Naturheld 140/180/220 Wood Fibre Insulation Boards

One board for four jobs. Naturheld wood fibre insulation is breathable, dense and takes a lime plaster or render finish directly, which makes it the natural partner to the Best of Lime range on solid walled and heritage buildings.

- Roof sarking board
- Internal wall insulation board with plaster
- External wall insulation board with render
- External wall insulation board behind a ventilated façade

0.041
declared thermal conductivity λ_D in W/mK, on Naturheld 140

22 to 200mm
thickness range across the three board densities

2100
specific heat capacity in J/kgK, the source of the thermal mass

Produced according to EN 13171 and CE marked. Wood sourced from PEFC certified, sustainably managed forests.

Naturheld 140/180/220 Characteristics

PRODUCED TO EN 13171

Versatility. The boards work across a range of applications. On **walls**, inside or out, they act as a plaster or render carrier board, or as part of an external insulation system finished with ventilated cladding or brick. They suit solid and cavity masonry as well as timber or metal framed structures. On **roofs**, used as sarking boards above the rafters, they insulate the roof, reduce thermal bridging and increase overall energy efficiency. They also add considerable thermal mass and acoustic insulation to the roof space.

Moisture management. The boards are designed for diffusion open, breathable construction. They allow moisture vapour to move through the structure, which greatly reduces the risk of interstitial condensation and the structural damage that follows it, such as mould, wet rot or dry rot. This matters most in older, solid walled buildings, where moisture accumulation can be a major problem. The building fabric is safeguarded against high moisture content, so the long term health of the building is catered for, unlike most conventional insulation systems. A dry building is a warm building.

Thermal insulation and high thermal mass. Naturheld boards perform well thermally, and their high density and high thermal capacity also add thermal mass to the building. That helps regulate internal temperatures, keeping interiors cooler in summer and warmer in winter. It is especially useful in buildings with a lot of glazing, and in timber and metal frame structures, where overheating is often a concern.

Acoustic insulation. The high density and fibrous structure give good sound insulation, reducing external airborne noise such as traffic or aircraft, as well as rainfall noise hitting the roof.

Sustainability and durability. Made from wood fibre, Naturheld boards are a renewable, environmentally friendly product. They also give long term protection against moisture related problems, safeguarding the structure and improving the lifespan of the building.

> **Cutting and storing the boards.** The wood fibre panels cut with normal timber tools, such as an electric circular saw or a jigsaw. Use suction equipment to keep the dust down. If a hole or gap appears through a construction error, fill it with small pieces of wood fibre and apply a reinforcing mesh patch at least 200mm larger than the damaged area. Keep the boards dry in storage and protect the edges from damage. Do not stack more than three pallets on top of each other.

Board Sizes and Coverage

Board	Thickness (mm)	Weight (kg/m²)	Overall size (cm)	Coverage area (cm)	Boards per pallet	M² per pallet	Kg per pallet
Naturheld 220	22	4.8	255 x 61.5	253 x 59.5	104	156.56	783
	35	7.7	255 x 61.5	252.8 x 59.3	64	95.94	764
Naturheld 180	40	7.2	188 x 61.5	185.8 x 59.3	56	61.70	469
	60	10.8	188 x 61.5	185.6 x 59.1	38	41.68	475
Naturheld 140	60	8.4	188 x 61.5	185.6 x 59.1	38	41.68	375
	80	11.2	188 x 61.5	185.6 x 59.1	28	30.71	369
	100	14.0	188 x 61.5	185.6 x 59.1	22	24.13	363
	120	16.8	188 x 61.5	185.6 x 59.1	18	19.74	357
	140	19.6	188 x 61.5	185.6 x 59.1	16	17.55	369
	160	22.4	188 x 61.5	185.6 x 59.1	14	15.36	369
	180	25.2	188 x 61.5	185.6 x 59.1	12	13.16	357
	200*	28.0	188 x 61.5	185.6 x 59.1	10	10.97	332

All Naturheld boards have a tongue and groove edge profile. * Allow longer lead times on 200mm boards.

Technical Details

	Naturheld 220 22 to 35mm	Naturheld 180 40 to 60mm	Naturheld 140 60 to 200mm
Density (kg/m³)	220	180	140
Declared thermal conductivity λ_D (W/mK)	0.047	0.043	0.041
Vapour diffusion factor μ	5	3	3
Specific heat capacity C (J/kgK)	2100	2100	2100
Tensile strength perpendicular to face of board (kPa)	≥ 50	≥ 30	≥ 20
Compressive stress at 10% compression (kPa)	≥ 200	≥ 150	≥ 100
Reaction to fire classification (EN 13501-1)	Class E	Class E	Class E

Roof Insulation Panels

Naturheld 140/180/220 insulation softboards install directly above the rafters, and the flexible, breathable Naturheld Flex wood fibre can be fitted between the rafters to meet the U-value you need while significantly reducing thermal bridging through the junctions. That helps a great deal towards Building Regulations, particularly once Y-values for thermal bridging are taken into account. The boards also improve airborne and impact sound insulation within the building. These CE marked boards give an ecological, breathable and durable structure that will protect the property for decades.

Naturheld sarking boards can be left exposed on roofs for up to four weeks without compromising the thermal insulation, which keeps the building dry so construction can carry on. They suit both new build and renovation. A breather membrane over the boards is not strictly necessary, though we strongly recommend one. If the Ampack Ampatop Protecta plus Breather Membrane is not used, every square cut or exposed board edge, penetration, ridge, valley and corner must be primed and sealed with Ampacoll Primax solvent free primer and Ampacoll XT tape. Ampatex Eco 5 Airtightness Membrane, or taped, airtight OSB board, must be placed internally under the insulation.

Typical construction from the top down on a pitched roof

- Tiles or slates
- Horizontal tile battens
- Vertical counter battens for ventilation, 38mm minimum x 50mm (H x W)
- 22 to 220mm Naturheld 140/180/220 tongue and groove wood fibre board, screwed to the rafters below. It can be left exposed for four weeks if square cut edges are primed and taped, or covered with the Ampack Ampatop Protecta plus Breather Membrane, which can then be left exposed for up to three months if well sealed
- Naturheld Flex insulation, fully filling between the rafters
- **Optional plaster finish.** Naturheld tongue and groove boards screwed to the underside of the rafters for added insulation, plastered directly with Limecote where required
- **Optional plasterboard finish.** OSB with taped joints for airtightness, or Ampatex Eco 5 Airtightness Membrane under the rafters
- Battens to form a services void if required, then plasterboard or Fermacell finishing board

Roof Pitch

15° and above	No need to tape over the tongue and groove joints, as they will be weathertight.
10° to under 15°	Apply a bead of Ampacoll RA Glue to the upper face of each tongue before it is inserted into the next board.
5° to under 10°	The complete roof surface must be covered with a sealed breather membrane.
Under 5°	Do not use Naturheld 140/180/220 on roofs with a pitch below 5 degrees.

Installing the Roof Boards

Fix the panels directly above the rafters in a landscape formation, with the tongue facing upwards towards the apex. Use the cut off piece from the end of one row as the first piece on the next, so the joints run in a brickwork formation. This increases the structural strength. Fix the boards to the rafters initially using one or two specialist screw fixings per board.

The panels can then be protected with the Ampack Ampatop Protecta plus Breather Membrane, which we strongly recommend. If no membrane is used, prime and tape all junctions that are not tongue and groove, such as the ridge, valleys, penetrations and perimeters, with Ampacoll Primax primer and Ampacoll XT tape to prevent rain ingress. Vertical counter battens of 38mm minimum height are then fixed securely over the panels to provide ventilation. Structural fixings secure these counter battens and the insulation into the rafters below according to the advice given, usually six or seven fixings per m^2. Fix horizontal tile battens if required, and secure the roof tiles to these. When working on the roof, only walk above the rafters rather than between them.

External Wall Insulation With Ventilated Cladding

Naturheld 140/180/220 also works in timber frame or masonry construction as an external wall sarking board, finished with a ventilated cladding façade or a ventilated brick wall.

Timber frame walls

On timber frame structures, the panels give water resistance as well as excellent vapour permeability, keeping the building structure dry and therefore safe. The boards cannot be fixed below damp proof course level, so XPS waterproof insulation must be used in the plinth area. The Ampatex Eco 5 Airtightness Membrane, or a racking board incorporating an airtightness detail such as OSB taped at the joints, should be inserted on the internal side of the timber frame.

Masonry walls

If the boards are used as a sarking board behind ventilated cladding on a masonry wall, the wall must be dry and reasonably flat so the tongue and groove slots together well. If the existing render has broken away in parts or is in poor condition, remove it first. The same applies if the existing render has a high cement content, because it is not very vapour open. Bond the boards to the masonry wall using a 5mm thick bond of Limecote, so cold air cannot bypass the insulation at the perimeter edges.

Fixing into timber frame and masonry construction

Please ask us about suitable fixings for the application. On timber frame structures, fixings go through the vertical counter batten and the Naturheld board into the timber structure, anchored into the timber by at least 40mm. Around seven fixings are needed per m². On masonry walls, fixings are typically embedded by at least 35mm excluding the render, depending on the substrate, and again there are generally seven fixings per m².

External Wall Insulation With a Render Finish

Naturheld 140 and 180 boards are mounted onto masonry walls, which must be dry and reasonably flat so the tongue and groove boards join neatly. If the walls have undulations of around 8mm or more, level them out first with a lime parge coat. Warmcote works well here, as it can be applied at practically any thickness for dubbing out. If the existing render has broken away in parts or is in poor condition, it needs to come off. The same applies if the existing render has a high cement content, which is not very vapour open, because it will trap water in the wall that then struggles to evaporate outwards. Bond the wood fibre boards to the masonry using a 5mm layer of Limecote, trowelled over the complete back surface of each board, to prevent thermal bypass. If using Naturheld 140 and render on timber frame stud walls, a minimum thickness of 80mm must be used. There is no minimum thickness for Naturheld 180.

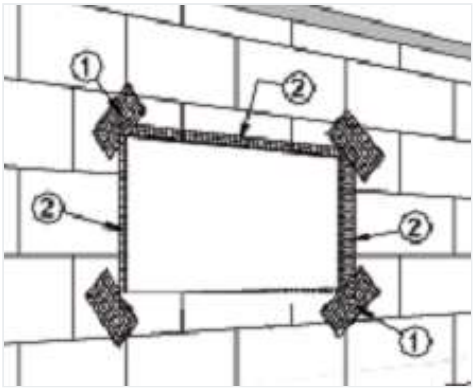
Installation

Fix the base rails at a minimum of 30cm above finished ground level. XPS waterproof insulation should be fitted in the plinth area below this base rail, extending down as far as possible below finished ground level. This stops the wood fibre boards from being permanently moistened by sitting in puddles. Bond the XPS insulation to masonry walls with Limecote at 5mm thickness.

Install the Naturheld 140 and 180 boards in a horizontal, brickwork formation with the vertical joints staggered by at least 25cm, so there are no cross joints. The horizontal tongues must face upright towards the roof so rain will not sit in the grooves. Secure the boards to the wall with specialist insulation fixings with a plastic washer, usually nine fixings per board into masonry or three fixings per stud into timber frame. Seal the boards at all openings, corners and penetrations to the building with expanding foam sealing tape, or some Limecote, to give a weathertight joint. The boards can be left exposed for up to four weeks, but they must be allowed to dry before they are rendered.

Rendering the External System

The board joints should not align with the corners of the windows or doors, as that weakens the strength of the Naturheld system. Fix a reinforcing mesh strip diagonally into some base coat render at the corners and all around the window and door openings, as shown. The door and window reveals must be insulated too, with 22mm or 35mm thick reveal boards. For best results, bond these to the window or door reveals using Limecote, applying it to the back of the reveal board with a trowel. There must be a weathertight fit around these thermal weak points, so alternatively seal the perimeter edge of the reveal boards to the structure with expanding foam sealing tape.



Board joints must not line up with the corners of windows or doors. Set a reinforcing mesh strip diagonally into the base coat at the corners and all around the opening.

Render the wood fibre and plinth boards with a Limecote base coat at a depth of 6 to 9mm. Embed a reinforcing mesh into the base coat. There is then a choice of breathable top coats that can go over it, and we are happy to talk through the right one for the exposure the wall will see. Where a wall takes a lot of driving rain, Silsan FC 624 is a water repellent impregnating agent for alkaline building materials that leaves the surface vapour permeable.

Any plinth boards that will sit below finished ground level must be sealed with a suitable below ground waterproof sealer, applied in two coats over the top coat. Please ask us which product suits the substrate you have.

> **Keep the whole build up breathable.** The point of a wood fibre and lime system is that moisture can move through it and evaporate away. A cement based render or a plastic paint on the outside face will trap water in the wall and undo the benefit, so every layer, from the bonding coat to the decoration, needs to be vapour open.

Internal Wall Insulation With a Plaster Finish

Naturheld wood fibre is the optimal ecological insulation for the inside of external walls, because of its dense, fibrous structure and its very effective vapour open, hygroscopic and capillary active properties. This prevents damaging moisture forming within the structure. The boards can be plastered directly with a vapour open lime plaster, which is alkaline and so inhibits mould growth.

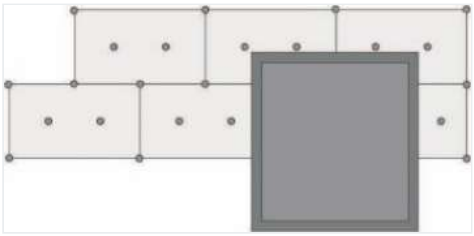
The boards can absorb moisture from inside the room and then release it, either back into the room or out through the walls, to create an ambient relative humidity without any detrimental effect on the integrity of the insulation. That avoids condensation, mould growth and humidity, and creates a pleasant, comfortable interior climate. Interstitial condensation should not get trapped in the structure, where it can cause untold damage.

This product plays a particularly important role in the maintenance and repair of older and historic buildings, where the external appearance must be preserved and so the walls cannot be insulated externally. Heritage and traditional buildings are usually built from vapour open materials such as stone, brick, timber frame, cob or wattle and daub, with lime or earth mortar in the joints and lime plaster, render or paint on the walls. These materials are all breathable, so moisture passes through them and evaporates away either externally or internally. That keeps the building dry, because outside, sun and wind dry out the fabric, and inside, moisture evaporates thanks to air circulating through leaky windows, doors, chimneys and roof eaves. It is critical to respect the breathability of these older buildings by using breathable insulation, plaster and paint, so that interstitial condensation and mould are hindered.

> **Do not over insulate a solid wall internally.** When insulating solid masonry walls from the inside, we do not recommend achieving a U-value below 0.4 W/m²K, as it slows how quickly the solid wall dries. Over insulate a single leaf solid wall internally and the wall becomes colder, because less heat from inside the building reaches it, and that increases the risk of interstitial moisture building up in the wall.

Application

Naturheld panels must be mounted onto dry, flat, even walls. If the masonry surface is bare or uneven, plaster and level the walls first with a breathable lime plaster, because cold air gaps between the wall and the wood fibre will cause interstitial condensation. Warmcote suits this levelling coat, as it can be applied at practically any thickness on most backgrounds. Any cement based plaster or oil based paint on the walls must be removed before the walls are levelled. If you are applying onto solid or uneven walls, please ask us about the best method.



Boards should not align with the corners of windows or doors, as it weakens the strength of the system. The reveals must be insulated too, to prevent cold bridging.

Bonding and setting out

Bond the boards to the plastered wall using a Limecote bonding coat at 5mm thickness. Airtightness comes from the lime levelling coat and the lime bonding coat. Start fitting in the bottom corner of the wall, with a straight edge butted to the adjacent wall. Fit the panels as tightly to each other as possible, so the gaps between them are as small as they can be. Begin the second row with the cut off piece from the previous row, so the boards form a brickwork pattern. Stagger the vertical joints by at least 25cm so as not to weaken the strength of the system, or 60cm spacing for the 22mm board.

Lime plaster and insulate the wall in the intermediate floor space too, where possible. If there is not enough space for Naturheld boards, insert 50mm thick Naturheld Flex flexible insulation into the cavity instead, to prevent cold bridging. If the floor joists are embedded into the wall, prime and tape around these junctions first to provide airtightness.

Fixing into masonry or timber frame construction

Rawlplug R-TFIX-8M hammer in fixings secure the boards to solid masonry walls. They must be anchored into the masonry substrate by at least 35mm, excluding the plaster layer. If the walls are crumbly or rubble masonry, use Rawlplug R-TFIX-8S screw in fixings and embed them by 35 to 65mm, excluding the plaster. As a general rule, use three fixings per board in addition to the bonding layer, placed optimally at 100mm from the edge of the board. Use Rawlplug R-PTX 6 fixings with a 60mm diameter plastic washer to secure boards into timber or sheet steel, anchored into the timber or metal frame by at least 40mm.

Limecote Lime Plaster

It is essential to use a capillary conductive lime plaster with Naturheld boards. Limecote is a non-hydraulic, ready mixed lime plaster that is breathable and extraordinarily flexible, and it sticks to practically any background. Please talk to us about applying the two coat Limecote and mesh system. A traditional, slightly coarse lime finish and a smooth modern finish are both available, to suit any interior design. Naturheld boards can also be finished with plasterboard, so please ask us for advice.

Talk to Us About Your Build Up

Every solid walled building is different. Tell us the wall, the exposure and the finish you are after, and we will help you specify the board thickness and the right lime system to go over it.

Best of Lime Ltd
Unit A, The Brocks Business Centre
Homefield Road
Haverhill, Suffolk CB9 8QP
01440 848200
info@bestoflime.co.uk
bestoflime.co.uk