SYNTHETIC
INSULATION

XPS
ON INVERTED ROOFS

BRAND NEW LOCAL **XPS INSULATION PRODUCTION SITE**

AMBIOR SITE

The SOPREMA insulation range is manufactured using the latest technologies in our own production factory. Since 2020, the new jewel in our crown has been the Ambior site in the Tongeren-Oost industrial zone.

MAMMOTH WITH A SMALL FOOTPRINT

Soprema's high-tech factory and central distribution centre, will produce and supply XPS insulation to all customers located in North West Europe. SOPRA XPS is an innovative alternative product for traditional insulation and is enjoying growing success among installers, advisers, and builder's merchants. In addition to being locally produced, this insulation material has a number of key advantages.

Summary

Rebate edge boards are preferable from hygrothermal, mechanical and implementation points of view.

The insulation protects the roofing against thermal shocks and UV-radiation for added durability. It also protects the roofing against mechanical damage.

1. Introduction

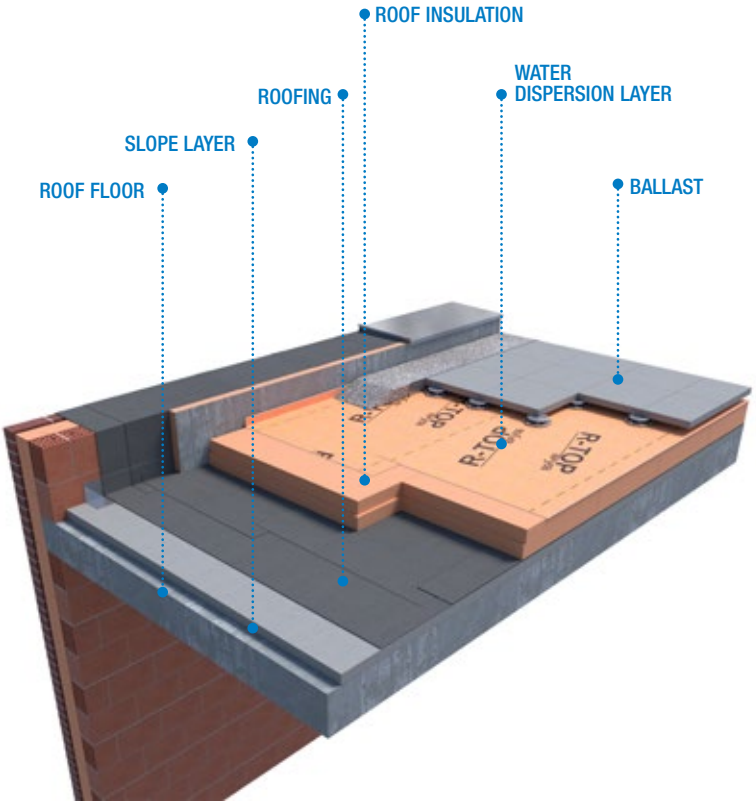
Notice: condensation issues may occur in spaces with climate class IV. In that case, a separate engineering study is recommended to determine the hygrothermal behaviour of the roof.

This manual describes the installation of XPS on inverted roofs. An inverted roof is characterised by an insulation layer that is placed on the waterproof roofing membrane. As such, it does not require an additional vapour barrier since the roofing underlay performs that function. The insulation must be ballasted, among other things because of resistance to wind loads.

Only extruded polystyrene (XPS) is suitable owing to its closed cell structure and its solid thermal and mechanical performance properties.

For inverted roofs, we recommend our SOPRAXPS 300 SL ES, SOPRAXPS 300 SL FS, SOPRAXPS 500 SL ES, SOPRAXPS 500 SL FS, SOPRAXPS 700 SL ES, SOPRAXPS 700 SL FS

depending on the required compressive strength and fire classification.


ROOF INSULATION
WATER
DISPERSION LAYER
ROOFING
SLOPE LAYER
ROOF FLOOR
BALLAST

2. User terms and requirements

At delivery and before installation, a quality check of the insulation boards is always required.

Soprema denies any liability for damage caused by visible defects of the insulation boards.

Damaged boards must not be processed. Therefore, all necessary measures should be taken to prevent damage of the rebate edges and any other product damage.

3. Health and safety

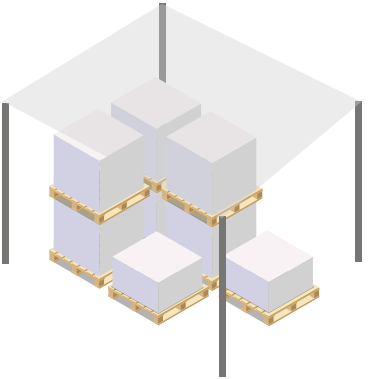
Local health and safety regulations must be complied with.

4. Storage and processing

Insulation boards should be stored flat in a dry environment away from direct sunlight. They must not be covered up with dark or black materials.

During storage, the insulation boards must not be exposed to:

- flames or other high temperature sources
- direct sunlight for a prolonged period, since UV-rays will attack the surface of the boards, potentially causing discolouration and slight pulverisation of the surface of the side exposed to the sunlight. However, the thermal performance of the boards remains unaffected;
- Materials that impair XPS



The insulation board can be installed in less favourable temperatures or during precipitation, but not in strong wind.

The insulation boards must be immediately ballasted after installation or, if applicable, after the water dispersion layer (e.g. gravel, tiles, concrete, …) has been laid.

The ballast protects the insulation boards from being blown away, pushed up or damaged by UV-rays.

Therefore, you should only install XPS boards if all the work can be completed on the same day.

5. Checklist on the construction site

Products		ok
SOPRAXPS 300 SL ES is a rigid thermal insulation board made of extruded polystyrene (XPS) foam. SOPRA XPS SL TO 300 ES SL is mainly used as thermal insulation, including floors and underground walls, flat and pitched roofs.		
SOPRAXPS 300 SL FS is a rigid thermal insulation board made of extruded polystyrene (XPS) foam		
SOPRAXPS 500 SL ES is a rigid thermal insulation board made of extruded polystyrene (XPS) foam. SOPRA XPS TO 500 ES SL is mainly used as thermal insulation for floors and car parks where a higher compressive strength is required.		
SOPRAXPS 500 SL FS is a rigid thermal insulation board made of extruded polystyrene (XPS) foam		
SOPRAXPS 700 SL ES is a rigid thermal insulation board made of extruded polystyrene (XPS) foam. SOPRA XPS 700 is mainly used as thermal insulation for floors and car parks where an extra-high compressive strength is required.		
SOPRAXPS 700 SL FS is a rigid thermal insulation board made of extruded polystyrene (XPS) foam		
Water dispersion layer ROOF 115 : A waterproof and vapour permeable geotextile made from non-woven polypropylene.		

SOPRAXPS upstand board is a rigid thermal insulation board made of extruded polystyrene (XPS) foam with on one side a hard cement-based facing.		

Tools		**ok**
Insulation saw A hand saw or, ideally, a (table-mounted) circular saw		
Box cutter To cut the water dispersion layer		

6. Construction site organisation

Certain third-party certified waterproofing and insulating systems are approved for use with zero falls but back falls are not acceptable and should be corrected.

In order to ensure a finished surface with a zero fall, a design fall of 1:80 should be used and a detailed structural analysis should account for construction tolerances, settlement and for deflection under load.

Where areas are found by a site level survey to have negative falls, i.e. will hold water, remedial action should be taken, e.g. localized screed or additional rainwater outlet

In both new constructions and renovations, the support structure must be checked to ensure that it is fit to carry the weight of the ballast layer.

A strength calculation must be carried out by the constructor in compliance with the national regulations.

7. Installation

Waterproof roofing:

The waterproofing should be installed in accordance with BS 8217 and BS 6229 2018.

The waterproofing will always be applied fully bonded

The system must be designed to allow drainage of any water present under the insulation boards. In addition, the roof surface must be flat and sufficiently smooth to prevent standing water.

For a renovation, existing roofing must be cleaned; bubbles removed and repaired; the height of upstands and rain water drainage must be adjusted.

Roof upstands:

Upstand insulation prevents extra heat loss.

Installation:

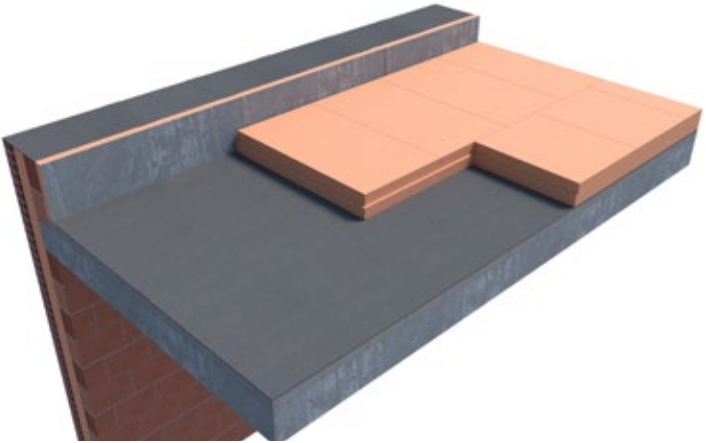
SOPRAXPS upstand boards can be placed loosely against the upstand in inverted roof applications

Insulation boards:

The thickness of the insulation board should comply with the local thermal regulations in force and meet with the client's wishes.

The insulation boards are installed as follows:

- Loose on the roofing
- In a single layer since any water between insulation boards will adversely affect their thermal performance and create a condensation risk in the lower insulation boards
- In broken bond
- Tightly connected to each other
- If necessary, always cut, saw or pierce the boards on site.



ROOF 115 water dispersion layer:

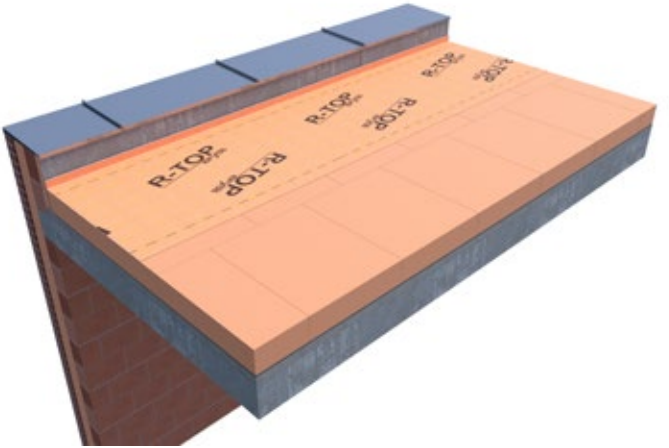
A water dispersion layer is recommended for all inverted roofs with ballast in order to achieve the correct Fx value.

ROOF 115 is light coloured, since dark water dispersion layers are unsuitable: a rise in heat due to sun exposure can damage the XPS insulation boards.

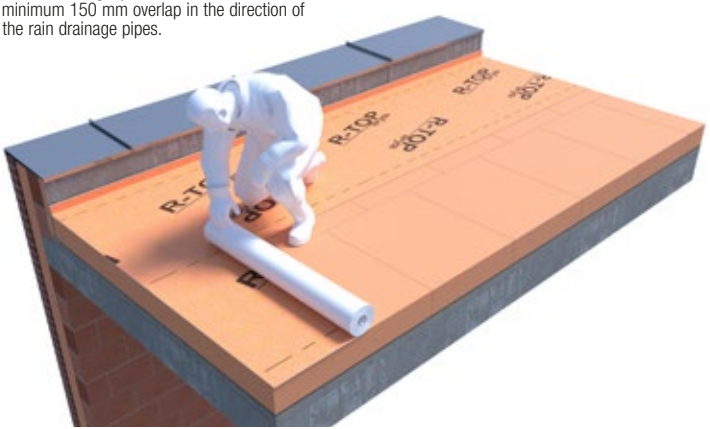
Installation:

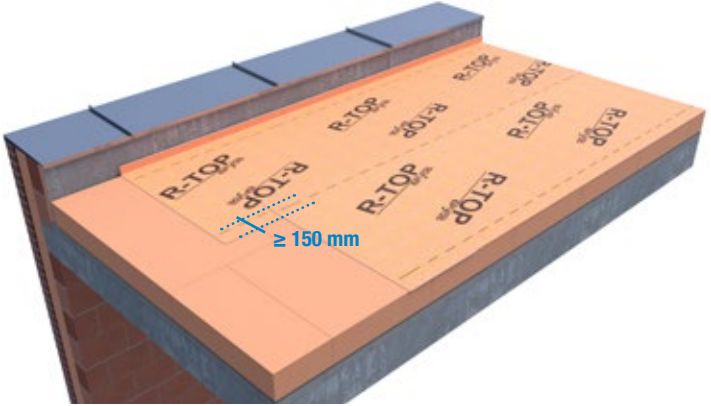
ROOF 115 is loose laid on the insulation boards, starting at the lower point.

ROOF 115 is placed upwards at upstands, around skylights and conducts, to at least the height of the top of the ballast layer.



The connecting layers are installed with a minimum 150 mm overlap in the direction of the rain drainage pipes.





Simply cut out the ROOF 115 to the shape of the water drain pipe to allow the water to drain away.

Notice: to prevent the insulation boards being damaged or blown away, apply the chosen ballast immediately after installation of the water dispersion layer.

Ballast:

Ballast protects the insulation boards against being blown away and/or pushed up by heavy rainfall. At the same time, it should be sufficiently vapour permeable.

A ballast layer supplies the following supplementary advantages:

- Limits the thermal stress on the roof
- Improves the fire behaviour thanks to cement or stone materials
- Protects the insulation boards against damages from UV radiation.

When checking wind resistance, the following important factors must be taken into account:

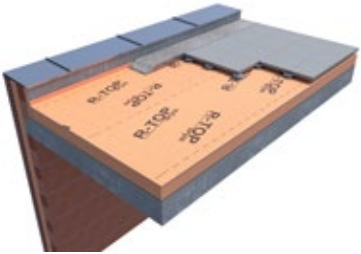
- Situation, form and height of the building
- Roof zones (edge, corner & middle zones)
- Edge finishing of the insulation boards, as these will influence the pressure differences between the upper and lower sides of the insulation boards.

The following ballast can be used:

- **1. Rounded pebble:**
  If you require a specialist calculation for high wind zones or extreme heights please contact soprema UK technical dept.

  The thickness of the gravel layer must be minimum 50 mm depth / 80 kg/m²

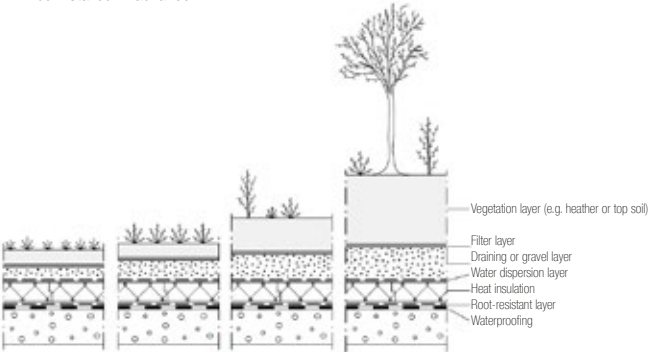
- **2. Paving slabs:**



- **3. Green roofs:**
  XPS insulation boards are suitable for both extensively and intensively planted green roofs.

  A draining layer with filter membrane is placed on top of the ROOF 115 water dispersion layer, before adding the substrate layer and the vegetation.

  The waterproofing beneath the XPS insulation must be root-resistant. If not, a root-resistant membrane must be installed in advance.

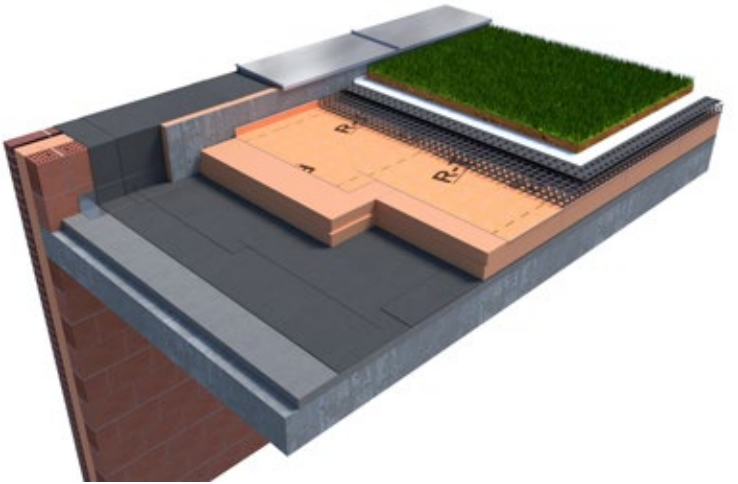


GREEN ROOFS		GARDEN ROOFS		
extensive planting		intensive planting		Vegetation
50-150mm	50-350mm	50-1000mm	≥1000mm	Vegetation height
≤90 mm	≤110 mm	≤240 mm	≥250 mm	Vegetatiion layer height
0,9 kN/m²	1,1 kN/m²	2,4 kN/m²	≥250 kg/m²	Surface weight of the vegetation layer
=±90 kg/m²	=±110 kg/m²	=±240 kg/m²		
±30 ℓ/m²	±45 ℓ/m²	±90 ℓ/m²	≥100 ℓ/m²	Possible water storage
manual	manual	manual or automatic	manual or automatic	irrigation

- **4. Blue roofs:**
  Can be created above the water flow reducing layer Roof 115 in an inverted roof, and should attenuate water for no more than a 24 hour period from the end of the maximum designed rainfall event.

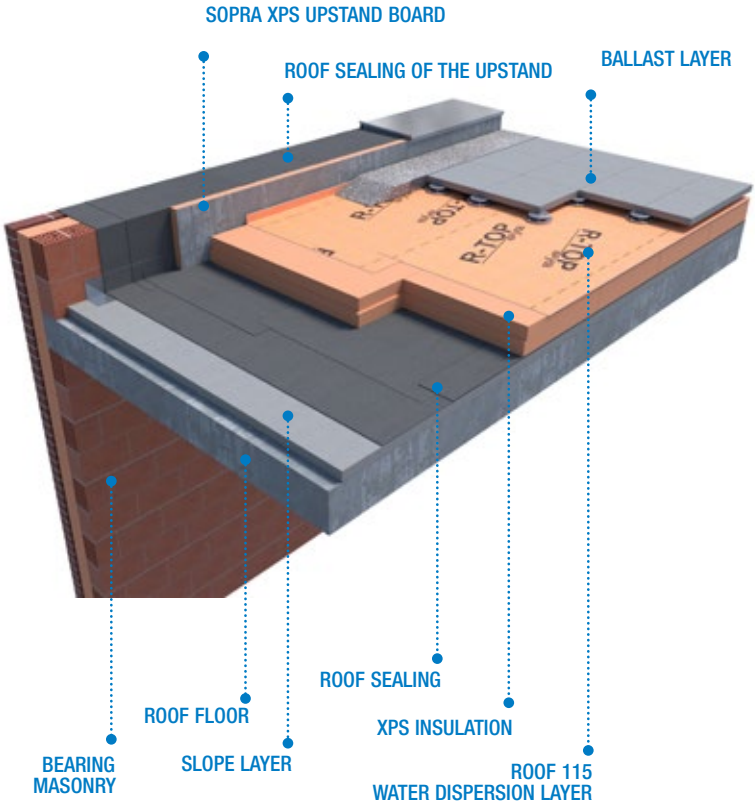
  A weight load calculation and the calculation of the number of outlets required must be done

  A blue roof can be installed on a design «zero fall of 180-0» and can be in a combination with a green roof



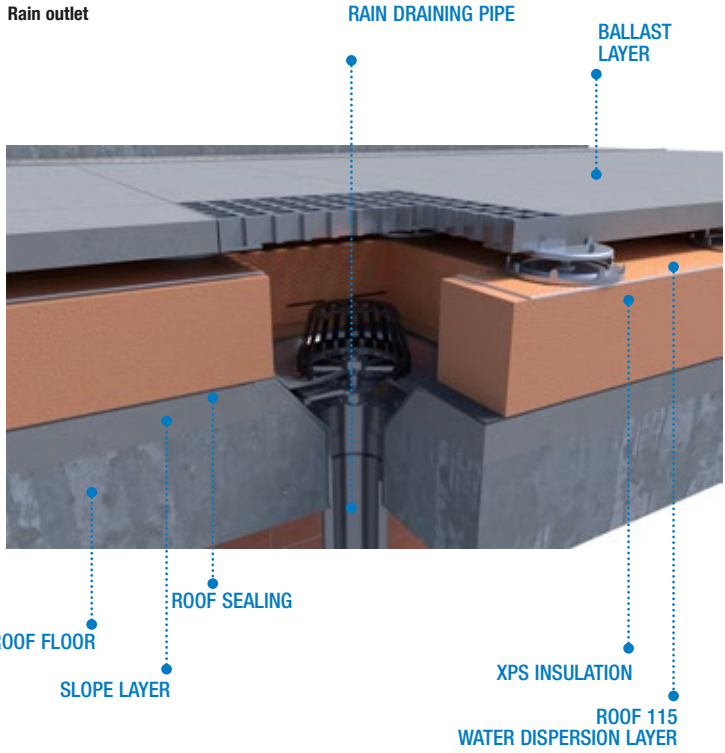
8. Details

Roof upstand



8. Details

Rain outlet



9. Maintenance

All roofs, including inverted roofs, benefit from regular maintenance checks.

The best time to check inverted roofs is after the autumn and winter period.

To be included:

- Check rain draining pipes and gutters to prevent puddles and obstructions
- Check the situation of ballast or tiles and adapt them if necessary
- Remove leaves, moss and other objects which may obstruct free water drainage
- Clean the space between water dispersion layer and tiles on tile carriers.

Maintenance of an inverted roof can require additional attention because of micro-organisms and vegetation grow between the insulation and the roof sealing due to heat.

A higher maintenance frequency may be needed where trees overhang the roof for example.

10. Certificates

Cradle to cradle certicate

11. References

For general installation on inverted roofs, we refer to the following documents:

- Technical files and DOPs of insulation boards available on www.soprema.be

- British standard :
  BS 8217
  BS 6229-2018

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SOPREMA SOLUTIONS

Do you have a question about one of our products and/or their application?

All information can be found at **www.soprema.co.uk**

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