

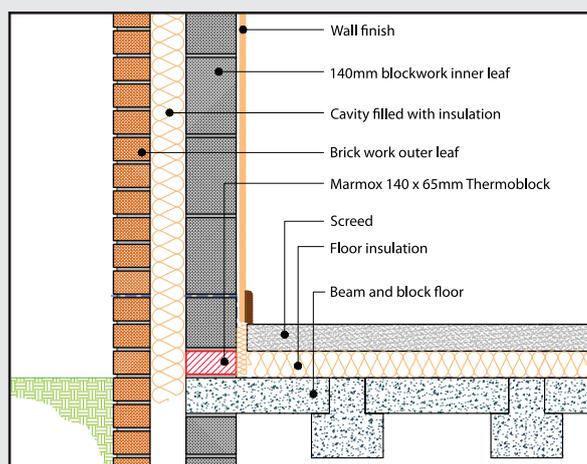
marmox thermoblock

stop thermal bridging at the root

Marmox Thermoblocks are high insulated, load-bearing, XPS building blocks designed to replace the course of bricks or blocks at the bottom of a wall.

They practically eliminate the thermal bridge at this point and retain significant heat within the building structure.

Marmox Thermoblocks are lightweight, highly insulating and amazingly strong. They can support a construction of at least two storeys making them truly unique as there is no other insulated block on the market that has such strength!



Compressive Strength

Mean compressive strength
6.5N/mm²

Insulation

Effective Thermal Conductivity
0.078W/mK

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0.078W/mK

Authorities

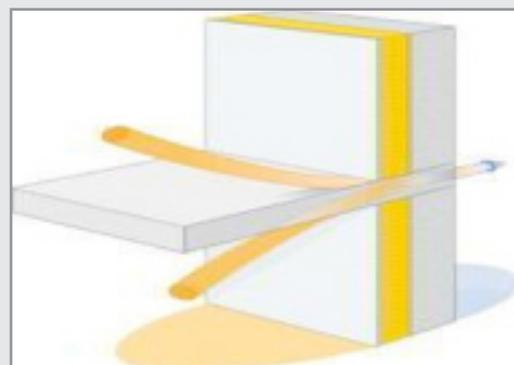
- Certified by BBA (number 10/4778)
- Manufactured and supplied according to ISO9001 (Bureau Veritas) ensuring all batches are tested for strength and thermal properties.
- NHBC accept its use as meeting their technical requirements.

Compliance to 2010 building regulations

- MARMOX Thermoblock® complies with parts A (loading), C (Resistance to moisture), L (Energy Saving) and 7 (Approved Materials) of the amended Building regulations for England and Wales.
- It complies with parts 1.1 (Structure), 3.4 (Moisture from the ground), 3.15 (Reduction of condensation), 6.1 (CO2 Emissions) and 6.2 (Insulation – Significant reduction of value) of the Scottish Building Standards.
- It complies with regulations B2 (Fitness of Materials), C5 (Reduction of condensation), D1 (Strength and Stability), F2 (Energy conservation), F3 (CO2 Emissions) of the Northern Ireland building Regulations.

The Solution to Thermal Bridging

A thermal bridge in a building is where two different materials of different thermal conductivities meet. If one of the materials is more conductive, then the heat that would normally be confined within the building escapes, finding a path along the more heat conductive material.



One of the worst areas of heat loss through a thermal bridge is where the floor cuts into the wall allowing heat to be transmitted to the outside. MARMOX Thermoblock® acts as a thermal barrier blocking this heat loss when placed between the floor slab and the wall.

Because the blocks are impermeable to water and can therefore be used in damp conditions they will create an effective waterproof thermal barrier.

What Marmox Thermoblock is



MARMOX Thermoblock® has been available on mainland Europe for several years. In response to the revision of the 2010 building regulations which now addresses thermal bridging, the product has been re-designed for the use in the UK.

The core of MARMOX Thermoblock® is specially formulated fire resistant extruded polystyrene made to a density of 36kg/m³. This is reinforced with load carrying lightweight columns made of a non-thermally conductive epoxy composite positioned at 60mm intervals. The blocks are covered on the top and bottom with a layer of alkali-resistant fibreglass mesh embedded in polymer concrete.

UK Building Regulations - Part A and BS8103 - 2: 2005

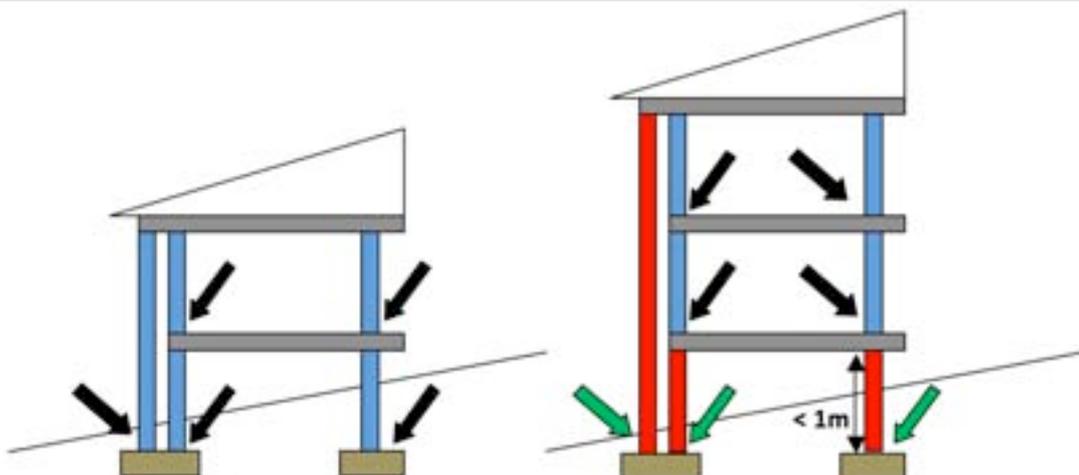
Marmox Thermoblock is suitable to foot the walls of one or two story buildings.

EN771-4: 2003, BS-EN8103-2: 2005 and UK Building Regulations part A (structural Design of Low Rise Buildings part 2) state that for a single story building, the compressive strength of the external and internal wall, must be greater than 2.9N/mm^2 . For a two story building, with a sub-floor foundation of less than 1m, the compressive strength must also exceed 2.9N/mm^2 .

- The mean strength of Marmox Thermoblock is 6.5N/mm^2
- The characteristic compressive strength is 5.9N/mm^2

*These results were obtained on blocks made in early 2010. QA reports from the last six months show a stepped and consistent increase in the strength performance of the blocks: **Mean Strength = 7.5N/mm^2 , Characteristic Compressive Strength = 6.4N/mm^2***

In these situations, 100mm or 140mm wide MARMOX Thermoblock® is suitable for use at the base of each wall. Both the black and green arrows in the diagrams below show all the possible locations. (The Blue walls are generally 100mm thick and the red walls are generally 140mm thick so would use Thermoblocks of corresponding thicknesses).

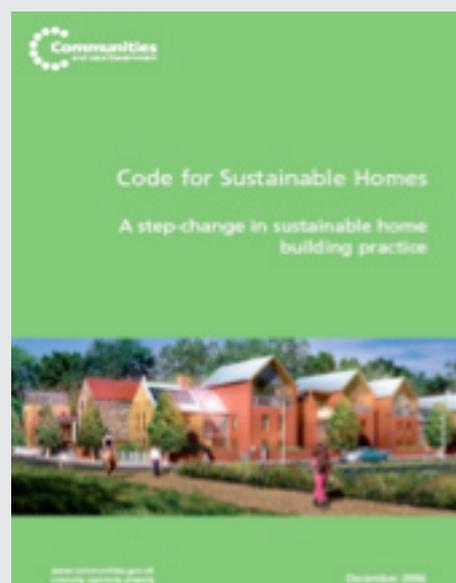


The Code for Sustainable Homes

Compliance to the Code for Sustainable Homes has been mandatory since 2008 for all socially funded homes and the 2010 revision in the UK building regulations now makes it compulsory for all new homes to achieve a rating of 3. This is equivalent to a 25% reduction in CO₂ emissions in new buildings compared with standards set in the 2006 building regulations.

The code aims to reduce the environmental impact of constructing new housing by regulating nine key areas of the design such as energy use, water use, pollution etc. Points are allocated for each category and buildings are then given a code rating between 1 and 6; with 6 representing the highest standard in sustainability. The category with the most points is energy with 36.4 points and 18.8 of these points is directly related to insulation.

From 2010, building regulations make it a mandatory obligation to reach code level 3 and in a few years a level 4 (equivalent to the 'Passiv-Haus' standard) will be required.



The pollution section of the Code also demands that chemicals used during manufacture must have a Global Warming Potential of less than 5 and a zero Ozone Depleting Potential. Additives used during XPS manufacture conform with the code: the GWP is 0.29 and the ODP is zero.

As a result of the 2010 building regulations now requiring thermal bridging to be controlled the use of Marmox Thermoblocks can now assist in obtaining level 3 or above.

Heat Loss at the Thermal Bridge

According to government figures (Accredited Construction Details), heat loss through poorly performing non-repeating thermal bridges represents approximately 25% of the total heat loss through the fabric and a DER of 23.64kgCO₂/m²/year. The Energy Saving Trust has carried out studies to show that by reductions of up to 80% in ψ values at the ground floor/wall junction can be achieved by enhancing the construction details at these junctions.

The heat loss for a thermal bridge is determined by its linear thermal transmittance or ψ measured in W/m.K. According to 'Accredited Construction Details,' the UK maximum allowable heat loss at a thermal bridge (the wall/floor junction) is 0.16W/m.K.

Thermal Performance of Marmox Thermoblock

From the ψ values, 'y-values' (ψ value divided by the area) can be calculated which are needed by the designers in the SAP calculation the building. Without knowing the true y values, building regulations require a 'default y-value' to be used which makes it harder to achieve a good CSH rating. These default y values add an approximated additional heat loss to the whole property based on its surface area and the default ψ values for that construction type (typically 0.16W/m.K) which is between two to five times worse than using Marmox Thermoblock.

BBA tests (to BS-EN ISO10211) using Accredited Construction Details determined the value of the floor/wall junction in two scenarios; a lightweight block inner wall and a dense concrete block inner wall. With Marmox Thermoblock at the wall/floor junction, this heat loss is at worst halved and at best reduced by five times.

ψ = between 0.03W/mK and 0.07W/mK

Thermal Conductivity

The Thermal conductivity (λ value) of the XPS and the epoxy material are 0.027W/mK and 0.22W/mK respectively. Being a composite product, MARMOX Thermoblock® is anisotropic inasmuch that its performance is affected by the direction of the heat flow. The actual Thermal conductivity therefore cannot be determined, however it can be accurately estimated by assuming the direction of heat flux is vertical only, and measuring the heat flow parallel to the supporting columns.

The equivalent heat conductivity coefficient (λ) = 0.078W/mK

Using this value, the Thermal resistance (R value) can be estimated. The R-value is the thickness of the block divided by λ . i.e. $0.065\text{m}/0.078\text{W/mK} = 0.8\text{mK/W}$.

Marmox Thermoblock-Super

Available as special order only

Using a patented advanced epoxy formulation incorporating nano technology, a 'super' version of Marmox Thermoblock is available that provides even greater thermal insulation for specialist use. These blocks, have an effective thermal conductivity (vertical) of 0.04W/m.K. This is almost twice as effective as the standard Thermoblock with an effective thermal conductivity (vertical) of 0.078W/m.K. They are produced in 50mm thickness to provide similar thermal properties to the standard 65mm block and in 80mm to give an equivalent R-value of 2.0mK/W which is a requirement in several northern European countries.

Although made to the same ISO9000 controls, these are not covered by the BBA certificate.