Xtratherm Ltd
Liscarton Industrial Estate
Kells Road
Navan
Co Meath
Ireland

Tel: 00 353 46 9066000 Fax: 00 353 46 9066090
e-mail: info@xtratherm.com
website: www.xtratherm.com

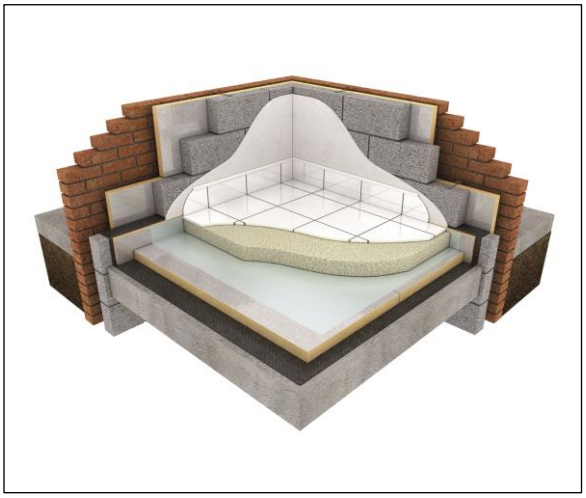
Agrément Certificate
12/4956
Product Sheet 6

XTRATHERM XTROLINER (XO)

XTRATHERM XTROLINER UNDERFLOOR INSULATION (XO/UF)

This Agrément Certificate Product Sheet(1) relates to Xtratherm Xtroliner Underfloor Insulation (XO/UF), comprising rigid polyisocyanurate (PIR) foam boards with a textured aluminium foil-facing on both sides, for use as insulation in ground-bearing or suspended concrete ground floors or between the joists of suspended timber ground-floors, in new and existing domestic buildings.

(1) Hereinafter referred to as 'Certificate'.



CERTIFICATION INCLUDES:

- factors relating to compliance with Building Regulations where applicable
- factors relating to additional non-regulatory information where applicable
- independently verified technical specification
- assessment criteria and technical investigations
- design considerations
- installation guidance
- regular surveillance of production
- formal three-yearly review.

KEY FACTORS ASSESSED

Thermal performance — the product has a declared thermal conductivity (λ_D) of 0.021 $W \cdot m^{-1} \cdot K^{-1}$ (see section 6).

Condensation risk — the product can contribute to limiting the risk of condensation (see section 7).

Floor loading — the product, when installed in accordance with this Certificate, can support a design loading for domestic applications (see section 9).

Durability — the product is dimensionally stable and, when installed with the overlays specified, will remain effective as an insulating material for the life of the building (see section 12).

The BBA has awarded this Certificate to the company named above for the product described herein. This product has been assessed by the BBA as being fit for its intended use provided it is installed, used and maintained as set out in this Certificate..

On behalf of the British Board of Agrément

Date of First issue: 7 June 2018

John Albon – Head of Approvals
Construction Products

Claire Curtis-Thomas
Chief Executive

The BBA is a UKAS accredited certification body – Number 113.
The schedule of the current scope of accreditation for product certification is available in pdf format via the UKAS link on the BBA website at www.bbacerts.co.uk
Readers are advised to check the validity and latest issue number of this Agrément Certificate by either referring to the BBA website or contacting the BBA direct.
Any photographs are for illustrative purposes only, do not constitute advice and should not be relied upon.

Regulations

In the opinion of the BBA, Xtratherm Xtroliner Underfloor Insulation (XO/UF), if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements of the following Building Regulations (the presence of a UK map indicates that the subject is related to the Building Regulations in the region or regions of the UK depicted):

The Building Regulations 2010 (England and Wales) (as amended)

Requirement:	**A1**	**Loading**
Comment:		The product can contribute to satisfying this Requirement. See section 9.2 of this Certificate.
Requirement:	**C2(c)**	**Resistance to moisture**
Comment:		The product can contribute to satisfying this Requirement. See sections 7.1 and 7.5 of this Certificate.
Requirement:	**L1(a)(i)**	**Conservation of fuel and power**
Comment:		The product can contribute to satisfying this Requirement. See section 6 of this Certificate.
Regulation:	**7**	**Materials and workmanship**
Comment:		The product is acceptable. See section 12 and the *Installation* part of this Certificate.
Regulation:	**26**	**CO_2 emission rates for new buildings**
Regulation:	**26A**	**Fabric energy efficiency rates for new dwellings (applicable to England only)**
Regulation:	**26A**	**Primary energy consumption rates for new buildings (applicable to Wales only)**
Regulation:	**26B**	**Fabric performance values for new dwellings (applicable to Wales only)**
Comment:		The product can contribute to satisfying these Regulations, although compensating fabric /service measures may be necessary. See section 6 of this Certificate.

The Building (Scotland) Regulations 2004 (as amended)

Regulation:	**8(1)**	**Durability, workmanship and fitness of materials**
Comment:		The product is acceptable. See section 12 and the *Installation* part of this Certificate.
Regulation:	**9**	**Building standards applicable to construction**
Standard:	1.1(b)	Structure
Comment:		The product can contribute to satisfying this Standard, with reference to clause 1.1.1(1). See section 9.2 of this Certificate.
Standard:	3.15	Condensation
Comment:		The product can contribute to satisfying this Standard, with reference to clauses 3.15.1(1), 3.15.4(1) and 3.15.5(1). See sections 7.1 and 7.6 of this Certificate.
Standard:	6.1(b)	Carbon dioxide emissions
Standard:	6.2	Building insulation envelope
Comment:		The product can contribute to satisfying these Standards, with reference to clauses or parts of clauses 6.1.1(1), 6.1.6(1), 6.2.1(1), 6.2.3(1), 6.2.4(1), 6.2.6(1), 6.2.7(1), 6.2.9(1), 6.2.10(1), 6.2.11(1) and 6.2.13(1). See section 6 of this Certificate.

Standard:	7.1(a)(b)	Statement of sustainability
Comment:		The product can contribute to satisfying the relevant requirements of Regulation 9, Standards 1 to 6, and therefore will contribute to a construction meeting a bronze level of sustainability as defined in this Standard. In addition the product can contribute to a construction meeting a higher level of sustainability as defined in this Standard with reference to clauses 7.1.4(1) [Aspects 1(1) and 2(1)], 7.1.6(1) [Aspects 1(1) and 2(1)] and 7.1.7(1) [Aspect 1(1)]. See section 6 of this Certificate.
Regulation:	**12**	**Building standards applicable to conversions**
Comment:		Comments made in relation to this product under Regulation 9, Standards 1 to 6, also apply to this Regulation, with reference to clause 0.12.1(1) and Schedule 6(1).

(1) Technical Handbook (Domestic).

The Building Regulations (Northern Ireland) 2012 (as amended)

Regulation:	**23**	**Fitness of materials and workmanship**
Comment:		The product is acceptable. See section 12 and the *Installation* of this Certificate.
Regulation:	**29**	**Condensation**
Comment:		The product can contribute to satisfying this Regulation. See section 7.1 of this Certificate.
Regulation:	**30**	**Stability**
Comment:		The product can contribute to satisfying this Regulation. See section 9.2 of this Certificate.
Regulation:	**39(a)(i)**	**Conservation measures**
Regulation:	**40(2)**	**Target carbon dioxide emission rate**
Comment:		The product can contribute to satisfying these Regulations. See section 6 of this Certificate.

Construction (Design and Management) Regulations 2015
Construction (Design and Management) Regulations (Northern Ireland) 2016

Information in this Certificate may assist the client, designer (including Principal Designer) and contractor (including Principal Contractor) to address their obligations under these Regulations.

See section: 3 *Delivery and site handling* (3.3) of this Certificate.

Additional Information

NHBC Standards 2018

In the opinion of the BBA, Xtratherm Xtroliner Underfloor Insulation (XO/UF), when installed and used in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements in relation to *NHBC Standards*, Chapter 5.1 *Substructure and ground bearing floors,* and 5.2 *Suspended ground-floors.*

CE marking

The Certificate holder has taken the responsibility of CE marking the product in accordance with harmonised European Standard BS EN 13165 : 2012. An asterisk (*) appearing in this Certificate indicates that data shown is given in the manufacturer's Declaration of Performance.

Technical Specification

1 Description

1.1 Xtratherm Xtroliner Underfloor Insulation (XO/UF), comprises rigid polyisocyanurate (PIR) foam boards with textured foil-facing on both sides.

1.2 The nominal characteristics of the product is given in Table 1 of this Certificate.

Table 1 Nominal characteristics

Length* (mm)	2400
Width* (mm)	1200
Thickness* (mm)	25 – 150 in 5mm increments
Flatness* (length ≤ 2.5 m)	Area ≤ 0.75 m^2 : Deviation ≤ 5mm Area > 0.75 m^2 : Deviation ≤ 10 mm
Minimum compressive strength at 10% compression* (kPa)	150
Edge profile	Square

1.3 Ancillary items used with this product, but outside the scope of this Certificate, are:

- saddle clips
- galvanized nails
- pre-treated battens
- acrylic adhesive foil tape
- damp-proof membrane (dpm)
- vapour control layer (VCL)

2 Manufacture

2.1 Raw materials are injected onto the lower foil-facer on a conveyor belt. The exothermic reaction expands the foam, which comes into contact with the upper foil-facer. An automated process cures the product and cuts it to the required size .

2.2 As part of the assessment and ongoing surveillance of product quality, the BBA has:

- agreed with the Certificate holder/manufacturer the quality control procedures and product testing to be undertaken
- assessed and agreed the quality control operated over batches of incoming materials
- monitored the production process and verified that it is in accordance with the documented process
- evaluated the process for management of nonconformities
- checked that equipment has been properly tested and calibrated
- undertaken to carry out the above measures on a regular basis through a surveillance process, to verify that the specifications and quality control operated by the manufacturer are being maintained.

2.3 The management system of Xtratherm Ltd has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2008 and BS EN ISO 14001 : 2004 by the Loss Prevention Certification Board (Certificates 851 and EMS 718 respectively).

3 Delivery and site handling

3.1 The product is delivered to site shrink-wrapped in polythene-wrapped packs containing a label with the product description and characteristics, the manufacturer's name and the BBA logo incorporating the number of this Certificate.

3.2 It is essential that the product is stored such that it is raised off the ground, inside or under cover on a flat, dry, level surface in a well-ventilated area. The product must be protected from rain, snow and prolonged exposure to sunlight. Boards that have been allowed to get wet or damaged must not be used. Nothing should be stored on top of the boards.

3.3 The products must not be exposed to open flame or other ignition sources, or to solvents or other chemicals.

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on Xtratherm Xtroliner Underfloor Insulation (XO/UF).

Design Considerations

4 Use

4.1 Xtratherm Xtroliner Underfloor Insulation (XO/UF) is suitable for use as floor insulation and is effective in reducing the thermal transmittance (U value) of ground-bearing or suspended concrete ground-floors, or between the joists of suspended timber ground floors, in new or existing domestic buildings. The product can also be used on suitably designed beam-and-block floors incorporating Type R2 semi-resisting or resisting blocks to BS EN 15037-2 : 2009 and self-bearing beams to BS EN 15037-1 : 2008.

4.2 Ground-bearing floors should only be used where the depth of compacted fill is less than 600 mm and is defined as non-shrinkable. Shrinkable fills are defined as material containing more than 35% fine particles (silt and clay) and having a plasticity Index of 10% or greater (shrinkable fills are susceptible to clay heave).

4.3 Ground-bearing concrete and suspended concrete ground-floors incorporating the product must include a suitable damp-proof membrane (dpm), laid beneath the insulation, in accordance with the relevant sections of CP 102 : 1973, and BS 8215 : 1991 (see sections 13.5 and 13.6 of this Certificate).

4.4 Suspended concrete or timber ground-floors incorporating the insulation boards must include suitable ventilation of the sub-floor void (minimum 150 mm void between the underside of the floor and the ground surface) or a dpm. For suspended floors in locations where clay heave is anticipated, an additional void of up to 150 mm may be required to accommodate the possible expansion of the ground below the floor. In such cases where the risk of clay heave has been confirmed by geotechnical investigations by a competent individual, a total void of up to 300 mm may be required.

4.5 The overlay to the insulation boards should be:

- a VCL as required (see section 7.3)

and:

- a cement-based floor screed of minimum 65 mm thickness(1), laid in accordance with the relevant clauses of BS 8204-1 : 2003 and/or BS 8204-2 : 2003, and BS 8000-9 : 2003

or

- a wood-based floor, eg tongue-and-groove plywood to BS EN 636 : 2012, flooring grade particle board (Types P5 to P7) to BS EN 312 : 2010 or oriented strand board (OSB) of type OSB/3 or OSB/4 to BS EN 300 : 2006, of a suitable thickness (to be determined by a suitably qualified and experienced individual), installed in accordance with DD CEN/TS 12872 : 2007 and BS EN 12871 : 2010

or

- a concrete slab to BS EN 1992-1-1 : 2004.

(1) NHBC only accept ground-bearing floor slabs with at least 100 mm thick concrete including monolithic screed.

4.6 Where a concrete screed or slab finish is to be laid directly over the product, a polyethylene separating layer/VCL must be installed between the insulation and the concrete to prevent chemical attack and seepage between the boards (see section 13.7). Any gaps between insulation boards or around service openings, visible prior to installing the concrete, must be filled with expanding foam or strips of insulation.

4.7 Loadbearing internal walls must not be built on the insulation.

5 Practicability of installation

The product is designed to be installed by a competent general builder, or a contractor, experienced with this type of product.

6 Thermal performance

6.1 Calculations of the thermal transmittance (U value) of a floor should be carried out in accordance with BS EN ISO 6946 : 2007, BS EN ISO 13370 : 2007 and BRE Report BR 443 : 2006 using the declared thermal conductivity (λ_D)* of 0.021 $W \cdot m^{-1} \cdot K^{-1}$ and an aged foil surface emissivity(ε) (to BS EN 15976 : 2011) of 0.03.

6.2 The U value of a completed floor will depend on the insulation thickness, the perimeter/area ratio and the floor type. Calculated U values for example constructions are given in Table 2.

Table 2 Example U values — ground-floor construction

Floor Type	Target U value ($W \cdot m^{-2} \cdot K^{-1}$)	P/A ratio				
		0.2	0.4	0.6	0.8	1.0
Ground-bearing concrete floor(1)(4)	0.13	90	115	125	130	135
	0.15	70	95	105	110	115
	0.20	40	65	75	80	80
	0.22	30	55	65	70	75
	0.25	25	45	55	60	60
Suspended concrete ground-floor(2)(4)	0.13	105	120	130	130	135
	0.15	85	100	110	110	115
	0.20	50	70	75	80	80
	0.22	40	60	65	70	70
	0.25	30	50	55	60	60
Suspended timber ground-floor(3)	0.13	165(5)	195(5)	-	-	-
	0.15	130	160(5)	170(5)	175(5)	180(5)
	0.20	75	105	115	125	125
	0.22	60	90	100	110	110
	0.25	45	75	85	90	95

(1) Ground-bearing concrete floor construction (Xtroliner Underfloor insulation on top of slab, under screed finish) 65 mm concrete screed λ = 1.15 $W \cdot m^{-1} \cdot K^{-1}$, polyethylene separating layer, Xtroliner Underfloor insulation, dpm, 100 mm concrete oversite, 150 mm sand-blinded hardcore.

(2) Suspended concrete ground-floor construction (Xtroliner Underfloor insulation on top of beam and block, below screed finish) – 65 mm concrete screed λ = 1.15 $W \cdot m^{-1} \cdot K^{-1}$, polyethylene separating layer, Xtroliner Underfloor insulation, beam and block floor (12%) Beam λ = 2.00 $W \cdot m^{-1} \cdot K^{-1}$, dense block infill λ = 1.13 $W \cdot m^{-1} \cdot K^{-1}$, ventilated void.

(3) Suspended timber ground-floor construction (Xtroliner Underfloor insulation between floor joists) – Floor deck thermal resistance 0.169 $m^2 \cdot K \cdot W^{-1}$ (based on 22 mm chipboard λ= 0.13 $W \cdot m^{-1} \cdot K^{-1}$), Xtroliner Underfloor insulation (87%) between 47 mm wide joists at 400 mm centres. The depth of the joists = 100 to 200 mm depending on the depth of insulation between floor joists (13%) based on BR 443 (nogging every 3 metres at 38 mm wide).

(4) Edge insulation used – Xtroliner Underfloor insulation (25 mm thick x 65 mm high).

(5) Thickness created by using 2 boards.

Junctions

6.3 The product can contribute to maintaining continuity of thermal insulation at junctions with other elements and minimise thermal bridges and air infiltration. Detailed guidance can be found in the documents supporting the national Building Regulations.

7 Condensation risk

Interstitial condensation

7.1 Floors will adequately limit the risk of interstitial condensation when they are designed and constructed in accordance with BS 5250 : 2011 Annex F and the relevant guidance.

7.2 For the purposes of assessing the risk of interstitial condensation, the insulation core vapour resistivity may be taken as approximately 300 $MN \cdot s \cdot g^{-1} \cdot m^{-1}$ and the resistance value of each individual foil-facing taken as 7000 $MN \cdot s \cdot g^{-1} \cdot$.

7.3 When the product is used above the dpm on a ground-bearing or suspended floor, a VCL is installed on the warm side of the insulation to limit the risk of interstitial condensation, unless a risk assessment shows this is not necessary.

7.4 For suspended timber ground floors, it is not necessary to introduce a VCL as long as adequate sub-floor cross ventilation is provided.

Surface condensation

7.5 Floors will adequately limit the risk of surface condensation when the thermal transmittance (U value) does not exceed 0.7 $W \cdot m^{-2} \cdot K^{-1}$ at any point, and the junctions with walls are designed in accordance with section 6.3 of this Certificate.

7.6 Floors will adequately limit the risk of surface condensation when the thermal transmittance (U value) does not exceed 1.2 $W \cdot m^{-2} \cdot K^{-1}$ at any point. Guidance may be obtained from BS 5250 : 2011 Annex F. Further guidance may be obtained from BRE Report BR 262 : 2002 and section 6.3 of this Certificate.

8 Behaviour in relation to fire

8.1 The product has a reaction to fire classification* of C-s2,d0 to BS EN 13501-1 : 2007.

8.2 When properly installed, the product will not add significantly to any existing fire hazard. The product will be contained within the floor by the overlay until the overlay itself is destroyed. Therefore, the product will not contribute to the development stages of a fire or present a smoke or toxic hazard.

9 Floor loading

9.1 The product has a minimum compressive strength (compressive stress at 10% deformation* to BS EN 826 : 2013) of 150kPa.

9.2 The product is suitable for domestic occupancies defined in this Certificate when covered with a suitable floor overlay (see section 4.5), and is capable of resisting a uniformly distributed load of 1.5 $kN \cdot m^{-2}$ or a concentrated load of 2 kN for category A1 and A2 (domestic) situations as defined in BS EN 1991-1-1 : 2002, and National Annex Table NA.2. Further assessment is necessary in the case of duty walkways and floors subject to physical activities.

9.3 The performance of the floor construction will depend on the insulation properties and type of floor overlay used (including thickness and strength). When the product is used under a concrete slab, resistance to concentrated and distributed loads is a function of the slab specification. Further guidance on the suitability of floor overlays can be found in BS EN 13810-1 : 2002, DD CEN/TS 13810-2 : 2003, BS 8204-1 : 2003 and BS EN 312 : 2010, and from the flooring manufacturer.

10 Incorporation of services

10.1 De-rating of electrical cables should be considered where installation restricts air cooling of cables; the product must not be used in direct contact with electrical heating cables or hot water pipes. Where underfloor heating systems are to be used, the advice of the Certificate holder should be sought.

10.2 Where possible, electrical conduits, gas and water pipes or other services should be contained within ducts or channels within the concrete slab of ground-bearing floors. Where this is not possible, the services may be accommodated within the insulation, provided they are securely fixed to the concrete slab. Electric cables should be enclosed in a suitable conduit. With hot pipes the insulation must be cut back to maintain an air space.

10.3 Where water pipes are installed below the insulation they must be pre-lagged with close-fitting pipe insulation. Pipes installed above the insulation will not require lagging, although some provision needs to be made for expansion and contraction.

10.4 Where the product is installed on a floor of a suspended beam-and-block design, all services must be installed so as not to impair the floor performance.

10.5 On overlay board floors, in situations where access to the services is desirable, a duct may be formed by mechanically fixing to the floor, timber bearers of the same thickness as the insulation to provide support for a particle board cover. The duct should be as narrow as possible and not exceed 400 mm in width or the maximum particle board spans given in DD CEN/TS 12872 : 2007 without intermediate support. Services should be suitably fixed to the floor base and not to the insulation boards.

10.6 On suspended timber ground floors all the services should be incorporated beneath the existing floor, above the insulation if possible.

11 Maintenance

As the product is confined within the floor by the overlay and has suitable durability (see section 12), maintenance is not required.

12 Durability

The product is rot-proof, dimensionally stable and, when installed with the overlays specified in this Certificate, will remain effective as an insulating material for the life of the building in which it is incorporated.

Installation

13 General

13.1 Installation of Xtratherm Xtroliner Underfloor Insulation (XO/UF) must be in accordance with the Certificate holder's instructions and the requirements of this Certificate.

13.2 Typical methods of installation are shown in Figures 1 to 6. Reference should also be made to BRE Report BR 262 : 2002.

Figure 1 Ground-bearing concrete floor – screed overlay

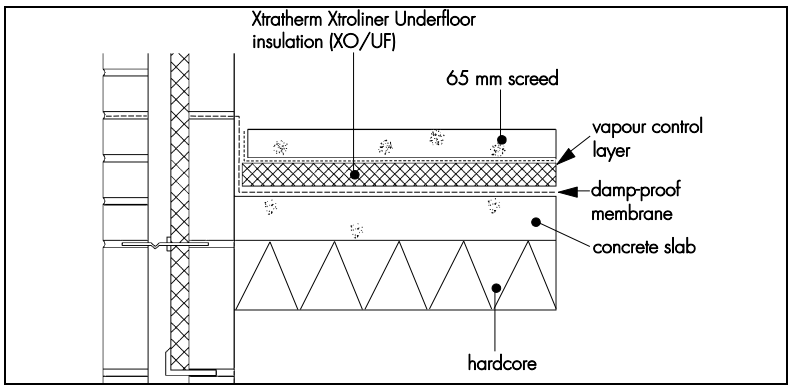


Figure 2 Suspended concrete ground floor – screed overlay

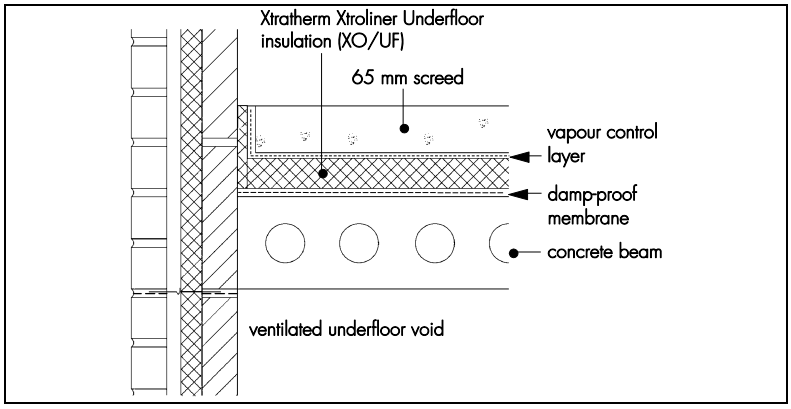


Figure 3 Ground-bearing concrete - slab overlay

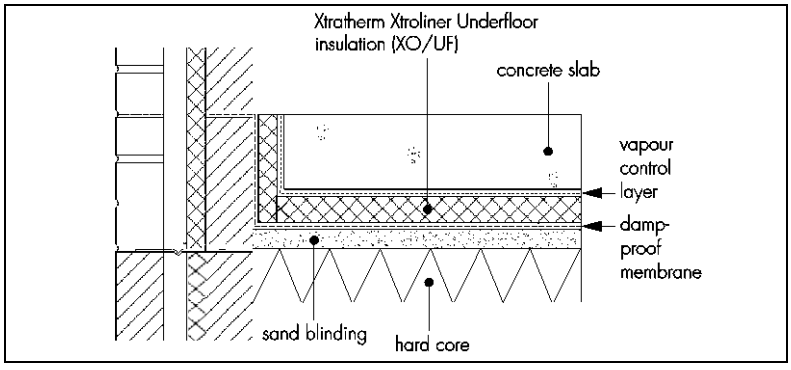


Figure 4 Ground-bearing concrete floor – board overlay

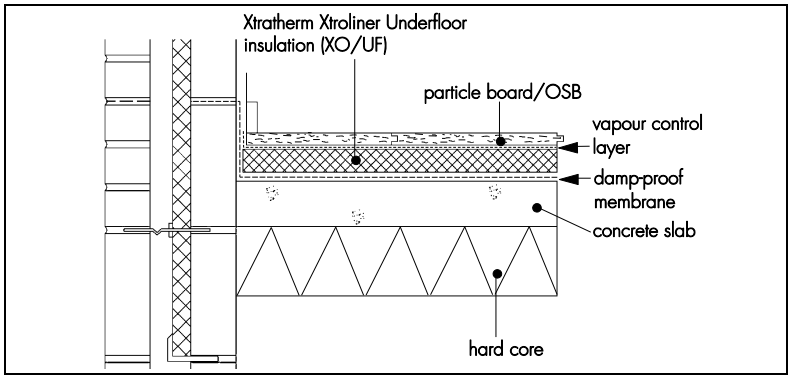


Figure 5 Suspended concrete ground floor – board overlay

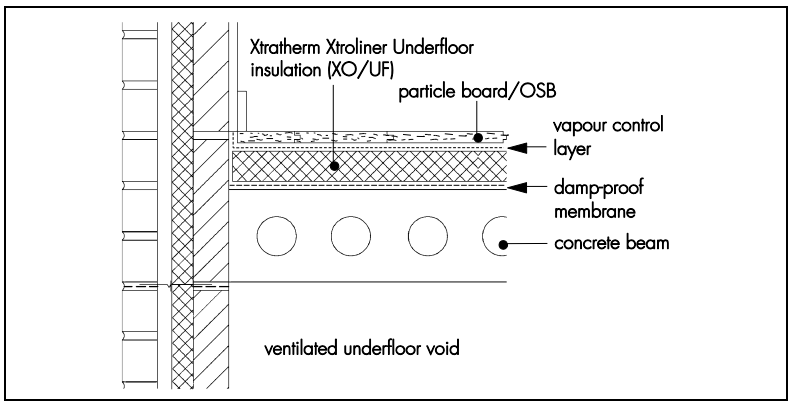
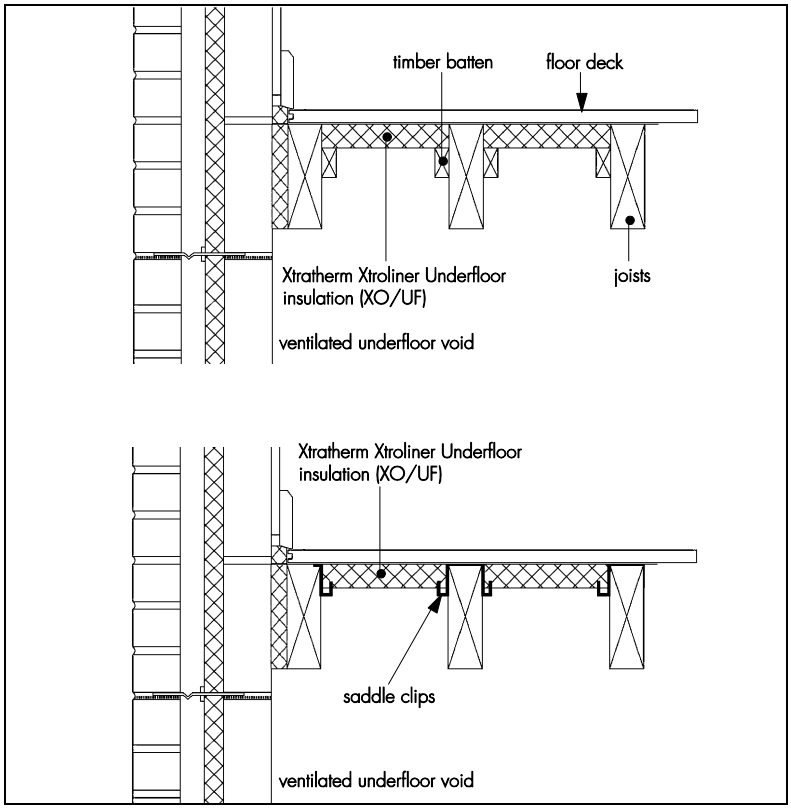


Figure 6 Suspended timber ground floors



13.3 In ground-bearing concrete floors, the concrete floor slab over which the boards are to be laid should be left for as long as possible to maximise drying out and dissipation of constructional moisture, in accordance with BS 8203 : 2001, Section 3.1.2.

13.4 The concrete floor surface should be smooth, level and flat to within 5 mm when measured with a two-metre straight-edge. Irregularities greater than this must be removed. Minor irregularities (up to 10 mm deep) may be levelled with mortar or thin screed.

13.5 Where the insulation is used over ground-bearing concrete floor slabs, a suitable dpm in accordance with CP 102 : 1973 should be laid to resist moisture from the ground. If a liquid-type dpm is applied to the slabs, it should be of a type compatible with the product and be allowed to dry out fully before laying the insulation.

13.6 Where the insulation is used on hardcore bases beneath ground-bearing concrete slabs, the hardcore must be compacted and blinded with a thin layer of sand before application of the dpm, followed by the insulation boards.

13.7 A VCL is installed on the warm side of the insulation to inhibit the risk of interstitial condensation if necessary (see section 7.3). Where a concrete screed or slab finish is to be laid directly over the product, a polyethylene separating layer/VCL must be installed between the insulation and the concrete to prevent chemical attack and seepage between the boards.

13.8 Where a screed or concrete slab is laid over the insulation, vertical upstands of insulation should be provided and be of sufficient depth to fully separate the screed or slab from the wall. If used, a suitable cavity wall insulation material should be extended below the dpc level to provide edge insulation to the floor.

13.9 To limit the risk of condensation and other sources of dampness, the insulation and overlays should only be laid after the construction is made substantially weathertight, eg after glazing. During construction, the insulation and overlay must be protected from damage by traffic and moisture sources such as water spillage and plaster droppings.

14 Procedure

14.1 The product is cut to size (using a sharp knife or fine-toothed saw), as necessary, and laid with closely butted, staggered cross-joints, ensuring all spaces are completely filled.

14.2 The laying pattern should ensure that all cut edges are at the perimeter of the floor or some other feature, eg matwells, thresholds or access ducts. Spreader boards should be used to protect the insulation.

Cement-based screed overlay

14.3 Perimeter edge pieces are cut and placed around the edges and taped at joints. A polyethylene VCL, at least 0.125 mm thick (500 gauge), is laid over the insulation. The VCL should have 150 mm overlaps, taped at the joints and turned up 100 mm at the walls. A properly compacted screed of minimum thickness 65 mm is then laid over. The relevant clauses of BS 8204-1 : 2003 should be followed.

Timber-based board overlay

14.4 Before installing the overlay, preservative-treated timber battens, in accordance with BS 8417 : 2011, are positioned at doorways and access panels. Adequate time should be allowed for preservatives to be fixed, and the solvents from solvent-based preservatives to evaporate.

14.5 Where the insulation is laid above a dpm, a polyethylene VCL of at least 0.125 mm (500 gauge) thickness is laid between the insulation and the timber board overlay. The VCL should have 150 mm overlaps, taped at the joints and turned up 100 mm at the walls.

14.6 Timber based overlay boards as specified in section 4.5 are laid with staggered cross-joints, in accordance with DD CEN/TS 12872 : 2007 and BS EN 12871 : 2010.

Concrete slab overlay (ground-bearing only)

14.7 Perimeter edge pieces are cut and placed around the edges and taped at the joints. A polyethylene VCL, minimum 0.125 mm thick (500 gauge), is laid over the insulation. The VCL should have 150 mm overlaps, taped at the joints and turned up 100 mm at the walls. The concrete slab is laid to the required thickness in accordance with BS 8000-9 : 2003 and BS 8204-1 : 2003.

Suspended timber floor

14.8 Insulation boards can be supported between timber joists using either saddle clips or timber beads. Where timber beads are used, a void may be incorporated above the insulation to accommodate services, if required.

14.9 Saddle clips are placed at intervals not exceeding 1 m along the timber floor joists. Where the product is to be installed on only one side of the joist, twin clips can be cut into single clips and nailed into place with galvanized nails.

14.10 If saddle clips are not used, the product may be retained using preservative-treated timber battens. The battens should be wide enough to retain the product in place and secured with corrosion-protected nails at a depth that will accommodate the thickness of the product.

14.11 The product should be cut to fit tightly between joists and pushed down onto the spikes of the saddle clips, or onto the beads. Small gaps should be insulated with cut strips of the product.

Technical Investigations

15 Tests

An examination was made of test data relating to:

- dimensional accuracy
- dimensional stability
- load compression characteristics
- thermal conductivity
- compressive strength
- water vapour resistance
- diffusion-tight property of facings
- reaction to fire

16 Investigations

16.1 The manufacturing process was examined, including the methods adopted for quality control, and details were obtained of the quality and composition of the materials used.

16.2 A condensation risk analysis was carried out

16.3 A series of U value calculations was carried out.

Bibliography

BS 5250 : 2011 *Code of practice for control of condensation in buildings*

BS 8000-9 : 2003 *Workmanship on building sites — Cementitious levelling screeds and wearing screeds — Code of practice*

BS 8203 : 2001 *Code of practice for installation of resilient floor coverings*

BS 8204-1 : 2003 *Screeds, bases and in-situ floorings — Concrete bases and cement sand levelling screeds to receive floorings — Code of practice*

BS 8204-2 : 2003 *Screeds, bases and in-situ floorings — Concrete wearing surfaces — Code of practice*

BS 8215 : 1991 *Code of practice for design and installation of damp-proof courses in masonry construction*

BS 8417 : 2011 *Preservation of wood — Code of practice*

BS EN 300 : 2006 *Oriented Strand Boards (OSB) — Definitions, classification and specifications*

BS EN 312 : 2010 *Particleboards — Specifications*

BS EN 636 : 2012 *Plywood — Specifications*

BS EN 826 : 2013 *Thermal Insulating Products for Building Applications — Determination of Compression Behaviour*

BS EN 1991-1-1 : 2002 Eurocode 1 : Actions on structures — General actions — Densities, self-weight, imposed loads for buildings
NA to BS EN 1991-1-1 : 2002 UK National Annex to *Eurocode 1 : Actions on structures — General actions— Densities, self-weight, imposed loads for buildings*

BS EN 1992-1-1 : 2004 *Eurocode 2 : Design of concrete structures — General rules and rules for buildings*

BS EN 12871 : 2010 *Wood-based panels — Performance specifications and requirements for load bearing boards for use in floors, walls and roofs*

BS EN 13165 : 2012 *Thermal insulation products for buildings — Factory made rigid polyurethane foam (PU) products — Specification*

BS EN 13501-1 : 2007 + A1 : 2009 *Fire classification of construction products and building elements — Classification using test data from reaction to fire tests*

BS EN 13810-1 : 2002 *Wood-based panels — Floating floors — Performance specifications and requirements*

BS EN 15037-1 : 2008 *Precast concrete products — Beam-and-block floor systems — Beams*

BS EN 15037-2 : 2009 *Precast concrete products — Beam-and-block floor systems — Concrete blocks*

BS EN 15976 : 2011 *Flexible sheets for waterproofing — Determination of emissivity*

BS EN ISO 6946 : 2007 *Building components and building elements — Thermal resistance and thermal transmittance — Calculation method*

BS EN ISO 9001 : 2008 *Quality management systems — Requirements*

BS EN ISO 13370 : 2007 *Thermal Performance of Buildings — Heat Transfer via the Ground — Calculation Methods*

BS EN ISO 14001 : 2004 *Environmental Management systems — Requirements with guidance for use*

CP 102 : 1973 *Code of practice for protection of buildings against water from the ground*

DD CEN/TS 12872 : 2007 *Wood-based panels — Guidance on the use of load-bearing boards in floors, walls and roofs*

DD CEN/TS 13810-2 : 2003 *Wood-based panels — Floating floors — Test methods*

BRE Report (BR 262 : 2002) *Thermal insulation: avoiding risks*

BRE Report (BR 443 : 2006) *Conventions for U-value calculations*

17 Conditions

17.1 This Certificate:

- relates only to the product/system that is named and described on the front page
- is issued only to the company, firm, organisation or person named on the front page – no other company, firm, organisation or person may hold claim that this Certificate has been issued to them
- is valid only within the UK
- has to be read, considered and used as a whole document – it may be misleading and will be incomplete to be selective
- is copyright of the BBA
- is subject to English Law.

17.2 Publications, documents, specifications, legislation, regulations, standards and the like referenced in this Certificate are those that were current and/or deemed relevant by the BBA at the date of issue or reissue of this Certificate.

17.3 This Certificate will remain valid for an unlimited period provided that the product/system and its manufacture and/or fabrication, including all related and relevant parts and processes thereof:

- are maintained at or above the levels which have been assessed and found to be satisfactory by the BBA
- continue to be checked as and when deemed appropriate by the BBA under arrangements that it will determine
- are reviewed by the BBA as and when it considers appropriate.

17.4 The BBA has used due skill, care and diligence in preparing this Certificate, but no warranty is provided.

17.5 In issuing this Certificate the BBA is not responsible and is excluded from any liability to any company, firm, organisation or person, for any matters arising directly or indirectly from:

- the presence or absence of any patent, intellectual property or similar rights subsisting in the product/system or any other product/system
- the right of the Certificate holder to manufacture, supply, install, maintain or market the product/system
- actual installations of the product/system, including their nature, design, methods, performance, workmanship and maintenance
- any works and constructions in which the product/system is installed, including their nature, design, methods, performance, workmanship and maintenance
- any loss or damage, including personal injury, howsoever caused by the product/system, including its manufacture, supply, installation, use, maintenance and removal
- any claims by the manufacturer relating to CE marking.

17.6 Any information relating to the manufacture, supply, installation, use, maintenance and removal of this product/system which is contained or referred to in this Certificate is the minimum required to be met when the product/system is manufactured, supplied, installed, used, maintained and removed. It does not purport in any way to restate the requirements of the Health and Safety at Work etc. Act 1974, or of any other statutory, common law or other duty which may exist at the date of issue or reissue of this Certificate; nor is conformity with such information to be taken as satisfying the requirements of the 1974 Act or of any statutory, common law or other duty of care.

British Board of Agrément
Bucknalls Lane
Watford
Herts WD25 9BA

tel: 01923 665300
clientservices@bbacerts.co.uk
www.bbacerts.co.uk