CI/SfB | | | Yn6 | (M2)|
October 2011

WALLTITE®

The airtight insulation solution

Technical Guide

Spray foam insulation

BASF

The Chemical Company

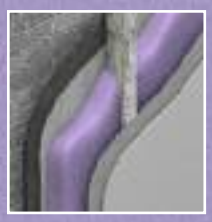
WALLTITE® A foam insulation system for internal roofs, floors and walls that provides a seamless airtight solution which, unlike conventional insulation materials, is spray applied.

WALLTITE is ideal for many applications:


New pitched roof


Existing pitched roof


Room in a roof


New timber frame wall


Masonry cavity wall


External soffit


External roof


Refurbished masonry wall (timber frame)


Refurbished masonry wall (steel stud)


Concrete slab ground floor


Beam and block floor


Suspended timber floor

BBA BRITISH BOARD OF AGRÉMENT
CERTIFICATE No. 11/4816

✓ Energy efficiency

WALLTITE is a speedy, efficient insulation solution coupled with significantly lower U-values than other conventional insulation materials.

WALLTITE has a thermal conductivity as low as 0.025W/mK.

✓ Air tightness

The continuous spray leaves a minimal amount of surface area without insulation resulting in an airtight building envelope of low permeability, and without the need for supplementary material.

The purple foam is fast to apply and quick to cure. WALLTITE therefore offers the specifier an all in one solution to meet and exceed latest Building Regulations requirements.

✓ Sustainability

By virtually eliminating air leakage, WALLTITE with its closed cell structure helps control the movement of vapour and moisture throughout the building, reducing the risk of condensation and mould. Sustainable over the life span of the building, WALLTITE can even prolong the buildings life as it protects against premature deterioration of building materials.

✓ Design freedom

WALLTITE also provides the specifier with complete design freedom as the spray foam adapts to the shape of the substrate providing an ideal solution for insulating difficult areas such as profiled and curved roofs.

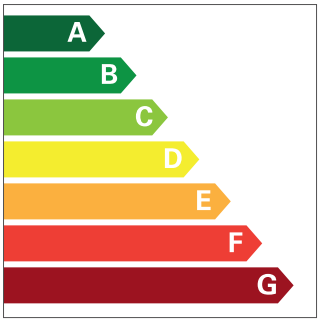
Technical support is available via our in-house BASF team and external retained consultants.

✓ Occupier comfort

For building occupiers, WALLTITE makes a significant contribution to a comfortable indoor climate by creating a draft free environment that prevents the infiltration of pollutants, toxins and allergens.

✓ Reliability

WALLTITE is only installed by BASF-trained professionals. A nationwide network of Approved Contractors is available throughout the UK.



Airtightness is important

The problem

Heat loss from a house or building occurs in almost every direction, with walls and roofs accounting for nearly 60% of total heat loss.

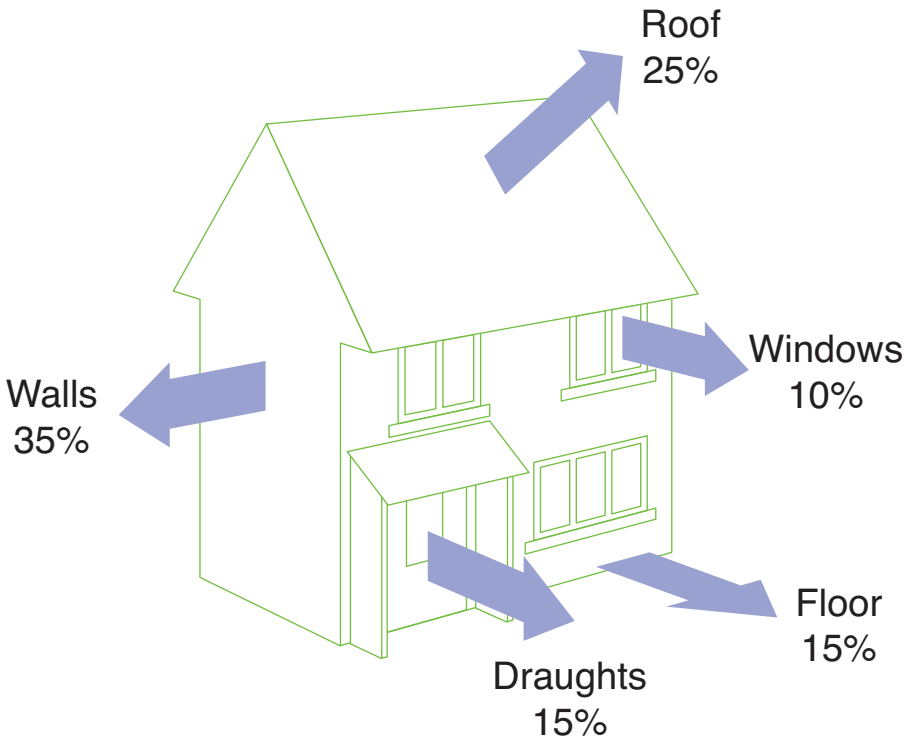
Loft and cavity wall insulation are simple and efficient ways to prevent heat loss through roofs and walls – but in time these can 'fail' and not perform as intended.

Energy savings could amount to as much as 40% depending on the type of insulation and the thickness used.

Even insulated buildings can show signs of heat loss which ultimately affects the building's performance and its sustainability

Damp and moisture ingress can affect the performance of certain insulation materials (such as mineral fibre).

Reducing air leakage can help to reduce the amount of fuel necessary to heat a building.



So why insulate with PU spray foam?

PU spray foam insulation can be applied onto any substrate – IN SITU and offers significant benefits over other insulations:

- adheres well to breather membranes and even roof tiles (this will help stabilise the roof structure and prevent tile slippage)
- typical lambda value 0.025W/mK (closed cell)
- can be applied to: solid walls (internal and some external applications), cavity walls (slight change in formulation), roofs, soffits and floors
- cures rapidly hence no waiting time – less wastage on site
- provides a seamless form of insulation which provides an airtight barrier
- closed cell spray foam not permeable to moisture and provides excellent thermal properties
- some acoustic performance
- Class 1 fire rating.

How it works

Composition

Polyurethane spray foam consists of two raw materials: a resin and a hardener – obtained from crude oil.

Mixing the two components – which contain auxiliary materials such as catalysts, foaming agents or stabilisers – gives rise to a reactive compound.

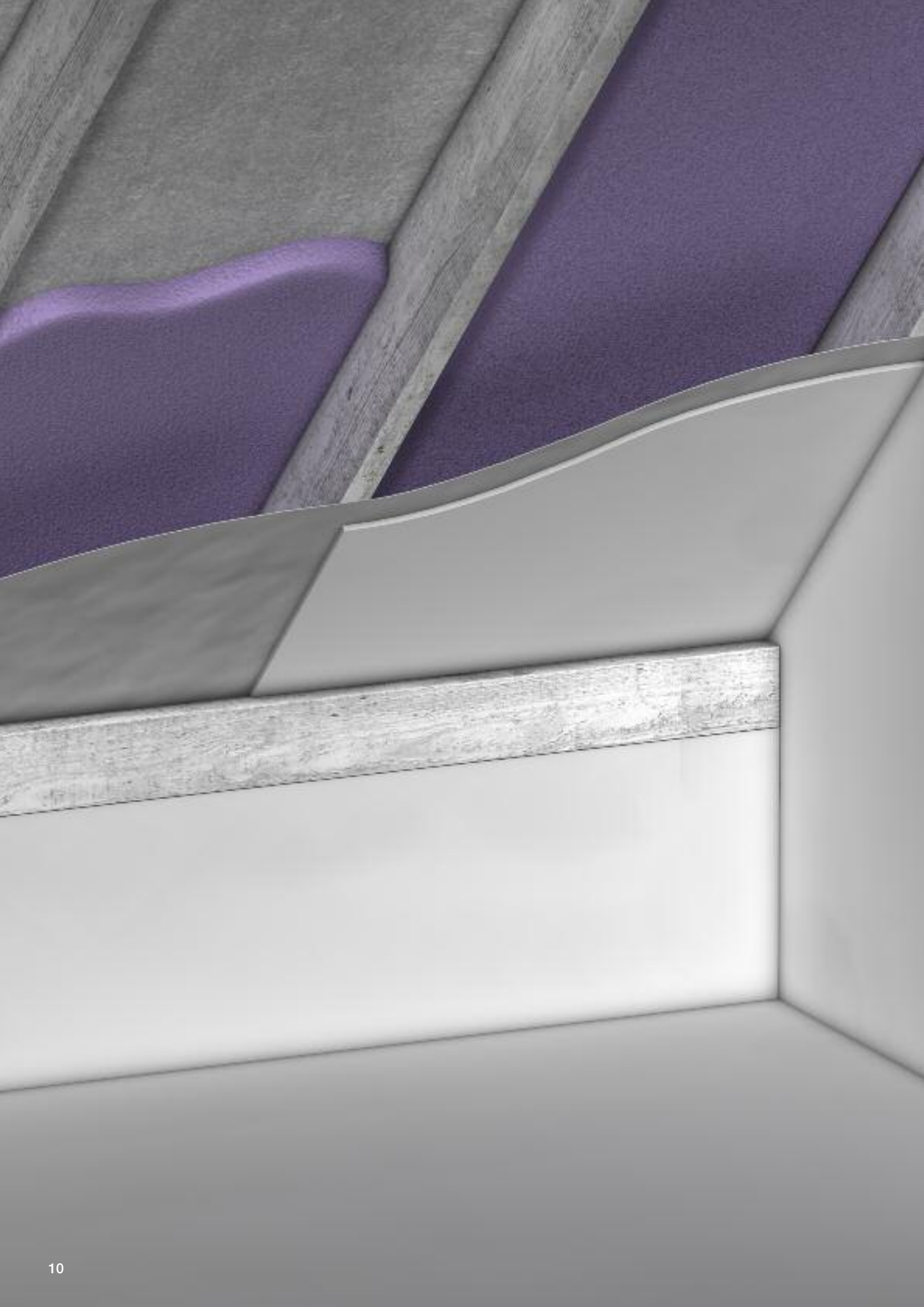
Depending on formula and proportions of the mix, the properties of the compound can be precisely regulated, e.g. hard, soft, integral, cellular (foamed) or compact.

Summary of key benefits...

Insulation with no joints or gaps	Spray application of WALLTITE insulating material produces a seamless insulating layer with no joints or gaps and reduces energy loss due to thermal bridging.
Maximum insulating performance at minimum thickness	WALLTITE has an extremely low thermal conductivity not achieved by any other conventional insulating material, saving valuable space.
Insulation of components in hard to treat areas	Liquid installation means that critical, inaccessible or curved areas can be insulated without any problem – no need for laborious cutting and fitting.
Excellent adhesion to the substrate	WALLTITE fits like a second skin and is suitable for virtually all substrates such as corrugated fibre cement, profiled metal sheet or timber boards.
Prolongs the life of buildings	WALLTITE rigid, robust, closed-cell foam demonstrably improves the construction and life of buildings.
Rapid installation times	An experienced installation team can treat many m^2 of roof area a day with a foaming unit, when conditions are favourable.
Safe, professional installation	Trained, qualified people from certified installation companies guarantee safe, accurate application of the spray foam.
Increases comfort in the home	Residents of buildings insulated with WALLTITE report an improved indoor environment and a greater degree of comfort.
Low material weight	WALLTITE´s low weight places very little stress on components making it safer, for example, when there is heavy snow on flat roofs.
Quality assurance through self-monitoring	BASF Polyurethanes U.K. Limited is certified to BS EN ISO 9001, ISO/TS 16949:2002 and BS EN ISO 14001. Each batch is checked and tested before delivery. Relevant countries have local product certifications for WALLTITE.
Easy to transport and store	WALLTITE is foamed as a liquid mixture on site which means rapid transport and space-saving storage at the site.

Roof applications

- New pitched roof insulation
- Existing pitched roof insulation
- Room in a roof insulation
- External roof insulation



New pitched roof insulation

Description

WALLTITE is applied directly to the breathable roofing membrane between timber rafters in tiled or slated pitched roofs.

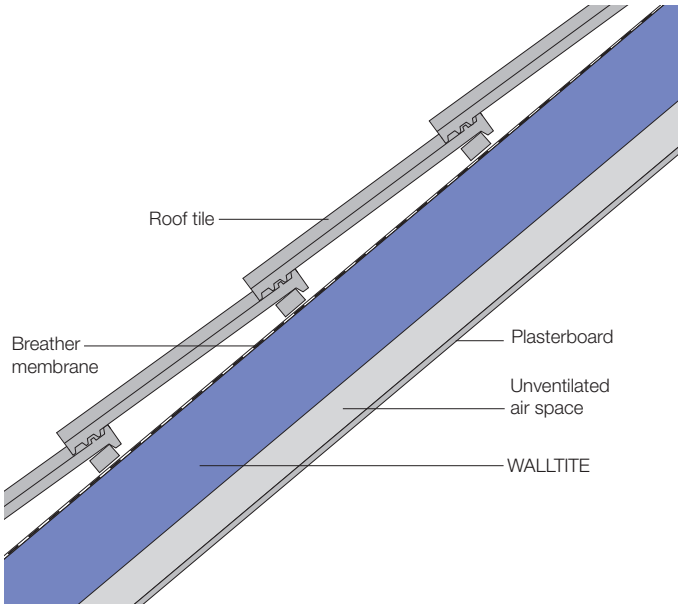
WALLTITE has a measured water vapour permeability, therefore it does not compromise the performance of any breathable membrane, or the timbers to dry out when subjected to periods of solar radiation.

The system minimises unwanted air leakage and air infiltration.

Certification

BBA Certificate No. 11/4816.

WALLTITE has undergone various performance tests. Certificates are available on request.

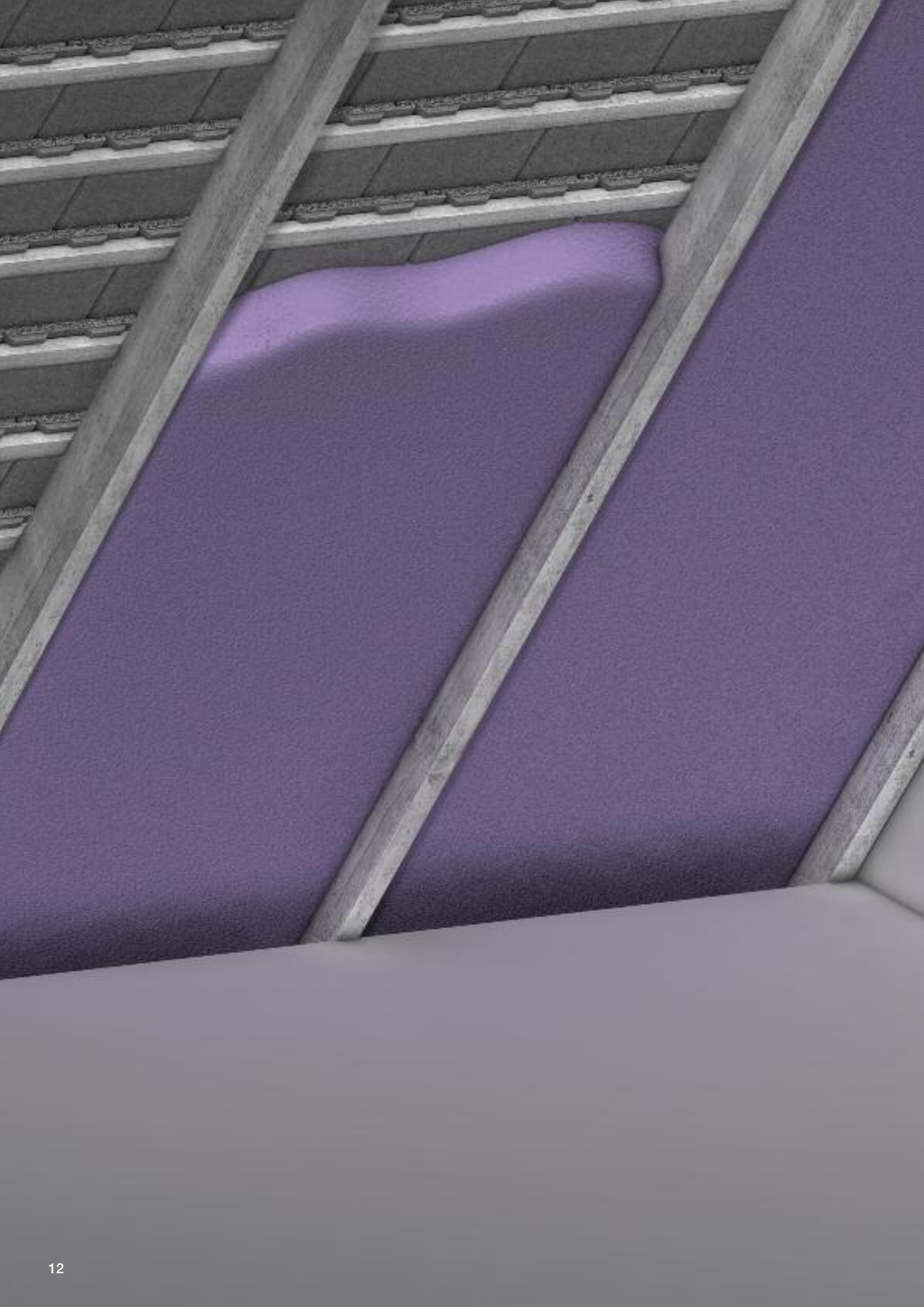


Technical data

Specification:	Spray applied polyurethane foam between rafters, directly onto breather membrane
NBS clause:	P10 15A
Conforms to:	Part L1A 2010, Appendix A
Average depth:	200mm
U-value:	0.13W/m²K
Condensation risk:	Zero
Ventilation:	Unventilated warm

U-value calculation

Construction details (pitched roof/ceiling at rafter line)	**Thickness (mm)**
Tiling including batten space	
Breather membrane	
WALLTITE between rafters	200
Cavity ≥25mm, roof (CIBS)	
Plasterboard	12.5
Finish plaster	2
U-value	**0.13W/m²K**



Existing pitched roof insulation

Description

WALLTITE can be applied directly onto the underside of existing slate or tiled roofs. It seals any air gaps, preventing the ingress of windblown snow, rain, dust and unwanted air infiltration.

The water vapour permeability of WALLTITE permits all roof timbers to dry out following periods of solar radiation.

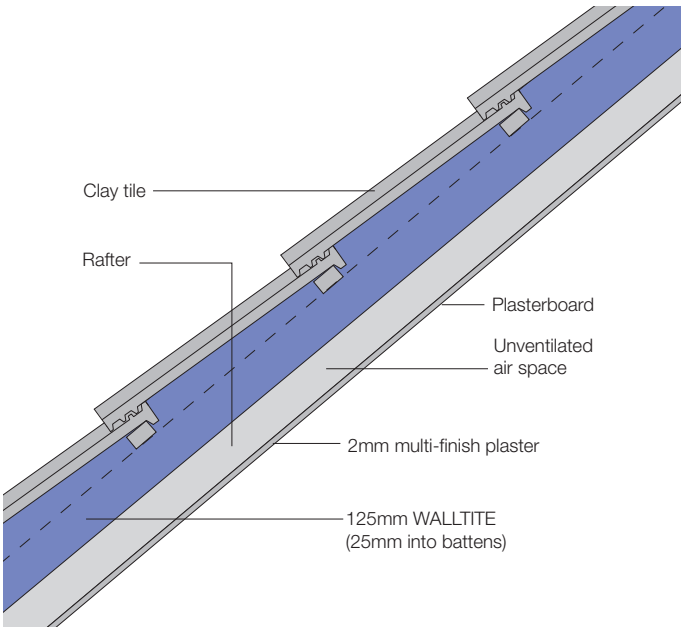
WALLTITE is applied between rafters in sloping ceiling areas and loft conversions. Plasterboard can then be fixed to the rafters.

In applications such as barn conversions the foam is dubbed out with a coat of bonding plaster and then finish plaster. Existing structures must be in a good state of repair with no evidence of rain penetration or damp. Defects should be made good prior to installing the product. WALLTITE also reduces airborne noise pollution from air and road traffic.

Certification

BBA Certificate No. 11/4816.

WALLTITE has undergone various performance tests. Certificates are available on request.



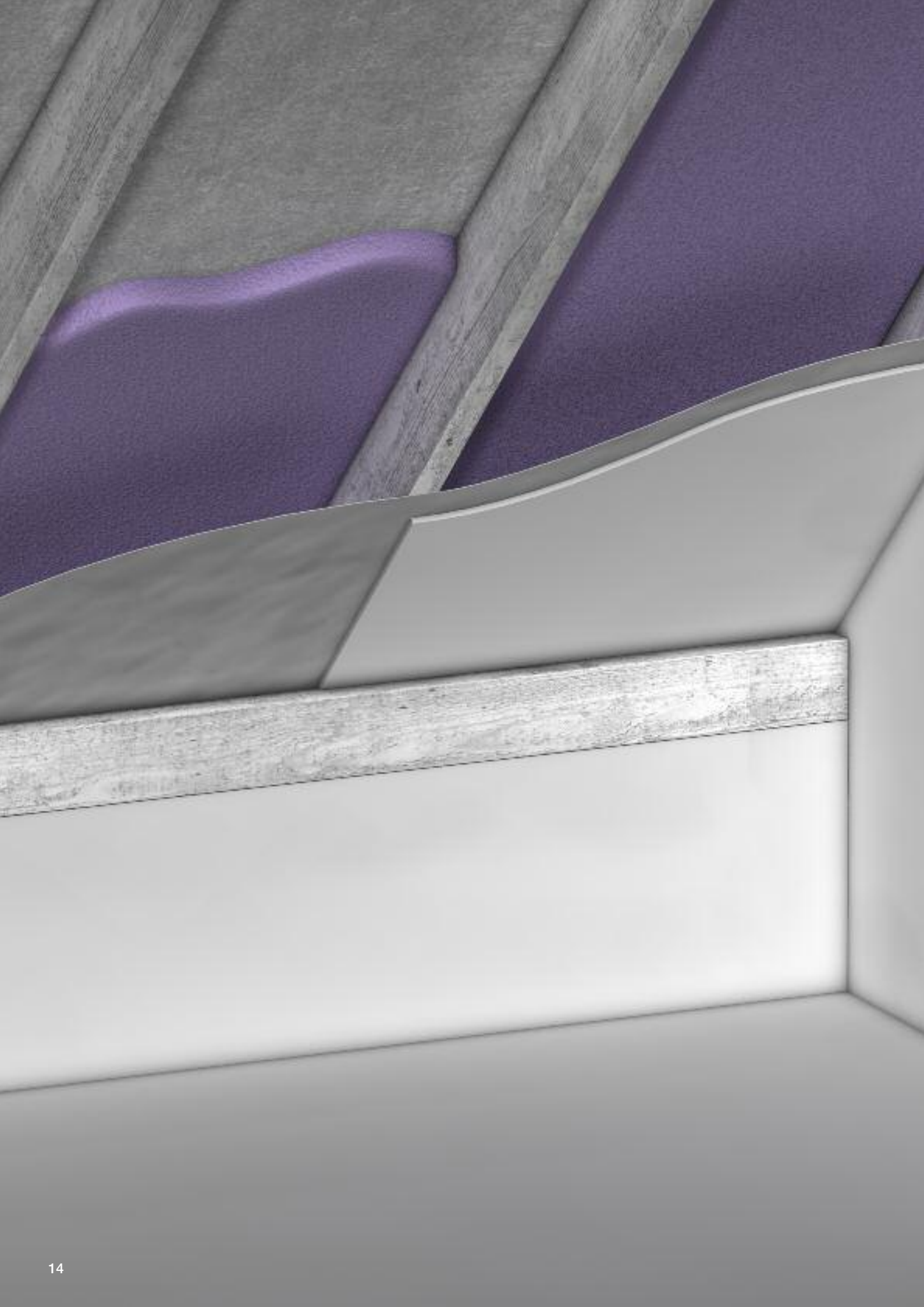
Technical data

Specification:	Spray applied polyurethane foam between battens and rafters, directly onto existing tiles or slates
NBS clause:	P10 15A
Conforms to:	Part L1B (2010) Existing dwelling – new thermal element and upgrading of retained thermal element Pitched roof – insulation at rafter level
Average depth:	150mm to 165mm*
U-value:	0.18W/m²K
Condensation risk:	Zero
Ventilation:	Unventilated warm deck

* Depending on the number and dimensions of repeating thermal bridges created by the roofing timbers.

U-value calculation

Construction details (hybrid warm pitched roof)	**Thickness (mm)**
Clay tiles	12
WALLTITE (between battens)	25
WALLTITE (between rafters)	125
Low emissivity cavity	
Plasterboard	12.5
Finish plaster	2
U-value	**0.18W/m²K**



Room in a roof insulation

Description

The versatility of in-situ applied WALLTITE insulation foam makes it an ideal material for use in loft conversions.

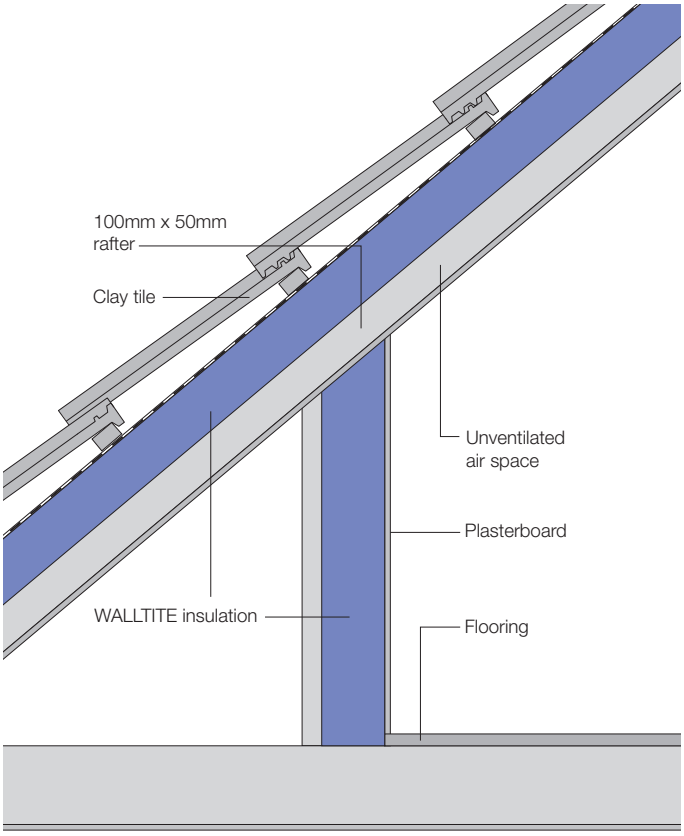
It can be applied to external solid or cavity walls, separating or party walls, knee or side walls, flat and pitched roofs.

WALLTITE automatically provides designers with a more airtight roof. It prevents the ingress of wind blown rain, snow and dust and other forms of airborne pollution.

Certification

BBA Certificate No. 11/4816.

WALLTITE has undergone various performance tests. Certificates are available on request.



Technical specifications

Existing pitched roof, ceiling at rafter line

Target U-value: 0.18W/m²K
150mm of WALLTITE

WALLTITE is applied between the rafters in sloping ceiling areas, either directly onto the underside of slates or tiles, or onto a membrane of low vapour resistivity.

Plasterboard is then fixed to the face of the rafters.

New flat roof

Target U-value: 0.18W/m²K
140mm of WALLTITE

WALLTITE is applied directly to the underside of the plywood decking, between the roof joists. When used in conjunction with spray applied foam, any external weatherproofing must be of low vapour resistivity, e.g. single ply membranes.

External Cavity Wall

Target U-value: 0.30W/m²K
50mm + 35mm of WALLTITE

Injection grade foam can be injected through a series of evenly spaced holes, normally drilled in the outer leaf. This closed cell foam is totally resistant to driving rain. In a residential property, the cavity is usually continuous from the ground floor to the apex of the roof. In this case the whole elevation must be filled. For a nominal 50mm cavity you would need to top this up with 35mm sprayed to the inner leaf.

Party wall

Target U-value: 0.30W/m²K
95mm of WALLTITE

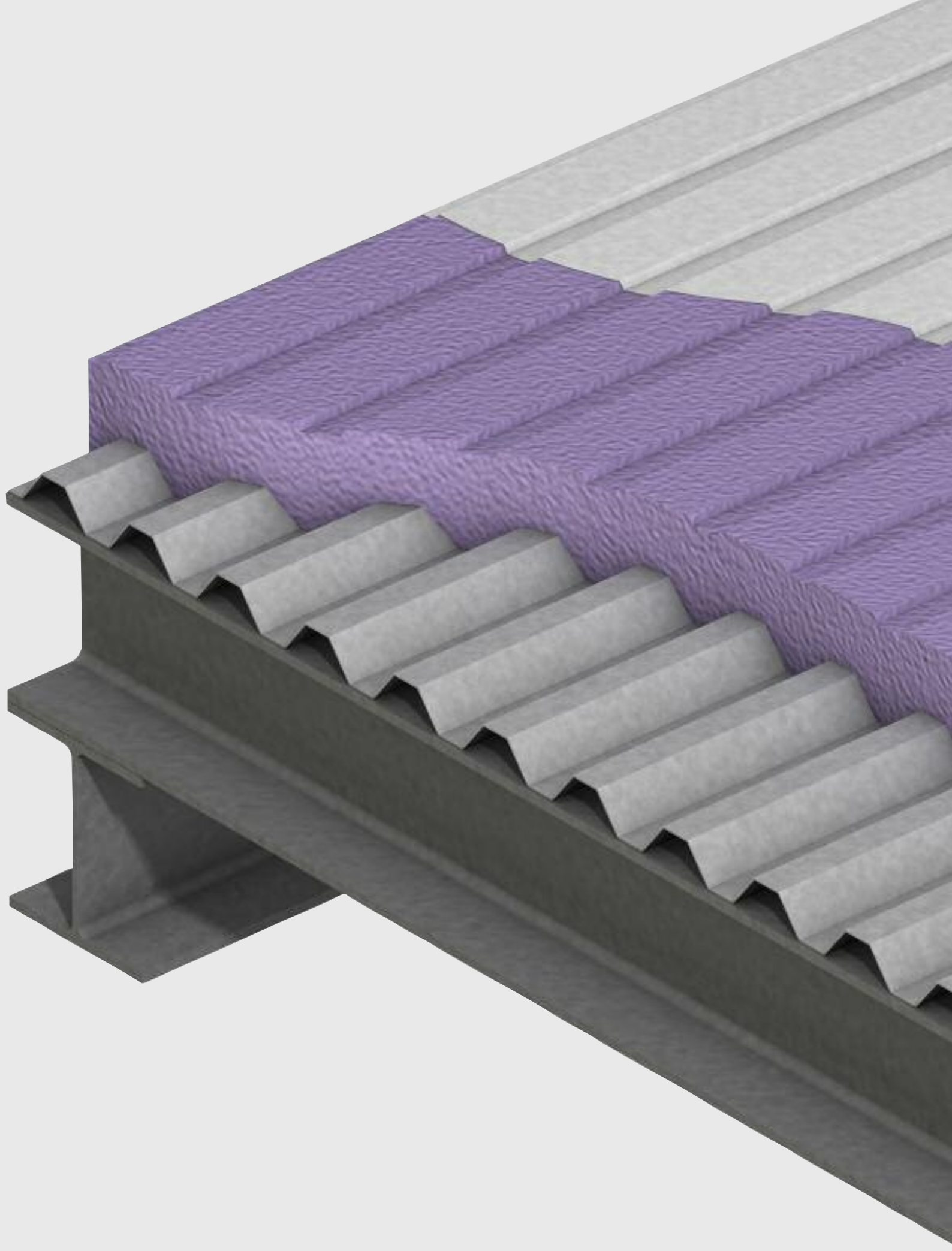
For solid wall insulation, WALLTITE is sprayed between metal or timber studs.

Plasterboard is then fixed to the face of the studwork.

Knee or side wall

Target U-value 0.30W/m²K
95mm of WALLTITE

WALLTITE is sprayed between the timber studs of the wall. Plasterboard or ply is used as a backing board. Plasterboard is fixed to the face of the studwork, on the warm side of the wall.



External roof insulation

Description

WALLTITE can be applied to the external surfaces of corrugated and profiled roof cladding. The in-situ application overcomes problem areas such as cracked roofing sheets and glazing, perished fixing bolt seals and gaps in the sheeting.

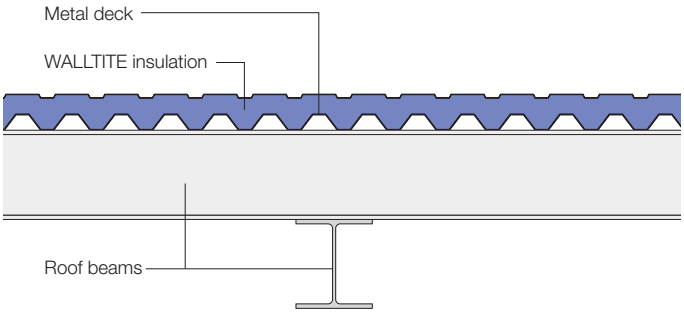
This practical way of insulating and weatherproofing a commercial building roof, provides a lightweight solution to condensation problems without disruption to production within the premises.

In these situations the WALLTITE needs to be provided with UV protection via a recommended membrane coating.

- Simple, seamless insulation of critical areas
- Suitable for virtually all substrate
- Economic due to 'fast track' installation
- Lightweight
- Adapts to any profile without gaps
- High compressive strength for occasional foot traffic

Certification

WALLTITE has undergone various performance tests. Certificates are available on request.



Technical data

Specification:	External roof
Internal surface emissivity:	High
External surface emissivity:	High

U-value calculation

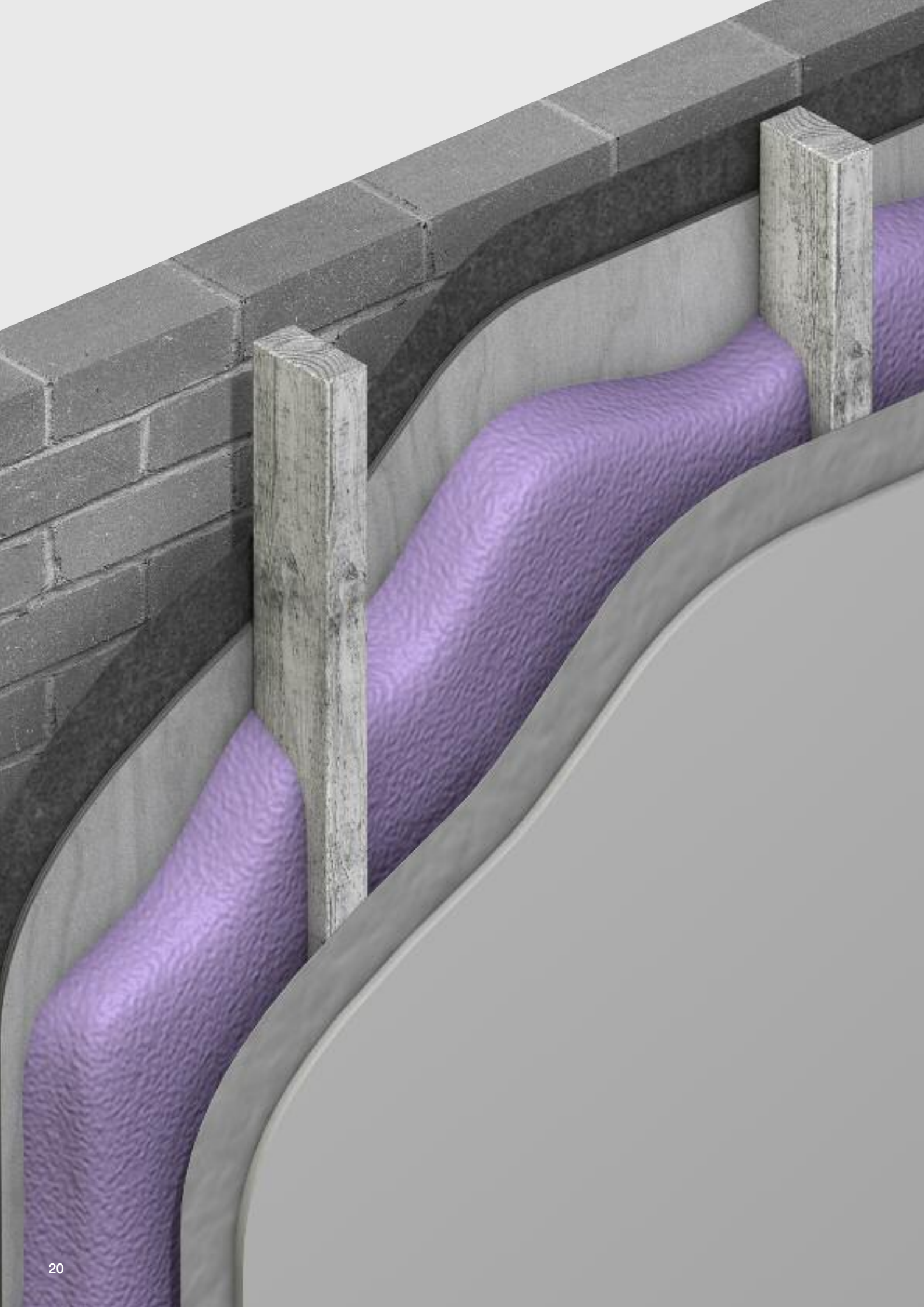
Construction details (external roof)	**Thickness (mm)**
Outside surface resistance	
UV protective membrane	
WALLTITE	35
Fibre cement sheeting (BS 5250)	10
Inside surface resistance	
U-value	**0.71W/m²K**

(Correction for mechanical fasteners, Delta Uf = 0.000W/m²K)

(Correction for air gaps, Delta Ug = 0.000W/m²K)

Wall applications

- New timber frame wall insulation
- Refurbished masonry wall insulation (timber frame)
- Refurbished masonry wall insulation (steel stud)
- Masonry cavity wall insulation



New timber frame wall insulation

Description

WALLTITE is applied directly between the studs onto the OSB. The stud is sufficient to meet the recommended elemental U-value.

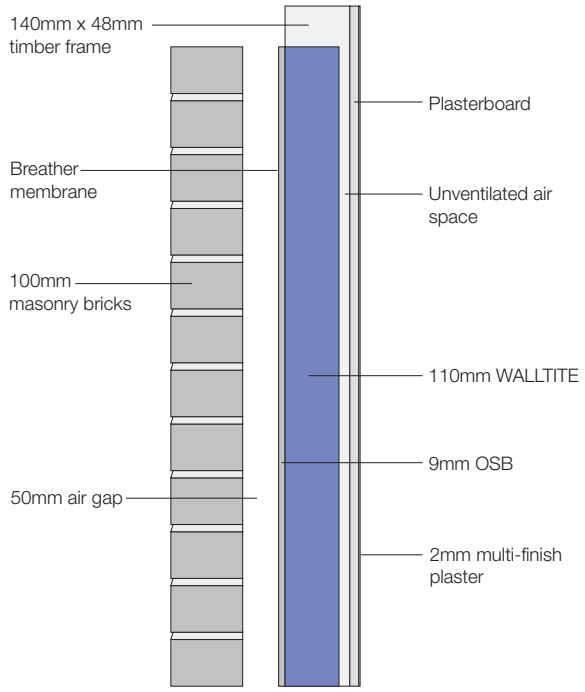
Unwanted air leakage and air infiltration is minimised and sound attenuation improved.

Polyurethane foams are hypo allergenic and so contain no fibres or dust and no noxious vapours. Mechanical and electrical services can be fixed between the foam and the plasterboard. WALLTITE is very quick to install minimising on overhead costs, site storage and waste.

Certification

BBA Certificate No. 11/4816.

WALLTITE has undergone various performance tests. Certificates are available on request.

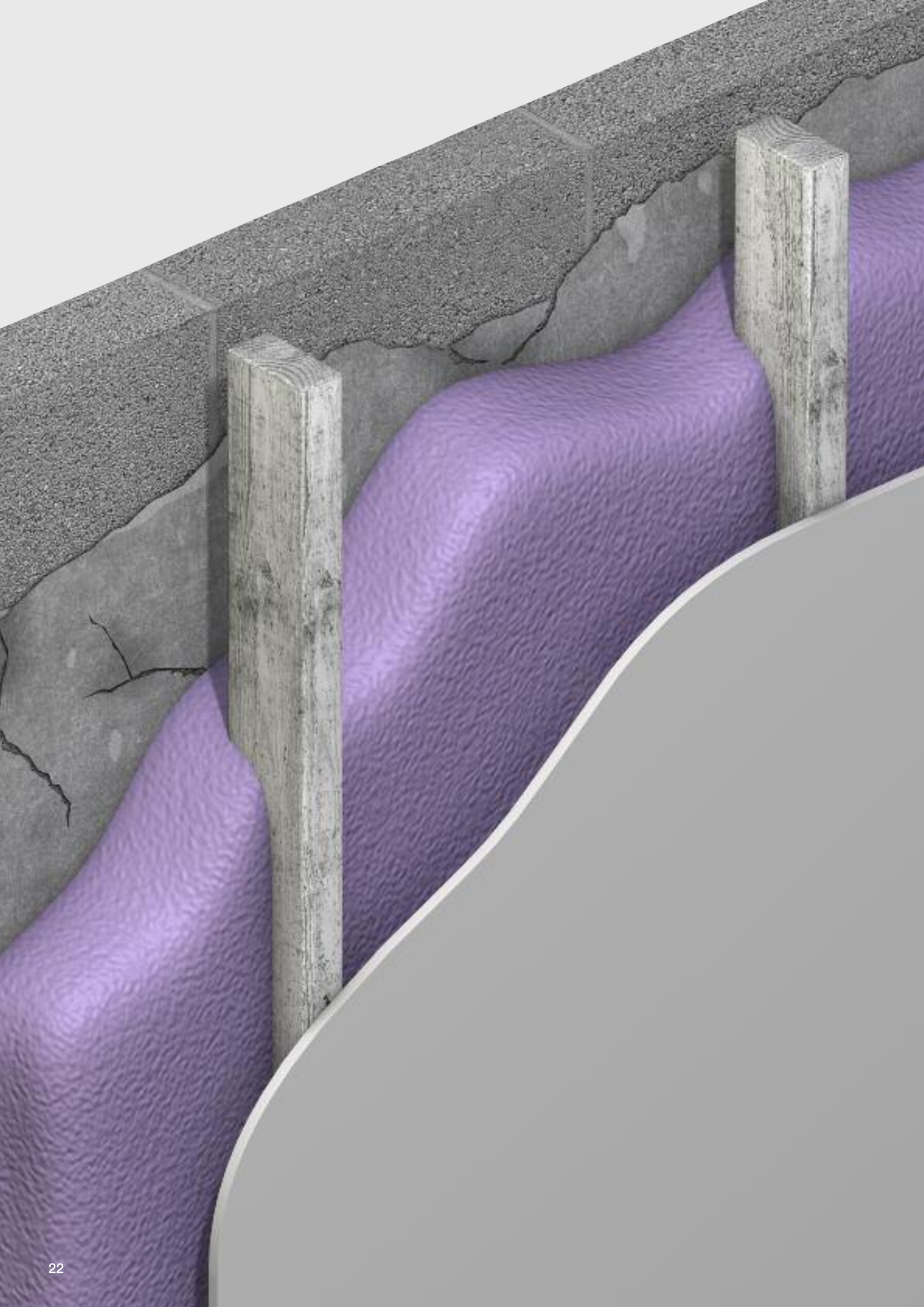


Technical data

Specification:	WALLTITE sprayed between studwork of timber framed wall
NBS clause:	P10 205A
Conforms to:	Part L1A 2010, Appendix A
Average depth:	55mm
U-value:	0.30W/m²K
Condensation risk:	Zero

U-value calculation

Construction details (Brick/block cavity wall)	**Thickness (mm)**
Brick – outer Leaf	103
Airspace in cavity wall construction	
OSB	9
Spray applied WALLTITE	55
Cavity ≥ 25mm, wall	
Plasterboard	12.5
Finishing plaster	2
U-value	**0.30W/m²K**



Refurbished masonry wall insulation (timber frame)

Description

WALLTITE can be applied directly onto a solid masonry wall, between 90mm or 140mm timber studs, without the need for traditional adhesion promoters or mechanical fixings.

Mechanical and electrical services can be fixed between the foam and the plasterboard.

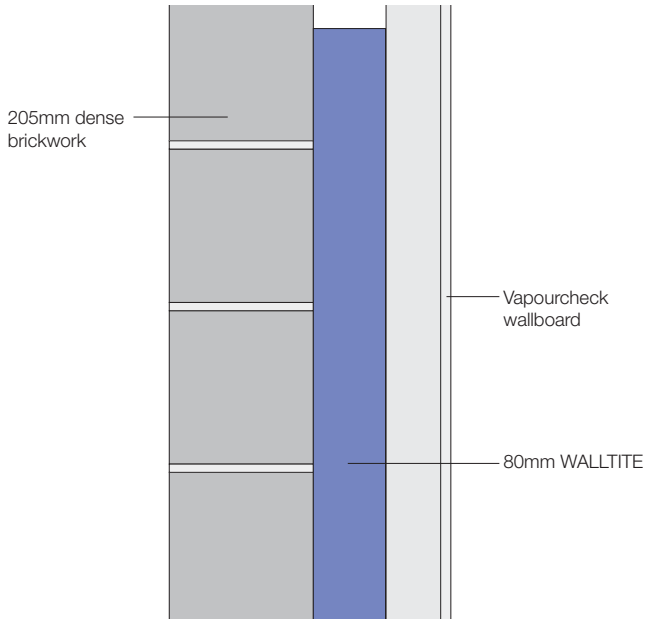
WALLTITE guarantees additional support and stability for the whole of the timber frame construction.

The resulting continuous insulation and air barrier system will provide a cleaner, healthier more comfortable environment for any "hard to treat" home situation.

Certification

BBA Certificate No. 11/4816.

WALLTITE has undergone various performance tests. Certificates are available on request.



Technical data

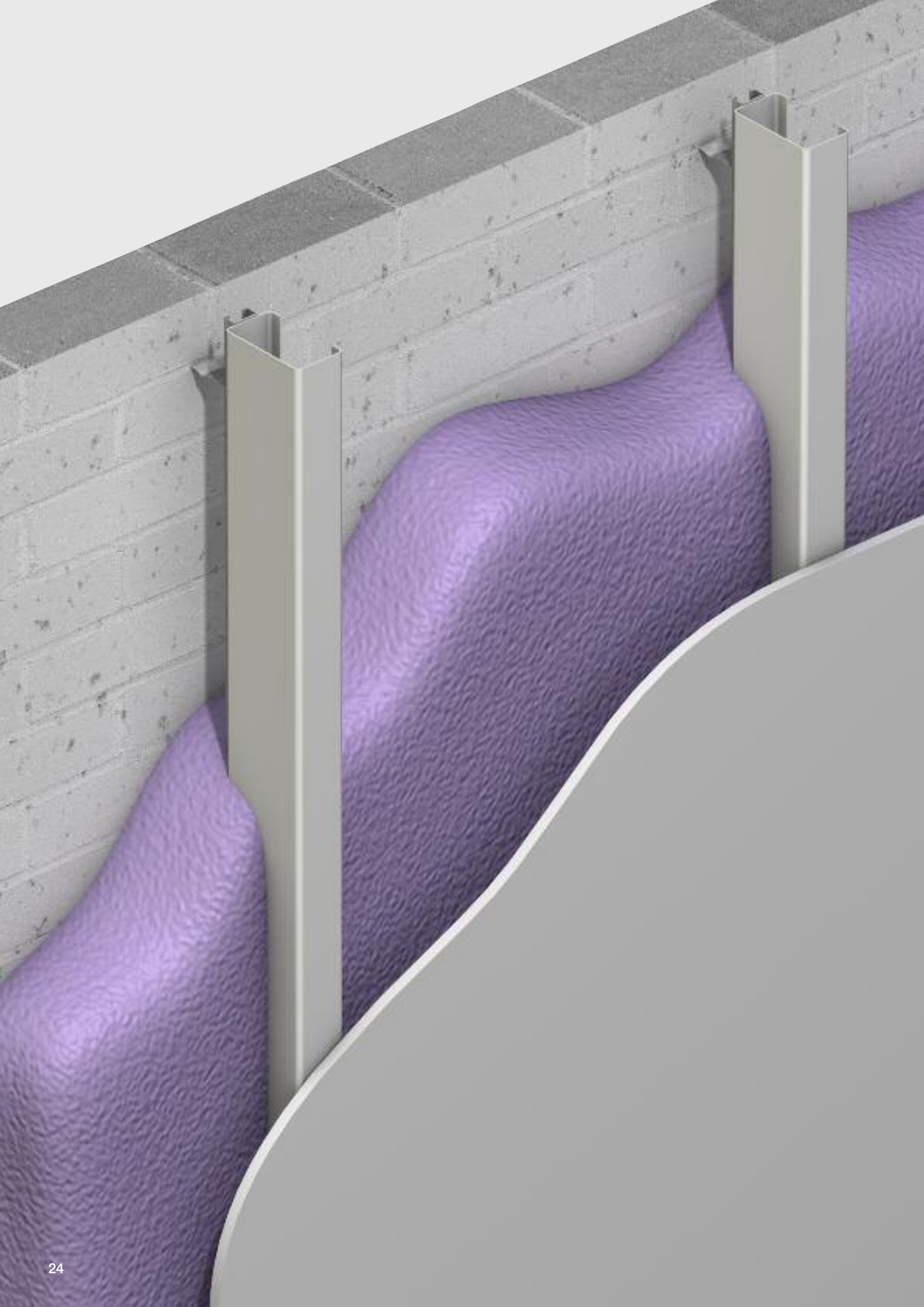
NBS clause:	P10 15A
Conforms to:	Part L1B (2010) Upgrading retained thermal element

U-value calculation

Construction details (solid masonry wall)	Thickness (mm)
Outside surface resistance	
Brick, dense, external	225
WALLTITE (behind studwork)	25
WALLTITE (between studwork)	75
Vapourcheck wallboard	12.5
Inside surface resistance	
U-value	**0.24W/m²K**

(Correction for mechanical fasteners, Delta Uf = 0.000W/m²K)

(Correction for air gaps, Delta Ug = 0.000W/m²K)



Refurbished masonry wall insulation (steel stud)

Description

WALLTITE can be applied directly onto a solid masonry wall without the need for traditional adhesion promoters or mechanical fixings.

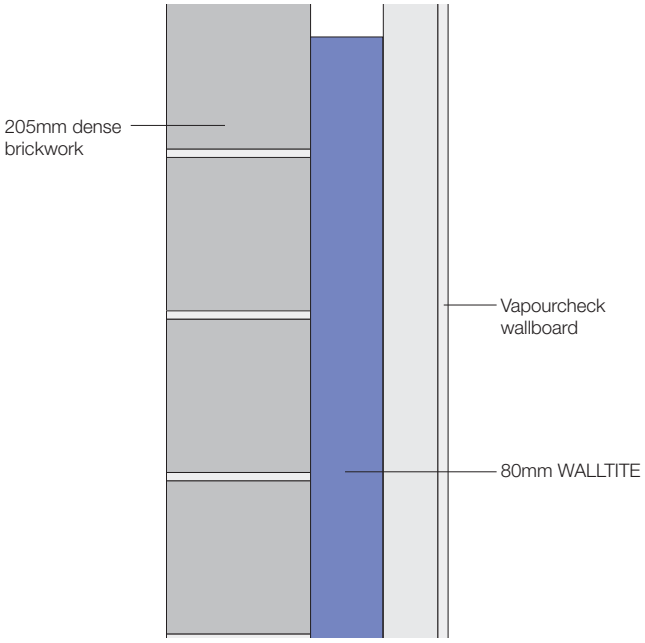
The foam will engage any light steel framework to provide a more solid, secure wall when compared to other insulation methods.

The resulting continuous insulation and air barrier system will provide a cleaner, healthier more comfortable environment for any "hard to treat" home situation.

Certification

BBA Certificate No. 11/4816.

WALLTITE has undergone various performance tests. Certificates are available on request.



Technical data

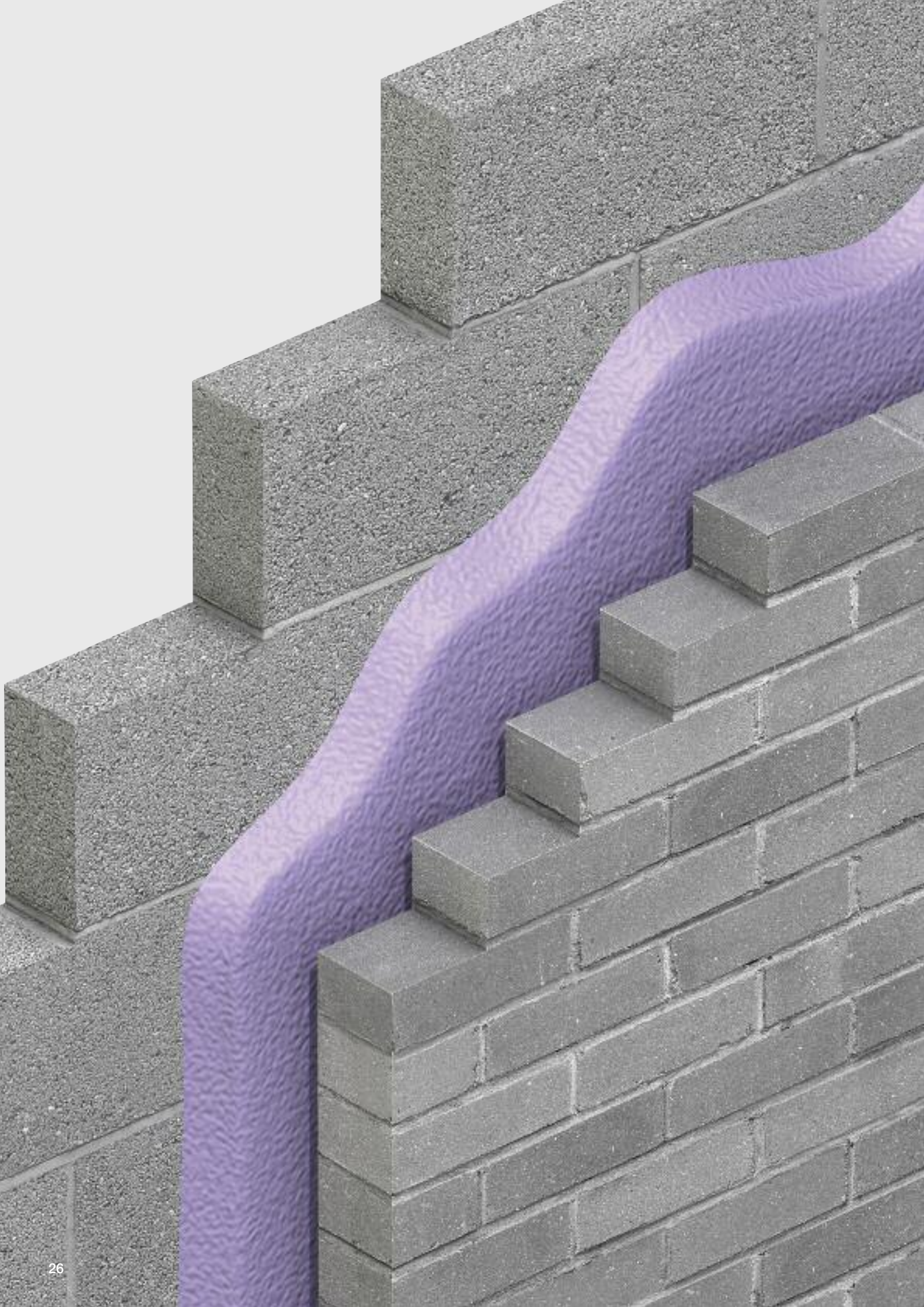
Specification:	Solid masonry wall
Internal dry lining	Upgrading retained thermal element
Light steel-frame construction:	Cold frame or hybrid type
Stud depth:	100mm
Stud spacings:	400mm
Flange width:	Not exceeding 50mm p : 0.780

U-value calculation

Construction details (solid masonry wall)	**Thickness (mm)**
Outside surface resistance	
Render (BS 5250)	20
Brick, dense, external	205
WALLTITE	80
Airspace in cavity wall construction (BS 5250)	
Vapourcheck wallboard	12.5
Inside surface resistance	
U-value	**0.27W/m²K**

(Correction for mechanical fasteners, Delta Uf = 0.000W/m²K)

(Correction for air gaps, Delta Ug = 0.000W/m²K)



Masonry cavity wall insulation

Description

WALLTITE is used to restore the structural stability and reduce the thermal transmittance of existing cavity walls, with masonry inner and outer levels, in which the conventional wall ties have corroded. It is also used in new construction where its superior thermal performance and resistance to flood water is of importance. It has excellent resistance to driving rain and can be installed in all geographical exposure zones.

WALLTITE is also ideal where the need to reduce air leakage is important. The foam seals the cavity, does not shrink or allow air to pass through it, therefore air leakage through the cavity can be reduced to zero. WALLTITE stabilises the wall by adhering to the inner surfaces of the cavity and providing a continuous structural connection between the two leaves.

Because of the greater thermal performance and the reduced air leakage, WALLTITE outperforms all other forms of cavity fill. It is hypo allergenic and so contains no fibres, dust or obnoxious fumes.

Certification

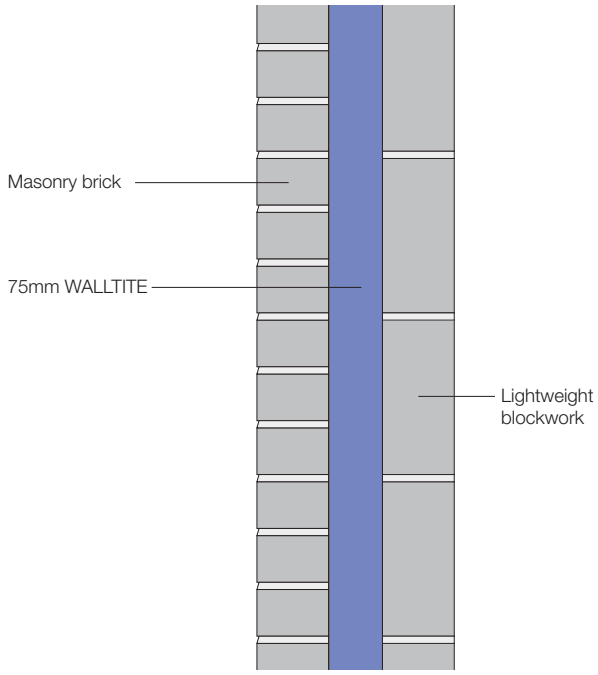
WALLTITE has undergone various performance tests. Certificates are available on request.

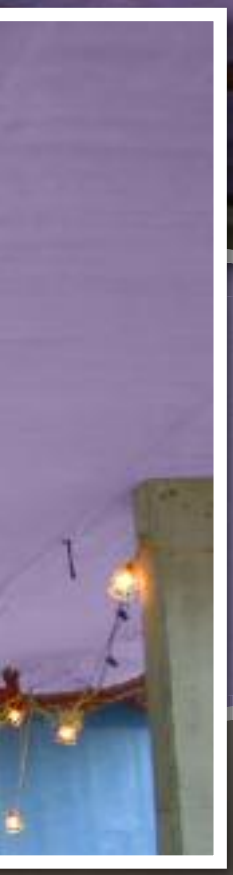
Technical data

Specification:	BS 7456: 1991 injected WALLTITE into masonry cavity wall
NBS clauses:	F30, 10 and 150 P11, 50, 220, 230 and 24
Average depth:	75mm
U-value:	0.27W/m²K
Condensation risk:	Zero
Ventilation:	Not applicable

U-value calculation

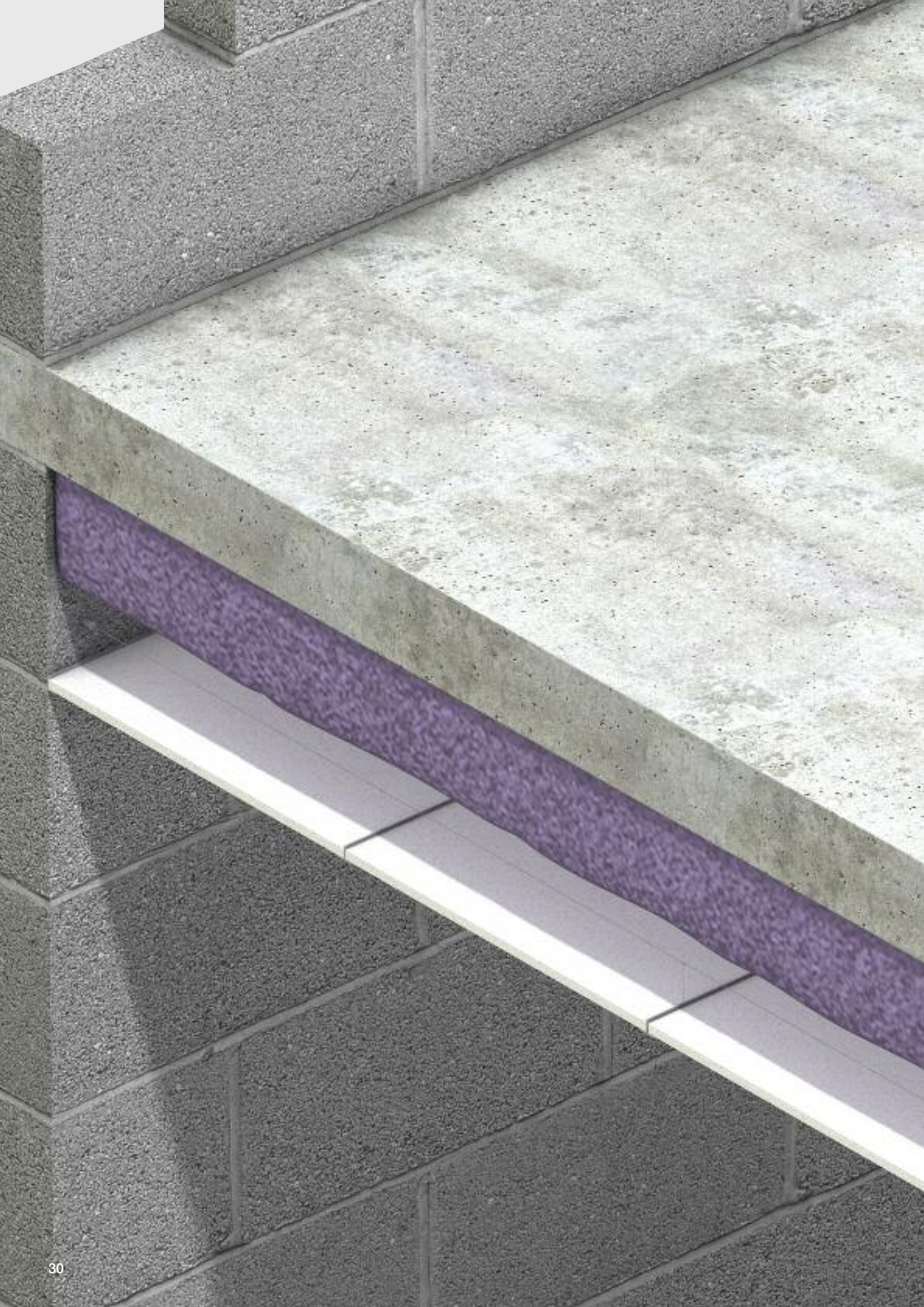
Construction details (brick/block cavity wall)	**Thickness (mm)**
Masonry bricks	100
WALLTITE	75
Lightweight blockwork	100
U-value	**0.27 W/m²K**





Special solutions

- External soffit insulation
- Concrete slab ground floor insulation
- Beam and block floor insulation
- Suspended timber floor insulation



External soffit insulation

Description

WALLTITE in-situ applied PUR insulation foam can be applied directly to the underside of either concrete or steel hollow rib design, ground floor structures.

This rigid insulation system does not suffer from air erosion problems and remains permanently adhered even in exposed situations.

Its low thermal conductivity maximises head room.

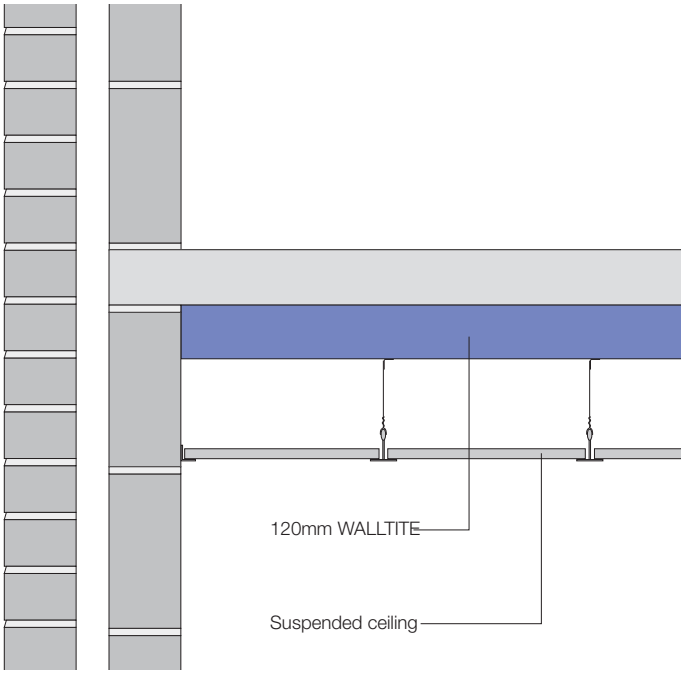
Ribbed or waffle shaped soffits can be rapidly, economically and seamlessly insulated with WALLTITE.

Any penetrations into the soffit such as ceiling or pipe hangers and cable trays can easily be sealed by a WALLTITE application, preventing heat loss and cold spots.

Certification

WALLTITE has undergone various performance tests. Certificates are available on request.

WALLTITE used in conjunction with a fire retardant coating will achieve a Class 0 rating.



Technical data

Conforms to:	Part L1A 2010, Appendix A
NBS clause:	P10 185
Element:	Floor
Basement soffit	
Internal surface emissivity:	High
External surface emissivity:	High

U-value calculation

Construction details	**Thickness (mm)**
Outside surface resistance	
WALLTITE	120
Concrete, dense (BS 5250)	200
Inside surface resistance	
U-value	**0.20W/m²K**

Concrete slab ground floor insulation

Description

WALLTITE is applied directly to the concrete. Under-floor heating pipes can be fixed to the foam with the normal clips. A layer of tamped or self-levelling screed is applied, usually to a depth of 75mm. The process is extremely quick to apply compared to other methods and the problems of insulation boards lifting are avoided. Site overhead time and material waste from off-cuts are minimised.

Certification

BBA Certificate No. 11/4816.

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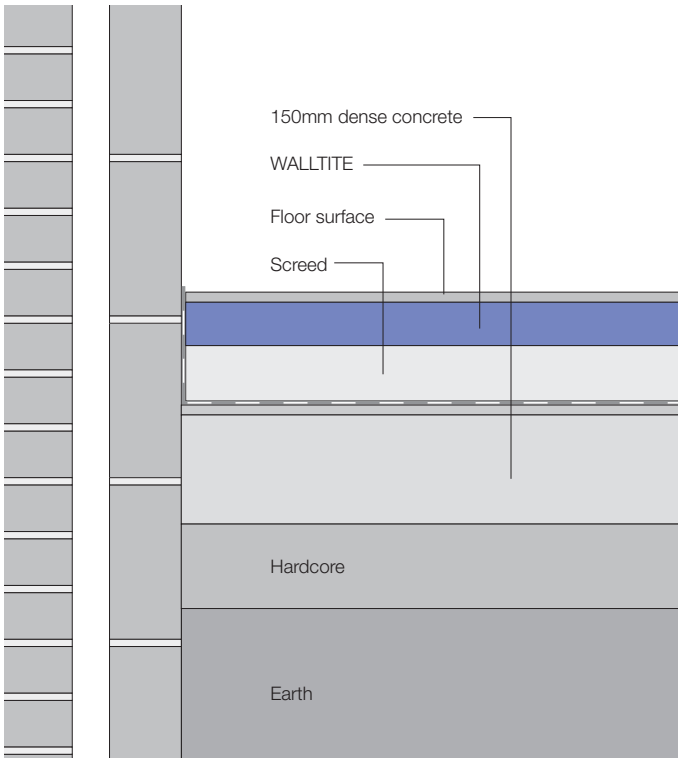


Technical data

Specification:	Spray applied polyurethane foam directly onto concrete
Average depth:	60mm
Calculation Method:	EN ISO 13370
Perimeter:	40m
Area:	100.0m²
P/A:	0.40m
Floor type:	Solid floor
Edge insulation:	None
U-value:	0.20W/m²K

U-value calculation

Construction details (concrete ground floor)	Thickness (mm)
Inside surface	0.04
Screed, cast (BS 5250)	75
WALLTITE	60
Concrete, dense (BS 5250)	150
Ground	
U-value	**0.20 W/m²K**

Beam and block floor insulation

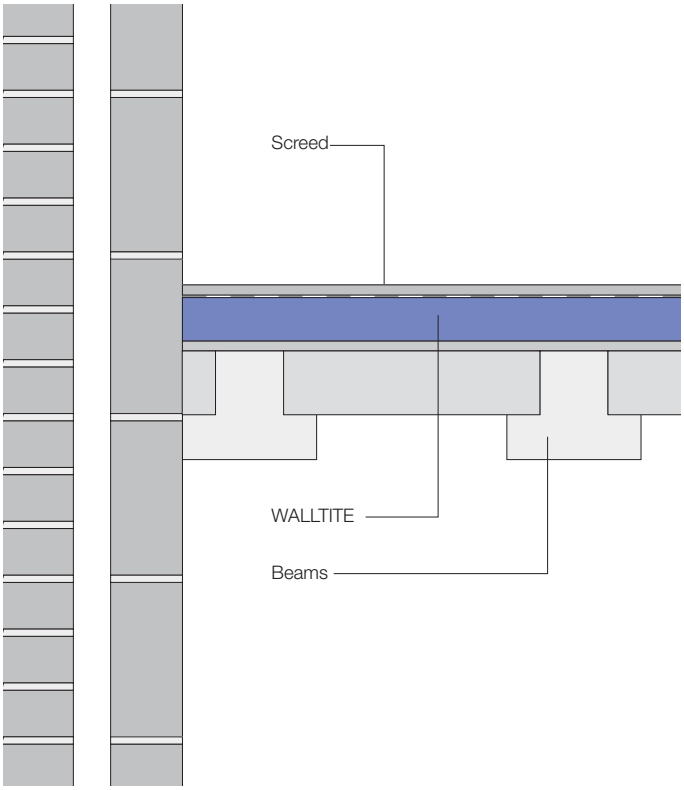
Description

WALLTITE can be applied either above or below a beam and block floor, providing a thermally efficient, airtight solution to floor insulation, without gaps or cold bridges. Walltite will cope with permanent compressive loads without any deformation.

WALLTITE can be used to refurbish beam and block soffits that have become a health and safety hazard. When blocks become friable they can fall off the edge of the nibs of the beams. WALLTITE sprayed onto the underside of the floor can provide a supporting layer for the damaged blocks, insulate the soffit and prevent cold air, that previously would have penetrated the structure, entering the ground floor.

Certification

WALLTITE has undergone various performance tests. Certificates are available on request.



Technical data

Element:	Floor - U-value Element 1
Basement soffit	
Internal surface emissivity:	High
External surface emissivity:	High

U-value calculation

Construction details (beam/block floor)	**Thickness (mm)**
Outside surface resistance	
Floor screed	50
Bridged floor deck	100
WALLTITE	90
Inside surface resistance	
U-value	**0.25W/m²K**

U-value, Combined Method : 0.25 W/m²K (upper /lower limit 4.110 / 4.007 m²K/W, dUf 0.0000, dUg 0.0000, dUp0.0000, dUr0.0000, dUrc0.0000)
(Correction for mechanical fasteners, Delta Uf = 0.000W/m²K)
(Correction for air gaps, Delta Ug = 0.000W/m²K)

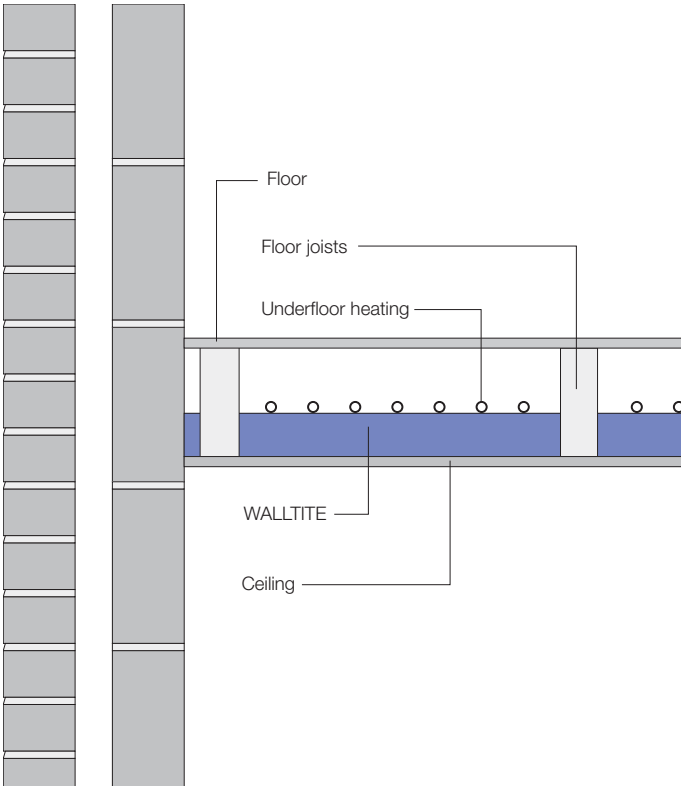
Suspended timber floor insulation

Description

WALLTITE floor insulation is advisable where underfloor heating is installed. The foam barrier separates heated and unheated rooms and in this way, reduces any loss of valuable heating energy into spaces where it is not needed. Rooms with just occasional use benefit from WALLTITE insulation, as the floor heats up more rapidly.

Certification

WALLTITE has undergone various performance tests. Certificates are available on request.



Technical data

Element:	Floor - U-value Element 1
Basement soffit	
Internal surface emissivity:	High
External surface emissivity:	High

U-value calculation

Construction details (beam/block floor)	**Thickness (mm)**
Outside surface resistance	
Hardwood dry	15
Cavity ≥25mm, floor (CIBS)	
WALLTITE	75
Plasterboard (BS 5250)	12.5
Inside surface resistance	
U-value	**0.30W/m²K**

U-value, Combined Method : 0.30 W/m²K (upper /lower limit 3.314 / 3.314 m²K/W, dUf 0.0000, dUg 0.0000, dUp0.0000, dUr0.0000,
(Correction for mechanical fasteners, Delta Uf = 0.000W/m²K)
(Correction for air gaps, Delta Ug = 0.000W/m²K)

Application guide

Cavity walls

Description

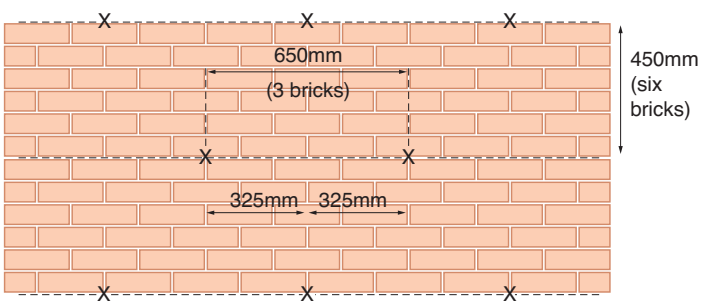
WALLTITE injection grade rigid closed cell polyurethane foam, has been widely used to restore the integrity of masonry cavity walls suffering from wall tie failure. In addition, WALLTITE is the most thermally efficient material available on the market for insulating existing cavity walls.

BBA certification pending.

Pre-installation preparation

Note the position and operation of any flues through or adjacent to a wall that is to be filled. Seal any gaps in the inner leaf to limit entry of foam system and vapours into the building. Brace window and door frames that cross the cavity to prevent possible distortion. Drill 12mm injection holes, through mortar joints if possible, following the hole pattern in the diagram. Modify the drilling pattern with extra holes around windows, doors, ventilators and eaves.

- ✓ Space saving and sustainable insulation for the life of the building
- ✓ Permanent adhesion over the whole surface area of a wall overcomes wall tie failure, weak mortar joints and other related structural problems
- ✓ Closed cell foam completely resistant to driving rain in any exposure zone
- ✓ Foamed in situ prevents air leakage and air infiltration
- ✓ Totally inert material – does not contain fibres, formaldehyde or styrene
- ✓ Installed to BS 7456: 1991, Code of Practice
- ✓ No shrinkage or settlement with ageing
- ✓ Guaranteed CO_2 savings, year on year



Foam application

When operating conditions with the equipment have been established, the operator should produce samples for quality checks. These should include appearance and reactivity.

Injection of foam should proceed on a horizontal front, ensuring no hole is missed and that the cavity is filled from the bottom upwards (see figure below). Indicator sticks are used to establish the presence of foam at each injection point.

WALLTITE foam should not be injected into a hole for longer than its cream time. Injection for longer may cause the foam to split and shrink. Care should be taken at all times to prevent over-pressurisation of the cavity, particularly where the cavity is closed e.g. below window frames. Where a cavity wall extends over a gable end up to the ridge of a roof, it is essential to fill the whole of the cavity right up to the ridge.

Post-installation activities

Drill holes should be made good to match the wall finish as closely as possible.

All flues, air ducts and underfloor vents should be demonstrated as being clear of any blockage.

Criteria of suitability of external cavity walls

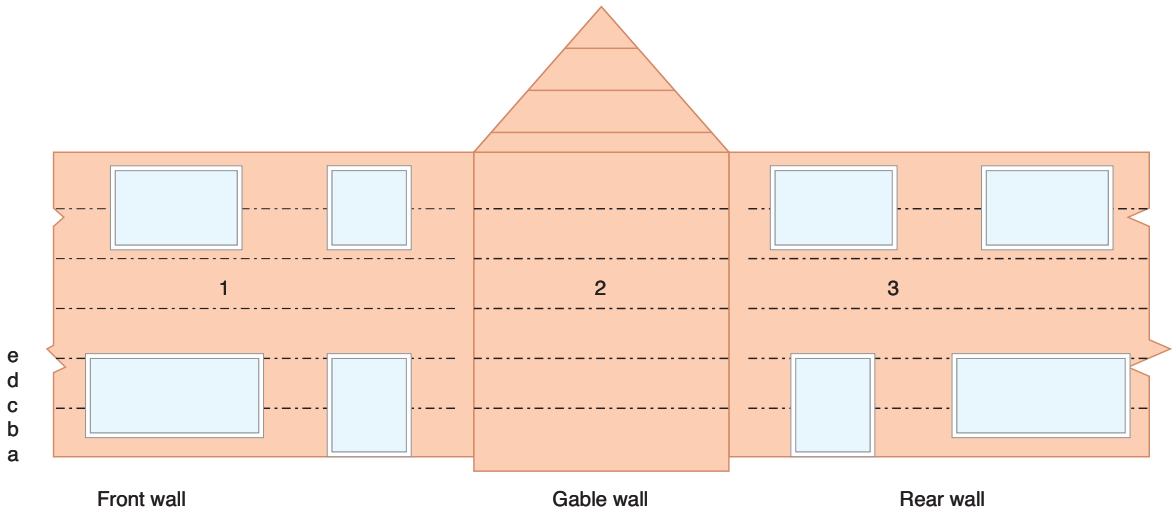
The inner and outer leaves of areas to be insulated should be of masonry or concrete construction.

Structural faults due to movement or settlement should be remedied prior to installation. Where the outer leaf has been covered with a material of very low vapour permeability, the cavity should not be filled.

Where there are exposed ring beams or slabs it is essential to ensure water will not track back along the underside of the beam or slab.

If there are signs of water penetration or damp to the internal walls other than that caused by condensation, the cause of the problem should be ascertained and remedies applied or agreed prior to the installation of WALLTITE.

A free cavity of 25mm width should be available over the areas to be filled. Cavities in excess of 100mm can be filled provided the drilling pattern or injection sequence is modified to suit.



Note: Injection of foam is undertaken in horizontal bands, e.g. a, b, c, d, e, as indicated, working from left to right at each level.

WALLTITE technical product information

Application

A Class 1 ODP Zero polyurethane spray system (in-situ foam) for the production of closed cell rigid foam. The system can be used to insulate and prevent condensation on a wide range of applications including roofs, walls, floors and soffits.

Chemical characteristics

A or Polyol component: A mixture of polyol, flame retardant, catalyst, stabiliser, and HFC blowing agent.

B or Isocyanate component: Polymeric diphenylmethane diisocyanate MDI (IsoPMDI 92140.)

Supply

The type of supply for the components will be decided after consultation with our Sales Office.

Storage, preparation

Polyurethane components are moisture sensitive. Therefore they must be stored at all times in sealed, closed containers. The A-component (Polyol) must be homogenised by basic stirring before processing. More detailed information should be obtained from the separate data sheet entitled *'Information for in-coming material control, storage, material preparation and waste disposal'* and from the component data.

Waste disposal

More detailed information is provided in our country specific pamphlet.

Processing

WALLTITE spray foam systems can be processed through all standard two component equipment designed for this purpose. This unit must be capable of maintaining a 1:1 by volume ratio, temperatures between 30 and 60°C using pre-heaters and heated hoses and pressures between 50 and 80 bar (700 to1200 psi). Self cleaning, impingement mix spray guns are recommended.

Possible hazards

The B-component (Isocyanate) irritates the eyes, respiratory organs and the skin. Sensitisation is possible through inhalation and skin contact. MDI is harmful by inhalation. When processing MDI, take note of the necessary precautionary measures described in the Material Safety Data Sheets (MSDS). This applies also for the possible hazards in using the A-component (Polyol) as well as any other components.

See also our separate information sheet *'Safety and Precautionary Measures for the Processing of Polyurethane Systems'* Use our Training Programme *'Safe Handling of Isocyanate'*.

Component data

	Unit	A -Comp	B -Comp.	Method
Density (20°C)	g/cm³	1.21	1.24	G 133-08
Viscosity (20°C)	mPas	200	220	G 133-07
Storage stability	Days	90	180	

Processing data

Cup test	Unit	Value	Method
Component temperature	°C	20	
Mixing ratio	by weight by volume	A:B = 100:103 A:B = 100:100	
Mixing weights	g	A = 28.0 B = 28.8	
Cream time	s	4	G 132 – 01
String time	s	9	G 132 – 01
Rise time	s	18	G 132 – 01
Free rise density	kg/m³	34	G 132 – 01

Machine processing	Unit	Value
Mixing ratio	by volume	A:B = 100:100
Mixing pressure	Bar	50 - 80
Component temp.	°C	30 - 60

Physical properties

	Unit	Measured value	Method
Density apparent overall	kg/m³	40 - 45	EN 1602
Thermal conductivity (initial)	W/mK	0.0209	EN 12667
Compression strength	N/332	0.259	EN 826
Tensile adhesion strength			
to concrete	kPa	260	ETAG 004
to breather membrane	kPa	232	EOTA TR004
to timber	kPa	136	EOTA TR004
Dimensional stability -20°C	%	< 1	EN 1604
Dimensional stability +70°C 90%RH	%	< 2	EN 1604
Closed cell content	%	> 95	ISO 4590
Water vapour transmission	mg/(m².h)	1084.68	EN 12086
Water vapour resistance	m².h.Pa/mg	2.21	EN 12086
Water vapour permeability	mg/(m.h.Pa)	0.0115	EN 12086
Water vapour diffusion resistance factor	μ	61.12	
Spread of flame		Class 1	BS 476 Part 7
Air leakage	@50 pascals $m^3.h^{-1}.m^{-2}$	0.0033	BSRIA
Short term water absorption	kg/m²	0.05	BBA

The above properties are typical of what can be expected when WALLTITE is processed using recommended procedures.

The values above were obtained by foam samples produced in BASF's laboratories.

Highly efficient thermal insulation with WALLTITE: **Declared thermal conductivity values**

The system uses 'permanent' type blowing agents and has a closed cell content of over 90%. Values are derived using the 'fixed increment' procedure after undergoing Normality checks at the BBA.

Covered by test reports 5874 BIN & 5874 BAN.

BASF Polyurethanes U.K. Ltd. is one of the worldwide leaders in polyurethanes (PU). As part of the BASF Group, we have over 40 years experience in the PU industry.

BASF is the market and technology leader for polyurethane systems and polyurethane special elastomers, as well as the leading supplier of polyurethane basic products.

For diffusion open faces:

Thickness (mm)	Conductivity (W/mK)
Less than 80mm	0.0269
80mm to 120mm	0.0257
Over 120mm	0.0247

Sprayed onto diffusion tight substrate:

Thickness (mm)	Conductivity (W/mK)
Less than 40mm	0.0269
40mm to 60mm	0.0257
Over 60mm	0.0247

Test reports and project-specific U-value calculations available on request.

WALLTITE technical product information (continued)

Test regimes

Test name	Measured property	Standards	Testing authority
Heat flow	Thermal conductivity, thermal resistance, density	ISO 8301:1991, BS EN 12667: 2001	BBA
Adhesion to various substrates	Maximum load, stress at maximum load	ETAG 004, EOTA TR004	BBA
Hard body impact	Diameter of indent	NA	BBA
Compressive strength	Compressive strain, stress	BS EN 826 1996	BBA
Compressive creep	Stress applied, compressive creep	BS EN 1606 1997	BBA
Compression behaviour		BS EN 826	BITS
Dimensional stability		BS EN 1604	BITS
Water vapour transmission		BS EN 12086	BITS
% closed cell		BS EN ISO 4590	BITS
Fungal resistance		BS EN ISO 846:1997	PRA
Emission of VOC		CertiPur label for Flexible Polyurethane Foams	PRA
Air leakage	At 50 pascals $m^3.h^{-1}.m^{-2}$		BSRIA
Surface spread of flame		BS 476: Part 7:1997	Bodycote
Moisture performance of roofs insulated with sprayed polyurethane foam		BS EN ISO 15026, BS EN ISO 13788	Glasgow Caledonian University
Short term water absorption		BS EN 1609	BBA

WALLTITE has also been thoroughly assess by condensation risk, SAP and WUFI simulations. For further information please contact our technical staff or send an e.mail to walltite-uk@basf.com.

Support services

Design and technical services

The WALLTITE team would be pleased to assist with any technical queries that may arise, if you are thinking of using a WALLTITE insulation and air barrier system.

There is a dedicated team based at our manufacturing plant in Derbyshire, a range of external consultants are on hand, plus the Global experience provided by the BASF sprayfoam network.

They can provide much of the information needed to provide detailed specification options including:

- statutory requirements, planning regulations and product standards
- cost benefits over other insulations
- design ideas along with structural implications and requirements
- thermal performance calculations
- condensation risk analysis.

Project specific help and advice

BASF Polyurethanes U.K. Ltd are happy to help with any specific queries regarding thermal performance or condensation risk.

To enable us to carry out these tasks we just need to know the construction details of the building section you are proposing to insulate, layer by layer, the thickness of each layer and the target U-value.

The results can then be emailed to you.

FOAM MASTERS Approved Contractors

The WALLTITE Approved Contractors scheme (FOAM MASTERS) ensures that contractors who install our products are fully trained and supported by our technical team.

Contractors must attend courses at our training centre in Alfreton and, on completion, the contractor's details are entered onto our database and a photo identity card is issued.

Once a trained FOAM MASTERS contractor, our technical team will help to ensure compliance with installation methodology and to offer advice on correct application, intricate interfacing with other construction elements.

Also BASF's technical staff supports contractors to be fully compliant with British Standards, Code of Practice and Building Regulations.

Technical queries from contractors, architects and specifiers are dealt with by our office based team, who use their expertise to ensure the best and independent advice is given in a clear and concise way.

If you require the services of a BASF Approved Spray Foam Contractor, pelase contacts us on 01733 601166.

foam masters™

BASF Approved Spray Foam Contractor

Frequently Asked Questions

How are polyurethane foams applied?

Our systems are spray-applied, two-component products that include a hardener (A-Side Component) and a resin (B-Side Component). These are not pre-formed, friction-fit batts or boardstock insulations. It is not a wet application – no water is used. During application, there is a chain reaction between the two components that creates a bond to the substrate as it foams up. It dries, cures and hardens within 3-5 seconds. This product should always be installed by a trained applicator.

What equipment is required?

Spray-applied polyurethane foam systems require specific application equipment, including pumps, proportioners and spray guns. BASF is pleased to advise on the best equipment for processing their insulation systems.

Are there any special handling considerations?

Always use personal protective equipment, avoid all contact with skin and eyes and do not inhale the vapours of the hardener. Before opening the resin, unscrew the bung slowly to release the gas pressure in the drums.

While spraying, always work with adequate ventilation. Protective gloves and face mask are strongly recommended. When atmospheric levels may exceed the occupational exposure limit (PEL or TLV), approved air purifying respirators equipped with an organic vapour sorbent and particulate filter can be used as long as appropriate precautions and change-out schedules are in place. Persons with known respiratory allergies must avoid exposure to the A component.

For more information, please ask for our material safety data sheets. Contact us on +44 (0)1773 601166.

What is the insulation U-value of your systems?

BASF will calculate the U-value of any structure that uses WALLTITE insulation foam. All we need is the thickness of each layer through the structure and your target U-value.

What are the differences between roofing foams and wall foams?

Polyurethane foams are plural-component products engineered on the molecular level for a specific purpose and application. Externally applied roofing foams tend to offer higher compressive strengths and smoother surfaces, while foams for timber framed walls and between rafter roof insulation, tend to offer faster reaction rates, higher yield and superior insulation values. All of our polyurethane technologies are closed-cell foams.

What are the differences between closed-cell and open-cell foams?

There are three major differences. First, BASF uses the versatility of chemistry to offer a closed-cell content of greater than 90% for all of its formulations, and open-cell foams commonly used as insulation systems have approximately 60 percent open-cell content. Second, closed cell content offers a thermal conductivity of between 0.028W/mK and 0.025W/mK, depending on the thickness applied. Open cell offers 0.035W/mK. Third, closed cell foam is virtually impermeable to air, while open cell foam allows far more air and vapour into the building interior.

What is an insulating air barrier system?

A closed-cell, spray-applied polyurethane foam wall system that combines superior insulation values and near-zero air permeability in a single application to improve building durability, energy efficiency and occupant comfort, health and safety.

Does polyurethane technology control air leakage?

Our polyurethane foam roof and wall systems have been tested and are certified to be an air barrier at an application of 25mm thickness. Once applied, our roof and wall systems are fully-adhered and do not allow air to flow around, behind or through the insulation system. Most open-cell foams have not been tested and therefore do not qualify as air barrier systems. One open-cell foam manufacturer's product requires an application of 125mm to pass the minimum requirements of the air barrier test.

Can an insulation system add structural strength?

Spray-applied closed-cell polyurethane foam is the only insulation material that adds structural integrity throughout the wall system. Testing shows spray-applied polyurethane foam insulation between wood- and steel-stud wall panels increased rack and sheer strength two to three times compared with standard stick-built components with glass fibre insulation when sprayed onto gypsum wallboard and vinyl siding, and increased racking strength when sprayed onto oriented strandboard (OSB).

What about mould?

Mould requires three things to grow: moisture, warm temperatures and a food source. Polyurethane foam insulation has no nutritional value and is not considered a food source for mould. The use of polyurethane as insulation eliminates condensing surfaces and reduces the potential to accumulate moisture. It also eliminates air movement within the wall cavity. Other insulations are less successful at controlling air infiltration and providing adequate insulation to eliminate condensing surfaces, thus increasing the possibility of an environment susceptible to mould.

Is polyurethane good for the planet?

Our polyurethane technologies are formaldehyde-free formulas that emit no volatile organic compounds (VOCs) and use zero ozone depleting blowing agent technology. Plastic building products, including polyurethane foam, use less energy from all sources than alternative products during production. Spray-applied polyurethane foam insulation saved 3.4 trillion BTUs in manufacturing energy over glass fiber in 1990. Our systems also increase building energy efficiency and reduce waste. For more information on how our polyurethane technologies help make buildings better visit www.walltite.basf.co.uk.

Can polyurethane foam systems be used in a chemically sensitive environment?

Yes. Our systems do not emit Volatile Organic Compounds (VOCs). Off-gassing from this product has been measured at 0.000 parts

Are there any fire protection requirements?

Polyurethane insulation meets Class 1 surface spread of flame rating when tested to BS 476: Part 7. Once installed, if 30 minute fire resistance is required, it must be covered by plasterboard, or similar thermal barrier.

Case studies

Curved roof presents no problem for WALLTITE spray foam insulation

Location: Hove
Client: Private
Project: New 5-storey mixed use development

Located on the site of an existing single storey property in a prestigious area of Hove, East Sussex, local architects Felce and Guy Partnership were commissioned to design a new mixed-use five storey property comprising ground floor and basement retail and office areas with residential accommodation above. With over sixty years experience in construction in the South East, the building and renovation work was completed by Brighton based A&F Pilbeam.

In order to meet the planning condition required to achieve Level 3 of the Code for Sustainable Homes, a low U-value was important. Due to the nature of the site, there were constraints on how this could be achieved. The curved nature of the roof in the penthouse flat presented an issue in relation to the original insulation specified as this could not achieve the radius required. Certain traditional mineral fibre solutions are not guaranteed to stay in place down the curve and attain the required U-value of 0.1W/m^{2}K. A spray foam insulation would be the ideal solution. The simplest way was to decrease the U-values of the various elements, of which the roof was one. The Code measures the sustainability of a home against design categories, rating the 'whole home' as a complete package. The sites boundaries are the external walls and so there was no opportunity to utilise other elements outlined in the Code such as greywater, recycling facilities, ground source heat pumps or to add in some green spaces. Improving the insulation with a better U-value was the answer. Following market research and discussions with the technical team at BASF Polyurethanes U.K., WALLTITE was specified as it could achieve the desired U-value and adapt to the curve.

Sustainable Training Facility

Location: Warwick
Client: Jaguar Land Rover
Project: Technical Academy Refurbishment
Scope: 4000 m^2

A leaking poorly insulated building has been transformed into the Jaguar Land Rover Technical Academy, which occupies over 4,000m^2 of floor area including a 60 metre workshop and training zone equipped with vehicles, components and systems for hands on training. A thermal assessment of the original building revealed that, without improvement it would emit 418 tonnes of carbon dioxide per year. The challenge was therefore to source products that would provide for a sustainable, energy efficient building that satisfied all local planning laws and the needs of the client's insurance company.

In partnership with BASF Group, Jaguar Land Rover looked at a vast range of energy efficient and sustainable construction products. One vital aspect of the project was to upgrade the insulation on the roof and walls and make the building airtight. For this aspect they chose WALLTITE, applied directly onto the existing laminate board insulation, with very little preparation. The in-situ application meant the foam expanded as soon as it hit the substrate, sealing it completely and preventing air leakage. The self adhesive properties of the system also meant that no extra costs were incurred for fixings and increased loading and potential thermal bridging was eliminated. 75mm thickness of rigid insulation foam was applied at a rate of 1,000m^2 per week.

By implementing the measures and products suggested by BASF, including low thermal conductivity in-situ spray foam, emissions were cut to 175 tonnes per year – an impressive 60% reduction. The use of WALLTITE ensured sustainability over the life span of the building.

Reduced Emissions for Victorian Terrace

Location: Watford
Client: BRE
Project: Victorian Terrace Refurbishment

WALLTITE spray foam insulation from BASF Polyurethanes UK, has been used to form an airtight thermal efficient solution at the BRE's Victorian Terrace retrofit project in Watford .

BASF in partnership with the BRE is helping to transform a disused Victorian stable block into a 21st century living and exhibition space. The Victorian Terrace demonstration project aims to bring about a step change in the housing agenda by highlighting the significant contribution refurbishment can play in reducing UK carbon emissions and encouraging industry to raise standards of practice.

WALLTITE was spray applied to one of the walls in the presentation room which when finished, will house a permanent exhibition of the products used on this project. The wall here was very unstable so a number of structural repairs had to take place before removing all the existing plaster. WALLTITE was then sprayed directly onto the rough, bare brick substrate without the need for primer or levelling coat to a thickness of 100mm. The strength of WALLTITE therefore helped to consolidate this very unsound surface.

To remove any concerns about potential thermal bridging via studwork or framing, the whole surface area of the wall was sprayed seamlessly and then finished with gypframe studs before applying plasterboard.

WALLTITE is a closed cell foam, the structure of which helps control the movement of vapour and moisture throughout the building thus reducing the risk of mould and condensation. At a thickness of 100mm WALLTITE achieved a U-value of 0.24W/m²K.

Case studies (continued)

Exposed Barn Defeats Elements

Location: North Yorkshire
Client: Mr McCann
Project: Barn Conversion
Scope: 100m²

Often cut off for weeks, Rigg End Farm, built in the C18th, lies in a remote part of the North Yorkshire moors. Its conversion into a modern four bedroomed family dwelling, needed a high standard of insulation at minimal thickness and maximum thermal efficiency. Exposed to the elements, a tried and tested insulation solution was required to provide both exceptional insulation values and complete airtightness. The best way to stabilise the stone work and get the maximum insulation value was to use WALLTITE spray foam insulation. One of the advantages of applying WALLTITE is that the substrate does not require any preparation and no primer is necessary. On this project the stonework was simply dusted off prior to application. WALLTITE was then spray applied to the internal walls between the timber studwork and fixed slightly off the wall in order to eliminate the potential for cold bridging. Any high spots were then trimmed back with a wood saw before attaching plasterboard to the studwork.

Approximately 100m² of WALLTITE was applied in just two and a half days. The finished walls achieve their target U-value of 0.26W/m²K, well within current Part L Building Regulations. A minimal insulation thickness of 85mm was achieved in most areas with little reduction in room size, enabling the owner to retain the character of the original building elements. Mr McCann commented, “This is a fast applied, efficient insulation system. I really like the fact that airtightness is built in and that the framework is now completely rigid.”

Energy Saving Apartments

Location: Rochford, Essex
Client: Sainsburys
Project: Six apartments over two storeys
Scope: 510m²

The 3-storey building in Rochford comprises six, two bedroomed apartments built over a Sainsburys Local on the ground floor. Working with Benbrook Enterprises, 510m² of structurally insulated panels (SIPS) were manufactured as timber frames sandwiched together using WALLTITE, to produce an energy efficient fast track building component and airtight solution.

A vapour control layer and breather membrane was applied to the panels; taking just eight hours to spray the panels for the whole block. The complete panels were ready by the end of the second day, this included the process of cutting them to size for quick installation on site. They were set out on a sole plate laid and fixed together to form the internal wall structure. A 25mm batten was then applied to work as a service void followed by plasterboard.

The energy efficient solution provided a U-value of 0.18Wm²/K which far outstripped the client’s recommended requirement of 0.33Wm²/K. As well as exceeding the new Part L requirements for insulation, this solution will provide future occupants with significant energy savings.

Jim Kirk of contractor Gilbert-Ash said, “The lightweight construction enabled the panels to be lifted onto site quickly and erected at an impressive speed, ensuring completely watertight envelope. We were impressed with the U-value that these insulated panels achieved and the ability to construct off site was an added bonus as access was very restricted due to the project’s location on a main road in the heart of the town.”

Reduced Emissions for Panoramic View

Location: Ruthin, North Wales
Client: Private
Project: Tyn Y Ddol House Refurbishment
Scope: 400m²

Two existing stone buildings at Tyn Y Ddol are connected by a mainly glass structure covering six interior levels. The extension of the glazing during the refurbishment and renovation needed to achieve the target emission rate, which could only be reached if the insulation standard of the rest of the building fabric was increased.

The pitched roof, containing some original oak beams and trusses, had to remain on view as a feature. This was achieved with WALLTITE sprayed between 200mm deep rafters then fixing composite insulated plasterboard to the faces. This combination kept the depth of the insulation to a minimum thickness of 190mm whilst accommodating more head room, keeping the timberwork exposed.

For the solid stone walls, WALLTITE was sprayed between timber studwork, fixed slightly off the wall to eliminate any potential for cold bridging. Little preparation was required; the stonework was simply dusted off prior to application of the foam. A seamless finish was achieved resulting in an airtight envelope of low permeability.
A target U-value 0.1W/m²K was achieved for the pitched slate roof with breather membrane underlay and target U-value 0.25W/m²K for the solid random stone walls, significantly lower than conventional insulation systems.

James Carroll Builders were very impressed. “Over 400m² of spray foam was installed in just three days, and we think the job would have taken around eight days to complete if we had used more conventional insulation materials. Less labour was required as well and the site was left clean and tidy with no waste materials to remove.”

For more details on these and other case studies please visit our website www.walltite.basf.co.uk

Glossary of terms

Cold bridging

Occurs between building materials and is a major cause of condensation and mould growth in buildings. There are several varieties of mould that can grow on the inside surface of buildings in certain conditions and some can be toxic. Products with little or no cold bridging thus provide a healthy environment by reducing moisture and mould growth.

Compressive strength

The maximum compressive stress a material can withstand without failure. Materials with high compressive strength thus have good load bearing capacity.

k-value or λ (lambda) value

The thermal conductivity of a material, the lower the value the better the material is at storing heat and retaining temperatures. Expressed in Watts per metre per degree Centigrade or Kelvin (W/mK).

Thermal bridging

A thermal bridge is a localised area of lower thermal resistance in the building envelope resulting in higher heat flow and lower internal surface temperatures. As well as increasing heat loss from the building envelope, thermal bridging can cause localised condensation as surface temperatures may be reduced below the dew point (condensation temperature) of the air in the space. This is a particular danger in buildings where the Relative Humidity (RH) may be high, such as canteens, laundries, swimming pools and some factories.

Thermal conductivity

Measure of the ability of a solid or liquid to transfer heat.

Thermal conductivity is a material property. It will not differ with the dimensions of a material, but it is dependent on the temperature, the density and the moisture content of the material. The thermal conductivity normally found in tables is the value valid for normal room temperature.

Generally light materials are better insulators than heavy materials, because light materials often contain air enclosures. Dry still air has a very low conductivity. A layer of air will not always be a good insulator though, because heat is easily transferred by radiation and convection.

When a material, for instance insulating material, becomes wet, the air enclosures fill with water and, because water is a better conductor than air, the conductivity of the material increases. That is why it is very important to install insulation materials when they are dry and take care that they remain dry.

Vapour permeability

'Breathable' is used as a short way of saying 'a high level of water vapour permeability'.

U-value

The U-value concept is used to quantify heat loss through plane elements of the building envelope or shell. U-value is defined as the overall thermal transmittance of a particular construction element (a wall or a roof for example), including the effect of surface resistance. It depends upon the thickness and thermal conductivity of its component layers and, in the case of air cavities, the emissivity of the surfaces.

Units of thermal transmittance are expressed in Wm^2K.

The term ‘U’ represents overall thermal conductance from the outside to inside covering all modes of heat transfer. From the above equation, ‘U-value’ can be defined as the rate of heat flow over unit area of any building component through unit overall temperature difference between both sides of the component.

The U-value is an important concept in building design. It represents the air-to-air transmittance of an element. This refers to how well an element conducts heat from one side to the other, which makes it the reciprocal of its thermal resistance. Thus, if we calculate the thermal resistance of an element, or R-value, we can simply invert it to obtain the U-value

R-value

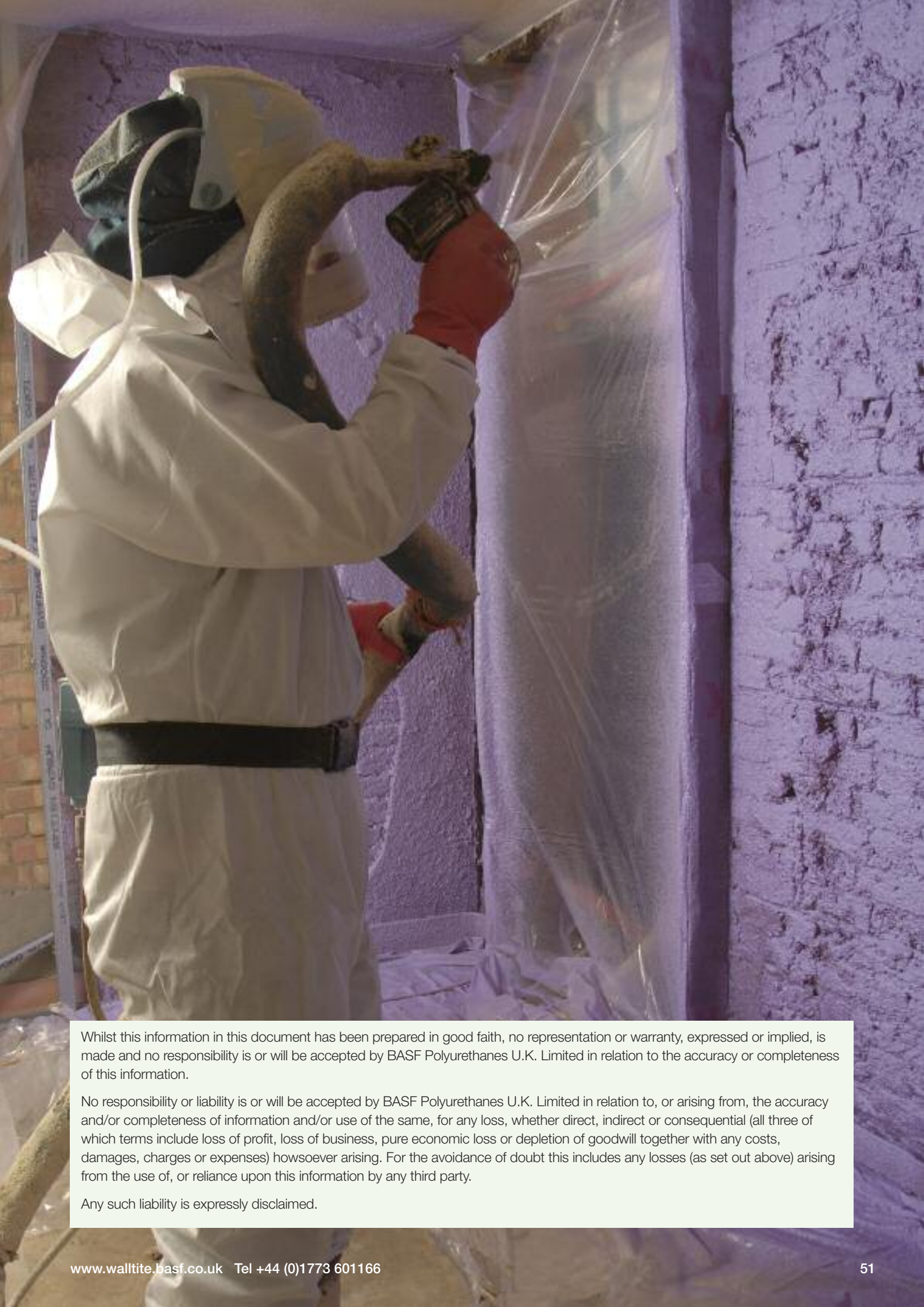
Insulation is rated in terms of thermal resistance, called R-value, which indicates the resistance to heat flow. The higher the R-value, the greater the insulating effectiveness.

R = l/k

Where: R = the thermal resistance per unit area of the piece of material (m^2K/W),

l = represents the thickness of the material (m), and

k = represents the conductivity of the material (W/mK).



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