Traditional build

with **extra-ordinary** U-values

CavityTherm CT/PIR

BUILT-IN CAVITY FILL INSULATION

The logical way to achieve U-values as low as 0.16 W/m²K from a standard 100mm cavity

ZERO CARBON* FABRIC STANDARD

BBA BRITISH BOARD OF AGRÉMENT
Certificate Number: 10/4786

www.xtratherm.com

Building regulations are committed to delivering Zero Carbon homes by 2016. The Government has now indicated what the fabric insulation standards are likely to be.

CERTAINTY

For the first time, designers and builders have been given indicative U-values targets to achieve Zero Carbon.* CavityTherm will achieve the target wall U-value within the traditional 100mm cavity.

- The new **CavityTherm** wall insulation system works within a traditional 100mm cavity using traditional foundations, building skills and materials to achieve U-values as low as 0.16W/m²K. Maintaining the standard overall wall width means no loss of living space internally nor an enlarged building footprint.
- The new **CavityTherm** insulation system is suitable for all housing types in mixed developments up to 12m in height and allows for most external wall finish to satisfy planning requirements.
- **CavityTherm** is available nationwide on short lead times through the traditional supply chain.

Typical U-values

CavityTherm U-values					
CT/PIR Thickness	Block Lambda Value				
	0.11	0.15	0.25	0.32	0.51
75mm	0.22	0.22	0.23	0.23	0.24
90mm	0.18	0.19	0.20	0.20	0.20
100mm	0.17	0.17	0.18	0.18	0.19
125mm	0.14	0.14	0.15	0.15	0.15
150mm	0.12	0.12	0.13	0.13	0.13

Dot and dab finish with parge coat 3 s/s ties/m²

*Building regulations are committed to delivering Zero Carbon Homes by 2016 and the Government has announced that the fabric standards required to achieve this goal will be based on the revisions outlined in the Code for Sustainable Homes 2010 where the Zero Carbon Hub set benchmarks for fabric performance. Their document defining a **Fabric Energy Efficiency Standard (FEES)** for Zero Carbon Homes, gives the maximum energy demand for space heating and cooling in two levels only, and gives indicative U-values for walls, floors and roofs to achieve the goal. The defining of indicative U-values (along with air permeability and thermal bridging targets) for the first time, gives designers and builders a target to achieve Zero Carbon. CavityTherm will achieve the target wall U-value within the traditional 100mm cavity.

Xtratherm
More than insulation.

DESIGN

Xtratherm **CavityTherm** wall insulation board is a high performance composite board of **PIR core with a lambda value of 0.021W/mK**. The boards have gas tight facings with one face bonded to a profiled HIPS skin during manufacture to provide a drainage plane. **CavityTherm's** unique profiled facing directs any moisture that might have penetrated the external wall down the protective facing and back onto the external leaf.

The board includes specifically designed rebated edge detailing on all four edges to allow the system to tightly interlock when installed.

TYPICAL PHYSICAL CHARACTERISTICS

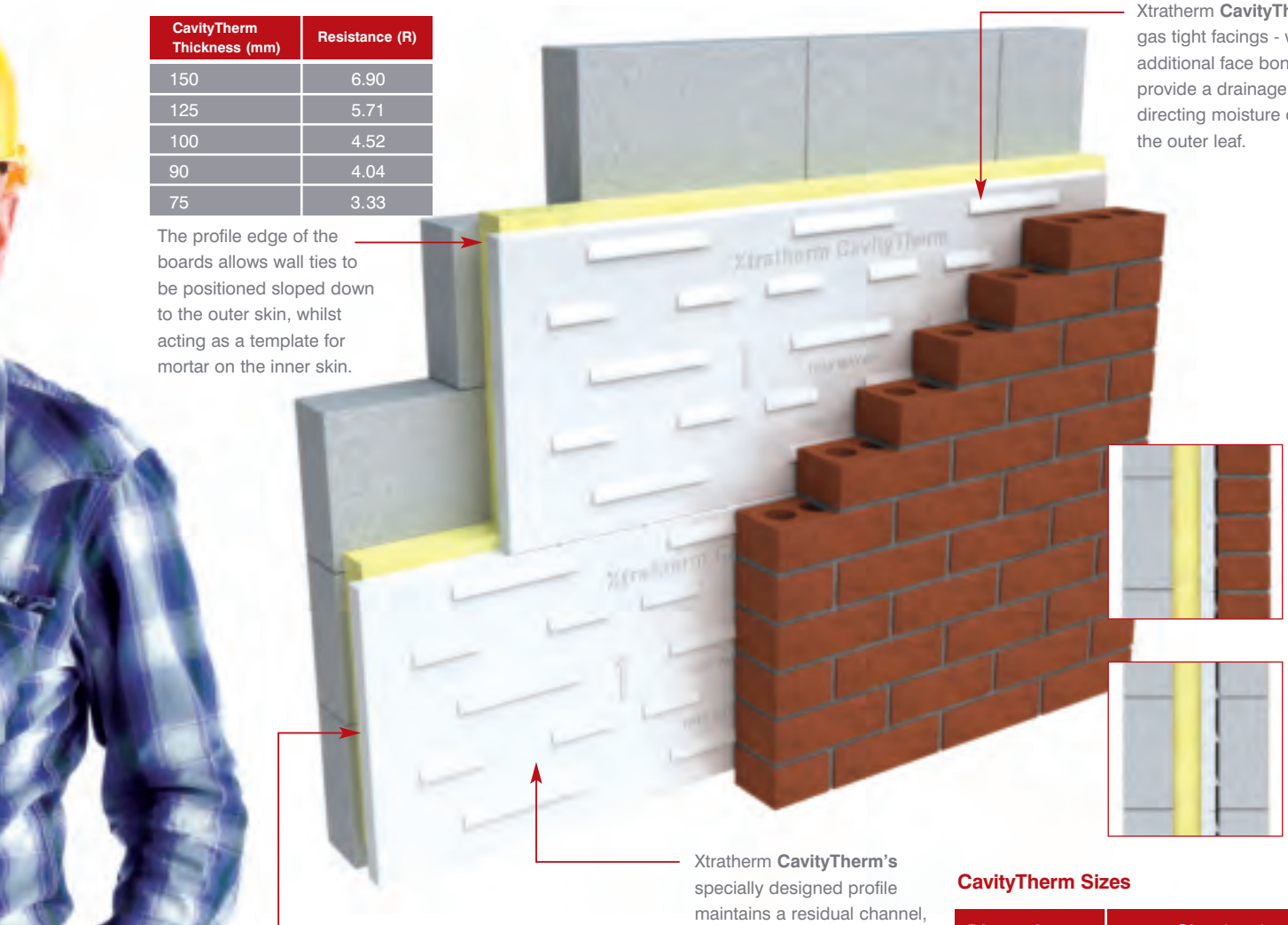
PROPERTY	UNITS
Density Typical (Foam Core)	30 Kg/m3
Compressive Strength	>100 kPa @ 10%
Thermal Conductivity	0.021 W/mK
Service Temperature	-20°C - +100°C

CavityTherm is SIMPLE, DURABLE & COST EFFECTIVE

A report by Cyril Sweett construction and property consultancy, analysed the costs involved in increasing cavities up to 200mm in a typical 3 bedroom semi detached. The report concluded that to push a cavity out to 200mm on a semi-detached property could add up to £2,070.95 before insulation costs are considered, for more information see Page 5.

RESISTANCE VALUES

CavityTherm Thickness (mm)	Resistance (R)
150	6.90
125	5.71
100	4.52
90	4.04
75	3.33



Xtratherm **CavityTherm** has gas tight facings - with one additional face bonded to provide a drainage plane, directing moisture onto the outer leaf.

The profile edge of the boards allows wall ties to be positioned sloped down to the outer skin, whilst acting as a template for mortar on the inner skin.

Xtratherm **CavityTherm's** specially designed profile maintains a residual channel, protecting the structure.

Installing Xtratherm **CavityTherm** gives U-values that are indicative of targets set to achieve the higher levels of the Code for Sustainable Homes - but within traditional construction allowing the architect to design low carbon homes and maintain an overall cavity width of 100mm.

CavityTherm Sizes

Dimensions	Size (mm)
Length	1200
Width	450
Thickness*	75, 90, 100, 125, 150

**Nominal width includes 5mm profiled facing - Other sizes may be available subject to quantity and lead time.*

Results in Eco-friendly, genuinely desirable dwellings that people will choose to live in.

Xtratherm®

CavityTherm

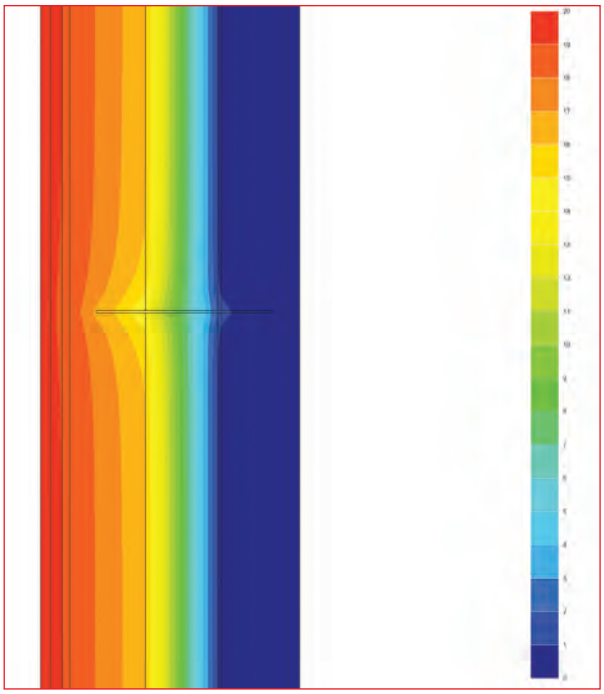
Reduced wall thickness, the bridging advantage

WIDER WALLS & THERMAL BRIDGING

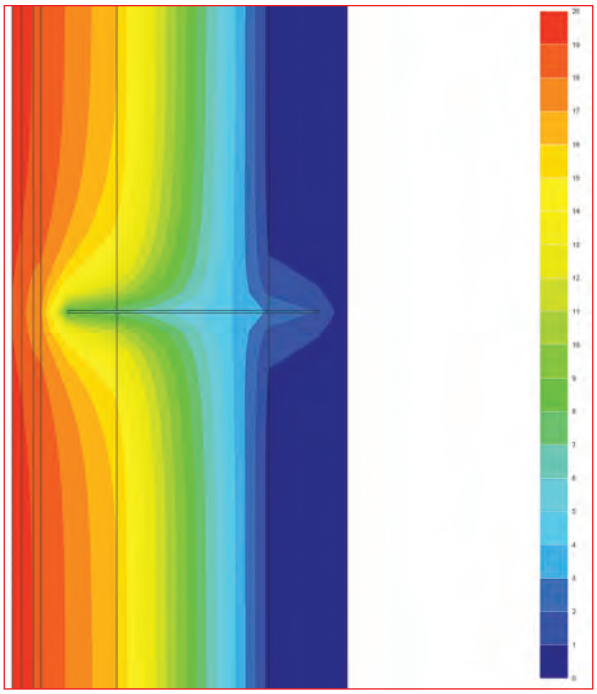
There are many ways to push the thermal performance of traditional walls towards Zero Carbon standards, but consideration should be given to the consequences of the specification. Take the obvious solution of simply widening the cavity and adding more insulation: you may indeed succeed in achieving a very good U-value by increasing the insulation thickness however, it is a paradox that the better insulated the wall is - the worse the heat loss through thermal bridging at the wall junctions, to such an extent that junction thermal transmittance fails to meet the default values laid down in the paper IP1/06 *'Assessing the effects of thermal bridges at junctions and around openings'*. This is why detailing and jointing of the insulation layer has become a critical factor in energy efficient design. It has been estimated that up to 30% of the heatloss in a well insulated house is through these 'Non Repeating Thermal Bridges' at wall/floor junctions,corners, reveals, ceiling junctions heads and sills.

Thermal bridging is particularly evident through the wall ties in a cavity construction; wider cavities need more and bigger wall ties, each in turn increasing the thermal heat losses through the wall (see diagram below). At a certain cavity width and U-value it may necessitate the use of low conductivity wall ties such as Basalt, adding costs to the construction.

To push a cavity wall width out to install greater thickness's of insulation, although achieving a better insulation levels may result in other problems such as condensation and mould growth in the future.



Thermal bridging through standard SS wire ties in 100mm cavity.



Increased Thermal bridging through bigger ties in wider cavity.

PART L REGULATIONS & THERMAL BRIDGING

Part L Building Regulation 2010 now place great emphasis on how thermal bridging is accounted for. To minimise thermal bridging, quality assured accredited construction details should be used. Industry based accreditation schemes are to be set up, and will include site inspection to ensure construction quality.

Alternatively, if the construction details are not accredited, their linear thermal transmittances (PSI values) may be calculated by persons with suitable expertise and experience, but the calculated values must be increased by 0.02W/mK or 25% (whichever is the greater).

If non-accredited details are used and PSI values are not calculated, a default overall thermal bridging transmittance (y value) of 0.15 W/m²K must be included in the DER calculation. Measured Xtratherm junction PSI values are given in the table opposite.

CavityTherm indicative PSI Values*

JUNCTION	PSI VALUE
Lintels	0.00
Sill	0.07
Jamb	0.00
Intermediate Floor	0.05
Corner	0.04
Party Walls	0.04
Gable wall	0.06
Ground Floor	0.05
Ceiling	0.04

**For specific PSI values contact Xtratherm Technical Support*

Xtratherm®

Cavity**Therm**

Reduced wall thickness, the cost advantage

3.04 (A) ESTIMATED COST FOR 200MM IN LIEU OF 100MM CAVITY CONSTRUCTION FOR TYPICAL SEMI-DETACHED HOUSE TYPE (EXCLUDING LOW CONDUCTIVITY TIES)

DESCRIPTION	Qty	Unit	Rate	Total
Substructures				
Excavate trenches not exceeding 2m deep	0.90	cu.m	£3.10	£2.79
Disposal of excavated material off site	0.90	cu.m	£9.40	£8.46
C20 in-situ concrete filling to cavities	0.68	cu.m	£95.00	£64.60
Increased depth of precast concrete threshold; 265 x 140 in lieu of 240 x 140	4.30	m	£1.45	£6.24
External Walls				
100mm thick facing brick external skin of cavity wall	6.76	sq.m	£58.00	£392.08
Increased size of stainless steel cavity wall ties	176.54	sq.m	£0.70	£123.58
6mm mineral fibre board closing cavities at tops of cavity walls; 325 wide in lieu of 300 wide	28.00	m	£0.50	£14.00

WIDER WALLS & ADDITIONAL COSTS

There are cost implications that must be considered when the decision has been taken to widen a cavity to insert a greater thickness of insulation. In the publication issued by the Zero Carbon Hub, 'Defining a Fabric Energy Efficiency Standard for zero carbon homes - Appendix D Cost analysis', the cost involved in increasing a wall cavity from 85mm to 210mm added an additional £2,570.00 to a typical semi-detached and £4,512.00 to a detached property.

Xtratherm commissioned a report by Cyril Sweet construction and property consultancy, to analyse the costs involved in increasing cavities up to 200mm in a typical 3 bedroom semi detached.

Consideration was given to:

- Greater excavation required.
- Wider foundation & extra concrete.
- The increase in size or type of wall ties.
- The effect of closing cavities.
- The depth of reveals.
- The effect on heads & sills.
- The increase in roof materials.
- Bespoke, non certified lintels required.

> "to increase a cavity out to 200mm on the semi-detached property could add up to £28.25 per square metre of external wall area - before insulation costs."

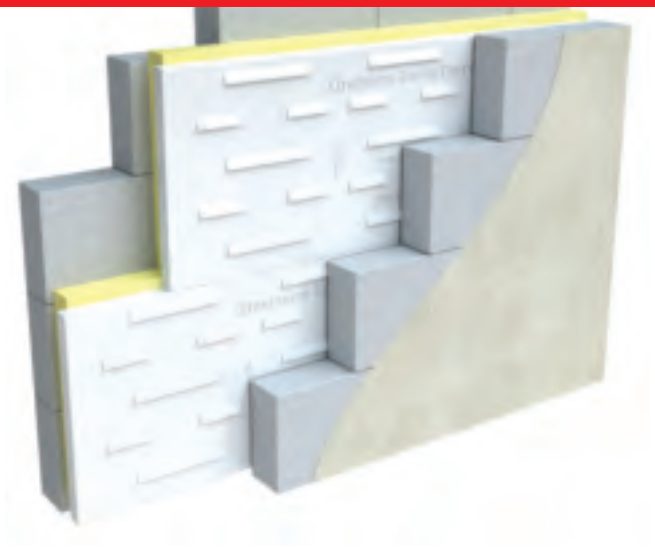
The report concluded that to push a cavity out to 200mm on the semi-detached property could add up to £28.25 per sq m of external wall before insulation costs are considered.

Widening walls has also the result of increasing the overall footprint of the building, this could cause difficulties with planning or even reductions in available plots on large spec sites. Alternatively a reduction in the internal living area of each house might be the only answer, but again restrictions might come into play regarding minimum space.

Cyril Sweett analysis of wider cavities.

Xtratherm®

CavityTherm Traditional materials, traditional skills,



The Xtratherm CavityTherm System can be installed by competent, traditional brick/block layers.
The engineered jointing of the components makes installation easier and ensures the continuity of the insulation layer.

Installation Guidelines

Install the first row of CavityTherm supported by at least 2 wall ties per board, allowing for an overlap with the floor insulation of a minimum 150mm. Starting at an external corner, the boards should be installed with the tongue upper most and the profiled face outermost with boards interlocked and continued towards the adjacent junction or reveal opening. Boards should be cut as they butt the adjacent corner, in the event that cutting should occur mid wall the facings should be overlapped and sealed with weather proof tape.

Wall ties conforming to BS 1243:1978 - should be used and placed at approx 600mm centres, do not place directly on the DPC.

The type and spacing of wall ties is dependant on geographical area, cavity width, wall length and height, and opening sizes. They should be placed at centres recommended by manufacturers to suit the wall specification and placed within the pre-formed notches of the CavityTherm.

Slots should be cut into the sloped surface of the boards to allow the ties to run down towards the outer leaf. (See Fig 1.)

A section of the internal leaf should be built up to a course above the next row of wall ties and ensuring that the wall is level and free of any protrusions, repeat the installation process, ensuring boards are kept free from mortar. The use of a cavity board is recommended during construction. All boards should be tightly interlocked with vertical joints staggered. Continue the installation to total wall height or if truncated, protect by an approved cavity tray, installed to manufacturers recommendations. Cavitytherm is suitable for walls up to 12m in height.

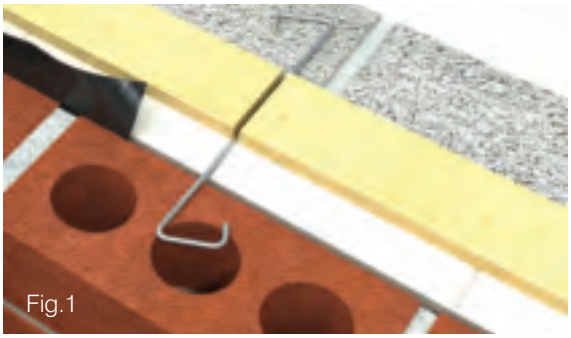
Where openings such as doors and windows are in close proximity, it is recommended that a continuous lintel or cavity tray is used.

Damp-proofing at lintel level must be provided with stopends and weep holes.

The recommendations of BS 5628-3:2001 should be followed.

It is recommended (to avoid piercing the boards with additional wall ties at reveal openings), that an additional wall tie is included within 225 mm of the opening on each board course (See Fig 2). If aerated thin joint systems are being used proprietary wall tie systems that avoid piercing the boards are required, contact Xtratherm technical help.

During installation, Accredited Detailing should be followed and ensure that installation is in accordance with certification. See BBA Certificate.

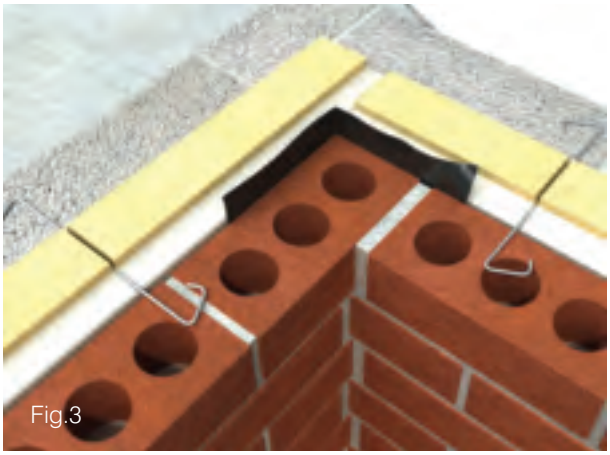


Wall tie sloping outward
Sloping wall tie in pre-formed slot.

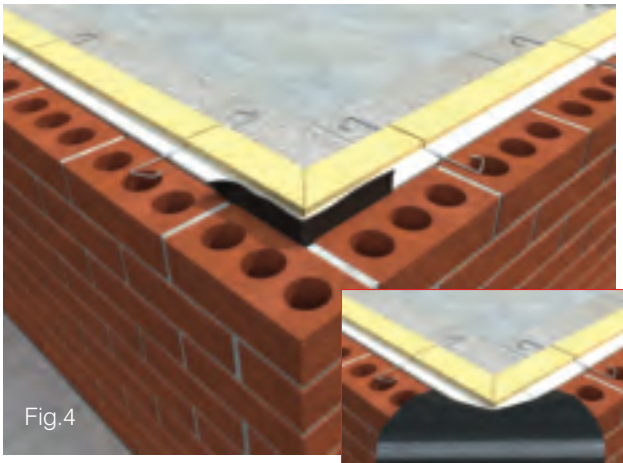
Double wall ties at reveal opening

CORNERS

Internal & external corners are formed on site and can be butt jointed or mitred.



Internal corner details



External corner details

Internal & external butted corner details are formed by closely butting the boards. It is important that they are closely jointed, the end profile should be removed to create square edges (fig.5) then cut and flatten the profiled flutes 100mm in from the board edge (fig.7 & fig.8).

FLATTENING THE FLUTES.

BUTTED JUNCTION (Fig.3)

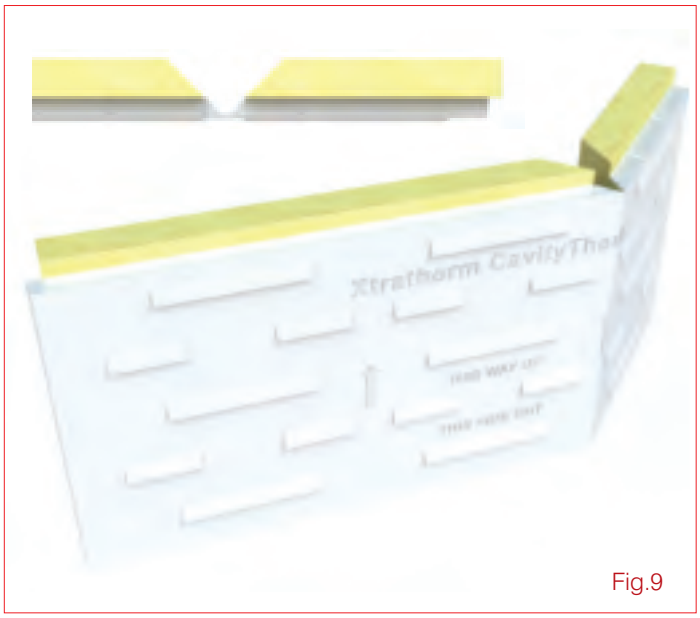
Remove the end profile from the abutting board and fit tightly against the flattened surface of the first board. This pattern should be repeated with subsequent lifts repeating the position of the first board tight against the return wall. Alternate boards should be cut to different lengths to create a brick bonded pattern.

MITRED JUNCTION (Fig.4)

Alternatively the boards are cut at an angle to create a mitred junction, so that all interfaces are uninterrupted. All corner details should incorporate a vertical dpc, built in during the build process (see Fig.5). Pre-formed external corner panels are available from Xtratherm (Fig 9).

Damp proofing at lintels and sills should be provided with stop-ends and weep holes.

Boards should be protected from weather during breaks in the installation.



Preformed corner panels *(currently not included in BBA certification)*

Technical Details/General Notes

CavityTherm built into a traditional 100mm cavity using standard foundations, building skills and materials achieves U-values as low as 0.16W/m²K

Description

CavityTherm, a PIR board faced with a composite foil facing on both sides, bonded to profiled high impact polystyrene (HIP) skin on the exposed face with tapered flutes to provide a drainage plane and shed water away from the internal leaf. Each board incorporates a specially designed rebated edging, enabling the boards to interlock when installed and is suitable for use as built-in full fill thermal insulation in new external masonry cavity walls up to 12 m in height in domestic and non-domestic buildings at cavity widths, external finishes and exposure zones as defined within BBA 10/4786. Building Regulations standards or where necessary NHBC requirements should be adhered to, contact the local Building Control or NHBC office before work commences. Each board is marked to identify the correct orientation for installation

Product Codes

CavityTherm: 150mm - CT/PIR150. 125mm - CT/PIR125. 100mm - CT/PIR100. 90mm - CT/PIR90. 75mm - CT/PIR075.
CavityTherm Pre-formed external Corner Boards: 150mm - CT/PIRCRN150. 125mm - CT/PIRCRN125. 100mm - CT/PIRCRN100. 90mm - CT/PIRCRN090. 75mm - CT/PIRCRN075.

Specifications Clause

The built in full fill cavity wall insulation shall be Xtratherm CT/PIR _ _ _ mm thick manufactured to EN ISO 9001:2000 by Xtratherm, comprising a CFC/HCFC free rigid Polyisocyanurate (PIR) core, lambda 0.021 between low emissivity foil facings with engineered outer skin. The wall insulation shall be installed in accordance with instructions issued by Xtratherm. Refer to NBS clause F30 151, F30 12.

Available Sizes

Length	1200mm
Width	450mm
Thickness	75mm / 90mm /100mm / 125mm / 150mm

Other sizes and thicknesses available dependent on quantity and lead time.

Physical Properties

Typical Density (foam core) is 30 Kg/m³
Compressive Strength >100 kPa @ 10%
Thermal Conductivity 0.021 W/mK when tested using BS EN 13165: 2001.
Service Temperature range from -20°C to +100°C

Moisture Vapour Transmission

Walls will limit the risk of interstitial condensation adequately when they are designed and constructed in accordance with BS 5250 : 2002, Section 8 and Annex D. If the product is to be used in the external wall of rooms expected to have high humidity, care must be taken to provide adequate permanent ventilation to avoid possible problems from the formation of interstitial condensation in the internal wall leaf.

Fixings

Wall ties conforming to BS 1243 : 1978 should be used. The type and spacing of wall ties is dependant on geographical area, cavity width, wall length and height, and opening sizes. They should be placed at centres recommended by manufacturers to suit the wall specification and placed within the pre-formed notches of the CavityTherm.

Cutting

Xtratherm CavityTherm Boards can be readily cut using a sharp knife or fine toothed saw.

Electrical Services

When running electric cables through any insulation, advice given in the BRE publication 'Thermal insulation: avoiding risks' and BS 7671: 2001 should be followed.

Durability

Xtratherm products are stable, rot proof and durable. They will remain an effective insulant for the life of the building.

Availability

Xtratherm products are available through builder's merchants throughout Ireland and the UK.
For the location of your nearest stockist contact Xtratherm.

Packaging, Handling & Storage

Xtratherm products are wrapped in polythene packs and each pack is labelled with details of grade/type, size and number of pieces per pack. Xtratherm products should be stored off the ground, on a clean, flat surface and must be stored under cover. The polythene wrapping of an Xtratherm pack is not considered adequate protection for outside exposure. Boards should be protected from weather during breaks in the installation.

Health & Safety

All Xtratherm products are safe to use and chemically inert.

Environmental

Cert. No.10/4786

Technical Support

Xtratherm Technical Support team provide a single point of contact to offer assistance on a wide range of issues for both the designer and builder and can be contacted by phone, fax or email. Full details of all Xtratherm products, along with full technical literature can be downloaded from the website at:

www.xtratherm.com

Xtratherm®

Xtratherm Limited
Kells Road Navan
Co Meath
Ireland

Tel: 046 90 66000
Fax: 046 90 66090
Email: info@xtratherm.com

Xtratherm UK Limited
Park Road, Holmewood
Chesterfield, Derbyshire
S42 5UY

Tel: 0371 222 1033
Fax: 0371 222 1044
Email: info@xtratherm.com

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