

PROCESSING INSTRUCTIONS

ROOF





Processing instructions for roofs



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Product overview

Product	Thicknesses in mm	Insulation value W/mK		Weathering time	
		λD 	λB 	Roof from the inside Extended	Roof from the inside open and visible
Weather-resistant sub-roof panels With tongue and groove connection or in Large format with taped joints					
Naturheld 220	22 - 35	0.047	0.049	4 weeks	12 weeks
Naturheld 180	40 - 120	0.043	0.045		
Naturheld 140 with groove and tongue	60 - 220	0.041	0.043	4 weeks	
Insulation on formwork and CLT (flat surface) under waterproofing or sub-roof					
				Compressive strength in kPa	
Naturheld 140	60 - 180	0.041	0.043	>100	
Naturheld 110	80 - 160	0.039	0.041	>50	
Naturheld 100	120 - 200	0.037	0.039	>40	
Compartmentalised insulation					
Naturheld FLOW	∞	0.038	0.040	-	
Naturheld FLEX	30 - 300	0.036	0.038	-	

Product data sheets available for download at:

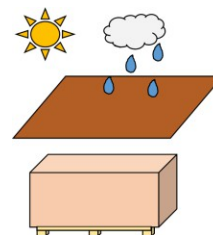
<https://www.naturheld.global/downloadbereich/>

Storage and transport

Check the condition of the goods upon receipt, observe the package inserts and keep them together with the delivery notes.

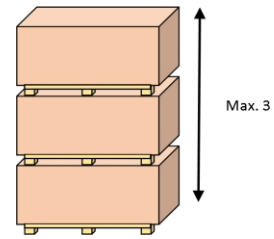
Unloading and transport on the construction site must be carried out using a suitable crane or forklift truck.

The insulation materials must be kept dry and protected from UV radiation and mechanical damage.

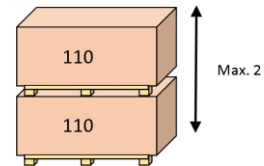


Processing instructions for roofs

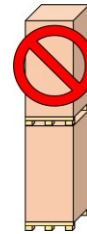
A maximum of three pallets of insulation boards with a bulk density of 140–220 kg/m³ may be stacked on top of each other.



Two pallets of insulation boards with a bulk density of 110 or 100 kg/m³ may be stacked.



Flex insulation and blow-in insulation must not be stacked.



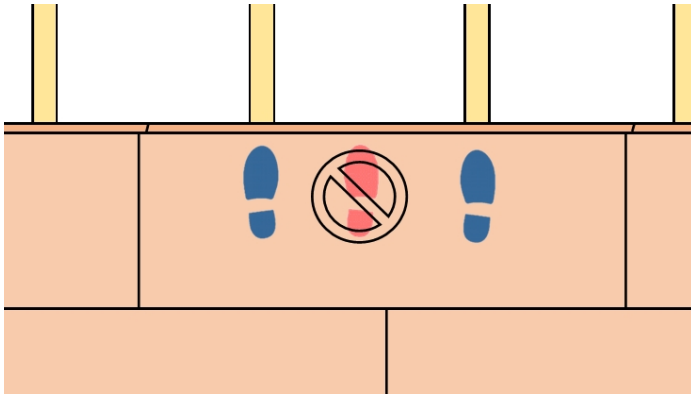
Processing

Cutting

- Naturheld insulation boards can be processed using standard woodworking tools. Hand and table saws, band saws and special insulation saws are suitable. Cut-outs can be made using jigsaws with serrated blades.
- Due to the dust generated, a powerful extraction system is recommended.
- Wear a dust mask.

Walkability and rafter spacing

Naturheld underlay boards are tread-resistant in the support area (e.g. over rafters), but underlays with wood fibre insulation boards are generally considered non-accessible components in accordance with the guidelines of the ZVDH and the Hauptverband der gewerblichen Berufsgenossenschaft (German Trade Association of Building Contractors).



In order to achieve sufficient walkability of the roof, it is recommended that the battens be laid at the same time. Legally valid accident prevention regulations, such as fall protection, must be observed.

In addition, the maximum rafter spacing must be observed, which is determined by the panel thicknesses and format. When using blow-in insulation, lower spacing is usually required so that the underlay panels can withstand the blow-in pressure.

Product	Thickness	Maximum rafter spacing – centre-to-centre distance in mm		
	mm	Format 1880x615	Format 2550x615	For blow-in insulation
Naturheld 220	22		850	-
	35		1000	850
Naturheld 180	40	950	1250	850
	60	950	1250	950
	From 80	1250		950
Naturheld 140	60	850		850
	80	850		850
	From 100	950		950



Processing instructions for roofs

Compartmental insulation

naturheld FLOW blow-in insulation

- Naturheld FLOW blow-in insulation may only be installed by trained specialists using suitable blow-in machines.
- The underlay board should be at least 35 mm thick when blowing in Naturheld FLOW blow-in insulation on site.

Naturheld FLEX

- The Flex insulation mats can be cut with special insulation saws, electric handsaws or band saws.
- Offcuts from FLEX can be combined.

See also processing instructions for Naturheld FLOW and Naturheld FLEX at: <https://www.naturheld.global/>

In general, the regulations of the BG and TR GS 533 must be observed.

Steep roof

Air seal

An airtight building envelope prevents heat loss and damage caused by condensation. It is also required by the Building Energy Act (GEG) and the thermal insulation standards DIN 4108 Parts 2, 3 and 7. Air sealing is usually implemented as a vapour barrier or by means of panel material

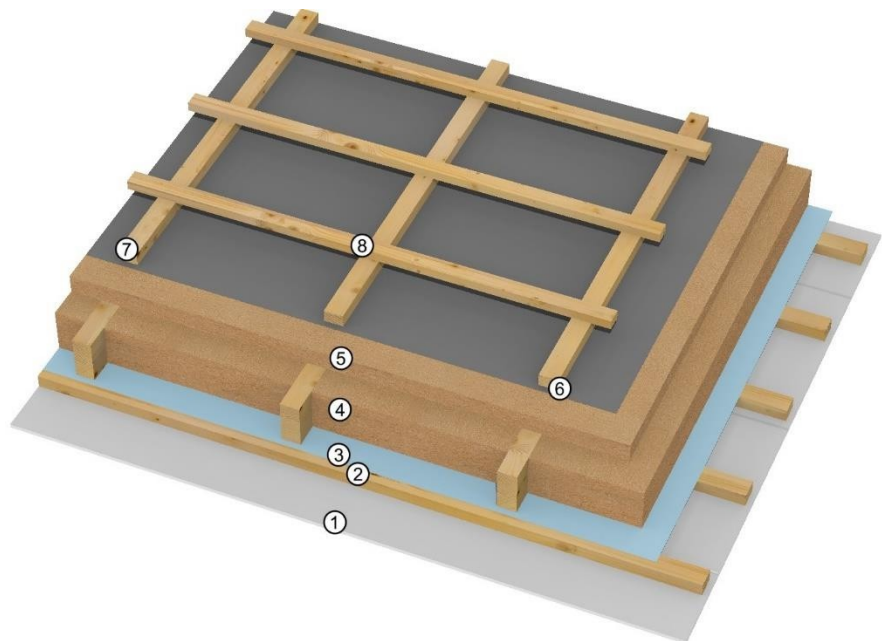
on the inside of the room. In the roof, this is not always possible when renovating from the outside. Here Naturheld insulation materials offer the option of implementing an airtight layer on the rafters:

Roof structure with air seal as a vapour barrier from the inside

Typical roof structure for core renovation and new construction. The airtight layer on the room side allows for numerous roof structures and the use of a wide range of insulation combinations.

Pitched roof variant 01.1

1. Interior panelling
2. Installation level
3. Vapour barrier
4. Naturheld Flex or Flow
5. Naturheld 140, 180 or 220
6. Underlay membrane, optional
7. Counter battens



Renovation from the outside without existing air sealing

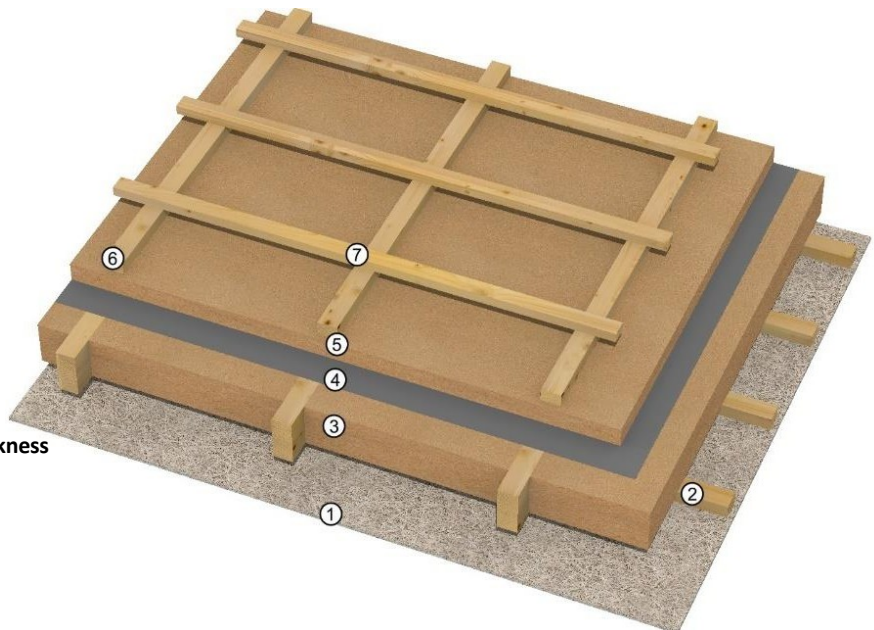
Without existing or intact air sealing, such as a vapour barrier or dense planking in accordance with DIN 4108-7, Naturheld insulation can be used under certain conditions

insulation thickness and the use of a suitable air sealing membrane, the air seal can be integrated into the roof structure and installed from the outside. This structure is safer, simpler and more cost-effective than loop-shaped installation of the vapour barrier around the rafters and is therefore ideal for renovation from the outside.

from the outside.

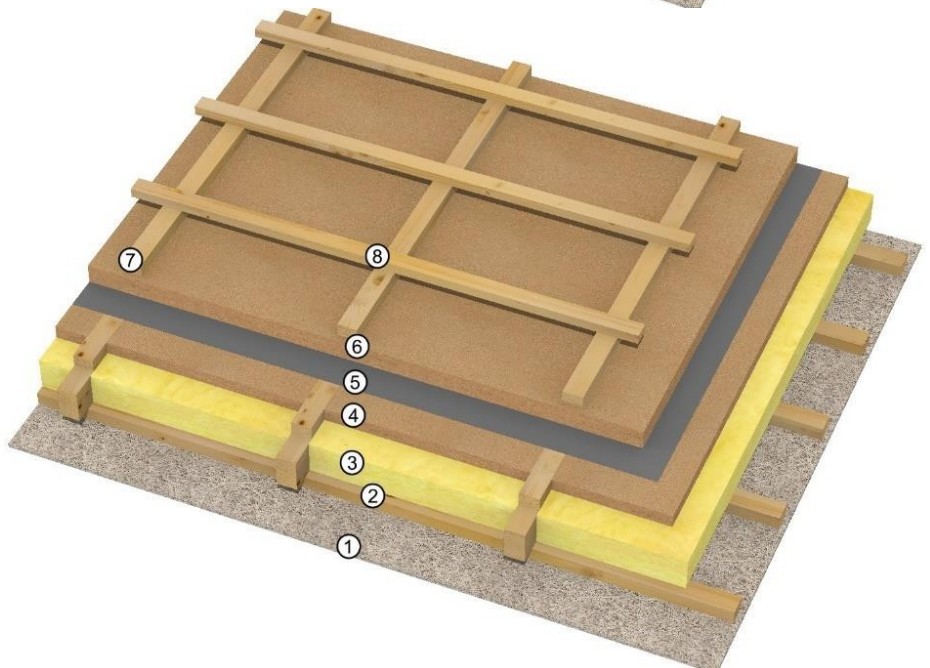
Pitched roof variant 02.1

1. Interior panelling, not airtight
2. Substructure
3. Naturheld Flex or Flow **max. 2/3 of the total insulation thickness**
4. Suitable airtight membrane, e.g. pro clima DASAPLANO 0.01 connect
5. Naturheld 140, 180 **min. 1/3 of the total insulation thickness**
6. Counter battens



Pitched roof variant 02.2

1. Interior panelling, not airtight
2. Substructure
3. Old insulation, e.g. glass wool, compressed
4. Naturheld Flex **min. 40 mm**
5. Suitable airtight membrane, e.g. pro clima DASAPLANO 0.01 connect
6. Naturheld 140, 180 **min. 1/3 of the total insulation thickness**
7. Counter battens

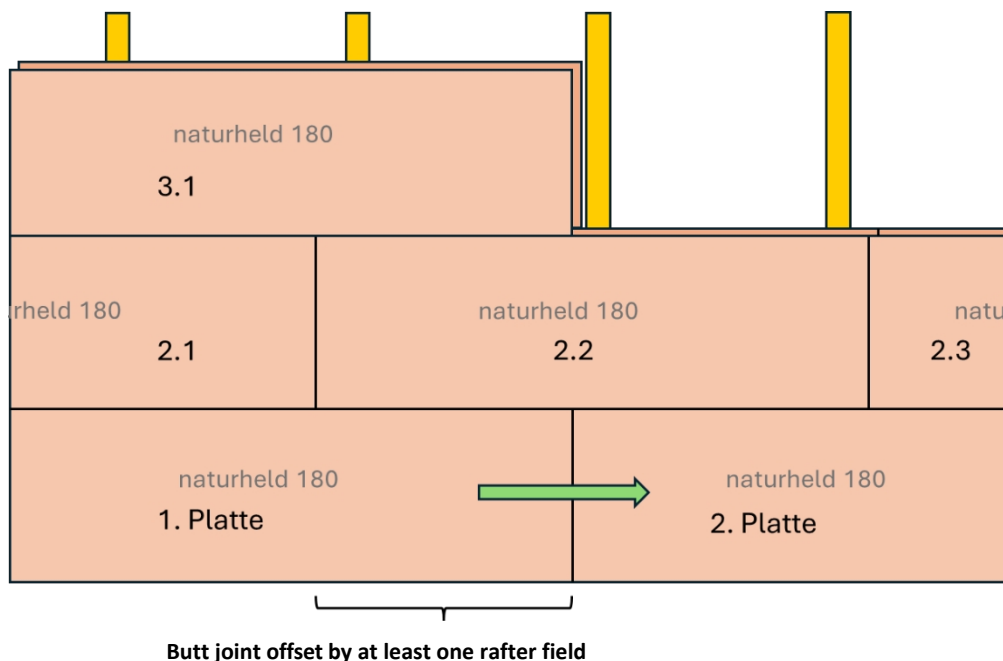


Laying the underlay boards

- The boards must be laid **horizontally with the tongue facing upwards** so that no water can collect in the groove.
- When **laying vertically** (coupled purlin roof), additional Sealing measures must be planned. (Butt bonding, horizontal installation of underlay membrane, etc.)
- Only panels with **undamaged tongue and groove profiling** may be used.

If the tongues are damaged during construction and the affected panel can no longer be replaced, mark the area and seal it with adhesive tape and primer so that the seal extends at least 30 cm on each side beyond the intact joint.

- The first row is laid starting at the bottom left, with the section of the last panel forming the start of the next row.
- The **panel imprint should face outwards**, as this side of the panel is more slip-resistant and abrasion-resistant.
- **Offcuts can also be rotated** and laid with the print facing inwards. The edge profile is symmetrical and the hydrophobic treatment is continuous. This does not compromise the rain resistance of the roof.



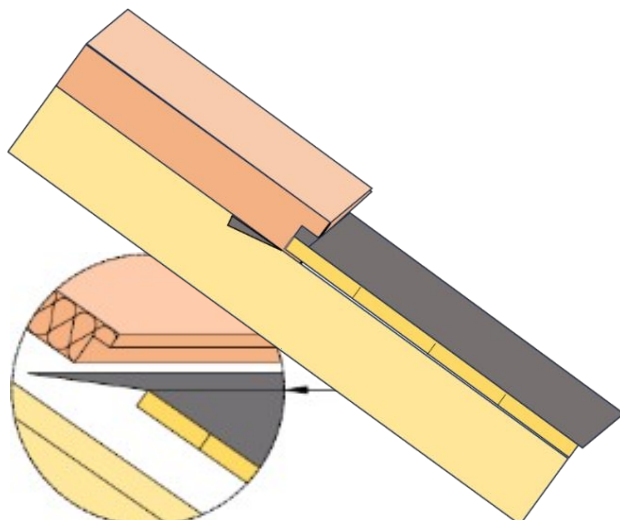
- The offset of the vertical butt joints per laying row is at least 600 mm for 22 mm thick underlay panels and **at least 250 mm** for all other panel thicknesses.
- When using blow-in insulation, the **minimum panel thickness is 35 mm**; if necessary, the panel thickness must be increased. Avoid consecutive vertical panel joints in the same compartment so that no bulging can occur. If necessary, structural measures must be taken (e.g. insertion of a support batten).
- Uneven roof trusses can sometimes cause a slight offset when laying the panels. In this case, **joints of up to 3 mm** between the panels are still acceptable. Joints wider than 3 mm must be sealed with a suitable sealing material (e.g. OTTOSEAL®M 360) or adhesive tape and primer.
- **Nail sealing tapes under the counter battens** are not necessary if a Naturheld underlay panel is used as a rainproof layer. When using an underlay membrane, this depends on the respective manufacturer's instructions.
- **Damage** such as faulty screw connections or penetrations must be sealed using suitable means.

Eaves connection

The eaves connection requires special attention, as rainwater can easily penetrate here. We recommend the following designs:

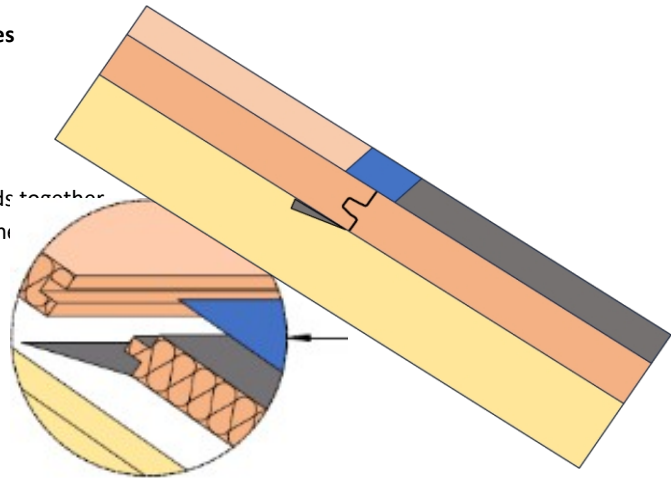
Eaves connection with fascia boards

- Lay boards and cover with foil
- Pull the foil onto the rafters
- Cut off the lower groove of the underlay boards
- Lay the underlay panels



Eaves connection with continuous insulation and eaves flashing:

- Lay foil over the first row of boards on the rafters
- Carefully push the Naturheld underlay boards together. Push the natural hero underlay boards together.
- Seal the joint with a suitable primer and adhesive tape



Fastening the underlay panels

General fastening instructions

- Installation is carried out using nails or staples, with permanent positioning secured by installing counter battens. Naturheld wood fibre boards are not load-bearing components and must not be used for structural purposes.
- Counter battens are used to ensure safe and permanent load transfer and to protect against wind and suction loads. Depending on the thickness of the insulation board, fastening is carried out using staples, nail screws, grooved nails, partially threaded screws or double threaded screws.
- For the necessary number and length of fasteners, a static verification is required for underlays of more than 60 mm. This is carried out by the manufacturers of the fasteners.
- Since the battens must be fastened to the counter battens and the fasteners usually do not reach the rafters through the underlay panel, in most cases a Counter battens 60 x 40 mm required.

- A penetration depth into the substrate (i.e. counter battens for batten fixing, rafters for counter battens fixing) of 12 x diameter for a smooth nail, 8 x diameter for grooved nails and 6 x diameter when using screws to achieve the intended pull-out resistance.

Fastening with screws

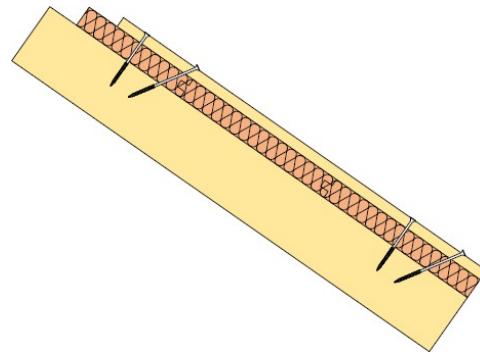
When using screws, our screw partners will be happy to provide a static verification. This must be created individually for each roof. To this end, we have registered our insulation materials with all screw manufacturers so that they can provide the relevant verification.

You can find a link to the manufacturers' calculation forms on our homepage:

<https://www.naturheld.global/schraubenberechnung/>

Schematic roof structure for screw fastening

The distance, length and angle of the fasteners are determined in a structural analysis by the fastener manufacturer.





Processing instructions for roofs

Fastening of sub-roof boards up to 60 mm with nails and staples

The following tables can be used as a guide for staples, nail screws and grooved nails and insulation thicknesses up to 60 mm.

22 mm Naturheld 220									
Counter battens	30 x 50 mm	40 x 60 mm				Minimum distance to the end of the batten			
Rafter spacing A	max. 750 mm								
Nails	3.8 x 100 mm	3.8 x 110 mm		orange		120 mm			
Clips	2 x 90 mm	2 x 100 mm		black					
Required number of fasteners per metre of counter batten									
Type of roofing	Rafter spacing in cm	Standard snow load							
		0.75 kN/m ²		1.0 kN/m ²		1.5 kN/m ²		2.5 kN/m ²	
Light roofing	75	3	4	3	5	3	6	4	8
Medium roofing	75	3	6	3	6	4	7	4	10
heavy roofing	75	4	8	4	8	4	9	4	12

35 mm Naturheld 220 and 40 mm Naturheld 180									
Counter battens	40 x 60 mm				Minimum spacing to the end of the batten				
Rafter spacing A	max. 850 mm								
Machine nails	3.8 x 130 mm			orange		120 mm			
Staples	2 x 130 mm			black					
Required number of fasteners per metre of counter batten									
Type of roofing	Rafter spacing in cm	Standard snow load							
		0.75 kN/m ²		1.0 kN/m ²		1.5 kN/m ²		2.5 kN/m ²	
Light roofing	85	3	6	3	7	4	8	6	11
Medium roofing	85	4	8	4	9	5	10	6	13
heavy roofing	85	5	11	6	12	6	13	7	16

60 mm Naturheld 180 and 60 mm Naturheld 140									
Counter battens	40 x 60 mm				Minimum spacing to the end of the batten				
Rafter spacing A	max. 850 mm								
Nails	6 x 180 mm			orange		180 mm			
Machine nails	4.6 x 160 mm			black					
Required number of fasteners per metre of counter batten									
Type of roofing	Rafter spacing in cm	Standard snow load							
		0.75 kN/m ²		1.0 kN/m ²		1.5 kN/m ²		2.5 kN/m ²	
Light roofing	85	3	3	3	3	3	4	3	5
Medium roofing	85	3	4	3	4	3	5	4	6
heavy roofing	85	3	5	3	5	3	6	4	7

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Version 004, 1 August 2025

Roofing categories

Roofing	kN/m ² Roof load	Roof covering
Light	0.30	Metal roofing on wooden formwork
Medium	0.6	Roof tiles and roof tiles
Heavy	0.95	Plain tiles Shingles with mortar, natural stone

Snow and wind load zones



Rain protection

- Naturheld underlay panels have a windproof and water-repellent profile around the edges of the panels, they are completely water-repellent, and water drainage is guaranteed on both sides.
- Naturheld underlay panels can be used as temporary roofing for 4 weeks. The period of exposure to the elements can be extended to up to 12 weeks for Naturheld 180 and 220, provided that the underside of the panels is visible and any water that has penetrated can drain away unhindered.
. Heavy loads, such as snow, should be avoided.
- Additional joint taping is not necessary for roof pitches of at least 15° and a maximum deviation from the standard roof pitch of 4° or 8°. See also the section on roof pitch.
- Connections to openings in the surface (e.g. roof windows, chimney penetrations, ventilation pipes, etc.), butt joints at the ridge and valley, and connections to canopy formwork must be sealed with suitable system components such as primers and adhesive tapes.
- The adhesive surface width on each side of the butt joint should be at least 50 mm. The adhesive surfaces must be thoroughly primed with a suitable primer.

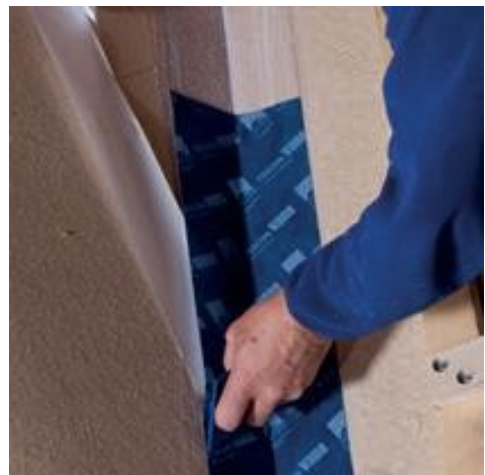
Please observe the manufacturer's processing guidelines.

Detailed information

Example of valley sealing with adhesive tape

Source: pro clima/Moll bauökologische Produkte

GmbH Tescon Vana adhesive tape + Primer RP or SPrimer



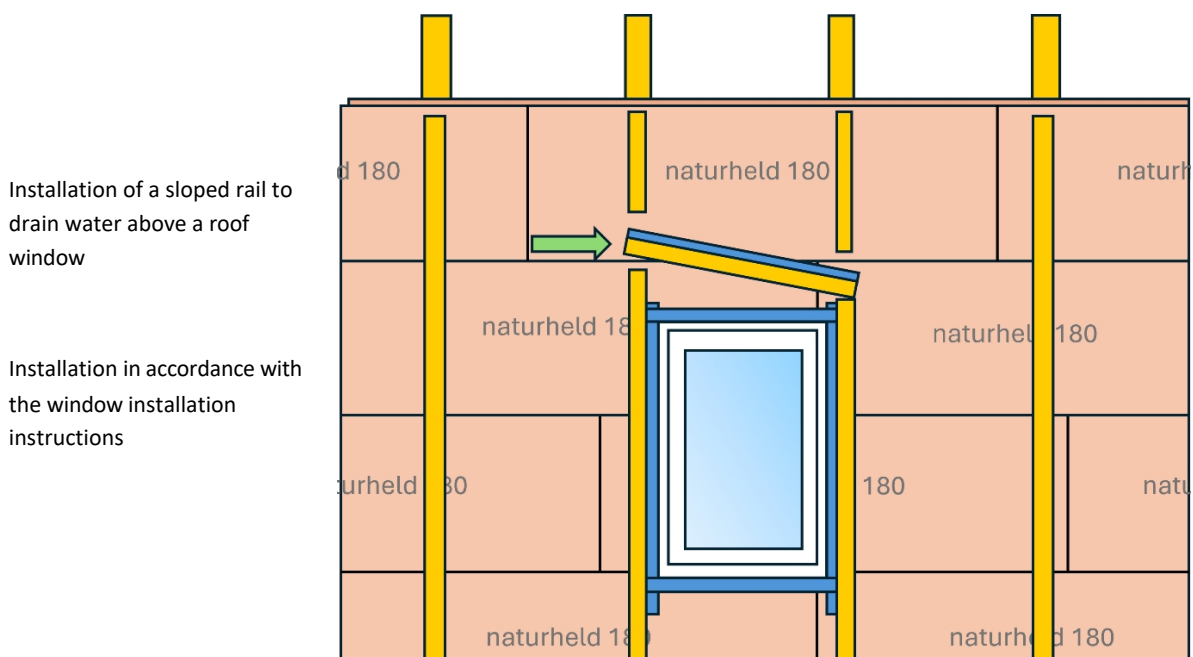
Roof windows, chimneys and other connections

A suitable water drainage system must be installed above openings in the roof surface, such as roof windows or chimneys.

Roof window manufacturers offer additional flashing aprons. However, rainwater can also be drained away using a metal bracket, a roof batten or a foil gutter. These are installed at an angle and secured using suitable System components such as primer and adhesive tape.

Alternatively, an underlay membrane can be inserted into the horizontal joint above during panel installation, which is later bonded with the water-diverting element in accordance with the system.

Roof windows



Fire protection for exhaust systems, chimneys and flues

For exhaust pipes with low exhaust gas temperatures of less than 160°C nominal output, a distance of 50 mm from the sub-roof panel is sufficient.

The exact details can be found in the technical specifications for the exhaust system, which is designated with the letter O(xx) – xx stands for the distance in millimetres. For fireplaces and chimneys, the technical specifications contain the designation G (xx); here too, a distance of 50 mm is often sufficient. For old brick chimneys, we recommend a distance of 200 mm.

The gap is usually filled with insulating material (melting point > 1000°C), but can also be ventilated.

It is advisable to discuss the procedure with the responsible chimney sweep in advance.

Expansion joints, fire barriers and building end walls

We recommend expansion joints for installation lengths of more than 20 m. If expansion joints are already provided in the building structure, they must be continued at the level of the Naturheld underlay panels. For the 220/22 mm roof, an expansion joint is required after just 15 m.

The expansion joint is filled with flexible insulation and sealed with primer and adhesive tape.

No combustible insulation may be laid on fire walls. In this case, the underlay board is replaced by a strip of non-combustible insulation and covered with a suitable underlay membrane. The underlay membrane is attached to the underlay board using adhesive tape and primer.

Example of an expansion joint with adhesive tape

Source: Ampack Bautechnik GmbH Ampacoll Flexx adhesive tape

Primer Ampacoll Primax or Ampacoll Airmax



Building moisture

Building moisture, caused e.g. by fresh screed, plaster or paint, should generally be removed by ventilation or by installing suitable drying equipment. A coordinated construction sequence must be observed.

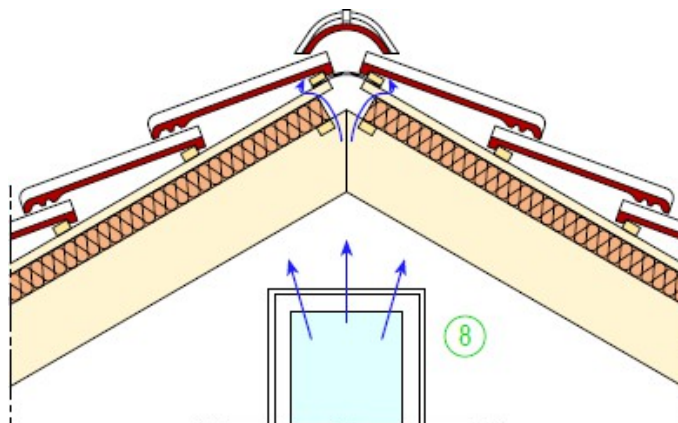


Top floor ceiling – pitched ceilings

Cold pitched roofs, which are created when insulating the top floor ceiling, must be considered separately. Here, care must be taken to ensure that there are no leaks above access points, such as pull-out stairs – the inflow of warm air can lead to mould formation on rafters and under-roofs, especially in the winter months. In addition, the attic should be ventilated with outside air.

Ventilation of uninsulated attic

- Ventilation ridge with rain protection above the counter batten
- Open roof underlay panels at the ridge
- Ventilation via windows or ventilation openings





Weathering times and roof pitch

- For **roof pitches of $\geq 15^\circ$** , the tightness of the tongue and groove connection has been verified.
- naturheld **underlay panels can be covered with suitable underlay membranes** to ensure a rainproof or waterproof sub-roof at lower roof pitches.
- Naturheld 140, 180, and 220 underlay panels are classified in the information sheet for underlays, undercoverings and underlayments in accordance with the guidelines of the ZVDH. They meet the rainproofing requirements in accordance with the product data sheet for underlay panels.
Wood fibre (as of 2012) of the Central Association of German Roofers (ZVDH) and are classified as category A underlay panels (UDP-A). Naturheld underlay panels also comply with type IL (interlocking underlay panels) according to EN 14964:2006
- Detailed information on the use of roof underlays is provided in the regulations of the German Roofing Trade Association (ZVDH). The use of naturheld roof underlay panels is influenced by the standard roof pitch (RDN), the roof pitch of the building project (DN), and also by the so-called increased requirements.

ZVDH regulations on wood fibre underlay panels

In 2024, due to the steady increase in heavy rainfall events, the ZVDH revised its regulations for roof tiles, roofing tiles and underlays and introduced a new system. According to this, the permissible deviation from the standard roof pitch for the use of wood fibre underlay panels changes as follows:

Roof underlays, ZVDH class 3 Seam and perforation-proof underlay	Without increased requirements	With increased requirements	
		≤ 30	$> 30^\circ$
Standard roof pitch		≤ 30	$> 30^\circ$
Permissible deviation below the standard roof pitch	8	4	8



Processing instructions for roofs

Increased requirements

- 1) Long rafter lengths represent an increased requirement depending on the roof pitch if:

Roof pitch	≥ 10	≥ 20	≥ 30°	≥ 40
Rafter length	> 10.00 m	> 10.50 m	> 11.50 m	> 13.00 m

- 2) Concentrated water flow on parts of the roof, e.g. below rainwater downpipes, valleys
- 3) Special roof areas, e.g. curved dormers, barrel and conical roofs
- 4) Areas with a high snow load $\geq 1.5 \text{ kN/m}^2$
- 5) Windy areas in wind load zones 4 or ridge and summit locations or gorges

Classes of additional measures

The "Technical Rules for Roof Coverings with Roof Tiles and Roof Stones" from the ZVDH (German Roofing Contractors' Association) – as of April 2024 – regulate the construction of the sub-roof in 5 classes, with the first class representing the most demanding.

Naturheld underlay panels can be used in classes 3-5 without any additional measures:

Class 5: Loosely overlapped or interlocked underlay (underlay board with tongue and groove connection). Butt joints and component connections must be taped.

Class 4: Bonded underlay/underlayment - Seams and joints of the membranes bonded

Class 3: Seam and perforation-secured underlay.

Wood fibre underlay boards have proven themselves to be puncture-proof for many years, even without nail seal tapes. Therefore, Naturheld guarantees perforation resistance without additional nail sealing tape.

Class 1 and Class 2: Waterproof and rainproof, seam-joined underlay

These underlays should be constructed with suitable underlay membranes. In this case, Naturheld products can be used as insulation under the underlay membrane.



Processing instructions for roofs

Areas of application for Naturheld underlay boards as rainproof underlays:

Standard roof pitch of the roof covering	Possible roof pitch for rainproof underlay without foil	
	15	40
Tiles without interlocking joints 40	≥ 32°	
Hollow tile 35	≥ 27°	
Roof tiles with double interlocking 30	≥ 26° with increased initial angle	
	≥ 22° without increased requirements	
Roof tiles with improved interlocking 25	≥ 21° with increased requirements	
	≥ 17° without increased requirements	
Flat roof tiles 22	≥ 18° with increased requirements	
	≥ 15° without increased requirements	

We also refer to the specifications of the Central Association of German Roofers (ZVDH).

Flat roof

For flat roof structures and gently sloping roofs, there are three types of structures that can be easily constructed using Naturheld wood fibre insulation.

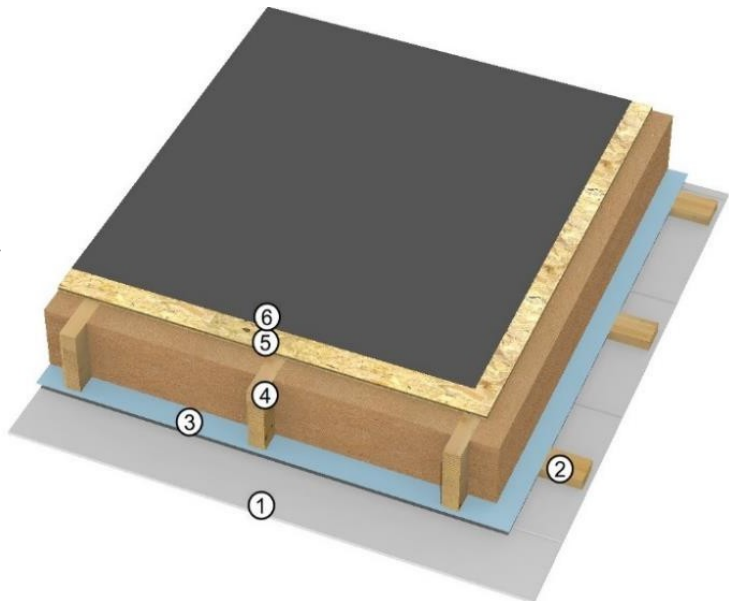
1. Unshaded flat roof with diffusion-open, variable vapour barrier

In this structure, the supporting structure is embedded in the insulation layer. As a rule, the inter-rafter space is filled with flexible insulation, Naturheld Flex or Flow blow-in insulation. Formwork is placed on the rafters to support the waterproofing.

This structure can be supplemented with sloped insulation. The interior finish must be sealed with a variable vapour barrier, e.g. pro clima INTELLO PLUS®. The function of the vapour barrier only functions under certain circumstances, such as an undamaged roof surface with a dark waterproofing membrane. Therefore, these roof structures must be evaluated and approved by the manufacturer of the vapour barrier.

Flat roof variant 01.1

1. Interior panelling Ceiling
2. Installation level
3. Variable vapour barrier
4. Rafters with Naturheld Flex or Naturheld Flow
5. Formwork, OSB board
6. Waterproofing, unshaded, dark

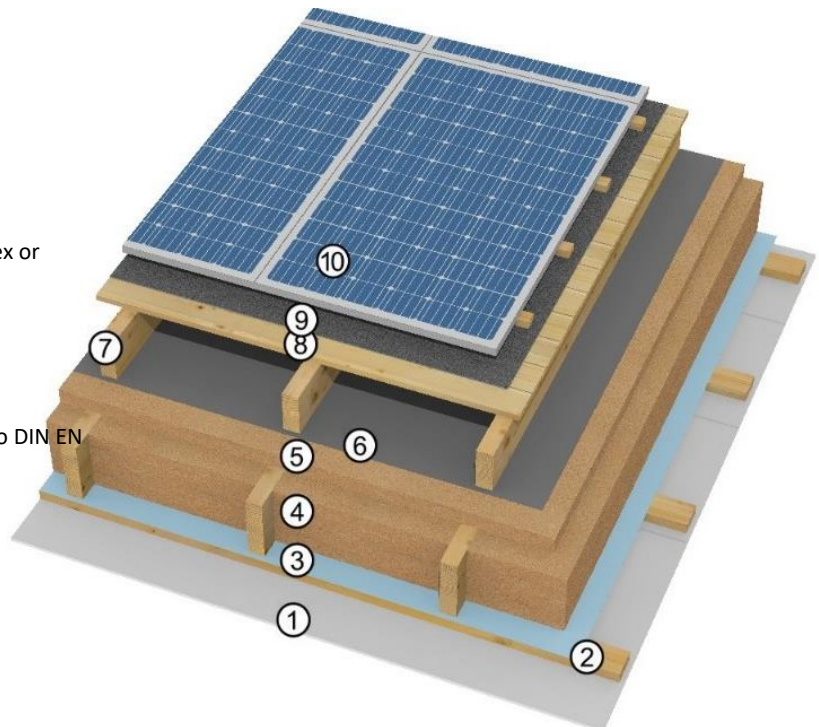


2. Ventilated flat roof

This structure differs only slightly from the usual pitched roof structures, as a ventilation layer is installed above the insulation. This allows the insulation to dry out and the construction is very safe, durable and resilient. Any desired roof design is possible, including use as a surface for photovoltaics. However, the ventilation cross-sections are large and are regulated in technical regulations such as DIN EN 68800.

Flat roof variant 02.1

1. Interior panelling Ceiling
2. Installation level
3. Variable vapour barrier
4. Rafters with Naturheld Flex or Naturheld Flow
5. Naturheld 180 or 140
6. Underlay
7. Ventilation level
(cross-section according to DIN EN 68800)
8. Formwork
9. Waterproofing
10. Any use, here: solar modules



3. Insulation layer with dense vapour barrier, separated from the supporting structure

With this variant, a hard roof covering can be constructed with gravel ballast or as a green roof. The insulation made of Naturheld 100, Naturheld 110 or Naturheld 140, depending on the required compressive strength, is sealed on the inside with a dense vapour barrier and on the outside with a dense waterproofing membrane. It is crucial that both sealing layers are permanently sealed and that the insulation is installed dry. A ballast secures the roof structure and can constitute a hard roof covering.

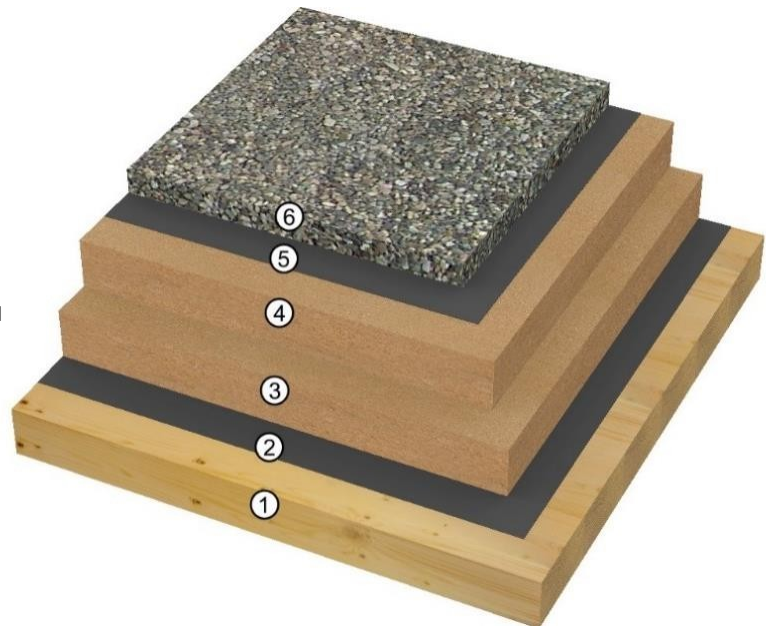
Caution: When storing the insulation and constructing the structure, it is particularly important to ensure dry conditions and low humidity in order to minimise

Moisture is trapped between the insulation layers.

Note: This structure is only possible if the insulation layer is separated from the supporting structure, such as on a CLT or concrete structure or on exposed rafters with formwork.

Flat roof variant 03.1

1. Solid wood ceiling
2. First waterproofing, e.g. EPDM
3. Example: Naturheld 110
4. in two layers
5. Second waterproofing EPDM
6. Gravel as ballast





Processing instructions for roofs

Building physics and component testing

All naturheld insulation materials are registered at **ubakus**, where proof of the U-value and moisture protection in accordance with DIN EN 4108-3 for individual roof structures can be easily generated:

www.ubakus.de/u-wert-rechner/

Layer	Material	Thickness (mm)	Width (mm)	Spacing (mm)
1	Gipskartonplatte	12,5		
2	OSB/3	15		
3	naturheld Flex	160		
4	naturheld 180	60	60	600
5	Hinterlüftung (Außenluft)	40		
6	Installationsebene	40		
7	Boden-Deckel-Schalung	44		
8				

U-Wert: 0,187 W/(m²K)

sd-Wert: 3,0 m

Temp. Ampl. Dämmung (1/TA_V): 21,0

Speicherfähigkeit innen: 42 kJ/m²K

Contact naturheld Technology

Do you have any questions about our products?

We are happy to help.

Fast, simple and competent – free of charge on the technical hotline:

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