Code: TLBP130
Revision: 02
Release: 13.07.2022

Technical Leaflet

Installation and Usage Guideline of EGGER DHF

The following leaflet refers to EGGER DHF. It is intended to provide builders, fabricators, planners and all interested parties with essential information on the advantages of using this product, as well as general information on the processing and installation of EGGER DHF in wall and roof constructions.

Please note that EGGER DHF is not intended for use in floor constructions!

Product properties

Product description

EGGER DHF-boards are resin-bonded, medium-density wood fibreboards of the type MDF.RWH according to EN 622-5. According to this product standard, the board type MDF.RWH is defined as "boards for use in rigid underlays in roofing and walls".

EGGER DHF-boards are produced in a dry process on a modern Contiroll® press. They are mainly made of spruce and pine (by-products from the sawmill). As moisture-resistant, vapour-permeable, windproof and at the same time reinforcing planking, they are ideally suited for the exterior cladding of roofs and walls. The areas of application as well as the properties of DHF-boards are regulated in the declaration of performance (DOP-506). Due to the formaldehyde-free gluing and the use of hazardous-free wood, the boards are particularly environmentally friendly and have low emissions.

Delivery program

Table 1: We currently offer the following EGGER DHF formats

Board thickness mm	2-sided tongue- and groove profile		4-sided tongue and groove profile		
	2.800 x 1.250	3.000 x 1.250	2.500 x 675	2.500 x 1.250	2.500 x 612
15	•	•	•	•	
20					•

Product advantages

The use of DHF-boards makes it possible to quickly and effectively create a waterdraining, windproof and accessible roof surface. As compared to the conventional method of constructing a roof, three functions are fulfilled with one operation.

1. Puncture resistance

2. Water-repellent layer

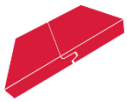
3. Windtightness

Rain resistance and outdoor weathering

DHF-boards offer thoroughly tested rain resistance. DHF-boards can be used up to a roof pitch of 14° without additional measures. In the case of roof pitches between 10° and 14°, the tongue and groove joints must be covered with additional tape in order to achieve rain resistance. Nail sealing tape is not necessary when using DHF-boards.

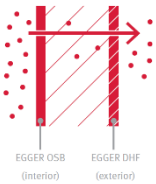
Boards without reinforcing function can be weathered outdoors for two months as temporary roofing between March and November. During the winter months, outdoor weathering should be limited to a maximum of two weeks.

Tongue and groove profile



The optimised tongue and groove profile allows for a better and a fast installation, allowing the user to save time and money. The asymmetric, conic profile ensures, on the one hand, that water can run without problems across the board joint, and creates, on the other hand, a windproof structure. For a rain-resistant installation on the roof, the edge must always point with the tongue to the ridge.

Vapour permeability



DHF-boards have low resistance to water vapour diffusion. With a μ-value of 11, for the available board thickness of 15 mm there is an s_d-value of less than 0.2 m. In combination with a vapour control layer on the interior of the components (e.g., OSB 3 boards), safe and durable structures can be constructed with low condensation risk and high drying potential. Vapour barrier film on the interior is not generally necessary when using DHF-boards.

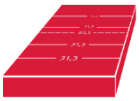
Raw density

With a high raw density of at least 600 kg/m3, DHF-boards can be used as alternatives to other wood-based materials (OSB, chipboard) in structures with fire protection requirements. The high raw density, in relation to large-area installation with few joints, has a positive effect on the noise reduction of components. Roof constructions particularly benefit from this. In addition, boards with high heat storage capacity combined with high raw density have a sensible contribution to heat protection in the summer.

Hail safety

If the roof cover is damaged by hail, the DHF-board below provides reliable protection against water. During construction, the DHF-board also ensures hail protection until the final roof cover is completed.

Nail grid



The DHF-board is quickly installed, thanks to the printed nail grid aiding assembly. It is stamped on the upper section of the DHF-board in the divisions of 31.3 cm and 83.3 cm (for the axial dimension 62.5 cm). Thanks to the nail grid, no additional marking is necessary during assembly. This also simplifies installation in the case of deviating raster dimensions. Only the first nail is placed and the DHF-board is fastened parallel to the line print.

Floor to ceiling formats

The formats of DHF-boards are optimal for use on the roof or on the wall. With board lengths of 2,500 mm, 2,800 mm, and 3,000 mm, timber frame architectural boards can be constructed for different floor heights without horizontal joints. The set of formats matching our OSB boards simplifies the planning and the manufacturing of roofs and walls in timber frame construction.

More safety

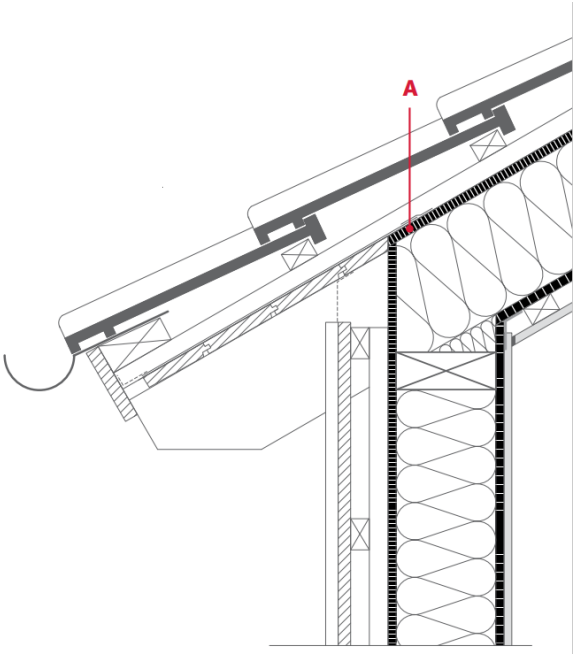
DHF-board with 20 mm thickness guarantees more safety on the construction site. It is puncture resistant up to 1.25 m rafter spacing and the 20 mm thickness also increases the stability, strength and load capacity of the board. This DHF-board is the most economical solution due to its higher load-bearing capacity in the stiffening planking. Thus, larger rafter or stud spacing is possible. An advantage during installation is also the offset-free transition with standard 19 or 21 mm thick exposed formwork at the eaves and verge.

Use

Roof

DHF-boards are mainly used in roof structures. They are applied on pitched roofs to create the second water-draining layer under the roofing and to structure reinforcing roof boards (**A**). They serve as an additional rain-resistant measure. In addition, they form the temporary roofing during the construction period.

For roofs with full rafter insulation, that is, for regular unventilated roof constructions, DHF-boards are highly beneficial thanks to their vapour-permeability. As such, the components structure is largely vapour-permeable and in addition, preventive chemical wood protection may be left out. Also an additional vapour barrier foil can be dispensed if EGGER OSB 4 TOP is used on the interior side.

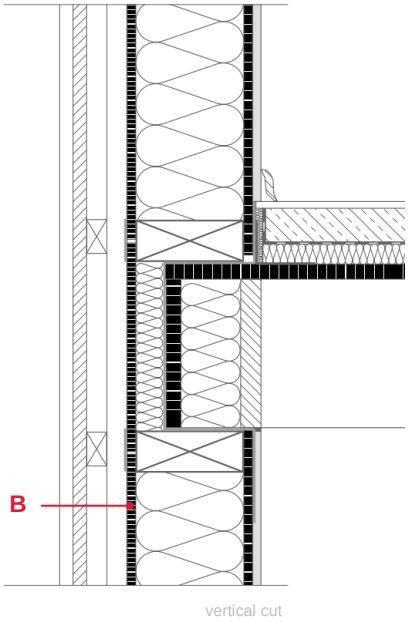


(Image 1)

For more information on the use of DHF in roofs, please refer to the technical data sheet *132_DHF special_use of EGGER DHF on the roof*.

Wall

As an external cladding of outer walls in timber frame construction, DHF-boards can be used perfectly well behind curtain walls, but also under thermal insulation composite systems and masonry facings (**B**). They can also take over the function of reinforcement planking. A condensation-free and physically safe construction presupposes a fully insulated structure with vapour-permeable DHF-boards as external planking. It provides the necessary windtightness of the components. Thanks to their stability, DHF-boards are highly suitable for the use of blow-in insulation material.



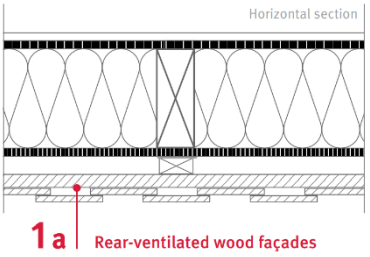
(Image 2)

Outdoor Exposure

The duration of permissible free weathering for DHF-boards without a stiffening function depends in the wall area on the driving rain load and the existing re-drying potential. The period of free weathering is not limited for wall areas protected by a roof overhang within an angle of incidence of 60°. During the construction period, DHF-boards in the wall area can be exposed to free weathering for up to 2 months if the installation conditions comply with service class 3.1 according to DIN 68800. Constant contact with earth and water as well as accumulation of water, for example in the area of open joints, must be avoided. Before installation of a closed, non-ventilated facade, the DHF-boards must be dried back to their subsequent service moisture content.

1 Ventilated façade cladding

EGGER DHF provides multiple options for the design of rear-ventilated façades for timber frame constructions with DHF-boards. It must be proven that all façades comply with requirements concerning efficient weather protection and driving rain resistance. Horizontal weatherboarding or vertical “board to board” rear-ventilated façades do not require additional measures, such as facade wraps on the DHF-boards. In contrast, in the case of façades with a large amount of joints, such as horizontal wood siding with open joints and of non-ventilated façades (only horizontal battens with non-ventilated compartments), facade wraps should be applied to the DHF-boards as protective measure.



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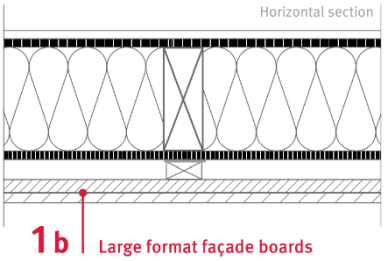
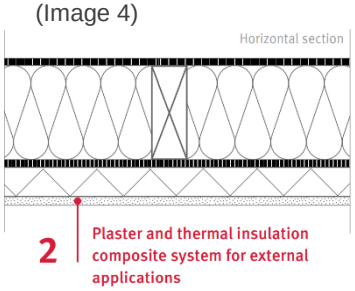


(Image 4)

2 Plaster and thermal insulation composite systems for exterior applications

Direct plastering of DHF-boards is not possible. Nevertheless, the combination of DHF-boards with thermal insulation composite systems provides an additional energy saving measure for timber frame constructions. One part of the insulating layer thickness can be relocated to the exterior skin of the building shell, therefore allowing the wood cross-sections to be reduced to the requirements.

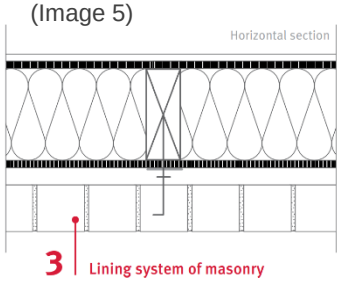
Approved thermal insulation composite systems suitable for DHF shall be used. These systems are best installed according to the installation guidelines of the system suppliers.



(Image 5)

3 Lining systems of masonry

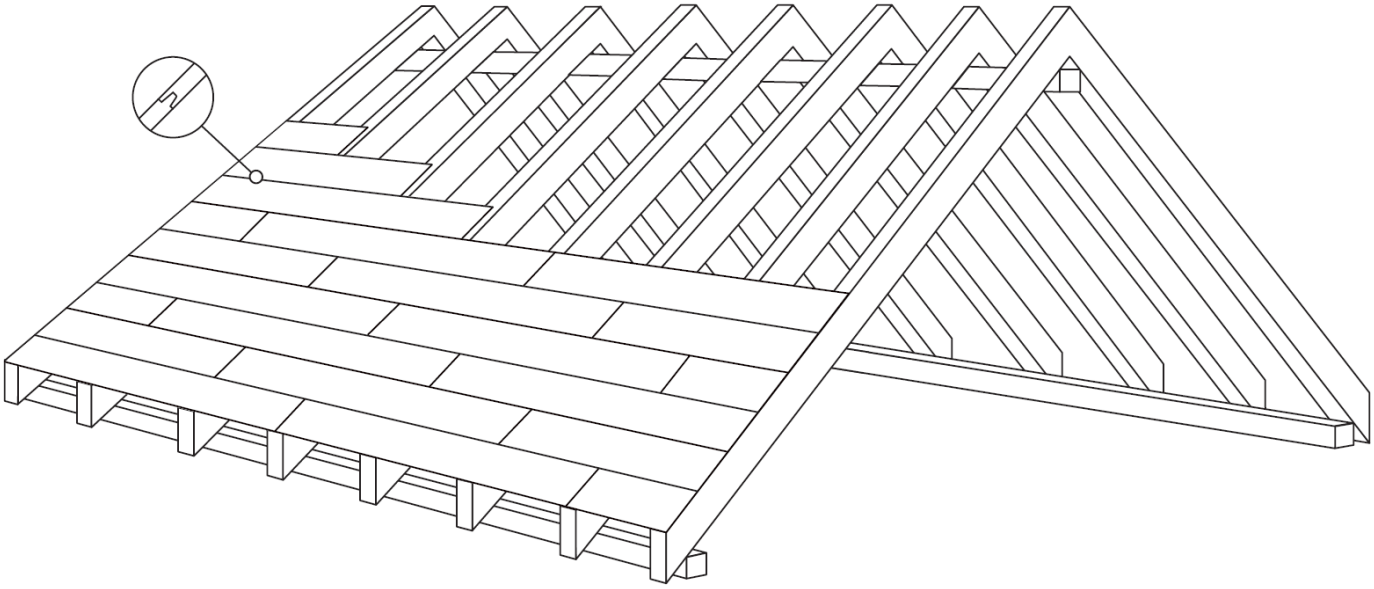
Lining systems of masonry are able to absorb larger quantities of moisture in the case of driving rain. In addition, the masonry is relatively impermeable in comparison to the remaining wall structure. The air gap between the masonry lining and the DHF-board is not ventilated. This results at times in high air humidity inside the air gap, leading to unsuitable permeability conditions. Therefore, a water-draining and vapour-permeable layer (s_d-value 0.3 to 1.0 m) should be integrated outside the DHF-board.



(Image 6)

Processing information

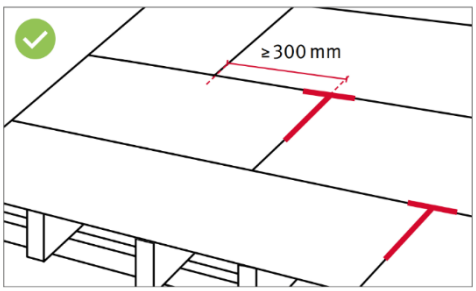
- The board imprint indicates which side must face outwards or inwards.
- The tongue of the DHF-board must always face to the ridge so that rainproof installation is ensured.
- Installation begins at the eaves and continues horizontally from one corner of the roof to the next.
- After the last board in a row has been cut, a new row can be started with the remaining piece.
- For optimal installation, it is recommended to choose a rafter spacing of 62.5 or 83.3 cm.
- If the boards are to be used as reinforcing planking, large-sized boards 2,500 x 1,250 mm must be used.
- Building moisture, caused e.g. by fresh plaster or paint, must be removed by ventilation. Dry air must be provided inside the building during the construction phase.



(Image 7)

It should be noted

- that the short edges must rest on a beam.
- that board edges with a width of at least 18 mm rest on beams.
- that cross joints are not permitted and the distance from one T-joint to the next must be at least 300 mm:



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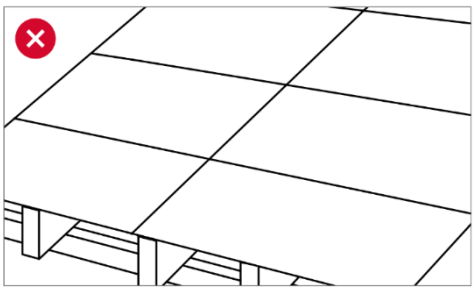


(Image 9)

Fastening

Fastener

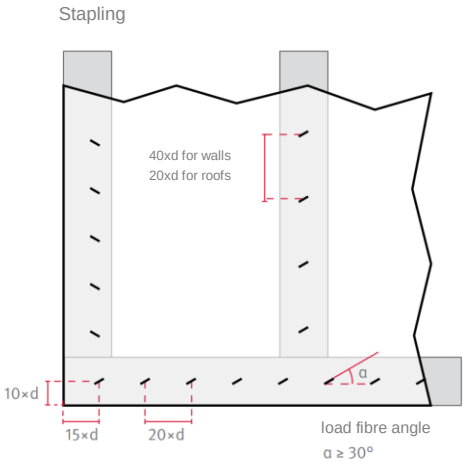
DHF-boards can be fastened with fasteners like stapling, nails or screws. DHF-boards have a high bearing strength for fasteners with wire thickness up to 3 mm. Therefore, fastening with stapling is adequat.

In general, the following applies for stapling and nails:

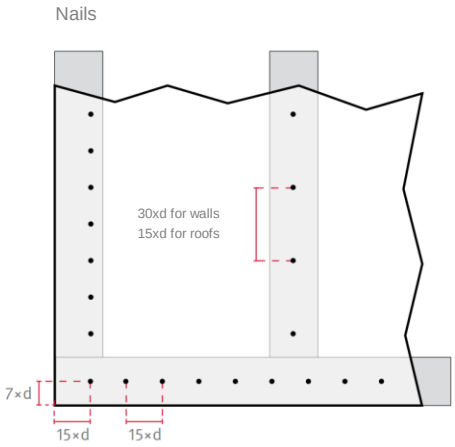
- building authority proof of usability such as approval or standard (brands such as Haubold, Prebena and SFS Intec)
- length 2.5 × board thickness, minimum length 50 mm
- stapling with wire thickness of at least 1.52 mm
- resistant to corrosion, made of galvanized or stainless steel
- when using nails: flat-head nails with gutter groove, screwnails or annularly threaded nails.

For planking loaded components, the minimum fastener distances specified in the table must be observed. In the case of non-load bearing planking, the fastener distances in the following image should not be exceeded.

Recommendation for minimum fastener distances in load bearing structures:

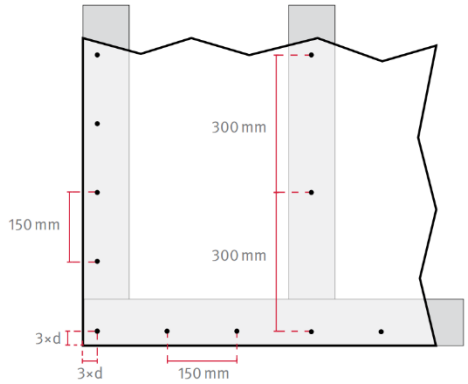


(Image 10)



(Image 11)

Recommendation for maximum fastener distances of non-load bearing structures:



(Image 12)

→ More detailed information on fasteners can be found in **DIN EN 1995-1-1**.

Fastening counter battens

Counter battens are anchored in the rafters through DHF-boards. The proof regarding the load-bearing capacity of the fasteners is provided on the basis of the theory of Johansen. The following table lists data regarding the required quantity of fasteners. The following framework conditions are taken into account:

- the computation occurs with nails 3.1 × 80 mm according to EN 10230
- the counter battens have minimum dimensions of 30 × 50 mm and are fastened to the rafters with 15 mm DHF-boards

In the case of larger counter batten cross-sections, longer nails must be used. The wind suction is secured with a minimum insertion depth of 12 d_n into the rafters.

Table 2: Number of nails required per meter of counter-batten (pieces/linear metre)

	snow load s_k							
	0,75 kN/m²		1,00 kN/m²		1,50 kN/m²		2,50 kN/m²	
rafter spacing e_{max} in mm	**850**	**1.000**	**850**	**1.000**	**850**	**1.000**	**850**	**1.000**
lightweight roofing 0,35 kN/m²	3	3	3	3	3	4	5	5
average roofing 0,60 kN/m²	3	4	4	4	4	5	5	6
heavy roofing 0,95 kN/m²	4	5	5	5	5	6	7	8

Material moisture

Wood as main component of DHF-boards is a hygroscopic building material. This means that the moisture content of the boards changes depending on the prevailing humidity and temperature. The changes in material moisture are associated with dimensional changes in length, width and thickness. According to DIN CEN/TR 12872, the following moisture-related dimensional changes can be assumed for DHF-boards:

- length: 0.05 %
- width: 0.05 %
- thickness: 0.7 %.

If the roof and wall boards are used for load-bearing purposes, they must be protected from direct weathering and precipitation immediately after installation. Permanently, the board moisture content should **not exceed u = 15%**.

Correct construction from a moisture point of view

- Ideally, the permeability effective overall structure of external components should be prefabricated with insulation and vapour barrier on the side of the room.
- In the case of production on the construction site, the vapour barrier (OSB) on the side of the room should be integrated first, followed by the structure of components on the outside.
- Prefabricated components planked on one side with DHF-boards should be completed on the construction site with insulation and vapour barrier on the side of the room.

Expansion gaps

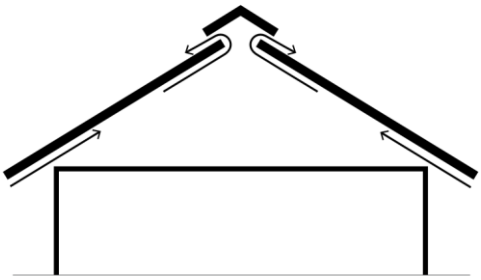
DHF-boards should always be laid tightly joined. Large wall and roof surfaces should be partitioned with expansion gaps in sections with side lengths of maximum 10 m. These expansion gaps should be 10 mm to 15 mm wide.

Caution – Convection

- Through leaks in the building envelope, moist and warm air may be transported into the component cross section (convection), where it may occur on cold surfaces (e.g. DHF planking) as condensation water. The amount of condensation water may exceed the evaporation potential of the construction by a factor of 1,000.
- Condensation due to convection must be excluded during construction with a properly executed, airtight layer (e.g. through joint sealing tapes).
- Resulting condensation is not diffusible and can no longer be transported through a material via diffusion processes. It leads to a potentially unacceptable increase in material moisture and related damage.

Uninsulated loft

Permeability processes and the related condensation water also occur in the case of underlays in the area of uninsulated lofts. If sufficient and permanent ventilation cannot be secured via openings in the eaves, ridge and gable condensation water will occur on the cold surface of the DHF-board under unfavourable climatic conditions. Lofts that are not permanently insulated in relation to DHF-board underlays are not recommended in the case of absent or insufficient ventilation.



Belüftung ungedämmter Spitzböden

(Image 13)

In addition to creating ventilation for the pointed floor in the ridge, the airtightness of the ceiling, including the floor hatch, to the living space below must be carefully executed.

Possible convection currents from the masonry heads of interior walls and the eaves and verge walls must be taken into account in the planning and implementation of the airtightness concept. This can be done, for example, by covering with foil and bonding with the airtightness layer of the remaining construction!

Crawl Space

DHF-boards are not recommended as lower building edge to crawl spaces. Due to the lower edge on the soil as well as unfavourable ventilation conditions, relatively humid climate conditions may arise in crawl spaces. High air humidity may lead to condensation water on the external boards surface. Larger amounts of condensation water lead to permanently increased material moisture. In combination with existing climate conditions, an infestation by moulds cannot be excluded.

Surface coating

In the case of coatings, the DHF-boards must be prepared accordingly. The surface must be free of dust and grease, absorbent, sanded and dry. Visible external boards that are not directly weathered should be coated adequately for protection against weathering and abrasion. It is recommended to test the functioning of the coating system on a test area. Compliance with the processing instructions of the manufacturers is mandatory.

General notes

All documents can be found at www.egger.com. For further information please contact our hotline.

Additional documents

CE Declaration of Performance DOP-506 for EGGER DHF

TLBP001 Transport and Handling Instructions

TLBP002 Storage Instructions

TLBP130 Installation and Usage Guideline

TLBP132 DHF special – Use of EGGER DHF on the roof

For questions please contact:

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