

TIMBER FRAME APPLICATION NOTES

INTRODUCTION

This application guidance is aimed at ensuring you make the best use of the Thermafleece range of insulation when used in timber frame applications. Traditional and special timber frame designs are illustrated which utilise a combination of timber stud depths to suit a variety of thermal requirements. This guidance is intended to meet or exceed Part L of the Building Regulations and to assist in achieving the requirements of the Code for Sustainable Homes for energy and material content. The following are illustrated:

- Light weight timber framed building systems
- Breathing wall timber frame building systems
- Twin wall timber frame building systems
- Engineered “I” beam timber frame building systems
- Acoustic requirements

INSULATION MATERIALS

The Thermafleece range of insulation utilises the unique functional properties of sheep’s wool. Our insulation range is suitable for timber frame sizes from 50mm upwards. Thicknesses can be combined to suit the depth of void to be insulated. Other products within the Thermafleece range can be included to suit your design, subject to volume and performance requirements

THERMAFLEECE

Thermafleece has been the UK’s first choice of sheep’s wool insulation since it was launched in 2001. Thermafleece is a high density, wool rich insulation that is the first choice when maximum thermal and acoustic performance and breathability are required or in space limited situations. Thermafleece contains 85% British sheep’s wool.

THERMAFLEECE PB20

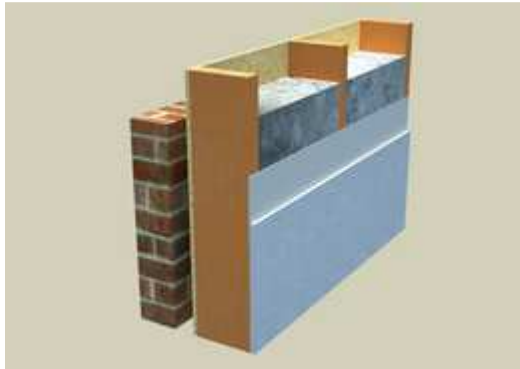
Thermafleece PB20 is a lower density insulation that is easy to handle and install. Thermafleece PB20 contains 60% British sheep’s wool and is available as a compressed roll or in flat slab format

INSULATION REQUIREMENTS

The required depth of insulation is achieved by multi-layering to suit the void to be insulated. The range of available thickness and sizes are:

Type	Thickness	Length	Width	K Value W/mK
Thermafleece	50mm	1200mm	600 & 400mm	0.038 W/mK
Thermafleece	75mm	1200mm	600 & 400mm	0.038 W/mK
Thermafleece	100mm	1200mm	600 & 400mm	0.038 W/mK
Thermafleece PB20	70mm	7600mm	570mm	0.039 W/mK
Thermafleece PB20	100mm	5300mm	570 & 370mm	0.039 W/mK

STANDARD TIMBER FRAME CONSTRUCTION



A standard timber frame construction as a structural external system requires a 140mm timber stud to achieve current Building Regulations. A 9mm racking board is attached to the outer leaf to form a structural wall system. In this type of construction, the risk of interstitial condensation can be addressed by incorporating vapour control layers to the warm side of the insulation. This controls the passage of moisture through the structure, but does not allow the structure to breathe naturally.

As such, the addition of vapour impermeable materials must be correctly detailed and materials must be completely sealed to ensure that no moisture can penetrate into the structure.

TYPICAL SPECIFICATION

External timber frame walls incorporate a 140mm timber stud with a 9mm racking board to the outside. This enables the thermal requirements of the Building Regulations to be achieved when used in conjunction with a cavity wall construction and masonry cladding. All internal load-bearing and non load-bearing walls are constructed using an 89mm timber stud.

Typical U Values of $0.29\text{W/m}^2\text{K}$ can be achieved using a 140 mm Timber Frame with a 50 mm Cavity and a 103mm outer Brick finish. Specific U Value are developed based on the construction required via our technical support team.

BREATHING WALL TIMBER FRAME CONSTRUCTION

Breathing wall timber frame systems for cladding board or brick cavity finishes incorporate a standard 89mm or 140mm timber frame structure in conjunction with external natural fibre insulation board. This provides a complete structural breathing wall system without relying on breather membranes or internal vapour controls. These systems are designed to provide:

- Low environmental impact solutions
- Lightweight building system
- Excellent thermal performance
- Part L /CSH compliant
- Excellent air tightness
- Utilises natural and recycled materials

In the case of a breathing wall construction, the timber frame racking board is positioned to the inside of the timber frame, unlike traditional timber frame systems (where the racking board is positioned to the cold cavity side of the structure). Vapour control layers are not required in a breathing wall construction since the structure allows the free passage of moisture.

Thermafleece or Thermafleece PB20 should be installed between studs before options onto the external timber frame are considered. These options can include a natural fibre insulation board or a breather membrane finish to hold the Thermafleece in place. Using a natural fibre insulation board has the advantages

of aiding airtightness and adding thermal mass to the construction.

In a breathing wall timber framed system, the external insulation attached to the timber frame maintains the timber frame above the dewpoint temperature, further reducing the risk of condensation. Calculations for U values and dewpoints can be carried out to assess the risk of interstitial condensation by our Technical Team.

TYPICAL SPECIFICATION

External walls usually incorporate an 89 or 140mm timber stud with a 9mm racking board or vapour permeable racking board fixed to the inside of the structure. In order to meet or better the thermal performance requirements of the Building Regulations, or to assist in achieving the requirements of the Code for Sustainable Homes for Energy and Material content, a natural fibre insulation board is applied to the cavity side of the construction. This can receive either a masonry or timber cladding finish. The natural fibre insulation board aids air tightness and maintains vapour permeability whilst adding thermal mass. This helps maintain a constant temperature within the building

Internally forming a service void between the racking board and plasterboard contribute towards effective air tightness control and enables easy access to services. Other natural internal lining boards such as wood wool slab with lime internal finishes or clayboard are available as alternatives to plasterboard and gypsum render. Natural fibre insulation boards are available in a range of thicknesses to provide the required thermal performance.

Natural fibre insulation boards come with an interlocking joints that minimise the risk of thermal bridging. However, when used in conjunction with an external cavity masonry or clad construction, breather membranes should be added to the construction in addition to the natural fibre insulation boards.

CLADDING BREATHING WALL

To finish the boards externally for a cavity-cladding finish, fix counter battens to form a 50mm ventilated cavity before installing the lightweight cladding system of your choice, such as timber cladding.

PERFORMANCE

89mm Timber Frame overall depth of wall can achieve a U Value.

231 mm 0.26 W/m²K

251 mm 0.23 W/m²K

271 mm 0.21 W/m²K

140mm Timber Frame overall depth of wall can achieve a U Value.

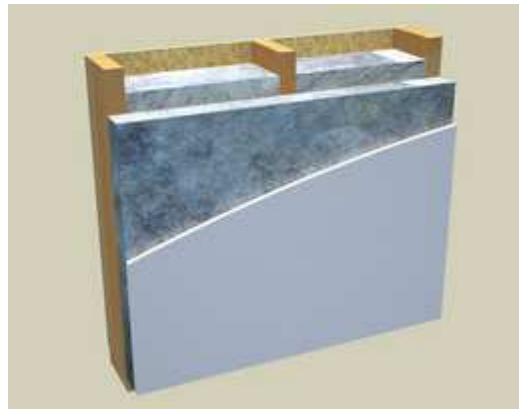
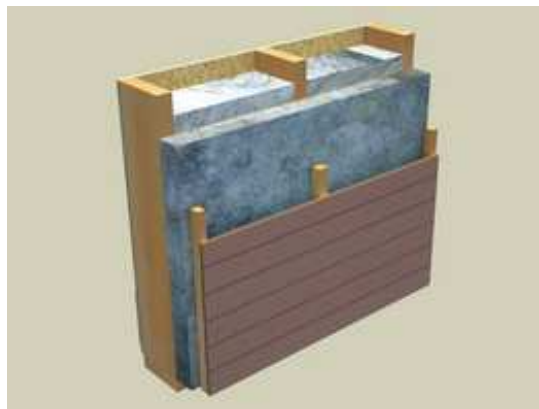
283 mm 0.21 W/m²K

303 mm 0.19 W/m²K

323 mm 0.17 W/m²K

Specific U Value are developed based on the construction required via our technical support team

EXTERNAL RENDER BREATHING WALL



The natural fibre insulation boards for external rendering are supplied as a complete system with a range of mineral lime based renders, with ancillary items required to complete the project. Other finishes can be used as an alternative to the render but care must be taken to ensure that the vapour permeability is maintained.

PERFORMANCE

89mm Timber Frame overall depth of wall can achieve a U Value.

206 mm 0.27 W/m²K

226 mm 0.24 W/m²K

246 mm 0.22 W/m²K

140mm Timber Frame overall depth of wall can achieve a U Value.

258 mm 0.21 W/m²K

278 mm 0.19 W/m²K

298 mm 0.18 W/m²K

Specific U Value are developed based on the construction required via our technical support team

TWIN WALL TIMBER FRAME BUILDING SYSTEMS

DESCRIPTION



Twin frame systems are based on utilising two standard 89mm timber studs engineered to allow a deeper timber frame which can be filled with a greater quantity of insulation. The twin frame system ensures that no thermal bridging occurs within the construction helping to maximise insulation performance. By using two 89mm structural timber frames, the width of the construction can be varied to achieve specific insulation requirements without risking thermal bridging.

SYSTEM PERFORMANCE TWIN WALL SYSTEM

Overall depth of wall can achieve a U Value (including cavity construction):

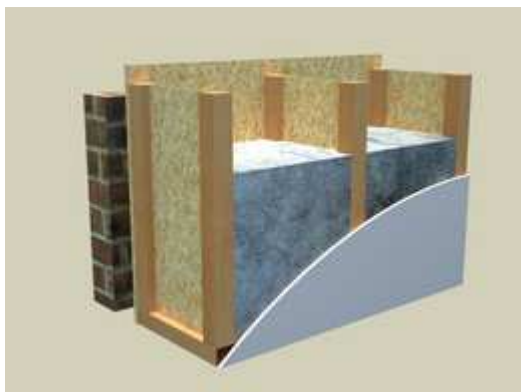
375 mm 0.19 W/m²K

475 mm 0.13 W/m²K

Specific U Value are developed based on the construction required via our technical support team

ENGINEERED "I" BEAM TIMBER FRAME BUILDING SYSTEM

DESCRIPTION



The timber frame 'I' beam system uses an engineered timber 'I' beam stud to create a greater depth of timber frame which can be filled with a greater quantity of insulation. The structural timber frame 'I' beam section has a racking board attached to the cavity side of the construction. This gives the structure a high degree of strength whilst allowing greater insulation levels to be achieved. The system can also be fabricated as a closed panel system, delivered to site in panelled sections that are pre-insulated with the Thermafleece or Thermafleece PB20.

PERFORMANCE

Overall depth of wall can achieve a U Value (including cavity construction):

420 mm 0.16 W/m²K

475 mm 0.14 W/m²K

525 mm 0.12 W/m²K

575 mm 0.10 W/m²K

Specific U Value are developed based on the construction required via our technical support team

SERVICE VOIDS

Incorporating a service zone ensures that the insulation remains undisturbed and airtightness remains intact in the event that services are accessed for maintenance. Services can be installed within the insulation zone of the timber frame. Alternatively a low emissivity insulated service void can be included to provide a clear cavity for services, but also having the added benefit of providing a vapour control, airtight seal, and reflective insulated void within the construction. Please ask our technical support team for advice on this application. We recommend providing a 25mm service zone which is formed by counter battening along the timber frame internal face and fixing a plasterboard or alternative internal lining.