

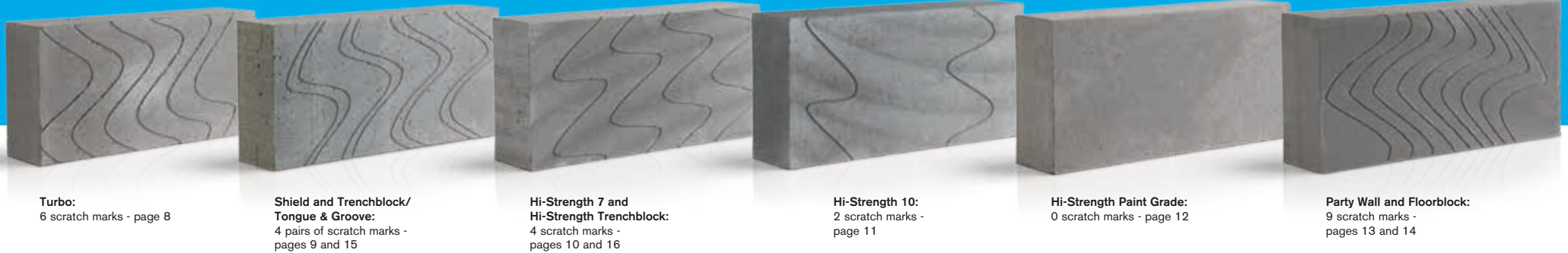
Aircrete Blocks

Product Guide

THERMALITE

a Forterra brand

Thermalite blocks are manufactured with scratch marks to identify the different range of densities in which they are produced. The products and corresponding scratch marks are shown below.



Introduction

Thermalite aircrete blocks from Forterra offer cost-effective solutions for a wide range of applications. The closed micro-cellular structure of Thermalite, featuring millions of tiny pockets of trapped air, gives this product its distinctive features: high compressive strength, lightness for handling, high thermal insulation and moisture resistance.

Continual research and development has resulted in a range of building blocks that meet the demands of the modern construction industry.

With up to 80% recycled content, Thermalite blocks are a lightweight, sustainable building material that are not only easy to handle, but are extremely workable, and easily cut, sawn and chased accurately with ordinary hand tools.



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Benefits

Forterra's aircrete blocks are stocked by a large network of builders merchants across the UK, ensuring easy availability. The extensive product range means that a variety of tried and tested, cost-effective solutions can be offered for wall, floor and below-ground constructions.

Forterra manufactures its Thermalite products to a quality-assured system in accordance with EN ISO 9001 and BS EN 771-4, ensuring compliance with all relevant standards and codes of practice. In addition, Thermalite products have independent certification from the British Board of Agrément (BBA).

All manufacturing locations are certified by both the environmental manufacturing standard EN ISO 14001 and the Building Research Establishment (BRE).

All Thermalite blocks are certified as 'Very Good' under BES 6001, Responsible Sourcing of Materials.

Properties

High insulation

The excellent thermal performance of Thermalite aircrete blocks can reduce the need for additional insulation materials.

Moisture resistant

Each Thermalite block contains millions of tiny pockets of trapped air, preventing the passage of water.

Fire resistant

All Thermalite products provide excellent fire protection. They are classified as A1, non-combustible in accordance with BS EN 771-4.

Frost resistant

Thermalite blocks offer superior protection against the effects of frost.

Strong

Thermalite products are very strong, as well as lightweight, and may be used in loadbearing walls for a structurally sound building.

Workability

One hand lift

The light weight of Thermalite blocks ensures that they can be laid more quickly, leading to significant productivity gains for the builder.

Easily worked

There is no need for special tools because Thermalite blocks can be easily sawn, cut, chased and drilled using ordinary hand tools.

Easily fixed to

Generally, no special fixings need to be used with Thermalite products, which provide an ideal background for fixing household fittings using ordinary cut nails, direct screwing or screws with plugs.

Easy to finish

Thermalite blocks provide an excellent background for the use of internal and external finishes, such as plaster, render, painting or tiling.

Services

Customer service

Forterra has a reputation for first class customer care. Wherever you are, our dedicated Thermalite team will be able to help you with product information, quotations, orders, distribution facilities and stockist information.

Technical service

Forterra provides a full technical advisory service staffed by a qualified team with specialist knowledge on the use of Thermalite products. Technical advice can be provided on Building Regulations, including thermal calculations and energy ratings.

Website

For up-to-date information regarding our products and services visit our website at: forterra.co.uk



Applications

The high level of performance achieved by Thermalite blocks, combined with the extensive product range offered, ensures that cost-effective solutions for wall, floor and below ground constructions can be achieved. Thermalite products are available for use in all of the following applications:

Foundations

• Trenchblock/Tongue & Groove

Trenchblock and Trenchblock Tongue & Groove have been specifically developed for use in the construction of solid foundation walls. By combining light weight with a large modular size, Trenchblock is a popular choice with builders. Trenchblock Tongue & Groove offers the addition of hand holds for even easier lifting, along with tongue and groove joints which avoid the need for mortar in the perpend.

Beam and block floors

• Floorblock

The Thermalite Floorblock system is designed for use with all proprietary T-beams. The use of Floorblock in conjunction with Trenchblock will effectively contribute to meeting the thermal requirements of the Building Regulations.

Cavity walls

• Shield • Turbo • Hi-Strength • Hi-Strength Paint Grade

Shield and Turbo are most often used for the construction of inner leaves in conjunction with a cavity and a brick or block outer leaf.

As an alternative, Thermalite Hi-Strength 7 and Hi-Strength 10 are available for situations where loading conditions require 7.3N/mm^2 and 10.4N/mm^2 respectively. Additionally, Hi-Strength Paint Grade is available for situations in which the builder wishes to achieve a painted finish.

Even higher thermal insulation values can be achieved by specifying Shield for the construction of the external leaf of a cavity wall, which can be either rendered or clad with systems such as tile hanging or brick slips.

Solid walls

• Shield • Turbo • Hi-Strength

Solid walls are a tried and tested, fast and efficient way of constructing walls which offer higher U-values. Shield and Turbo are produced in thicknesses suitable for solid wall construction. Alternatively, Hi-Strength 7 or Hi-Strength 10 may be used to meet special requirements.

Partitions

• Shield • Party Wall • Hi-Strength Paint Grade

Thermalite blocks are suitable for the construction of partition walls above and below dpc level. The use of Shield in single leaf partitions will greatly reduce sound transmission, and provides an ideal background for fixing shelves, radiators and bathroom fittings.

Separating walls

• Party Wall • Shield • Hi-Strength 7 • Hi-Strength 10

Thermalite Party Wall, Shield, Hi-Strength 7 and Hi-Strength 10 blocks can be used in all types of sound insulating separating walls between dwellings.

Detailing

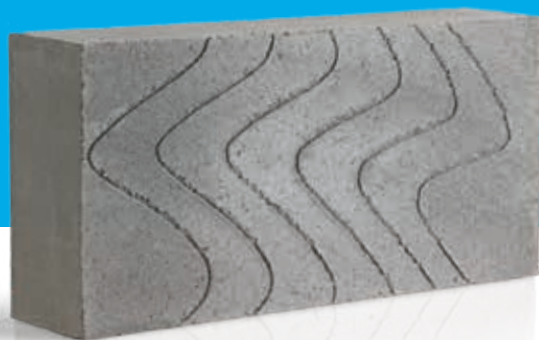
• Coursing Brick and Coursing Block

Thermalite Coursing Bricks and Blocks are produced especially for coursing and bonding-in to enable walls to be constructed from uniform materials and prevent cold bridging.



Turbo

- External Walls
- Foundations
- Partitions



Turbo offers very high thermal insulation properties and is therefore ideal for external solid wall applications (min. block thickness 215mm) where low U-values are required.

- Available in large format
- For use with thin layer mortar
- Use only in soils up to Design Sulfate Class DS 3* below ground

Key Data

Strength 2.9N/mm²

Thermal conductivity 0.11W/m.K

Density 470Kg/m³

Shield

- External Walls
- Foundations
- Partitions
- Separating Walls



Shield combines all the normal qualities of Thermalite blocks with extremely high moisture resistance.

- Available in large format
- For use with thin layer mortar

Key Data

Strength 3.6N/mm²

Thermal conductivity 0.15W/m.K

Density 600Kg/m³

Specifications

Working dimensions

Face dimensions (mm) 440 x 215, 440 x 430[†]

Thicknesses and weights

Block thicknesses and weights at equilibrium density (for 440 x 215mm)

Thickness (mm)	100	115 [†]	125 [†]	130 [†]	140 [†]	150	190 [†]	200 [†]	215	265	300 [†]
Weight ¹ (kg)	4.6	5.3	5.7	6.0	6.4	6.9	8.7	9.2	9.8	12.1	13.7

Properties

Mean compressive strength not less than 2.9N/mm²

Design thermal conductivity (λ) 0.11W/m.K

Dry thermal conductivity value: ($\lambda_{10, dry, unit}$) 0.10W/m.K

Specified gross dry density 470kg/m³

Specifications

Working dimensions

Face dimensions (mm) 440 x 215, 440 x 140[†], 440 x 430[†], 540 x 440[†], 440 x 240[†]

Thicknesses and weights

Block thicknesses and weights at equilibrium density (for 440 x 215mm)

Thickness (mm)	50	75	90 [†]	100	115 [†]	125 [†]	140	150	190 [†]	200
Weight ¹ (kg)	2.9	4.4	5.3	5.8	6.7	7.3	8.2	8.8	11.1	11.7

Properties

Mean compressive strength not less than 3.6N/mm²

Design thermal conductivity (λ) 0.15W/m.K

Dry thermal conductivity value: ($\lambda_{10, dry, unit}$) 0.13W/m.K

Specified gross dry density 600kg/m³

¹ Weights quoted are based on 3% equilibrium moisture content. For typical as-received weights the above figures should be increased by a further 20%. This is however dependent on climatic and storage conditions.

* May be used in situations described in Table 13 of BS 5628: Part 3 A1, A2 but not in situations described in A3 (no longer current but still cited in the Building Regulations).

[†] Manufactured to special order only.

¹ Weights quoted are based on 3% equilibrium moisture content. For typical as-received weights the above figures should be increased by a further 20%. This is however dependent on climatic and storage conditions.

[†] Manufactured to special order only.

‡ Only available in 100mm thickness with a compressive strength of 3N/mm², manufactured to special order only.

Hi-Strength 7

- External Walls
- Foundations
- Partitions
- Separating Walls



Key Data

Strength 7.3N/mm²

Thermal conductivity 0.18W/m.K

Density 730Kg/m³

Hi-Strength 7 has been specifically designed for applications such as flats of three storeys and above, offices, supermarkets and retail parks, where loading conditions require a 7.3N/mm² building block.

- Available in large format
- For use with thin layer mortar

Specifications

Working dimensions

Face dimensions (mm) 440 x 215, 440 x 430[†]

Thicknesses and weights

Block thicknesses and weights at equilibrium density (for 440 x 215mm)

Thickness (mm)	100	115 [†]	125 [†]	140	150	190 [†]	200	215
Weight ¹ (kg)	7.1	8.2	8.9	10.0	10.7	13.5	14.2	15.3

Properties

Mean compressive strength not less than 7.3N/mm²

Design thermal conductivity (λ) 0.18W/m.K

Dry thermal conductivity value: ($\lambda_{10,dry, unit}$) 0.16W/m.K

Specified gross dry density 730kg/m³

¹ Weights quoted are based on 3% equilibrium moisture content. For typical as-received weights the above figures should be increased by a further 19%. This is, however, dependent on climatic and storage conditions.

[†] Manufactured to special order only.

Hi-Strength 10

- External Walls
- Foundations
- Partitions
- Separating walls



Key Data

Strength 9.0N/mm²*
(10.4N/mm² equivalent)

Thermal conductivity 0.19W/m.K

Density 770Kg/m³

Hi-Strength 10 has been specifically developed for structural applications such as three or four storey buildings, where loading conditions require a 10.4N/mm² building block.

Hi-Strength 10 blocks are available in a range of thicknesses as a special order item only.

Specifications

Working dimensions

Face dimensions (mm) 440 x 215

Thicknesses and weights

Block thicknesses and weights at equilibrium density (for 440 x 215mm)

Thickness (mm)	100	140	150 [†]	190 [†]	200 [†]	215 [†]	275 [†]	300 [†]	355 [†]
Weight ¹ (kg)	7.8	10.9	11.7	14.8	15.6	16.8	21.4	23.4	27.7

Properties

Mean compressive strength not less than 9.0N/mm²*

Design thermal conductivity (λ) 0.19W/m.K

Design thermal conductivity below ground (λ) 0.31W/m.K

Dry thermal conductivity value: ($\lambda_{10,dry, unit}$) 0.17W/m.K

Specified gross dry density 770kg/m³

¹ Weights quoted are based on 3% equilibrium moisture content. For typical as-received weights the above figures should be increased by a further 20%. This is, however, dependent on climatic and storage conditions.

[†] Manufactured to special order only.

* Blocks are manufactured to BS EN 771-4, Category 1, which allows the use of an enhanced partial safety factor (BS 5628).

Hi-Strength Paint Grade

- Inner Leaves of External Walls
- Partitions

Hi-Strength Paint Grade combines a high quality appearance with the compressive strength of Thermalite Hi-Strength blocks.

Note: If required, Hi-Strength Paint Grade can also be laid fair-faced. However, consideration should be given to the fact that colour variation can occur.

It is recommended that a Hi-Strength Paint Grade sample panel is erected for comparison purposes before construction commences, and that selection is undertaken during construction. It may also be necessary to fill small blow holes before decoration.

Due to thickness variations within manufacturing tolerances, it may be difficult to build solid partition walls which have a smooth and even surface on both sides.



Key Data

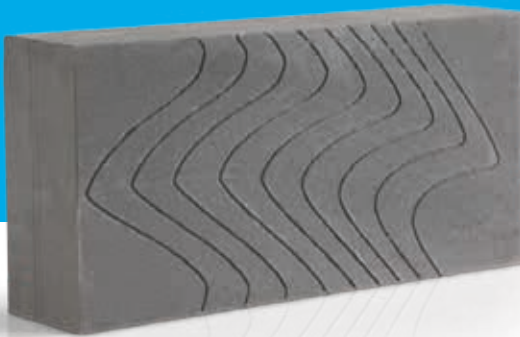
Strength	7.3N/mm ²
Thermal conductivity	0.18W/m.K
Density	730Kg/m ³

Party Wall

- Separating Walls
- External Walls
- Partitions
- Foundations

Party Wall gives very high levels of sound reduction in separating walls between buildings.

- Available in large format
- For use with thin layer mortar



Key Data

Strength	4.0N/mm ²
Thermal conductivity	0.16W/m.K
Density	660Kg/m ³

Specifications

Working dimensions							
Face dimensions (mm) 440 x 215							
Thicknesses and weights							
Block thicknesses and weights at equilibrium density (for 440 x 215mm)							
Thickness (mm)	100	140	150 [†]	190 [†]	200 [†]	215 [†]	
Weight ¹ (kg)	7.1	10.0	10.7	13.5	14.2	15.3	
Properties							
Mean compressive strength not less than 7.3N/mm ²							
Design thermal conductivity (λ) 0.18W/m.K							
Dry thermal conductivity value: (λ _{10,dry, unit}) 0.16W/m.K							
Specified gross dry density 730kg/m ³							

¹ Weights quoted are based on 3% equilibrium moisture content. For typical as-received weights the above figures should be increased by a further 19%. This is, however, dependent on climatic and storage conditions.

[†] Manufactured to special order only.

Specifications

Working dimensions			
Face dimensions (mm) 440 x 215, 440 x 430 [†]			
Thicknesses and weights			
Block thicknesses and weights at equilibrium density (for 440 x 215mm)			
Thickness (mm)	100	215	
Weight ¹ (kg)	6.4	13.8	
Properties			
Mean compressive strength not less than 4.0N/mm ²			
Design thermal conductivity (λ) 0.16W/m.K			
Dry thermal conductivity value: (λ _{10,dry, unit}) 0.14W/m.K			
Specified gross dry density 660kg/m ³			

¹ Weights quoted are based on 3% equilibrium moisture content. For typical as-received weights the above figures should be increased by a further 20%. This is, however, dependent on climatic and storage conditions.

[†] Manufactured to special order only.

Floorblock

• Beam & Block Floors



Floorblock is an efficient method of providing insulated floors. It is light in weight and is designed for use with all proprietary T-beams and can improve the thermal performance of the floor.

Note: After the Floorblocks have been positioned, before any traffic or loading is allowed and before any floor finish is commenced, the floor must be grouted with a 1:4 cement/sharp sand composition.

Key Data

Strength 4.0N/mm²

Thermal conductivity 0.16W/m.K

Density 660Kg/m³

Specifications

Floorblock

Face dimensions (mm)	440 x 215	440 x 350 [†]	540 x 440*
Block thickness (mm)	100	100	100
Block weight ¹ (kg)	6.4	10.5	16.2

Properties

Mean compressive strength not less than 4.0N/mm²

Design thermal conductivity (λ) 0.16W/m.K

Dry thermal conductivity value: ($\lambda_{10,dry, unit}$) 0.14W/m.K

Specified gross dry density 660kg/m³

¹ Weights quoted are based on 3% equilibrium moisture content. For typical as-received weights the above figures should be increased by a further 20%. This is, however, dependent on climatic and storage conditions.

[†] Manufactured to special order only.

* Blocks can be laid to correspond with 540mm beam spacing (660Kg/m³ density only).

Trenchblock / Tongue & Groove

• Foundations



Thermalite Trenchblock is a tried and tested, economical alternative to the construction of cavity walls with concrete infill, engineering bricks or heavy aggregate blocks for foundations.

- For use in soils of up to Design Sulfate Class DS 4
- Available with tongue and groove joints and handholds
- Improves thermal performance
- Eliminates the need to mortar perpend

Key Data

Strength 3.6N/mm²

Thermal conductivity

Above dpc: 0.15W/m.K

Below ground: 0.24W/m.K

Density 600Kg/m³

Specifications

Working dimensions

Face dimensions (mm) 440 x 215, 440 x 140*

Thicknesses and weights

Block thicknesses and weights at equilibrium density (for 440 x 215mm)

Thickness (mm) 255[†] 275[†] 300 355

Weight¹ (kg) 14.9 16.1 17.5 20.8

Properties

Mean compressive strength not less than 3.6N/mm²

Design thermal conductivity (λ) 0.15W/m.K (above dpc), 0.24W/m.K (below ground)

Dry thermal conductivity value: ($\lambda_{10,dry, unit}$) 0.13W/m.K

Specified gross dry density 600kg/m³

¹ Weights quoted are based on 3% equilibrium moisture content. For typical as-received weights the above figures should be increased by a further 19%. This is, however, dependent on climatic and storage conditions.

* Not available with tongue and groove joints

[†] Manufactured to special order only.

Hi-Strength Trenchblock / Tongue & Groove

- Foundations



Thermalite Hi-Strength Trenchblock provides all the benefits of Trenchblock, together with the 7.3N/mm² compressive strength of Thermalite Hi-Strength.

- For use in soils of up to Design Sulfate Class DS 4
- Available with tongue and groove joints and handholds

Key Data

Strength 7.3N/mm²

Thermal conductivity
Above dpc: 0.18W/m.K
Below ground: 0.29W/m.K

Density 730Kg/m³

Specifications

Working dimensions

Face dimensions (mm) 440 x 215, 440 x 140*

Thicknesses and weights

Block thicknesses and weights at equilibrium density (for 440 x 215mm)

Thickness (mm)	255 [†]	275 [†]	300	355
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Weight [†] (kg)	18.1	19.6	21.3	25.3
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Thicknesses and weights

Block thicknesses and weights at equilibrium density (for 440 x 140mm)*

Thickness (mm)	255 [†]	275 [†]	300	355
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Weight [†] (kg)	11.8	12.7	13.9	16.4
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Properties

Mean compressive strength not less than 7.3N/mm²

Design thermal conductivity (λ) 0.18W/m.K (above dpc), 0.29W/m.K (below ground)

Dry thermal conductivity value: ($\lambda_{10,dry, unit}$) 0.16W/m.K

Specified gross dry density 730kg/m³

[†] Weights quoted are based on 3% equilibrium moisture content. For typical as-received weights the above figures should be increased by a further 20%. This is, however, dependent on climatic and storage conditions.

* Not available with tongue and groove joints.

[†] Manufactured to special order only.

Coursing Brick

- Bonding
- Coursing
- Infill
- Making up



Coursing Bricks are autoclaved aerated units produced in standard brick sizes for use in bonding and infill to ensure that a uniform thermal performance is achieved throughout the wall.

- Protect against pattern staining
- Infill above doors and windows
- Coursing at floor and ceiling level
- Making up between joists

Key Data

Strength 2.9N/mm²

Thermal conductivity
Standard: 0.15W/m.K

Note: Thermalite Coursing Bricks are suitable for use externally (with an impervious finish) and internally, above or below dpc level, in loadbearing or non-loadbearing applications.

Loadbearing walls should not be constructed with Thermalite Coursing Bricks as the sole masonry unit.

Additionally, standard Coursing Bricks should not be used in walls where the compressive strength requirement for the blockwork is in excess of 2.9N/mm².

Specifications

Working dimensions

Face dimensions (mm) 215 x 65

Thicknesses (mm)

Coursing Brick	100	115 [†]	125 [†]	130 [†]	140	150 [†]
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Properties

Mean compressive strength 2.9N/mm²

Design thermal conductivity (λ) 0.15W/m.K

Dry thermal conductivity value: ($\lambda_{10,dry, unit}$) 0.13W/m.K

[†] Manufactured to special order only.

Hi-Strength 7 and 10 Coursing Block

- Bonding
- Coursing
- Infill
- Making up



Hi-Strength Coursing Blocks are autoclaved aerated masonry units produced to a standard brick height while retaining the length of a standard block. They are used for bonding and infill to ensure that a uniform thermal performance is achieved throughout the wall. The Coursing Block reduces the number of mortar joints required when detailing, and therefore provides time savings.

- Protect against pattern staining
- Infill above doors and windows
- Coursing at floor and ceiling level
- Making up between joists
- For use with general purpose mortar and thin layer mortar

Key Data

Strength 7.3N/mm², 9.0N/mm²
(10.4N/mm² equivalent)[†]

Thermal conductivity
Hi-Strength 7: 0.18W/m.K
Hi-Strength 10: 0.19W/m.K

Note: Thermalite Hi-Strength Coursing Blocks are suitable for use externally (with an impervious finish) and internally, above or below dpc level, in loadbearing or non-loadbearing applications.
Loadbearing walls should not be constructed with Thermalite Hi-Strength Coursing Blocks as the sole masonry unit.

Specifications

Working dimensions

Face dimensions (mm) 440 x 65

Thicknesses	Pack size			
Thickness (mm)	100	140	100mm 180 Blocks	6.0m ² *
Weight ¹ (kg)	2.15	3.0	140mm 126 Blocks	4.26m ² *

Properties

Mean compressive strength 7.3N/mm² and 9.0N/mm²

Design thermal conductivity (λ) 0.18W/m.K for Hi-Strength 7 and 0.19W/m.K for Hi-Strength 10

Dry thermal conductivity value: ($\lambda_{10, dry, unit}$) 0.16W/m.K for Hi-Strength 7 and 0.17W/m.K for Hi-Strength 10

¹ Weights quoted are based on 3% equilibrium moisture content. For typical as-received weights the above figures should be increased by a further 20%.

* Using traditional coordinating work face size i.e. 450mm x 75mm.

[†] Blocks are manufactured to BS EN 771-4, Category 1, which allows the use of an enhanced partial safety factor. This provides the equivalent of 10.4N/mm² compressive strength.



Thin joint masonry

Thermalite Thin Joint Masonry is a fast, clean and accurate construction system using Thermalite blocks manufactured to a high degree of dimensional accuracy and a thin layer of mortar.

The increasing demands of the UK construction industry for higher build quality, greater productivity, and improved thermal performance, airtightness and waste reduction, mean that the benefits offered by thin layer mortar are becoming increasingly relevant.



Benefits

Faster build speed

The application of a thin layer mortar to Thermalite blocks is achieved by the use of a serrated scoop applicator, which allows mortar to be quickly and accurately applied to the bed joint of the wall. The full benefits can be realised on long runs of walling.

Independent speed trials, conducted by Percy Howes & Co. Chartered Surveyors, have indicated that a wall of Thermalite blocks and thin layer mortar can be laid twice as fast as that built with aggregate blocks and general purpose mortar.

This speed of construction can be further enhanced when using Thermalite Large Format blocks, which have a face size equivalent to two traditional concrete blocks.

Increased productivity

Thin layer mortar is different from general purpose mortar in that it sets far more rapidly. The same high levels of productivity are not achievable with masonry built using general purpose mortar, which requires more time to attain sufficient strength to support further construction, thus limiting the height that can be built in one day.

Typically, Thermalite blocks built with thin layer mortar will be stable after 60 minutes. This means that the amount of walling that can be built will increase and enables the earlier installation of other components, such as floors and roof timbers. The completion of a weathertight envelope allows brickwork to be taken off the critical path and for internal work, such as plastering, service installation and partitioning to progress.

Improved thermal performance

The thermal insulation requirements of the Building Regulations call for attention to be given to the effects of cold bridging. Consequently, when calculating U-values for walls, heat loss through mortar joints must be taken into consideration.

By reducing the amount of mortar in any given area of wall by at least 70% compared to a traditional mortar joint, heat loss through the mortar joints is reduced.

Improved airtightness of construction

The thermal performance of the wall is also improved by the effect of thin layer mortar on the airtightness of the construction. Reducing the air infiltration rate of the masonry will, in turn, decrease ventilation heat loss through the fabric.

Airtightness test results for Thermalite 100mm blockwork and thin layer mortar, as conducted by the Building Services Research and Information Association (BSRIA) were better than $< 0.10 \text{ m}^3/(\text{h.m}^2)$, the lowest possible score.

Reduced site wastage

A key benefit of Thermalite blocks is that they can be easily cut, sawn and worked accurately on site. The precision cutting of blocks for use with thin layer mortar allows greater utilisation of the blocks, which can substantially reduce site wastage.



Thin joint masonry



Thin layer mortar

Thin layer mortar is a pre-mixed cement based product that only requires the addition of water to make an easily applied mortar. It differs from general purpose mortar in that it sets more rapidly, thus giving early stability to the construction. It provides an alternative to traditional sand/cement mortar and allows the depth of mortar to be reduced from 10mm to 3mm or less. Clan Thin Joint Technology can supply mortar for the Thermalite system - telephone 0151 422 8000.

Thermalite Large Format blocks

Thermalite Large Format blocks offer considerable productivity gains. They are produced with face dimensions of 440 x 430mm in a range of thicknesses. This is equivalent to two normal concrete blocks, or twelve bricks.

Independent tests by Percy Howes & Co. Chartered Surveyors have found that the use of Large Format blocks in thin joint construction can lead to at least a 50% time saving, compared with the use of aggregate blocks and general purpose mortar.

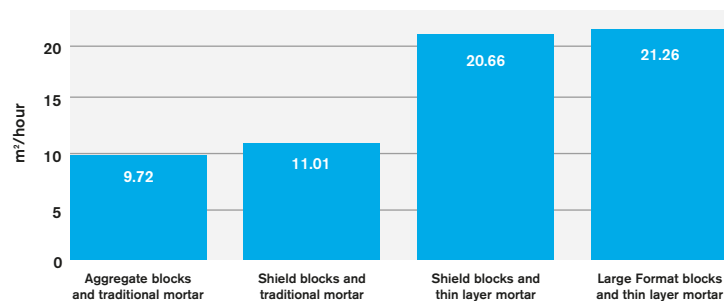
Ancillary components

Due to the increasing use of thin joint masonry there is a widening choice of suitable ancillary products. Many components are available through builders merchants or specialist fixings suppliers. When buying products for use with thin layer mortar, customers should ensure that they are fit for purpose and, preferably, supported by third party certification.

The Thermalite House

The Thermalite thin joint masonry system, has been used to construct a detached house from a design made available by a national house builder. The main objective of this project was to demonstrate that the thin joint system could be safely used to construct the load bearing inner leaf of masonry up to roof plate level, without the stabilising effect of the brickwork outer leaf, and to complete the process quickly and accurately. The inner leaf of this three-bedroom detached house, including floor and roof truss installation, was completed in just 16 hours using a standard team of two block layers and one labourer.

Rate of laying



Note: In a thin joint masonry construction, the joints at maximum are only 3mm thick. Consequently, when blocks with a face size of 440 x 215mm are selected an additional 3.55% blocks will be required to complete a m² of walling. When Large Format blocks with a face size of 440 x 430mm are selected for use in thin joint walling, an additional 4.3% blocks will be required to complete a m² of walling.



Performance



Fire resistance

All Thermalite products provide excellent fire protection. They are classified as A1, non-combustible in accordance with BS EN 771-4.

Loadbearing

Thermalite blocks with a thickness of 90mm or more may be used in the construction of loadbearing walls. Where the loading conditions require a 7.3N/mm² or 10.4N/mm² block, Thermalite Hi-Strength 7 or 10 may be used.

Sound insulation

Forterra offers a range of solutions to achieve the performance standards of Part E of the Building Regulations. When employing these solutions, pre-completion testing (PCT) will be necessary to prove compliance.

As an alternative to PCT, the use of Robust Details* will also demonstrate compliance.

There are currently six Robust Details for aircrete separating walls, referenced E-WM-6, E-WM-10, E-WM-13, E-WM-15, E-WM-23 and E-WM-24. These Robust Details are detailed on pages 28-31.

Please refer to the Robust Details Handbook for full guidance.

Moisture penetration

Thanks to their closed micro-cellular structure, all Thermalite products provide good resistance to the passage of moisture. Independent tests have indicated that Thermalite blocks make water penetration extremely difficult.

Walls which contain an insulating material with the capacity to store heat, such as Thermalite blocks, can help reduce condensation, because the temperature drop across the wall is gradual.

* For further details, please refer to robustdetails.com

Frost resistance

Thermalite blocks offer superior protection against the effects of frost. Independent comparative frost resistance tests have been carried out on facing bricks, common bricks and Thermalite blocks. After 20 freeze/thaw cycles, the facing bricks were severely cracked. At 61 cycles, the Thermalite blocks showed no signs of cracking.

Wall ties

Wall ties should be of Building Regulations Part E, Type A for separating and flanking walls; and Type B for where a Type A tie is not suitable.

Movement joints

In common with all cement-based products, Thermalite walls are subject to movement as the walls dry out. Movement joints should be located at 6m centres, although this may vary depending on the building layout.

As advised in BS 5628: Part 3*, movement joints may or may not be necessary in the internal walls of dwellings, subject to the size of the dwelling, although bed joint reinforcement may be recommended in specific situations.

Workability

All Thermalite products can be easily cut, sawn, chased and worked accurately with ordinary hand tools. A straight cut ensures less wastage, reducing the need to make good.

Fixings

The majority of general purpose fixings give excellent performance in Thermalite. Examples of such fixings include:

- Cut nails, with a minimum penetration of 50mm
- Wood screws - No.12 or No.14 screws fixed directly into Shield or Hi-Strength 7 with a minimum penetration of 50mm
- Plastic or fibre plugs for screws into a pre-drilled hole

Certain structural situations may require the use of special fixing methods such as a spiral plug, grouted fixing, spiral nail or 'sleeved' nail.

* No longer current but still cited in the Building Regulations.



Sound insulation

Forterra offers a wide range of Thermalite block solutions for walls and floors to satisfy the performance standards of Part E of the Building Regulations, as well as the specific needs of builders and designers.

Forterra's solutions to Part E offer high levels of performance and can achieve compliance through Robust Details and pre-completion testing.

Background

Unwanted sound, particularly in dwellings has in recent years given rise to an increasing number of complaints by occupiers. It was recognised that existing standards, of both regulation and workmanship, were failing to protect residents adequately. Rising housing densities, changes of lifestyle, technology, perception and tolerance had all contributed to the pressure for change. Therefore, Approved Document E (AD E) was amended in 2003 and again in 2010.

The overall aim of the amendments to AD E was to improve the sound insulation, through better specification and workmanship, both between and within dwellings, as well as between rooms in hostels, hotels and residential homes. The scope was also extended to cover reverberation in common parts of blocks of flats and acoustic conditions in schools.

AD E provides some of the technical specifications and solutions that might be adopted to satisfy the statutory requirements. As an alternative to pre-completion testing,

the use of Robust Details will demonstrate compliance with AD E for new dwellings. Robust Details are high-performance separating wall and floor constructions that are expected to be sufficiently reliable not to need the check provided by pre-completion testing.

AD E Requirements

E1: Protection against sound from other parts of the building and adjoining buildings.

E1 states:

"Dwelling-houses, flats and rooms for residential purposes shall be designed and constructed in such a way that they provide reasonable resistance to sound from other parts of the same building and from adjoining buildings."

As part of the construction process, sound insulation testing (pre-completion testing) to demonstrate compliance with Requirement E1 should be carried out on site and is the responsibility of the builder.

As an alternative to pre-completion testing in purpose built dwelling-houses and flats, separating walls and floors shall be designed and constructed as specified in the Robust Details Handbook. These approved designs

represent minimum performance standards far superior to those in the Approved Document, and eliminate the need for pre-completion testing.

E1 Performance requirements for pre-completion testing

Dwelling-houses and flats - performance standards for separating walls, separating floors, and stairs that have a separating function

	Airborne sound insulation ($D_{nT,w}+C_{tr}$)dB (minimum values)	Impact sound insulation ($L'_{nT,w}$)dB (maximum values)
Purpose built dwelling-houses and flats		
Separating walls	45	—
Separating floors and stairs	45	62
Dwelling-houses and flats formed by material change of use		
Separating walls	43	—
Separating floors and stairs	43	64

Rooms for residential purposes - performance standards for separating walls, separating floors and stairs that have a separating function

	Airborne sound insulation ($D_{nT,w}+C_{tr}$)dB (minimum values)	Impact sound insulation ($L'_{nT,w}$)dB (maximum values)
Purpose built rooms for residential purposes		
Separating walls	43	—
Separating floors and stairs	45	62
Rooms for residential purposes formed by material change of use		
Separating walls	43	—
Separating floors and stairs	43	64

Sound insulation

Thermalite Robust Details separating walls, no pre-completion testing required (applies to purpose built dwelling-houses and flats)

Robust Detail	E-WM-6	E-WM-10	E-WM-13	E-WM-15	E-WM-23	E-WM-24
Block density range (kg/m³)	600-800	600-800	600-800	600-800	600-800	600-800
Thermalite products	Shield Party Wall Hi-Strength 7 Hi-Strength 10	Shield Party Wall Hi-Strength 7 Hi-Strength 10	Shield Party Wall Hi-Strength 7 Hi-Strength 10	Shield Party Wall Hi-Strength 7 Hi-Strength 10	Shield Party Wall Hi-Strength 7 Hi-Strength 10	Shield Party Wall Hi-Strength 7 Hi-Strength 10
Block thickness	100mm (min.)	100mm (min.)	100mm (min.)	100mm (min.)	100mm (min.)	100mm (min.)
Mortar type	General purpose mortar	Thin layer mortar	Thin layer mortar	General purpose mortar	General purpose and thin layer mortar	General purpose and thin layer mortar
Wall tie	Type 'A'	Ancon Staifix HRT4 or Clan PWT4	No wall ties – the structural adequacy of the wall should be assessed by a structural engineer	Type 'A'	Type 'A' for general purpose mortar. Ancon Staifix HRT4 or Clan PWT4 for thin layer mortar	Type 'A' for general purpose mortar. Ancon Staifix HRT4 or Clan PWT4 for thin layer mortar
Cavity	75mm (min.) clear cavity or option of insulating with mineral wool with a maximum density of 40kg/m ³ . This includes mineral wool batts, rolls and blown mineral wool	75mm (min.) clear cavity or option of insulating with mineral wool with a maximum density of 40kg/m ³ . This includes mineral wool batts, rolls and blown mineral wool	75mm (min.) clear cavity or option of insulating with mineral wool with a maximum density of 40kg/m ³ . This includes mineral wool batts, rolls and blown mineral wool	75mm (min.) leaf-to-leaf, partially filled with 35mm Saint Gobain Isover RD35 mineral wool acoustic batt	100mm (min.) leaf to leaf fully filled with 100mm Superglass Party Wall Roll	100mm (min.) leaf to leaf fully filled with 100mm Isover RD Party Wall Roll
Internal finish	Gypsum-based board (nominal 8 kg/m ²) on dabs on nominal 8mm render coat with scratch finish (or British Gypsum Gyproc Soundcoat Plus)	Gypsum-based board (nominal 8 kg/m ²) on dabs on nominal 8mm render coat with scratch finish (or British Gypsum Gyproc Soundcoat Plus)	Gypsum-based board (nominal 8 kg/m ²) on dabs on nominal 8mm render coat with scratch finish (or British Gypsum Gyproc Soundcoat Plus)	Gypsum-based board (nominal 9.8 kg/m ²) on dabs	Gypsum-based board (nominal 8.0 kg/m ²) on dabs	Gypsum-based board (nominal 8.0 kg/m ²) on dabs

Notes:

All constructions require the external (flanking) walls to be masonry with 50mm (min.) cavity.
 All plots to be pre-registered with Robust Details Limited.
 All constructions should be built in accordance with the Robust Details Handbook.

Sound insulation

Use of Thermalite Robust Details in flats/apartments using Robust Detail separating floors

Separating wall construction	E-FC-1 (pre-cast plank & screed)	E-FC-4 (pre-cast plank, screed on 'Thermal Economics Isorubber')	E-FC-5 (pre-cast plank, screed on 'Collecta Yelofon HD10+')	E-FC-6 (beam & aggregate block, screed on 'Regupol E48')	E-FC-7 (beam & aggregate block, screed floating floor)	E-FC-8 (pre-cast plank, bonded floor cover on screed on resilient layers)	E-FC-9 (pre-cast plank, Isorubber Top' on screed)		E-FC-10 (Isorubber Top' on in-situ concrete)	E-FC-11 (pre-cast plank screed on 'Icopal-Monarfloor Tranquilt')	E-FC-12 (pre-cast plank 'Thermal Economics Isorubber Base HP3')	E-FC-13 (pre-cast plank Instacoustic Instalay 65)	E-FC-14 (pre-cast plank 'Thermal Economics Isorubber Code' layer and floating screed)	E-FC-15 (pre-cast plank 'Regupol Quietlay' layer and floating screed)	E-FC-16 (pre-cast plank 'Thermal Economics Isorubber CC3' bonded resilient floor covering)
E-WM-6 see note 1 (Shield, Party Wall, Hi-Strength 7 or 10)	F	✓	✓ ²	F	F	✓	✓		✓	F	F	F	F	F	F
E-WM-10 see note 1 (Shield, Party Wall, Hi-Strength 7 or 10)	F	✓	✓ ²	F	F	✓	✓		✓	F	F	F	F	F	F
E-WM-13 see note 1 (Shield, Party Wall, Hi-Strength 7 or 10)	F	✓	✓ ²	F	F	✓	✓		✓	F	F	F	F	F	F
E-WM-15 see note 1 (Shield, Party Wall, Hi-Strength 7 or 10)	F	✓	✓ ²	F	F	✓	✓		✓	F	F	F	F	F	F
E-WM-23 see note 1 (Shield, Party Wall, Hi-Strength 7 or 10)	F	✓	✓ ²	F	F	✓	✓		✓	F	F	F	F	F	F
E-WM-24 see note 1 (Shield, Party Wall, Hi-Strength 7 or 10)	F	✓	✓ ²	F	F	✓	✓		✓	F	F	F	F	F	F
Inner leaf of external (flanking) wall construction (subject to structural requirements)															
Turbo (density 470kg/m³)	X	✓	✓	X	X	X	X		X	X	✓	✓	✓	X	X
Shield (density 600kg/m³)	X	✓	✓	X	X	✓	✓		X	X	✓	✓	✓	X	✓
Party Wall (density 660kg/m³)	X	✓	✓	X	X	✓	✓		X	X	✓	✓	✓	X	✓
Hi-Strength 7 (density 730kg/m³)	X	✓	✓	X	X	✓	✓		X	X	✓	✓	✓	X	✓
Hi-Strength 10 (density 770kg/m³)	X	✓	✓	X	X	✓	✓		X	X	✓	✓	✓	X	✓

Key: ✓ Permissible wall and floor combinations for flats/apartments which do not require pre-completion sound testing.
 X Wall may not be used with floor.
 F Only the separating floor requires pre-completion sound testing.

Notes: 1. At least one storey of the separating wall flanking the separating floor must be built with Hi-Strength 7 or Hi-Strength 10 - typically for two-storey flats this will consist of Hi-Strength 7 or 10 on the ground floor as a minimum, with a lower density product (if required) on the first floor. For three storey flats Hi-Strength 7 or 10 on the ground and first floor as a minimum, with a lower density product (if required) on the second floor.

2. 200mm (min.) thick precast concrete planks and CT5 ceiling treatment must be used.

Mortar and finishes

Mortar

Selection of a suitable mortar is important to ensure that the composition is compatible in relation to the blocks being used. The following recommendations for general

purpose mortar with Thermalite take this into account and are based on the requirements of BS 5628: Part 3*.

Above dpc (externally and internally)		Below dpc	
Ratio	Material	Ratio	Material
1 : 1 : 6	cement : lime : sand	1 : 4	cement : sand
1 : 6	cement : sand with a plasticiser	1 : 1/2 : 4	cement : lime : sand
1 : 5	masonry cement : sand		

Below dpc sulfate resisting cement may be required, depending on ground and groundwater conditions.



Finishes

Thermalite blocks provide an excellent background for the use of internal and external finishes to walls.

Although the scratch finish is primarily an identification characteristic, it helps provide a key and should be augmented by recessing the mortar joint, to assist during the application of direct finishes.

Blockwork should be allowed to dry out thoroughly before rendering or plastering, in accordance with relevant codes of practice.

External rendering

The finishes suitable for external rendering onto Thermalite blocks are classified by BS 5262* as follows:

- Float finish
- Scraped or textured, hand applied
- Dry-dash, dry-thrown by hand
- Machine applied, Tyrolean or power spray

The rate of drying will vary with conditions of temperature, humidity and ventilation. If necessary, precautions should be taken to retain sufficient moisture throughout curing. It is recommended to seal the blockwork before applying the scratch coat.

* No longer current but still cited in the Building Regulations.
 ** For further details, please contact our Technical Services Department on 0330 123 1018.

Plaster finishes

The following plaster undercoats are recommended:

- 1 : 1 : 6 cement : lime : sand
- Pre-mixed gypsum-bound or cement-lime-bound lightweight aggregate

The undercoats may be plaster finished with neat gypsum Class B finish coat, or with a lightweight pre-mixed gypsum, or gypsum-lime-bound coat.

Dry lining

The following systems are suitable for use on Thermalite blocks:

- Plaster dab method
- Timber batten method
- Metal framing systems

Painting direct

Hi-Strength Paint Grade blocks built fair-faced are particularly suitable for the direct application of paint (please refer to paint manufacturers' advice on suitability) using a brush, roller or spray gun.

Tiling**

Thermalite is ideal for external tile hanging because it readily accepts fixing direct by cut nails and screws. Thermalite blocks also provide a suitable background for the application of ceramic wall tiles. Proprietary adhesives should be used to fix ceramic tiles to rendered or plastered Thermalite walls.

Thermal insulation and U-values



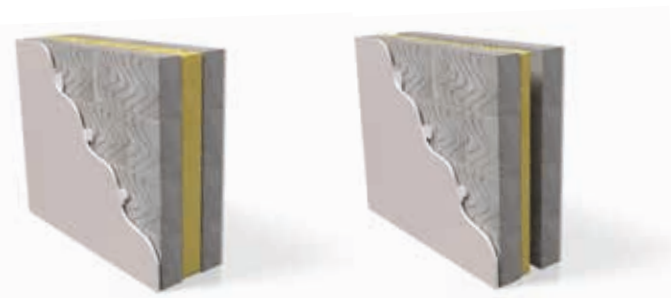
The thermal performance of the building fabric is becoming increasingly reliant upon the considered combination of structural components, specialist insulation products, finishes and workmanship. The high level of thermal performance of Thermalite blocks, coupled with excellent thermal mass qualities and inherent airtightness, ensures that cost-effective solutions can be achieved to satisfy the Building Regulations.

The Building Regulations

Devolved government has resulted in England, Scotland and Wales formulating their own approach and set of standards for the conservation of fuel and power. Therefore, across the nation each country has set its own limiting backstop U-values for new build, extensions and conversions.

Thermal solutions

Pages 36-41 show a comprehensive range of thermal solutions to satisfy the individual requirements of each country using Thermalite blocks in the following common types of constructions:



Full fill constructions -
pages 36-37

Partial fill constructions -
pages 38-39



External solid wall constructions -
pages 40-41

Thermal mass

The heat capacity of the external wall is used in the SAP calculation and the use of Thermalite blocks can offer benefits in this respect. Increasing the effective thermal mass reduces the need for heating and cooling. However, the rules for calculating heat capacity mean that items such as internal dry-lining, thermal lining and lightweight construction will reduce the effective thermal mass.

Linear thermal bridges

Linear thermal bridging is where heat loss occurs through the junction of building elements such as the wall and the floor, where the continuity of the insulation is interrupted. These heat losses are significant, but can be reduced by adopting Enhanced Construction Details (ECD's).

Thermalite can offer a range of high-performance construction details that have recently been developed within the masonry sector, covering all the usual methods of construction and materials used. The use of these generic details is recommended.

The Aircrete Products Association (APA) developed the details in partnership with Constructive Details Ltd. These include a useful construction checklist to help ensure the details are built correctly.

The details can be downloaded at constructivedetails.co.uk

Other useful sources of information and accredited constructions can be obtained from the NHBC Foundation and LABC, details can be accessed via their websites: nhbcfoundation.org and labc.co.uk

Air permeability

The average air permeability of new masonry dwellings has steadily decreased in recent years as knowledge gained through pressure testing has informed the design and construction process. An air permeability rate in the region of $5.0 \text{ m}^3/\text{hr}/\text{m}^2$ is now fairly standard, with lower values achieved as required. In fact, results from pressure testing wet plastered or parge coated walls consistently return results in the region of $3.0 \text{ m}^3/\text{hr}/\text{m}^2$, as this layer provides a highly effective air barrier.

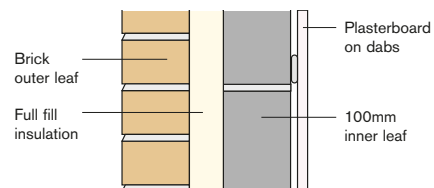
The effect of thin joint masonry

The use of thin joint masonry with a bed joint thickness of approximately 2.5mm in lieu of conventional general purpose mortar can provide a significant contribution to improving the overall U-value of a masonry wall, without the need to increase the amount of insulation.

This is seen at its most effective on internally insulated solid wall constructions as shown on page 40.

Thermal performance Full fill construction

Full fill construction - table 1



Full fill construction - table 2

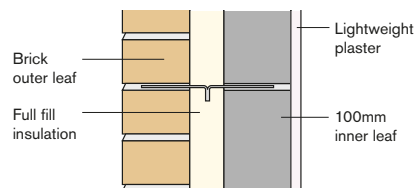


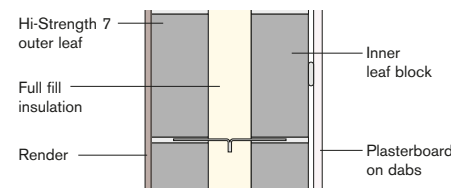
Table 1: Minimum thickness of insulation (in mm) required to achieve illustrated U-values (W/m²K) in conjunction with clay brickwork externally.

Inner leaf block	Insulation conductivity (W/m.K)	U-value (W/m²K)						
		0.30	0.28	0.25	0.22	0.20	0.18	0.15
Turbo	0.021	45	49	58	69	78	90	114
	0.032	68	75	88	105	119	140	180
	0.037	78	86	101	122	140	165	*
	0.040	84	93	110	132	155	180	*
Shield	0.021	48	53	62	73	82	93	116
	0.032	73	80	93	110	125	145	185
	0.037	85	93	108	130	145	171	*
	0.040	90	100	117	140	162	185	*
Hi-Strength 7	0.021	50	55	63	74	84	95	118
	0.032	75	83	96	113	130	150	190
	0.037	87	95	111	132	155	175	*
	0.040	94	103	120	142	165	190	*

Table 2: Minimum thickness of insulation (in mm) required to achieve illustrated U-values (W/m²K) in conjunction with clay brickwork externally.

Inner leaf block	Insulation conductivity (W/m.K)	U-value (W/m²K)						
		0.30	0.28	0.25	0.22	0.20	0.18	0.15
Turbo	0.021	47	52	60	71	81	92	115
	0.032	71	78	91	108	122	141	182
	0.037	81	90	105	126	142	168	*
	0.040	88	97	114	136	159	182	*
Shield	0.021	50	55	64	75	84	95	118
	0.032	76	83	97	114	129	146	188
	0.037	88	96	112	132	154	175	*
	0.040	95	104	121	143	166	188	*
Hi-Strength 7	0.021	52	57	66	77	86	97	120
	0.032	79	86	99	116	132	149	191
	0.037	91	99	115	136	157	178	*
	0.040	98	107	124	146	169	192	*

Full fill construction - table 3



Full fill construction - table 4

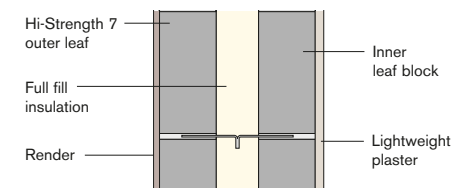


Table 3: Minimum thickness of insulation (in mm) required to achieve illustrated U-values (W/m²K) in conjunction with 100mm Hi-Strength 7 blockwork externally.

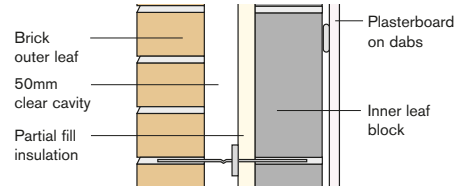
Inner leaf block	Insulation conductivity (W/m.K)	U-value (W/m²K)						
		0.30	0.28	0.25	0.22	0.20	0.18	0.15
Turbo	0.021	37	42	50	61	71	82	104
	0.032	55	63	76	93	107	124	166
	0.037	64	73	88	107	124	145	190
	0.040	69	78	95	116	135	161	*
Shield	0.021	40	45	54	65	74	85	108
	0.032	61	68	82	98	113	131	172
	0.037	70	79	94	114	131	156	198
	0.040	76	85	102	123	142	168	*
Hi-Strength 7	0.021	42	47	56	67	76	87	110
	0.032	64	71	84	101	115	134	175
	0.037	73	82	97	117	134	159	200
	0.040	79	88	105	127	145	172	*

Table 4: Minimum thickness of insulation (in mm) required to achieve illustrated U-values (W/m²K) in conjunction with 100mm Hi-Strength 7 blockwork externally.

Inner leaf block	Insulation conductivity (W/m.K)	U-value (W/m²K)						
		0.30	0.28	0.25	0.22	0.20	0.18	0.15
Turbo	0.021	39	44	53	64	73	84	106
	0.032	59	66	80	96	110	129	169
	0.037	68	77	92	111	129	149	194
	0.040	73	83	99	120	139	165	*
Shield	0.021	43	47	56	67	76	88	110
	0.032	64	72	85	102	116	134	175
	0.037	74	83	98	118	135	160	*
	0.040	80	89	106	128	146	173	*
Hi-Strength 7	0.021	44	49	58	69	78	89	112
	0.032	67	74	88	105	119	137	178
	0.037	77	86	101	121	138	164	*
	0.040	83	93	109	132	149	176	*

Thermal performance Partial fill construction

Partial fill construction - table 5
Low-emissivity cavity resistance 0.644m²K/W



Partial fill construction - table 6
Low-emissivity cavity resistance 0.644m²K/W

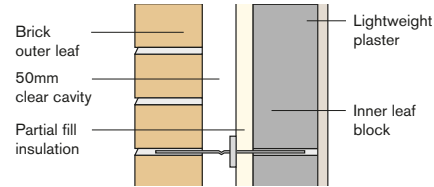


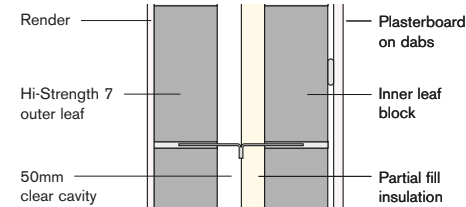
Table 5: Minimum thickness of insulation (in mm) required to achieve illustrated U-values (W/m²K) in conjunction with clay brickwork externally.

Inner leaf block	Insulation conductivity (W/m.K)	U-value (W/m²K)						
		0.30	0.28	0.25	0.22	0.20	0.18	0.15
Turbo	0.020	29	34	42	53	62	72	95
	0.022	32	37	46	58	68	81	111
	0.023	34	39	48	61	71	84	115
Shield	0.020	33	37	46	56	65	77	99
	0.022	36	41	50	62	72	85	115
	0.023	37	43	52	65	75	88	119
Hi-Strength 7	0.020	34	39	47	58	67	79	107
	0.022	38	43	52	64	73	87	117
	0.023	39	45	54	67	78	90	122

Table 6: Minimum thickness of insulation (in mm) required to achieve illustrated U-values (W/m²K) in conjunction with clay brickwork externally.

Inner leaf block	Insulation conductivity (W/m.K)	U-value (W/m²K)						
		0.30	0.28	0.25	0.22	0.20	0.18	0.15
Turbo	0.020	31	36	44	55	64	75	98
	0.022	34	40	49	60	70	83	113
	0.023	36	41	51	63	73	87	118
Shield	0.020	35	39	48	59	67	79	108
	0.022	38	43	53	64	74	87	117
	0.023	40	45	55	67	78	91	122
Hi-Strength 7	0.020	36	41	50	60	69	81	110
	0.022	40	45	54	66	77	89	119
	0.023	42	47	57	69	80	93	124

Partial fill construction - table 7
Low-emissivity cavity resistance 0.644m²K/W



Partial fill construction - table 8
Low-emissivity cavity resistance 0.644m²K/W

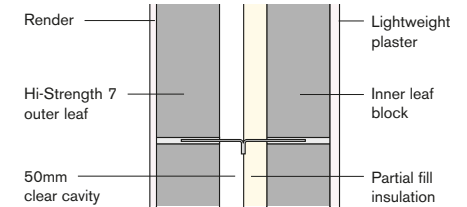


Table 7: Minimum thickness of insulation (in mm) required to achieve illustrated U-values (W/m²K) in conjunction with 100mm Hi-Strength 7 blockwork externally.

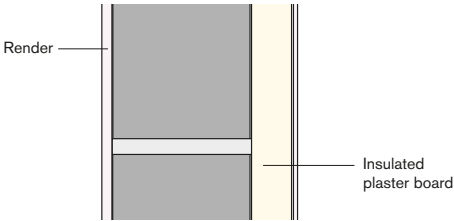
Inner leaf block	Insulation conductivity (W/m.K)	U-value (W/m²K)						
		0.30	0.28	0.25	0.22	0.20	0.18	0.15
Turbo	0.020	22	27	35	46	54	65	88
	0.022	24	29	38	50	60	71	96
	0.023	25	30	40	52	62	75	100
Shield	0.020	25	30	38	49	58	68	91
	0.022	28	33	42	54	63	75	100
	0.023	29	34	44	56	66	80	110
Hi-Strength 7	0.020	27	32	40	51	59	70	93
	0.022	30	35	44	56	65	78	108
	0.023	31	36	47	58	68	82	112

Table 8: Minimum thickness of insulation (in mm) required to achieve illustrated U-values (W/m²K) in conjunction with 100mm Hi-Strength 7 blockwork externally.

Inner leaf block	Insulation conductivity (W/m.K)	U-value (W/m²K)						
		0.30	0.28	0.25	0.22	0.20	0.18	0.15
Turbo	0.020	24	29	37	48	57	67	90
	0.022	26	32	41	52	62	74	99
	0.023	28	33	43	55	65	78	109
Shield	0.020	28	32	41	51	60	71	94
	0.022	30	35	44	56	66	79	109
	0.023	32	37	46	59	69	82	113
Hi-Strength 7	0.020	29	34	42	53	62	72	95
	0.022	32	37	46	58	68	81	111
	0.023	33	39	48	61	71	84	115

Thermal performance Solid wall construction

External solid wall construction - table 9
20mm external render
Traditional mortar



External solid wall construction - table 10
20mm external render
Thin layer mortar

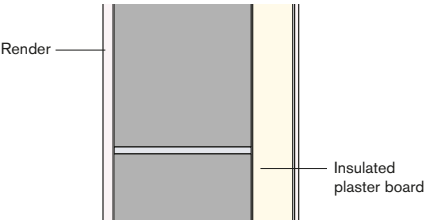


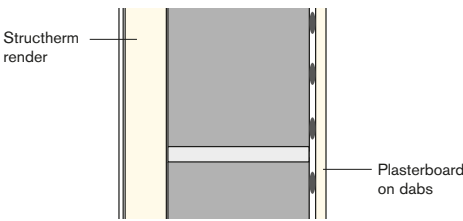
Table 9: Thickness of Thermaline Super insulated plasterboard located internally (in mm) required to achieve illustrated U-values (W/m²K).

	Insulated plasterboard thickness						
	30mm	40mm	50mm	60mm	70mm	80mm	90mm
Single leaf block	U-value (W/m²K)						
215mm Turbo	0.37	0.31	0.27	0.23	0.21	0.19	0.17
265mm Turbo	0.33	0.28	0.25	0.22	0.19	0.18	0.16
300mm Turbo	0.31	0.26	0.23	0.21	0.19	0.17	0.16
190mm Shield	0.44	0.36	0.30	0.26	0.23	0.20	0.19
190mm Hi-7	0.46	0.37	0.32	0.27	0.24	0.21	0.19
215mm Hi-7	0.44	0.36	0.31	0.26	0.23	0.21	0.19

Table 10: Thickness of Thermaline Super insulated plasterboard located internally (in mm) required to achieve illustrated U-values (W/m²K).

	Insulated plasterboard thickness						
	30mm	40mm	50mm	60mm	70mm	80mm	90mm
Single leaf block	U-value (W/m²K)						
215mm Turbo	0.34	0.29	0.25	0.22	0.20	0.18	0.17
265mm Turbo	0.30	0.26	0.23	0.20	0.18	0.17	0.16
300mm Turbo	0.28	0.24	0.22	0.19	0.18	0.16	0.15
190mm Shield	0.41	0.34	0.29	0.25	0.22	0.20	0.18
190mm Hi-7	0.44	0.36	0.31	0.26	0.23	0.21	0.19
215mm Hi-7	0.42	0.35	0.30	0.25	0.22	0.20	0.18

External solid wall construction - table 11
Plasterboard on dabs internally
Traditional mortar



External solid wall construction - table 12
Plasterboard on dabs internally
Thin layer mortar

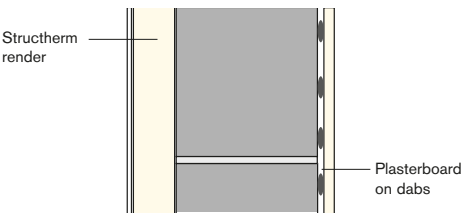


Table 11: Thickness of Struchterm insulation located externally (in mm) required to achieve illustrated U-values (W/m²K).

	Expanded polystyrene λ=0.038			Platinum polystyrene λ=0.030			Mineral fibre λ=0.036			Phenolic foam λ=0.022		
	100mm	150mm	200mm	100mm	150mm	200mm	100mm	150mm	200mm	100mm	150mm	200mm
Single leaf block	U-value (W/m²K)											
215mm Turbo	0.22	0.17	0.14	0.19	0.14	0.12	0.21	0.16	0.13	0.15	0.11	0.09
265mm Turbo	0.20	0.16	0.13	0.18	0.14	0.11	0.20	0.15	0.13	0.15	0.11	0.09
300mm Turbo	0.19	0.15	0.13	0.17	0.13	0.11	0.19	0.15	0.12	0.14	0.11	0.09
190mm Shield	0.25	0.19	0.15	0.21	0.16	0.12	0.24	0.18	0.14	0.17	0.12	0.10
190mm Hi-7	0.26	0.19	0.15	0.22	0.16	0.13	0.25	0.18	0.15	0.17	0.12	0.10
215mm Hi-7	0.25	0.19	0.15	0.21	0.16	0.12	0.24	0.18	0.14	0.17	0.12	0.10

Table 12: Thickness of Struchterm insulation located externally (in mm) required to achieve illustrated U-values (W/m²K).

	Expanded polystyrene λ=0.038			Platinum polystyrene λ=0.030			Mineral fibre λ=0.036			Phenolic foam λ=0.022		
	100mm	150mm	200mm	100mm	150mm	200mm	100mm	150mm	200mm	100mm	150mm	200mm
Single leaf block	U-value (W/m²K)											
215mm Turbo	0.21	0.16	0.13	0.18	0.14	0.11	0.20	0.16	0.13	0.15	0.11	0.09
265mm Turbo	0.19	0.15	0.13	0.17	0.13	0.11	0.19	0.15	0.12	0.14	0.11	0.09
300mm Turbo	0.18	0.15	0.12	0.16	0.13	0.10	0.18	0.14	0.12	0.13	0.10	0.08
190mm Shield	0.24	0.18	0.15	0.20	0.15	0.12	0.23	0.17	0.14	0.16	0.12	0.09
190mm Hi-7	0.25	0.19	0.15	0.21	0.16	0.12	0.24	0.18	0.14	0.17	0.12	0.10
215mm Hi-7	0.24	0.18	0.15	0.21	0.15	0.12	0.23	0.18	0.14	0.17	0.12	0.09

Sustainability

Thermalite blocks are an exceptionally sustainable building material that can help designers and specifiers meet all current Building Regulations, legislation and codes of practice. Thermalite blocks are manufactured with up to 80% recycled material, have a long life span and are recyclable after use.



Thermalite – manufacture and delivery

There are strict waste minimisation schemes in place and delivery is by a modern transport fleet.



Thermalite – end of life use

Thermalite blocks can be fully recycled to create new construction materials. Buildings constructed from Thermalite can be easily altered should their use change, avoiding the need to demolish and rebuild.



Thermalite – in use

The inherent properties of the blocks mean they provide good thermal and acoustic comfort for occupants of homes constructed from Thermalite.



Thermalite – in design

Thermalite blocks can help designers and specifiers to meet all current Building Regulations, legislation and codes of practice.



Thermalite – in construction

Thermalite blocks meet current CDM Regulations and can be easily and accurately cut to reduce waste on site.

The whole life cycle of Thermalite blocks has sustainability at its core. From manufacture and delivery through to design in use, construction and reuse, Thermalite blocks are inherently sustainable.

Sustainability



Thermalite manufacture and delivery

Recycled content

Up to 80% of the material used in Thermalite blocks is pulverised fuel ash (PFA), a by-product from coal burning power stations, which is both stable and environmentally friendly.

Waste minimisation

A strict waste minimisation scheme is operated during manufacture, and all waste from the process is either crushed and recycled into the next mix or used in other concrete products.

Quality

All Thermalite blocks are manufactured in accordance with ISO 9001 (quality management system) and all sites are certified to ISO 14001 (environmental management system).

Responsibly sourced

All Thermalite blocks are certified as 'Very Good' under BES 6001, Responsible Sourcing of Materials.

UK sourced

Over 99% of the materials used to manufacture Thermalite blocks are sourced in the UK. Not only does this help towards the UK economy but it means that the materials do not travel an excessive distance to the factory.

Low embodied carbon dioxide (CO₂)

Thermalite has a low embodied carbon dioxide figure compared with generic aircrete.

Delivery

We also operate a modern transport fleet, which, when combined with the lightweight Thermalite product, ensures that energy consumption during haulage is minimised.

Thermalite in design

Part L

Thermalite offers cost-effective solutions to both current and future Part L requirements. See also pages 34-41.

Life cycle assessment

Thermalite was the first aircrete block to have its life cycle assessment (LCA) data independently reviewed and to be awarded certified Environmental Profiles by BRE Certification. LCA is a method that measures the environmental impact of a product by assessing the energy and materials used and carbon dioxide released to the environment over its full life cycle.

Green Guide

When used in an external wall, Thermalite products achieve an A+ rating in the Green Guide to Specification. Thermalite separating walls also give superior ratings compared with generic aircrete and achieve up to 'A' ratings.

Air permeability

Thermalite blocks have a closed micro-cellular structure that is highly resistant to the passage of air. Air permeability contributes to the thermal insulation performance of a building.

Fire resistance

Thermalite blocks are classified as A1 non-combustible, meaning they are highly fire resistant.

Linear thermal bridging

Linear thermal bridging is where heat loss occurs through the junction of building elements such as walls and floors, where the continuity of the insulation is interrupted. The use of Thermalite enhanced construction details (ECDs) can help reduce heat loss through thermal bridging. This can make a significant improvement in CO₂ emissions, dependent on the house type.

Thermalite in construction

Health and well-being

Thermalite products meet current CDM Regulations, with Thermalite blocks generally falling well below handling guideline limits. The Health and Safety Executive also recommends that blocks with handholds should be selected wherever possible. Thermalite Trenchblock Tongue & Groove is the first block manufactured in the UK to offer handholds.

Product waste

The finished product also contributes to waste reduction. Thermalite blocks are made to high dimensional tolerances and can be easily and accurately cut to reduce waste on site.

Fire protection during construction

Thermalite blocks are one of the best building materials to fire-proof a development during construction. The combination of the closed micro-cellular structure of Thermalite blocks and the use of non-combustible raw materials is the key to making them fire resistant. This means a safer site for construction workers.

Thermalite in use

Thermal comfort

The micro-cellular structure of the Thermalite product offers remarkably high thermal insulation and can help achieve an energy-efficient building fabric, lowering heat loss through walls and at junctions of building elements.

Acoustic comfort

Thermalite provides excellent acoustic performance, insulating against noise from adjoining buildings and external sources.

Durability

Thermalite blocks are an extremely durable building material which will exceed the assumed 60 year life expectancy of a building. They also ensure resistance to weathering, abrasion and impact damage, mould/rot, sunlight and water damage.

Thermal mass

Thermal mass reduces the extremes of internal temperature within a building, keeping it at a more consistent and comfortable level.

Air permeability

Thermalite has a very low air permeability $< 0.10 \text{ m}^3 / (\text{h} \cdot \text{m}^2)$ which helps in achieving an airtight building fabric, consequently reducing energy use.

Fire protection

Thermalite blocks are one of the best building materials to fire-proof a development. The combination of the closed micro-cellular structure of Thermalite blocks and the use of non-combustible raw materials is the key to making them fire resistant. This makes a safer living environment for future occupants.

Thermalite end of life use

Recyclable

At end of life, Thermalite blocks can be fully recycled to create new construction materials.

No pollution

The Thermalite products provide no direct pollution risk to water or air, and the stable and inert waste materials can be safely used as land infill if recycling is not feasible.

Flexibility

A building constructed from aircrete blocks can easily be altered should its use change, avoiding the need to demolish and rebuild.

Logistics

Deliveries

Thermalite orders can be placed with leading builders merchants throughout the United Kingdom for delivery direct to site by our team of dedicated professional delivery agents.

The maximum load sizes quoted may vary dependent on haulier (Forterra or external) and the factory from which they are supplied. Values given are indicative and should be checked with the Customer Service Centre prior to ordering: 03705 626 500.



Packaging

Void packs

Void packaging has been developed in response to our customers' demands for packs that eliminate the need for a pallet and can be easily moved around the yard.

Note: void packs are only available for delivery into merchant yards and are subject to availability.

Grab packs

Grab packs are shrink-wrapped with strong plastic film, which provides protection for the blocks and stability to the packs. Grab packs can be easily unloaded and moved using normal brick grabs, thereby saving on pallet costs.

In addition to ensuring that the product is kept in good condition, the Thermalite packaging is clearly marked with the product description, leading to improved security and management of materials. Chargeable pallets can be supplied on request.

Pack weights

Pack weights appear heavier than the sum of the blocks in each pack as they contain a high proportion of water required in the production process. Once the protective wrapping is removed the blocks will dry to an equilibrium weight consistent with our quoted values.

Note: pack weights are based on the highest moisture content for health and safety reasons.

Rigid deliveries

Subject to availability, rigid deliveries are a non-standard delivery option and a haulage charge will be applied.

Product Description	Block thickness (mm)	Blocks per pack	Pack height (mm)	Pack width (mm)	Pack depth (mm)	Weight (kg)	m ² per pack	Artic (m ²)	Wagon & Drag (m ²)	Rigid (m ²)
Coursing Bricks 100mm (215mm x 65mm) Grab	100	450	500	1090	1170	585	7.5	352	345	232
Hi-Strength Coursing Blocks 100mm (440mm x 65mm) Grab	100	180	440	1000	1160	650	6	252	246	162
Floorblock 100mm (440mm x 215mm) 4.0 N Grab	100	60	440	1075	1200	510	6	324	318	216
Floorblock 100mm (440mm x 350mm) 4.0 N Grab	100	36	440	1050	1200	497	5.34	310	304	204
Floorblock 100mm (540mm x 440mm) 4.0 N Grab	100	24	440	1080	1200	511	5.7	307	302	205
Hi-Strength 7 100mm (440mm x 215mm) 7.3 N Grab	100	60	440	1075	1200	558	6	300	294	198
Hi-Strength 10 100mm (440mm x 215mm) 9.0 N Grab	100	60	440	1075	1200	600	6	294	282	192
Party Wall 100mm (440mm x 215mm) 4.0 N Grab	100	60	440	1075	1200	510	6	324	318	216
Party Wall 215mm (440mm x 215mm) 4.0 N Grab	215	25	440	1075	1075	455	2.5	150	147	100
Shield 100mm (440mm x 215mm) 3.6 N Grab	100	60	440	1075	1200	468	6	354	348	234
Shield 100mm (440mm x 215mm) 3.6 N Void	100	92	1075	1000	880	718	9.2	349	340	239
Shield 140mm (440mm x 215mm) 3.6 N Grab	140	40	440	1075	1120	436	4	256	248	168
Hi-Strength Paint Grade 100mm (440mm x 215mm) 7.3 N Grab	100	60	440	1075	1200	558	6	300	294	198
Hi-Strength Trenchblock 300mm (440mm x 215mm) 7.3 N Grab	300	20	440	1075	1200	560	2	100	98	66
Trenchblock T & G 275mm (440mm x 215mm) 3.6 N Grab	275	20	440	1075	1100	430	2	128	126	84
Trenchblock T & G 275mm (440mm x 215mm) 3.6 N Void	275	26	825	1075	880	559	2.6	130	127	85
Trenchblock T & G 300mm (440mm x 215mm) 3.6 N Grab	300	20	440	1075	1200	468	2	118	116	78
Trenchblock T & G 300mm (440mm x 215mm) 3.6 N Void	300	26	900	1075	880	608	2.6	119	117	78
Trenchblock T & G 355mm (440mm x 215mm) 3.6 N Grab	355	20	440	1075	1420	416	2	100	97	66
Turbo 100mm (440mm x 215mm) 2.9 N Grab	100	60	440	1075	1200	366	6	420	414	282

Note: Pack and load data is correct at time of printing.

Material safety data

Products

All Thermalite products including Turbo, Shield, Hi-Strength 7, Hi-Strength 10, Hi-Strength Paint Grade, Party Wall, Floorblock, Trenchblock and Coursing Units.

Manufacturer

Forterra using the brand name of Thermalite.

Description

Autoclaved Aerated Concrete also known as AAC and Aircrete.

Composition

Pulverised Fuel Ash (PFA), sand, cement, lime, anhydrite, aluminium slurry, water.

Following manufacture, the products are deemed to be inert and therefore not hazardous in relation to the Health and Safety at Work Act.

Personal protective equipment (PPE)

When working with Thermalite blocks protective footwear, headwear, glasses and gloves should always be used.

In addition, suitable respiratory protection should be used when cutting blocks with hand or mechanical saws. If mechanical saws are used these should comply with regulatory requirements and be operated only by trained competent persons.

Hazard identification and first aid

Damage to skin by abrasion or irritation:

- First aid: Wash with soap and water and if irritation persists seek medical advice
- Prevention: Wear suitable gloves

Inhalation/ingestion of aircrete dust and particles:

- First aid: If ingested, drink plenty of clean water. If inhaled, aircrete dust causes irritation of the respiratory tract, seek medical advice
- Prevention: Wear suitable respiratory protection and wash hands thoroughly with soap and water before eating or drinking after handling Thermalite blocks

Dust in eyes may cause irritation and or abrasion:

- First aid: Irrigate liberally with water. If irritation persists seek medical advice
- Prevention: Wear suitable eye protection

Fire fighting measures

Products will not support combustion.

Accident release measures

Not applicable.

Storage

Thermalite blocks are delivered to site by road vehicles for which safe access and egress should be made available. Blocks need to be stacked on dry, level ground no more than three packs high. Whenever possible, blocks should be protected from inclement weather by use of the pack's own wrapping or by a suitable tarpaulin. This will minimise the moisture content of the blocks and any resulting weight increase.

The Control of Substances Hazardous to Health (COSHH), requirements of the Health and Safety at Work Act and the Chemicals Hazard Information and Packaging for Supply (CHIPS) regulations require manufacturers to provide relevant information regarding their products in respect of properties, correct use, storage/handling and disposal without risk to health.

When removing packaging, care should be taken to ensure blocks do not fall and cause injury to persons in the vicinity of the pack. Packaging should be disposed of in accordance with local and statutory regulations.

Handling

Where blocks are handled manually, this should be undertaken in accordance with the Manual Handling Regulations 1992 and the guidance given in the withdrawn Health & Safety Executive (HSE) Construction Information Sheet no. 37 'Handling Building Blocks'. These conclude that there is a high risk of injury in the single-handed repetitive manual handling of blocks heavier than 20kg. If single person handling is needed, blocks of 20kg or lighter should be specified and used, or other precautions should be taken to reduce the risk of injury by, for example, the provision of mechanical handling.

The HSE also recommends that blocks with handholds be selected wherever possible.

Individual block weights cited by the manufacturer in its literature and website are based on a theoretical equilibrium value of 3% moisture used for testing and calculation purposes. Moisture content prior to use will be higher than the quoted value and is variable subject to date of manufacture prior to delivery, weather and storage conditions.

The delivered weight of the Thermalite product range generally falls well below handling guideline limits. However, if there are specific manual handling concerns, particularly with larger block sizes, we recommend site sampling and weighing to determine safe handling practices.

Transport information

No special precautions required.

Regulation information

Classified as non-hazardous for conveyance and supply.

Other information

In accordance with the Management of Health and Safety at Work Regulations 1992, employers must carry out a risk assessment to ensure the health and safety of their employees and non-employees who may be affected by their undertaking.

Contact details

Forterra
222 Peterborough Road
Whittlesey
Cambridgeshire PE7 1PD

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CDM Regulations

Construction is one of Britain's most hazardous industries, with back pain cited as the single biggest cause of ill health.

The HSE maintains a policy to improve health and safety standards during construction work. This includes site visits to ensure the correct use of manual handling techniques.

The Construction Design and Management (CDM) Regulations place responsibility on all individuals who can contribute to health and safety on a construction project.

What are the guidelines?

The Construction Industry Advisory Committee (CONIAC) advises that the handling of heavy building blocks can result in a wide range of injuries where the damage is gradual and progressive over a substantial period of time.

After taking account of expert opinion, CONIAC has concluded that there is a high risk of injury in the single-handed, repetitive manual handling of blocks heavier than 20kg.

The Thermalite solution

The Thermalite micro-cellular structure results in a product range which is both strong and exceptionally light to handle. Consequently, all of our standard size blocks weigh less than 20kg in accordance with guidelines.

- Handholds - HSE also recommends that blocks with handholds should be selected wherever possible. We were the first block manufacturer in the UK to offer handholds, which have been introduced to the Thermalite Trenchblock range, making building with Thermalite blocks not only faster, but safer too.
- Large Format products - Large Format blocks, the equivalent of at least two normal blocks, are a proven solution to the demands of builders to increase productivity on site. Due to their micro-cellular structure they are also available in a weight less than 20kg, enabling compliance with CDM Regulations.



forterra.co.uk



Forterra is a leading manufacturer of a diverse range of clay and concrete building products, used extensively within the construction sector, and employs over 1,600 people across 18 facilities in the UK.

It is the second largest brick and aircrete block manufacturer in the country, and the only producer of the iconic London Brick. Other trusted brands from Forterra include Thermalite, Ecostock, Butterley, Cradley, Red Bank, Jetfloor and Formpave.

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