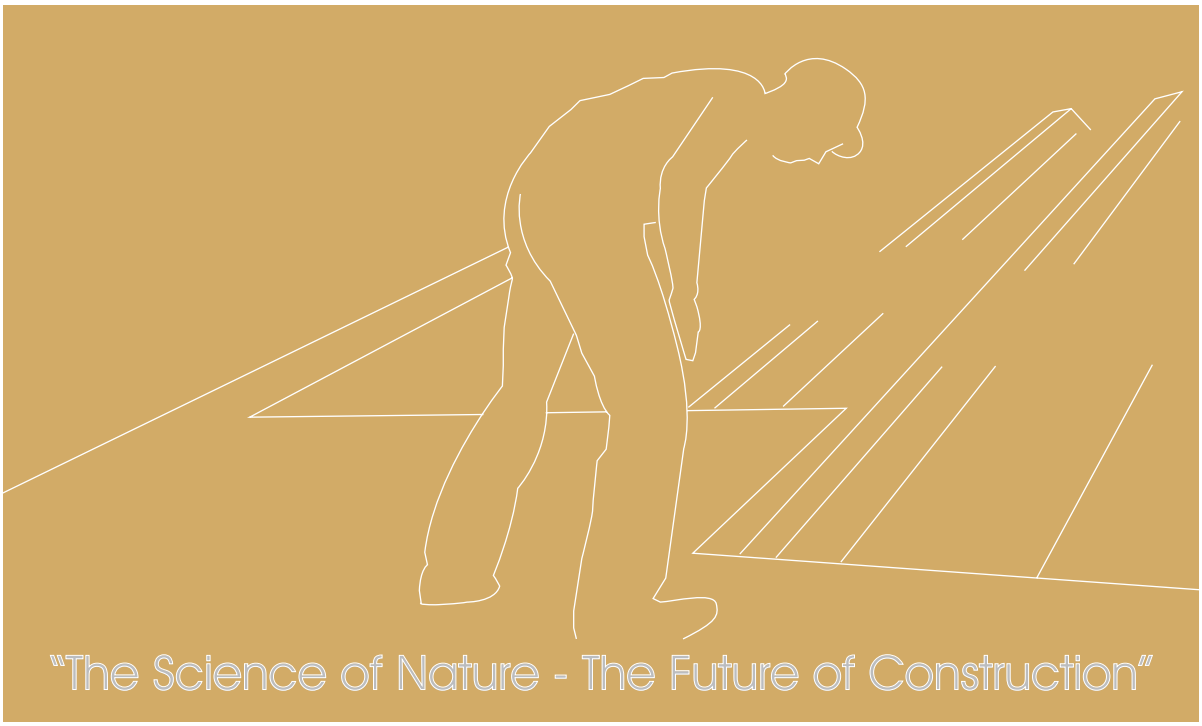
Isolair

Woodfibre Insulation



Isolair Insulation

"The Science of Nature – The Future of Construction"

Isolair – Table of Contents

Isolair Insulation

Pavatex Roofing Solutions

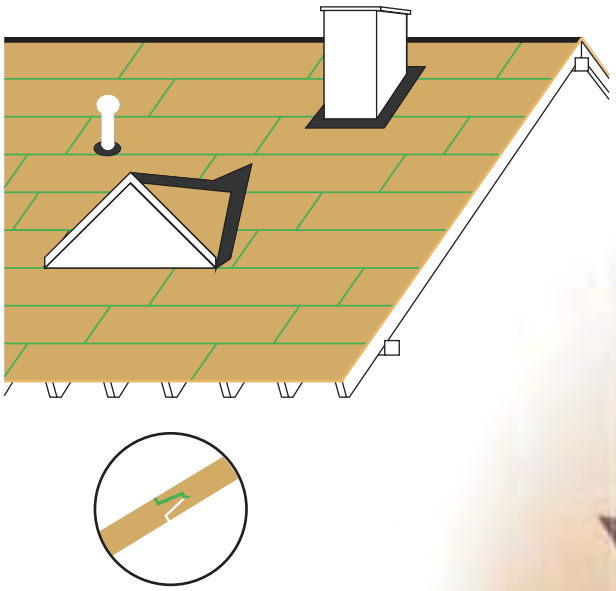
Insulation Sarking and airtightness all in one

- Cost effective
- Multifunctional
- High performance
- Robust
- Simple
- Breathable
- Controls summer overheating
- Ecological
- Used in of roofs in Switzerland
- Especially suitable for rooms in roofs

Cost Effective Solutions:

Pavatex boards are multi functional and can help save overall labour and material costs. By using Pavatex Isolair the following benefits can be achieved.

1. Reduction in the depth of rafters and inter rafter insulation (Isolair prevents cold bridging).
2. No membrane is required (Isolair is latex impregnated and acts as a sarking board).
3. No vapour check is required behind the plasterboard nor vents in the roof (Isolair it is fully vapour permeable and warm).
4. Air and wind tightness is guaranteed without the need for tapes and glues (Isolair is fully interlocking).



Plus the Added Benefits of:

- Ease of construction
- Robust detailing
- Excellent acoustic performance
- Summer overheating control
- Non Toxic or irritant
- Non hazardous with no restrictions on waste disposal
- Sustainable material

Isolair board on low cost houses in Greenock

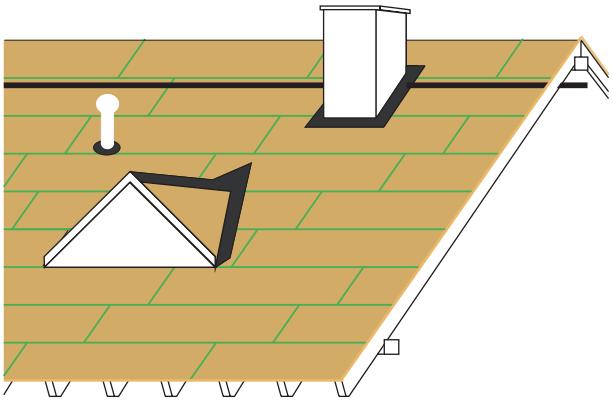
Architect: John Gilbert Architects

Applications

Isolair on Roofs

Isolair is suitable for over rafter insulation in both pitched and flat roofing applications. It provides a vapour permeable insulation and sarking layer that offers excellent thermal and acoustic performance without the need for membranes.

On pitches over 20° no additional tapes or glues are required , except around openings and ridges. NBT provides tapes for these applications and glues for pitches below 20°.



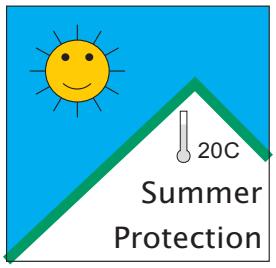
Isolair boards are interlocking on all four sides providing complete water and windtightness, as well as a continuous insulation layer thus reducing thermal bridging.

Latex impregnation through the board structure offers continued protection even if the board surface is slightly damaged unlike conventional membranes that often become punctured during installation causing them to fail. The boards can withstand a 3 months exposure period without a roof or wall covering, whilst continuing to protect the building.

Isolair in Walls

Isolair can also be used directly onto timber or metal studwork, onto timber in constructions that are to be covered with a rain screen or cladding outer layer, including facing brickwork.

No membranes are required, making design and installation simpler, quicker.



The density and specific heat capacity of the boards gives a reduction in the average temperature within a building space, typically around 4°C, compared to a construction of the same U value using only mineral or plastic based insulation. This substantially improves comfort and reduces the need for air conditioning.

Isolair Insulation

Pitched Roofs

- Cost Effective
- Multi-functional
- Excellent Acoustic Performance
- Good Thermal Insulation
- Simple Construction
- Reduces Thermal Bridging
- Highly Vapour Permeable
- Reduces Summer Overheating
- Ecologically Sound
- Used in 40% of Swiss Roofs
- Non Toxic and Non Irritant
- Easy to Use

Specification

Pitched Roofs

Specification

Isolair boards of (*specify thickness*) thickness should be supported by at least two rafters spaced at a maximum of (*specify distance*) mm at all times.

Working from eaves to ridge lay Pavatex Isolair boards of (*specify thickness*) thickness over rafters in staggered bond pattern with board tongue facing up slope and joints full engaged.

Temporarily secure board with one (*specify make*) fixing part no: (*specify part no:*) per rafter.

Isolair boards should cut using either Pavatex knife edge jigsaw blades part no PAVZK, or by a wavy edge insulation knife or by circular saw with a fine toothed tungsten carbide tipped blade.

For roof pitches >20° boards are laid dry - no glueing required.

For pitches of between 10° and 20° apply a bead of Pavatex Isoroof glue part no PAVZG using a Pavatex glue gun part no PAVZGG to the upper face of each tongue before fitting next board.

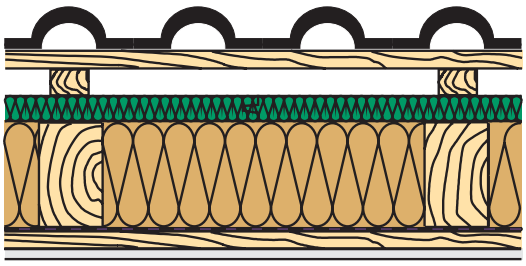
For pitches <10° refer to NBT for advice

Apply Pavatex Pavatape part no PAVZT over board joints at valleys, ridges and around chimneys, rooflights and other penetrations. Joints should be dry, clean and primed to ensure good adhesion .

Notes:
Pavatex Tape should be applied before fitting counterbattens.
Always apply Pavatex primer part no PAVZTA with a brush or roller to board and abutment surfaces and allow to dry for between 30 and 60 minutes dependent on temperature (@ 20°C ca 30min / @5°C ca 60min) prior to fixing Pavatex tape.
Pavatape should not be applied if the temperature is below 5°C.

Fix directly through counterbatten and Isolair into rafter using (*specify qty*) (*specify make*) part no (*specify part no:*) fixings per linear metre rafter.

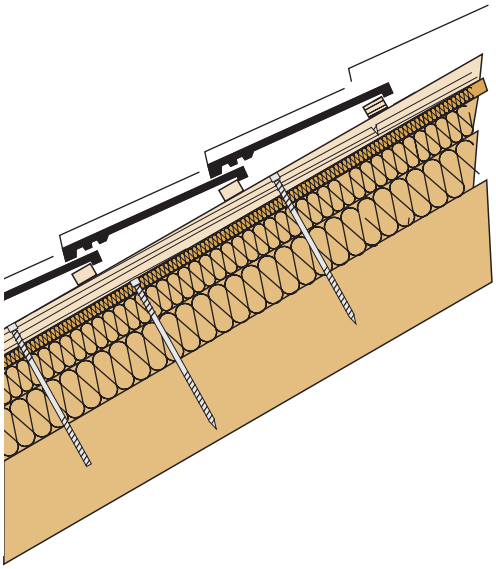
Fix battens and tiles using conventional roofing techniques.



Max Rafter Centres

- Max. 0.85m with Isolair 22
- Max. 1.00m with Isolair 35
- Max 1.10m with Isolair 52 & 60

(Boards must be supported by at least 2 rafters.)



Isolair Insulation

Thermal Performance – U Values

U values (Typical New Build)

Isolair over rafters @ 600 centres (8% bridging) with insulation of K =.040 between – finished internally with 12.5mm plasterboard (without foil) with skim finish.

Table 1

Isolair	Rafter Depth with K=0.040 Insulation between. 100mm	150mm	175mm
22mm	0.34	0.25	0.22
35mm	0.31	0.23	0.21
52mm	0.28	0.22	0.19
60mm	0.27	0.21	0.18

Isolair over rafters @ 600 centres (8% bridging) with insulation of K =.040 between – finished internally with 12.5mm plasterboard (without foil) with skim finish.

Table 2

Isolair	Rafter Depth with K=0.035 Insulation between. 100mm	150mm	175mm
22mm	0.32	0.23	0.20
35mm	0.29	0.21	0.19
52mm	0.26	0.20	0.18
60mm	0.25	0.19	0.17

U values – (Typical Retrofit)

Isolair over 100 mm rafters @ 400 centres (15% bridging) with insulation of K =.035 between – finished internally with options as shown.

Table 3

Isolair	40mm Pavatherm Floor NK under rafters
22mm	0.24
35mm	0.23
52mm	0.21
60mm	0.20

Table 4

Isolair	60mm Pavatherm Floor NK under rafters
22mm	0.22
35mm	0.21
52mm	0.19
60mm	0.18

Table 5

Isolair	No Insulation under rafters
22mm	0.35
35mm	0.32
52mm	0.28
60mm	0.27

Thermal Performance
Decrement Delay

Isolair: Overheating Control

As part of the design of roof it is important to understand about protection from summer overheating, particularly when there are rooms in roofs, or buildings such as schools and halls open to the roof.

The easiest way to measure this is by decrement delay. This means the time it will take a constant temperature on the outside of a structure to reach the inside. It is a common misconception that insulation protects against overheating, when actually this is a function of density and specific heat capacity (the same factors that give thermal storage inside a structure). The ideal decrement delay is 12 hours or over, which will balance the heat emitted from a roof evenly through night and day in the summer. Inversely (depending on design) the use of materials with high density and specific heat capacity will help provide good thermal storage and balance of temperature when the room is heated from inside in the colder seasons. Pavatex Isolair has an excellent combination of specific heat capacity (2100J/kgK) and density (240kg/m3) which far exceeds any conventional insulation material. This means that with Isolair a lightweight structure such as a roof or timberframe wall can perform as though it was a mass structure. The consequence is the reduction of internal temperatures by 4° C or more in summer in structures which may have the same U value.

Decrement delay examples:

	Isolair 35mm over 150mm rafters filled with mineral wool	Isolair 60mm over 150mm rafters filled with mineral wool	22mm Isolair over 200mm Pavatherm
U Value	0.23 W/m2K	0.19 W/m2K	0.17 W/m2K
Isolair Roof Decrement Delay	6.9 Hours	8.6 Hours	13.7 Hours
Conventional Roof Decrement Delay *	2 Hours	2.2 Hours	2.2 Hours
Improvement	4.9 Hours	6.4 Hours	11.5 Hours

* Approximate Decrement delay of Roof construction to same U Value

Decrement delay can be calculated on request by NBT. There may be a small charge for this.

Acoustic Performance

Isolair: Acoustic Performance

Pavatex Woodfibre boards have excellent acoustic properties. Sound insulation depends on density, air resistance, and airtightness all of which are provided by Isolair boards.

The density of Isolair boards is 240kg/m3, as compared with figures of between 10 and 40 kg/m3 for mineral wool or plastic insulation.

Sound insulation also depends on air resistance, which can be measured in KiloPascals/ m3. The optimum resistance is 100kPa/m3, which is the figure for Pavatex Woodfibre boards. As a comparison mineral wool has a resistance of 40kPa/m3.

Airtightness is guaranteed by the fact that boards interlock on all sides. Where ever boards do not interlock (such as at ridges/ hips, openings), the boards should be fitted as tightly as possible, and all gaps filled with woodfibre offcuts. These areas should then be taped with Pavatape, ensuring air and water tightness.

Typically for roofs of the same U value, Isolair gives much improved acoustic insulation in comparison with roofs utilizing other insulation materials. Because of the variations in roof design, and in the relative performance of materials, the following are given as guide figures only:

A roof with 150mm rafters full filled with mineral wool insulation, and with 22mm Isolair board over the top will give an acoustic performance of R = 48 dB, with a U value of 0.24

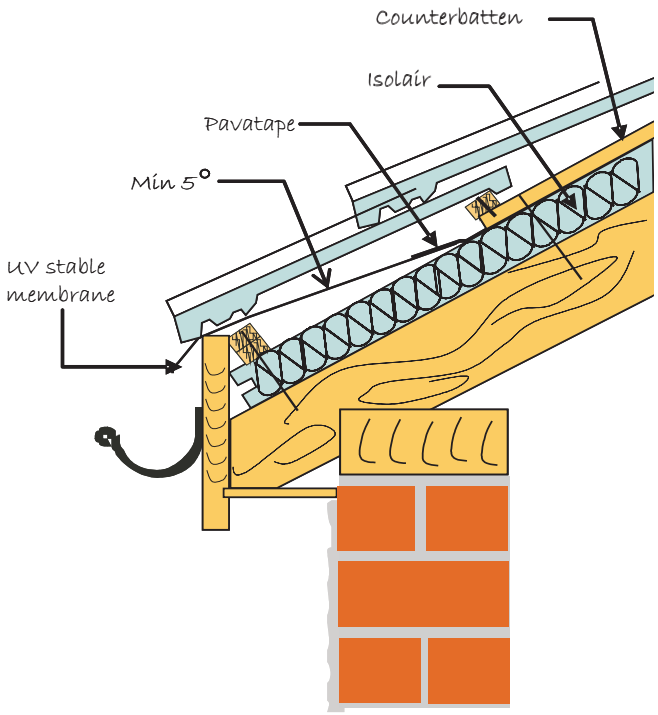
A roof with 150mm rafters full filled with mineral wool insulation, and with 52mm Isolair board over the top will give an acoustic performance of R = 50 dB, with a U value of 0.21

A roof with 150mm rafter full filled with Pavatherm, with 22mm Isolair board over the top and 40mm Pavatherm Floor NK board underneath, will give an acoustic performance of R = 59dB, with a U value of 0.19

Pitched Roofs

Eaves Detailing

Eaves Detail 1



Wind driven rain directed over fascia

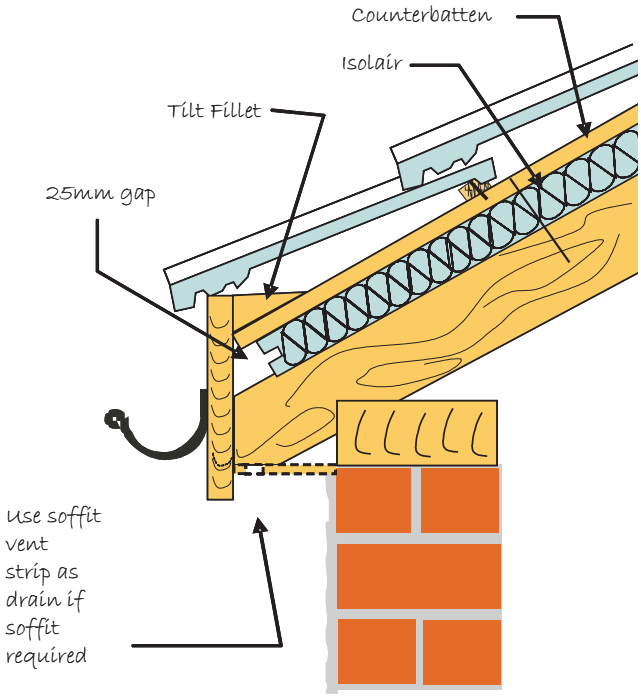
1 Lay Isolair boards inline with rear of fascia

2 Fix 1st batten to height of fascia

3 Attach a UV stable membrane to face of Isolair board using Pavatex Pavatape. (Membrane to be at min 5° angle.)

4 Fix counterbatten overlapping top edge of membrane by min 25mm.

Eaves Detail 2



Wind driven rain drips behind fascia

1 Lay Isolair boards with a 25mm gap at the rear of fascia

2 Fix 1st batten to height of fascia

3 Fix counterbatten up to rear of fascia

4 Fix tilt fillet to height of fascia (optional soffit with eaves vent acting drain)

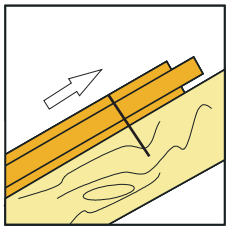
Installation Procedure

Cutting and Fitting the boards

Cutting:

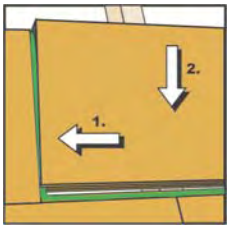
- The boards are easily cut with any of the following tools:
- Pavatex Knife edge jigsaw blade, bayonet fitting to suit most makes of jigsaw, part no: PAVZK.
- Standard wave edge insulation knife.
- Circular saw, hand-held or bench mounted with a fine, cross-cut, tungsten tipped blade.
- Safety goggles and dust mask must be worn during cutting to protect the user from the small, non hazardous, dust particles.

Fitting:

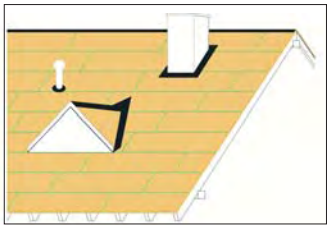


Fix first board according to chosen eaves detail with tongue uppermost using one fixing per rafter. (Final fixing occurs through counterbatten.)

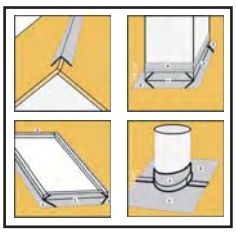
If pitch below 20^{0} clean joint and apply a bead of Pavatex Isoroof glue to the upper edge of the tongue. Above 20^{0} leave joint dry. (For pitches of less 10° contact NBT for advice.)



Locate end tongue first then slide down onto lower board. Fix with one fixing as step one.

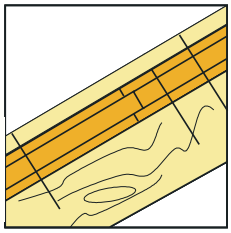


Stagger joints as shown.



Tape board edges at all ridges, valleys, chimneys, roof lights & other penetrations using Pavatex Pavatape.

Apply Pavatex Pavatape <u>before</u> fixing battens. (See specification and installation procedure – joint taping for requirements and use)



Fix through the counterbatten and Isolair directly into the rafter
(See fixings specification sheet for requirements and use)

Finally fix batten and tiles with conventional roofing techniques.

Installation Procedure

Using Pavatex Pavatape

Pavatape 150mm Self Adhesive Tape
Guidelines for Use

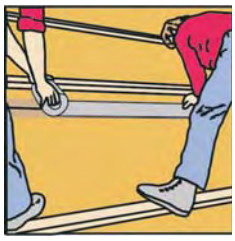
- Only use Pavatape on dry, clean and dust-free Isolair boards.
- Use after laying board and always before installing the counterbattens
- Apply Pavatex Primer with a brush or roller onto the board and abutment surfaces and allow to dry for between 30 and 60 minutes dependent on temperature. (@20°C ca 30min / @5°C ca 60min.)
- Pavatape should not be applied if the temperature is below 5°C
- Store Pavatape rolls lying down in a dry and dust-free environment.
- Shelf life when kept at around 20°C is unlimited.
- Pavatape supplied on 15m rolls – Primer is supplied in 5Litre tins (coverage 20m/l)

How to Use

Pavatape self-adhesive tape.


Clean surface with a brush. Surface must be dry to ensure adhesion.

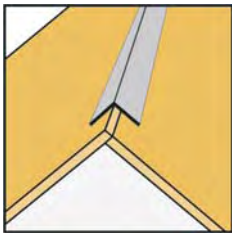

Apply primer with a brush or roller and allow to dry. (See above for details)

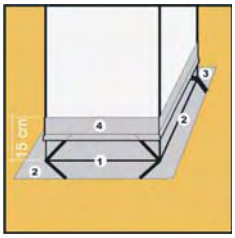

Roll the tape. Remove backing paper. Keep rolling tape continuously & press with other hand. Stretch tape to avoid creases.


Press tape on firmly using a seam roller.

When to Use

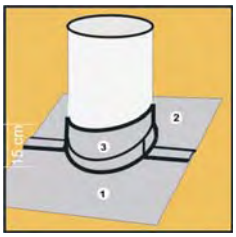

Valleys.


Ridges.



Chimneys and wall abutments


Rooflights



Vent pipes.

Expansion joints must be provided for eaves lengths of more than 15 m . After the whole surface has been covered cut a 5mm wide groove along the rafter.
Seal over the groove with PAVATEX self adhesive tape.
Use also at eaves detail where eaves detail one is chosen (Eaves detailing)

Technical Data

Standards		DIN 68755 Part One		DIN EN 622 Part 4	
		Isolair 22	Isolair 35	Isolair 52	Isolair 60
Thickness mm		22	35	52	60
Length	mm	2500	2500	2500	2500
Width	mm	770	770	770	770
Board Area	m2	1.925	1.925	1.925	1.925
Density	Kg/m3	250	250	250	250
Weight per m2	Kg/m2	5.5	8.75	13	15.12
Board Weight	Kg	10.58	16.85	25.02	29.1
K Value		0.047	0.047	0.047	0.047
Specific Heat Capacity J/kgK		2100	2100	2100	2100
Vapour permeability µ value		5	5	5	5
Sd Value m		0.11	0.17	0.26	0.3
Building Material Class for Fire DIN 4102		B2	B2	B2	B2
Maximum Rafter Spacing		0.85	1	1.1	1.1
Minimum Gradient		10– 20° with Pavatex Glue		Over 20° without glue	
Boards per pallet		44	28	19	16
Area per pallet	m2	84.7	53.9	36.57	30.8
Pallet Weight	kg	486	494	496	482

Fixings Technical Data

Refer to fixing manufacturer for application details for buildings : over 2 storeys high ; in areas with basic wind speed (Vb inBS 6399 Pt2) > 26ms^{-1} ; areas with high local winds ; roof slopes > 60° ; roof coverings heavier than 60kg/m^2.

Isolair 22

Fixings : 3.75 Ø x 90mm corrosion resistant nails through 25mm counterbattens.
Pre-drill holes if necessary to avoid battens splitting.

Roof Covering	Snow Load 0.75 kN/m^2	Snow Load 1.0 kN/m^2	Snow Load 1.50 kN/m^2
Lightweight 0.35 kg/m^2	3	3	4
Mediumweight 0.60 kg/m^2	3	4	4
Heavyweight 0.95 kg/m^2	5	5	5

Chart applies for rafter centres 400 – 600mm and roof slopes up to 60°

Isolair 35

Fixings : 5.5 Ø x 125mm corrosion resistant nails through 38mm counterbattens
Pre-drill holes if necessary to avoid battens splitting
OR 110mm Ancon Stafix Thor Helical Batten Fixings through 38mm counterbattens @ 4.6 fixings /m^2. Refer to Ancon Fixings Guide for limits of application
OR 100mm Helifix InSkew 600 fixings through 25mm counterbattens.
Refer to Helifix enquiry sheet for fixing centres and application limits

Roof Covering	Snow Load 0.75 kN/m^2	Snow Load 1.0 kN/m^2	Snow Load 1.50 kN/m^2
Lightweight 0.35 kg/m^2	3	3	3
Mediumweight 0.60 kg/m^2	3	3	3
Heavyweight 0.95 kg/m^2	3	4	4

Fixings Technical Data

Isolair 52

Fixings : 6.0 Ø x 150mm corrosion resistant nails through 38mm counterbattens.
Pre-drill holes if necessary to avoid battens splitting.
OR 125mm Ancon Stafix Thor Helical Batten Fixings through 38mm counterbattens @ 7.0 fixings /m^2. Refer to Ancon Fixings Guide for limits of application
OR 115mm Helifix InSkew 600 fixings through 25mm counterbattens.
Refer to Helifix enquiry sheet for fixing centres and application limits

Number of fixings / linear metre rafter

Roof Covering	Snow Load 0.75 kN/m^2	Snow Load 1.0 kN/m^2	Snow Load 1.50 kN/m^2
Lightweight 0.35 kg/m^2	4	4	4
Mediumweight 0.60 kg/m^2	4	4	4
Heavyweight 0.95 kg/m^2	3	4	4

Chart applies for rafter centres 400 – 600mm and roof slopes up to 60°

Isolair 60

140mm Ancon Stafix Thor Helical Batten Fixings through 38mm counterbattens @ 7.0 fixings /m^2. Refer to Ancon Fixings Guide for limits of application
OR 120mm Helifix InSkew 600 fixings through 25mm counterbattens.
Refer to Helifix enquiry sheet for fixing centres and application limits

Roof Covering	Snow Load 0.75 kN/m^2	Snow Load 1.0 kN/m^2	Snow Load 1.50 kN/m^2
Lightweight 0.35 kg/m^2	4	4	4
Mediumweight 0.60 kg/m^2	4	4	4
Heavyweight 0.95 kg/m^2	n/a	n/a	n/a

Chart applies for rafter centres 400 – 600mm and roof slopes up to 60°

MATERIAL SAFETY DATA SHEET

According to EEC 91/155 EWG

Trade name and synonyms : **Isoroof natur, Isolair L, Pavaflat**

1. Identification of Substance and Company

Description of product :	Wood fibrous insulating boards for the building industry
Manufacturer / Supplier :	Pavatex Fribourg S.A. Route de la Pisciculture 37 CH 1701 Fribourg
Emergency phone :	+41 (0) 26.426.31.11

2. Information on Ingredients

Ingredients :	**Contents in % wt**
Swiss Conifer	93.8
Paraffin	0.7
Synth. Rubber Copolymer and PVAc	5.5

3. Hazards Identification

Health :	This product involves no particular risks. Apply the same safety measures against dust as when processing wood.
Environment :	This product is combustible as wood.

4. First Aid Measures

General information :	no special risks
Inhalation :	--
Skin contact :	--
Eye contact :	--
Ingestion :	--

5. Fire-Fighting Measures

Suitable extinguishing media :	water, CO_2
Not recommended extinguishing media :	--
Special fire fighting procedures :	--
Special protective equipment :	--
Unusual fire & explosion hazards :	none
Hazardous combustion products :	none known

6. Accidental release measures

Personal protective measures :	not necessary
Environmental measures :	not necessary
Spill clean-up methods :	not applicable

7. Handling and Storage

Usage precautions :	--
Storage precautions :	keep in a dry place, store flat

8. Exposure Controls / Personal Protection

	long time exposure (8 hours)	short time exposure (10 minutes)
Ventilation :	none	none
Protective equipment :	not necessary	not necessary
Respirators :	not necessary	not necessary
Protective gloves :	not necessary	not necessary
Eye protection :	not necessary	not necessary
Other protection :	--	--

Trade name and synonyms : **Isoroof natur, Isolair L, Pavaflat**

9. Physical and Chemical Properties

Appearance / colour :	porous board
Odour :	--
pH-value :	≈ 7.0
Boiling range :	not applicable
Flash point :	not applicable
Flammability :	not applicable
Auto-ignition temperature :	not applicable
Explosive properties :	not applicable
Oxidising properties :	combustible
Density (20°C) :	210 – 270 kg/m^3
Solid contents (30'180°C) :	< 8 % (humidity content)
Solubility in water :	not soluble
Solubility in oil / solvent :	not soluble

10. Stability and Reactivity

Stability :	no decomposition
Conditions to avoid :	none known
Materials to avoid :	none known
Hazardous combustion products :	none known
Additional information :	--

11. Toxicological Information

Toxicity Dose LD_{50} :	not investigated
Eye contact :	possible temporary irritation (mechanical)
Skin contact :	possible temporary irritation (mechanical)
After inhalation:	possible temporary irritation (mechanical)
After ingestion :	no available information

12. Ecological Information

Degrability :	this product is to be seen as non hazardous
Acute fish toxicity :	--
Water hazard classification :	--

13. Disposal Information

Disposal number solidified :	not applicable
Incineration :	possible
Recycling :	possible

14. Transport Information

no special precautions required

Class / division :	--
UN-number :	--
Package number :	--
Additional information :	--

Overland transport

ADR / RID class:	--
GGVE / GGVS :	--
Transport document :	--
Additional information :	--

Sea freight

EMS-number :	--
IMO / IMDG Code:	--
Transport document :	--
Additional information:	--

Air cargo

IATA / ICAO / DGR :	--
Additional information:	--

15. Regulatory Information

Label for supply :	no distinguishing marks required
EEC-number :	--
Symbols :	--
Risk-phrases :	--
Safety-phrases :	--

16. Additional Information

The information contained herein is based upon data considered to be accurate. However, no warranty is expressed or implied regarding the accuracy of these data, the results to be obtained from the use thereof, or that any such use will not infringe any patent. This information is furnished as a guide only and upon the condition that person receiving it shall make tests to determine the accuracy and suitability for his or her own purpose.