Ravago
BUILDING SOLUTIONS

RAVATHERM™ XPS X

Insulating applications below DPC with Ravatherm XPS X

Photo courtesy of R-Wall

Insulating applications below DPC with Ravatherm XPS X Version 1 20260720
To check the latest version for this document, please visit:
https://ravagobuildingsolutions.com/uk/en/product-information-versions/

BBA APPROVAL INSPECTION TESTING CERTIFICATION
CERTIFICATE 21/5866

MADE IN BRITAIN®
All Ravatherm XPS X products are Made in Britain

Insulating areas susceptible to damp conditions and vulnerable to moisture ingress - basements, swimming pools & cavity walls below damp proof course (DPC) level.

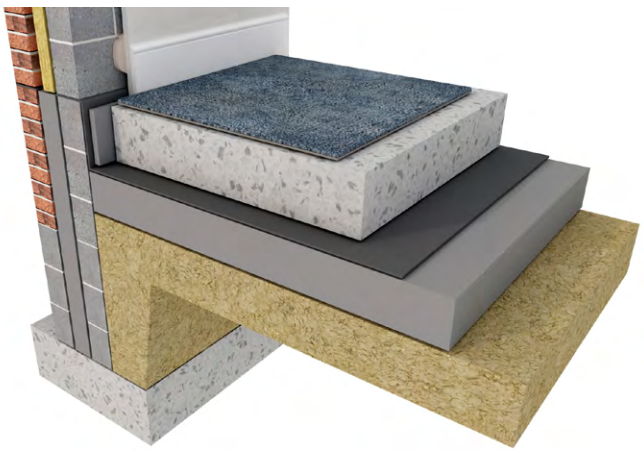
About Ravatherm XPS X

Ravatherm XPS X is designed for use in applications where architects and specifiers are looking to specify a product that has a high level of moisture resistance to provide added reassurance that the insulation used is resistant to ground moisture.

Due to the low water absorption[1] and freeze-thaw resistance[2] properties of XPS it is commonly used to insulate areas that will be susceptible to water ingress such as basements, swimming pools, spas and to the cavity wall below DPC level.

Ravatherm XPS X has proven performance in places exposed to damp conditions below ground which makes it suitable for use in a wide range of demanding insulation applications:

- **Low thermal conductivity**[3] of 0.030 – 0.031 W/m.K- minimising the board thickness needed to achieve a specific U-value
- **High compressive strength**[4] of 300 kPa – in load-bearing applications, the closed cell structure gives the foam great rigidity and makes it highly resistant to compression
- **Low water absorption**[1] – Ravatherm XPS X has natural resistance to moisture which makes it an exceptionally stable material, it retains its thermal and structural performance in exposed conditions over the long term.



1 Long term water absorption by total immersion to BS EN 12087:2013 < 0.7%
2 Water pick up after Freeze Thaw to BS EN 12091:2013 < 1%
3 Thermal Conductivity Declared to BS EN 13164:2012+A1:2015
4 Compressive Strength @ 10% Deformation to BS EN 826:2013

Cavity Walls

Insulation used below DPC level in cavity walls should be moisture resistant and to minimise the risk of thermal bridging precautions should be taken to ensure that the insulation in the cavity wall extends below floor slab level, it is also good practice to always include insulation vertically to the perimeter of the floor.

Ravago recommends fully filling the cavity below DPC level when using Ravatherm XPS X 300 SB. This ensures the insulation remains in position and delivers the maximum thermal performance to the junction detail. A cavity tray should be installed over the insulation and the insulation continued within the cavity to a minimum of 225mm below the top of the perimeter upstand insulation. The insulation can be continued further to improve the thermal efficiency of the junction detail if required.

Basements

As well as reducing heat loss to the ground, floor insulation also assists in satisfying requirements for thermal comfort.

Heat loss from a family house can come from basement and/or cellar walls. In order to reduce energy consumption, achieve a pleasant indoor climate and prevent surface condensation, rooms in direct contact with the soil should have thermal insulation specified. The specification of thermal insulation to unheated areas or unused basement/ cellars can also be useful to prevent the development of cold bridges at footings or to avoid undesirable condensation occurring at junctions within the basement.

External insulation is the preferred option for basements as the whole structure is kept warm, with negligible risk of surface condensation. The insulation should be placed up against the waterproofing membrane. Only closed-cell insulation materials which are highly resistant to water absorption and freeze-thaw are recommended, closed cell extruded polystyrene (XPS), such as Ravatherm XPS X, is an effective insulation solution for these environments as the boards have very low water absorption, do not support mould growth, will not suffer from excessive compression or fall out of place.

Swimming pools

The advantages of extruded polystyrene boards are particularly evident around pool structures. The closed cell structure gives negligible water absorption and zero capillarity, which means it can also be successfully used when the insulation is laid directly on a sand bed before placing a waterproof concrete pool base.

Extruded polystyrene boards are non-biodegradable, so their use does not impart any risk to the ground or water environment. External insulation of the pool retaining walls follows simply once the walls are in place.

Insulating the structure of heated swimming pools reduces heat loss to the surrounding ground and the need for energy to maintain water temperature. Where pools are installed within a building then the surrounding floor U value may dictate the thickness of insulation around the pool recess and Building Control should be consulted to determine requirements for the floor and pool.

EWI

XPS can be used to insulate external walls but is only commonly used in such systems below DPC level. If render is being applied to the insulation it would be recommended to contact the render manufacturer to advise on whether their render system is suitable for application onto Ravatherm XPS X.

Ravatherm XPS X has a smooth naturally formed skin on its surface and so the skin of the insulation may need to be manually roughened to provide a suitable surface for the render system to adhere to.

Installation

Ravatherm XPS X thermal insulation in the floor slab beneath the building should be laid only on precisely prepared substrate. The insulation boards should be laid with joints offset in a brick bond pattern, and staggered between layers directly onto a level smooth compacted sand bed or a thin blinding layer of concrete.

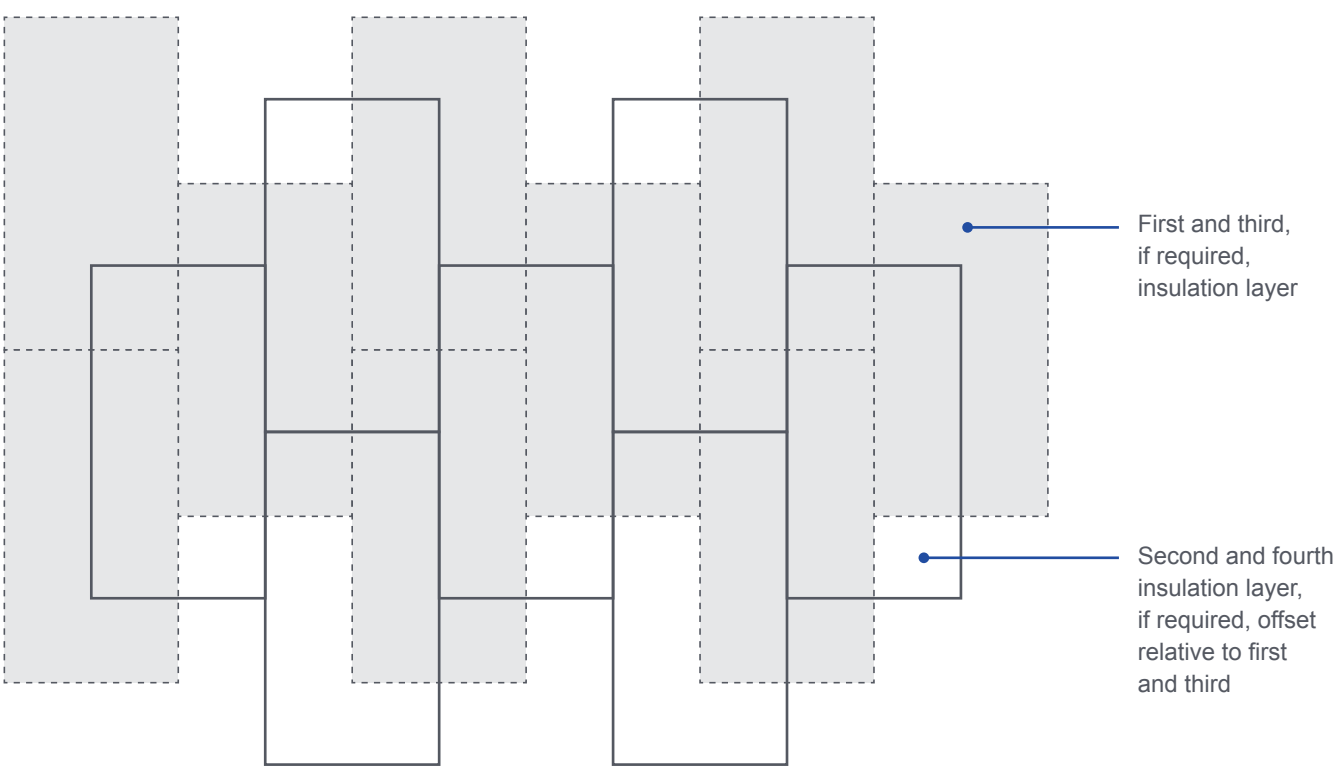
The boards can be cut to size with a hot wire cutter, knife or small-tooth saw. Cut surfaces should allow the boards to be fitted tightly together.

Due to the tolerances that Ravatherm XPS X can withstand in damp and wet conditions it enables for the insulation to be laid directly onto prepared ground with a DPM positioned on top of the insulation rather than below, in doing so this only acts not only as a damp proof membrane but also a separation layer to stop seepage of concrete or screed through any insulation joints.

When the DPM is positioned below the insulation an additional separating membrane should *always* be placed over the insulation and below the concrete/screed to stop seepage though any insulation joints. If a gas membrane has been specified this would normally be positioned beneath the insulation.

When installing Ravatherm XPS X insulation to basement or pool walls the boards can be simply bonded with polyurethane solvent-free adhesive foam applied to the external face of the waterproof reinforced concrete or blockwork retaining wall. Adhesive should be bead-applied (with minimum three strips per board) to wall surfaces.

The insulation boards should be installed with tight joints and in a brick pattern, in either a horizontal or vertical position on the pool wall. Ravatherm XPS X boards must stand on a firm base area at the foot to avoid sliding when compacting with free draining backfill.



Technical

Resistance to water

Ravatherm XPS X is tested to BS EN 12087:2013 and BS EN 12088:2013 respectively and these results provide added reassurance that the insulation will resist moisture in areas insulated by the insulation.

- BS EN 12087:2013 - Long term water absorption by total immersion < 0.7 % WL(T)
- BS EN 12088:2013 - Water pick-up by diffusion < 1 % WD(V)

Loadings

In determining the load bearing capacity of a structure containing a thermal insulation layer, under permanent and live loads, the Design Compressive Strength value of the insulation should be used (DCS is the load that if applied as a uniformly distributed load for 50 years then max compression 2%).

The compressive creep performance for Ravatherm XPSX is tested and declared. This demonstrates the long term performance of the insulation whilst in situ and with loads applied over 50 years.

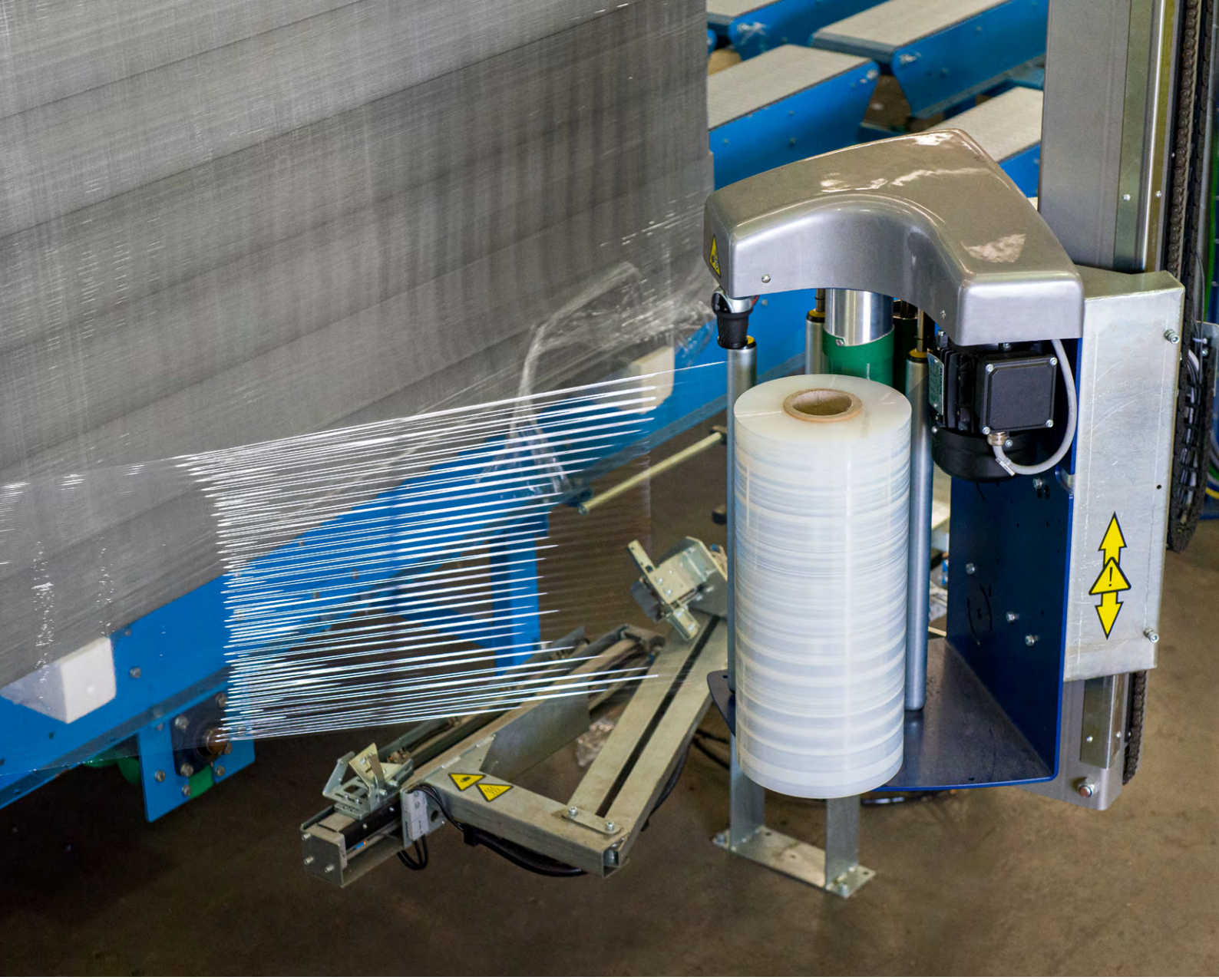
- Ravatherm XPS X 300 SB and Ravatherm XPS X 300 SL: 130 kN/m^2
- Ravatherm XPS X 500 SL: 180 kN/m^2
- Ravatherm XPS X 700 SL: 250 kN/m^2

This is determined in accordance with BS EN 1606:2013, which states an application period of 50 years and a maximum of 2% initial compression followed by a further 1.5% allowable compression. It requires a testing period from 122 days to 608 days, depending on the period of years being simulated – 10, 25 or 50 years.

A structural engineer should be consulted on the final choice of the appropriate material depending on the structure and type of construction.

Thermal performance

Ravatherm XPS X offers excellent thermal properties with a lambda value (also known as thermal conductivity) as low as 0.030 W/m.K - the lower this value the better its insulating capacity - making it one of the best thermally-performing extruded polystyrene insulation products available. This is declared as per BS EN 13164:2012+A1:2015.



Disclaimer

Recommendations about the methods, use of materials and construction details are given as a service to designers and contractors. These are based on the experience of Ravago with the use of Ravatherm XPS X.

Any drawings are meant only to illustrate various possible applications and should not be taken as a basis for design.

Since Ravago Building Solutions is a materials supplier and exercises no control over the installation Ravatherm XPS X products, no responsibility is accepted for such drawings and recommendations.

In particular, no responsibility is accepted by Ravago for the systems in which Ravatherm XPS X products are used or the method of application by which they are installed. The legal obligations of Ravago in respect of any sale of Ravatherm XPS X products shall be determined solely by the terms of the respective sales contract.

For technical enquiries, email:
technical.uk.rbs@ravago.com

Ravago Building Solutions
Estuary Road, King's Lynn PE30 2HJ

RavagoBuildingSolutionsUK

Note: The information and data contained in this brochure do not represent exact sales specifications. The features of the products mentioned may vary. The information contained in this document has been provided in good faith, however Ravago excludes as far as possible any liability relating to it and does not give any guarantee or assurance of product performance. It is the purchaser's responsibility to determine whether these Ravago products are suitable for the application desired and to ensure that the site of work and method of application conform with current legislation. No licence is hereby granted for the use of patents or other industrial or intellectual property rights. If Ravago products are purchased, we advise following the most up-to-date suggestions and recommendations.

Ravago
BUILDING
SOLUTIONS

RAVAGO BUILDING SOLUTIONS

Estuary Road
King's Lynn
PE30 2HJ

www.ravagobuildingsolutions.co.uk

General Enquiries
+44 3301 096138

BBA APPROVAL INSPECTION TESTING CERTIFICATION
CERTIFICATE 21/5866

UKAS MANAGEMENT SYSTEMS 0007

GREEN GUIDE BRE A

MADE IN BRITAIN®
All Ravatherm XPS X products are Made in Britain