm = 6.6 140mm = 8.0 215mm = 8.0	100mm = 6.6 140mm = 8.0 215mm = 8.0
Characteristic shear strength (f_{vk}) in masonry wall	N/mm^2	Eurocode 6	0.18	n/a	n/a
Expansion coefficient	Mm/m.k	EN 53752	0.07	0.07	n/a
Water absorption	%	EN 771-3	3.1%	2.2%	6.4%
Maximum operating temperature	°C	EN 14706	75°	75°	250°
Fire resistance	Euroclass	EN 13164	E	E	E
Fire resistance	Minutes	EN 1365-1	>120mins	>120mins	>120mins

NBS Plus

BBA APPROVAL INSPECTION TESTING CERTIFICATION
CERTIFICATE 10/4778

marmox
thermoblock
Reduce heat loss at the base of walls



Follow us on...

@MarmoxUK /marmoxukltd

Marmox (UK) Ltd
Caxton House (101-103) Hopewell Drive, Chatham, Kent, ME5 7NP
Tel: 01634 835290 **Fax:** 01634 835299 **Web:** www.marmox.co.uk

October 2019