HOFATEX®

Healthy living: the challenge of the modern age

Natural wood fibre thermal and acoustic insulation

Smrečina Hofatex® is one of the specialist manufacturers of wood fibre insulation materials, and we have been producing these boards using the eco-friendly 'wet process' for the past 60 years. The wet process ensures that customers get one of the most ecological building materials available because its production involves the thermo mechanical processing of coniferous raw material. The required energy is generated by Hofatex's own biomass plant, which in turn provides green energy for all the factory's energy needs, and indeed the surplus is sold back to the national grid.

All Hofatex® products are PEFC certified which guarantees that the timber raw material used in production comes from sustainably managed and legal resources.

Thanks to their intrinsic properties, wood fibre boards represent an excellent insulation solution for new buildings, for renovations and for the refurbishment of any building structure. Buildings comprising of wood fibre boards are high quality in terms of their structural and physical aspects, and they guarantee that thermal loss is minimized and excess summer heat is stored and released when required. They offer a complete thermal solution in comparison to commonly used insulation materials such as mineral wool or polystyrene.

Hofatex® wood fibre boards provide effective protection against:

- cold
- heat
- noise

www.hofatex.eu

Advantages of the Hofatex® wood fibre boards

Summer protection
The highest thermal capacity of all commonly used insulation materials (c = 2,100 J/kg.K) ensures the thermal stability of buildings, especially in the warmer summer months. The strong thermal retention ability of wood fibre boards protects the interior living space from overheating, and enables a phase shift in temperature by as much as 7-13 hours (note: other insulation materials can only provide 3-4 hours).

Winter protection
Thermal conductivity of wood fibre boards (λ_D = 0.039 – 0.049 W/m.K) minimizes heat loss through building structures, thereby making a substantial contribution in terms of lower heating costs during the winter.

Protection against noise and shape stability
Due to their higher density (ρ = 150 – 260 kg/m^3), wood fibre boards are capable of providing effective acoustic insulation, by reducing the spread of both airborne and impact noise through vertical or horizontal structures. Their density also ensures shape stability and this high-quality insulation does not degrade over time. This is critical to ensure that thermal leakages do not arise in the future.

Vapour permeability & hygroscopicity
Wood fibre boards are diffusion-open (breathable). The low factor of vapour resistance (μ = 5) hinders the accumulation of water vapour condensation inside the structure, thereby improving the air quality of the internal microclimate while allowing the walls and roof to breathe. This also protects the structure of the building by keeping it dry and preventing mould growth.

PEFC certified
Wood used to manufacture Hofatex® wood fibre boards comes from sustainable and managed forests and controlled resources (PEFC/23-31-11).

Ecology and sustainability
Smrečina Hofatex® is the first European wood fibre manufacturer to use ecological starch glue for the adhesion of the individual panels. The manufacturing process only uses ecological raw materials - timber and natural starch glue - which are processed using electric power and steam from the factory's renewable biomass energy source. That is why the wood fibre boards are ranked amongst the most environmentally-friendly, ecological insulation materials available which are not harmful to human health. The panels are fully recyclable, can be burned or safely composted.

Fire resistance
Hofatex® wood fibre boards feature Class E flammability (as specified in EN 13501-1). In a fire, the board surface chars and stops the fire from spreading inside the structure. This results in an above-standard fire resistance for the entire building structure, so that timber buildings will be able to resist an exterior fire for 90 minutes or an interior fire for 120 minutes.

Space saving
A timber frame building insulated with wood fibre boards can have a larger interior floor space area than a masonry building even if the external dimensions are identical. This provides a greater return on investment. On a 10m x 10m layout, a timber frame building with the same thermal insulation U values as a masonry building, will provide 10 m^2 more floor space.

Energy efficiency
Properties constructed using wood fibre boards allow for minimum energy loss, making them the ideal material for building low-energy and passive houses.

Fast and easy installation
Hofatex® wood fibre boards can be cut using standard wood cutting electric tools – e.g. a circular saw with a dust collector or a reciprocating saw with a suitable blade. Thin boards can be cut using a serrated knife. Wood fibre boards are secured to the timber frame structure by using wide-backed staples or plastic fasteners. For solid structures, the boards are fixed using plastic fasteners or screws. Wood fibre boards can be covered with plaster / render, tiles or a façade.

Multiple applications in a building
Hofatex® wood fibre boards can be used for the entire exterior cladding of a building, both on the roof and walls, as well as internally to provide additional insulation in the ceilings, walls and floors. The traditional and oldest application of wood fibre boards is their use in floor systems – so-called Hobra boards.

The philosophy of responsible and healthy living

The current trend in the construction industry is to build low-energy, passive, zero-energy and even energy-plus houses. The developer's objective for these buildings is to minimize energy consumption in order to ensure low on-going utility costs and a reduction in the carbon footprint. Guidelines for building energy efficient properties with low carbon emissions can be achieved by using a variety of construction materials. Selecting a suitable insulation for a house is not only influenced by the source of the raw material, but it is also imperative to achieve the best combination of **thermal insulation** (winter performance) and **thermal accumulation** (summer performance) properties.

The selection of a **thermal insulation material** is mainly influenced by the thermal conductivity coefficient of that particular material so that the most efficient insulation has the lowest lambda value (λ). When calculating the thermal transmittance (U value) of any building element e.g. walls, floors or roofs we ascertain the amount of heat transfer passing through 1m^2 of the building structure, when there is 1 K (1°C) of temperature difference between the air on the surface inside the structure and the air on the surface outside. The units used to express U-values are watts per m^2 Kelvin (W/m^{2}K). This means that if a wall, for example, has a U-value of 1.0 W/m^{2}K, for every degree of temperature difference between the air on the surface inside the wall and the air on the surface outside, 1 watt of heat would pass through any m^2.

An effort to minimize energy consumption often results in a building having very thick roof and external wall structures. Houses are classified as low-energy or passive etc if the resultant thermal loss meets certain criteria. This classification only concerns energy demand through the winter season and that is why we term this as a 'building's winter performance´.

However, the use of thick thermal insulation with a low thermal conductivity value does not necessarily mean that the occupier in a low-energy or passive house will have guaranteed thermal comfort over the entire year. In summer, the building may significantly overheat, which is a typical sign of unsuitable thermal cladding in attics and roofs, or incorrectly designed timber or steel framed buildings. The problem with certain insulation materials which have a low thermal accumulation capacity means they react very rapidly to any change in temperature – either externally from the sun or internally from the heating system or heat from cooking appliances etc. This absence of thermal mass is often cited as the main disadvantage of lightweight structures.

Moreover, a common opinion amongst the general public is that interior temperature fluctuations can be avoided by applying a sufficient thickness of any thermal insulation material. However this opinion is conceptually incorrect. The thickness of thermal insulation primarily decreases the thermal flow density, which is crucial for a ´building's winter performance´ but not necessarily for its summer performance.

Of all the parameters used in modern structural engineering, the Thermal Mass Parameter (KJ/m^{2}K) is probably the best indicator of a building's summer performance. By alternately storing and releasing heat, high thermal mass enables buildings to respond naturally to changing temperatures, helping to stabilise the interior temperature. In warm climates and during winter in moderate climates, where there is significant temperature variation between day and night, heat is absorbed during the day and then released in the evening when the excess can be used to heat the indoor space or be released through natural ventilation as the outside temperature drops. This reduces the dependency on both heating and air conditioning systems. The thermal mass of a product is determined by a combination of the product's density, its specific heat capacity and its thermal conductivity. Therefore many competitor insulation products e.g. polystyrene, which have a low density and a low specific heat capacity cannot contribute to the thermal mass of a building.

It is therefore critical to assess the thicknesses of individual layers of the structure, as well as their **accumulation abilities.** This parameter is particularly crucial when assessing living comfort during both the summer and winter seasons, which is also known as interior thermal stability.

Hofatex® wood fibre boards represent a multifunctional insulation material that is able to meet both of these requirements. In comparison with commonly used thermal insulation they have the following functions:

- ***Thermal insulation*** (properties comparable to mineral wool and polystyrene)
- ***Thermal accumulation*** (when compared to insulation products such as those mentioned above, with the same thickness, its accumulation ability is 20 – 30 times higher).

Hofatex® boards (in conjunction with conventional thermal insulation materials) enable the construction of thermal cladding structures for attics, roofs and timber frame walls which meet common requirements for a building's winter performance, as well as its summer performance requirements. The structure of such constructions is simpler in terms of the number of layers; they are built faster, and they do not require the use of various plastic foils (vapour barriers) as their use is unreasonable and conceptually incorrect in modern structures using wood-based materials.

Moreover, it has been scientifically proven that the internal environment of a building is often polluted by emissions from the materials used in its construction. As an example products containing formaldehyde and volatile organic compounds (VOCs), have been shown to emit higher emissions as temperature rises. As houses are mainly built or renovated in order to provide a comfortable and healthy living environment, natural building materials should be used in the construction and the building should be designed with an emphasis on a healthy internal environment. This requirement is met in particular by products made from biological raw materials such as wood – and therefore Hofatex® wood fibre boards.

Health + Responsibility = HOFATEX® insulate with wood

Roof

Hofatex® UD

With a density of 260 kg/m^3 this is the heaviest wood fibre board in the Hofatex® portfolio. The entire mass of the material is water resistant, and is primarily intended for use as a sarking board for direct application above the rafters and below the roofing surface so long as the roof pitch is greater than 20°. It also functions as a water resistant insulation, and can be left exposed for up to 3 months during construction without damage, with the exception of during heavy snow. In addition it can be used for external wall insulation behind a ventilated façade, for the construction of non load-bearing walls and for interior lining.

Hofatex® Kombi

This is a unique product combining the extraordinary insulation qualities of the Hofatex® TopTherm product and the approved quality of the water resistant Hofatex® UD boards. This sandwich construction board enables single layer application offering significant savings in time and labour. When applied as a sarking board under roofing or behind a ventilated façade wall, the Hofatex® UD layer must always be positioned towards the exterior, so that it can be left exposed for up to 3 months, with the exception of during heavy snow

The longer length of Hofatex® UD and Hofatex® Kombi products enables application across at least two rafters. The boards can also be joined away from the rafters due to the tongue and groove joints without any impact on the compression strength properties of the structure. The tongue and groove joint also reduces the risk of water leakage into the roof structure in the event of damaged roofing. Board joints must be sealed with Hofatex® Tapes at the junctions where eaves, roof valleys and ridges meet, as well as at any passages through the roof structure (e.g. skylight, chimney, ventilation ducts etc). To ensure better tape adhesion, surfaces must be first treated with a Hofatex® Primus primer coat.

	Product	Thickness (mm)	Size (mm)	Thermal conductivity λ_D (W/mK)	Density ρ (kg/m^3)	Heat transfer coefficient U (W/m^{2}K) - 60mm
Roof / Wall	Hofatex® UD	22, 35, 52, 60, 80, 100	580 x 2500, 580 x 1750	0,049	260 ± 20	0,82
	Hofatex® Kombi	60, 80, 100	580 x 2500	0,042/0,049	170/260	0,64

Wall

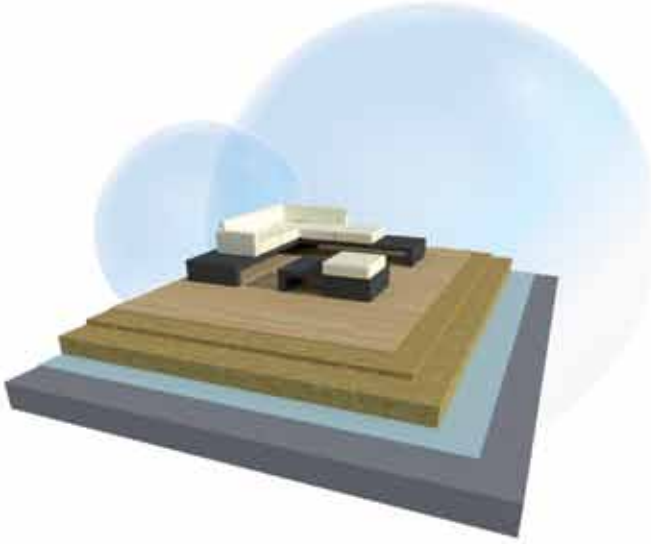
Hofatex® SysTem

Hofatex® SysTem insulation panels are designed for insulating external walls as they can be rendered to directly. They are attached to the timber structure using plastic fasteners or wide-backed staples. In renovation and refurbishment applications, they can be directly anchored onto a masonry wall using plastic fasteners. The Hofatex® SysTem boards are a component part of the certified Hofatex® EWI Render System, but they can also be rendered with lime render as well as other diffusion-open renders (e.g. those produced by Baumit, JUB, Caparol, Weber, Röfix, Hasit etc).

Thermal insulation cladding in historical buildings and log houses is primarily carried out on the inside of exterior walls in order to preserve the building's external appearance. Hofatex® SysTem IA insulation boards are used internally and can be plastered directly with suitable diffusion-open plasters. Hofatex® wood fibre boards are particularly beneficial when used on historical buildings as these buildings must be able to breathe. If the vapour cannot escape through the fabric of the building, condensation and mould growth will occur. However, do bear in mind that interior wall insulation will give lower thermal efficiency results compared to external wall insulation due to thermal bridging - for example, at the junction where a wall and ceiling meet.

	Product	Thickness (mm)	Size (mm)	Thermal conductivity λ_D (W/mK)	Density ρ (kg/m^3)	Heat transfer coefficient U (W/m^{2}K) - 40mm
Boards to be rendered or plastered	Hofatex® SysTem	40, 60, 80, 100	590 x 1300, 1220 x 2600	0,044	210 ± 20	1,1
	Hofatex® SysTem IA	40, 60, 80, 100	590 x 1300, 1220 x 2600	0,041	170 ± 20	1,03

Floor



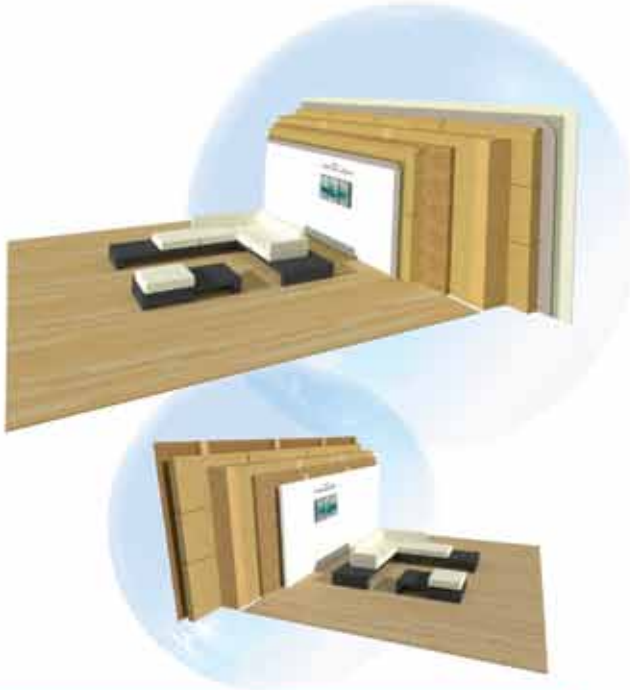
Hofatex® Standard

Hofatex® Standard products are used in many typical floor systems. They are primarily used as impact pads under a floating floor to absorb impact or footstep noise. These thin boards come in practical sized formats to ensure easy, dry installation. They can also be used under the floors at trade show exhibitions and for the production of notice boards.

For floor structures requiring higher compression load resistance such as in convention centres, lecture theatres, schools, canteens, factories and other premises, a suitable product is Hofatex® Standard – Strongboard. This board is characterised by its high strength in terms of pressure resistance and its ability to maintain its shape stability over a long period of time.

	Product	Thickness (mm)	Size(mm)	Thermal conductivity λ_D (W/mK)	Density ρ (kg/m^3)
Floor boards	Hofatex® Standard Natur 1	8, 10, 12, 15, 19, 20	1220 x 2440, 1000 x 1200	0,046	230 ± 20
	Hofatex® Standard - Silent	6, 8	600 x 800	0,046	230 ± 20
	Hofatex® Standard - Strongboard	20, 40, 60, 80, 100	1000 x 1200	0,046	230 ± 20

Universal insulation boards



Hofatex® Therm

Of all the wood fibre boards manufactured using the wet process, the universal Hofatex® Therm product has the lowest density and also the best thermal insulation properties. The 100% ecological softboard insulation material is used between wall studs, on cross walls and in ceiling structures. The density of the Hofatex® Therm product of 150 kg/m^3 ensures that the boards have good shape stability, even after many years following installation, with no settling or sagging which would cause thermal leakages.

Hofatex® CannaTherm

Hofatex® CannaTherm is a diffusion-open, flexible insulation made of hemp fibres with thicknesses of up to 180mm. Due to its low bulk weight - 30 kg/m^3, it is easy to compress and install in a roof or wall lining, where it functions as the main insulation layer. It is easy to squash in between studs or rafters so that no air gaps are left making installation quicker and avoiding thermal bridges.

	Product	Thickness (mm)	Size (mm)	Thermal conductivity λ_D (W/mK)	Density ρ (kg/m^3)	Heat transfer coefficient U (W/m^{2}K) -100mm
Universal insulation products	Hofatex® Therm	20, 30, 40, 60 80,100, 120	800 x 1200	0,039	150 ± 10	0,39
	Hofatex® CannaTherm	40, 50, 60, 80,100, 120, 140, 160, 180	600 x 1200	0,040	30	0,4

Storage and Handling, Application and Installation Rules for the Hofatex® Wood Fibre Boards

Storage and handling

All Hofatex® thermal insulation boards must be stored in dry environments, i.e. protected against weather, humidity and ground moisture. These rules apply to storage at storage premises and on open-air construction sites.

Boards must be stored flat on a level surface so that their shape stability is not disturbed.

Inside storage premises, boards must be packed on pallets which must be moved using forklift trucks. These pallets are protected from damage either by protective casing or cardboard corners, and are strapped. **Pallets can be stacked.**

On the construction site the pallets can be unloaded manually or by using various mechanical aids. In both cases it is necessary to ensure that board corners or grooves are not damaged when moving them.

Prior to application, the boards must be left for a few days to acclimatise in the given environment.

Board cutting and treatment

Wood fibre boards can be cut using common tools for cutting wood and wood products.
Hofatex® wood fibre boards can be cut using:

- Electric circular saw with a dust collector – common blade for timber products
- Electric reciprocating saw with a special blade designed for wood fibre boards
- Power chain saw with a small tooth chain – only for very thick materials and for "undercutting"
- Manual cutting tools, e.g. serrated knife – only for thin materials

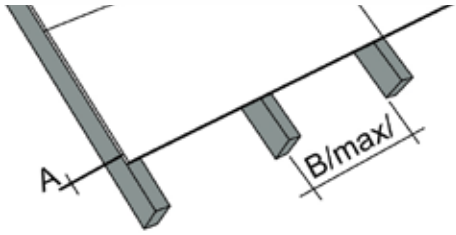
When cutting Hofatex® wood fibre boards, it is necessary to use protective equipment for working in a dusty environment.

Correct application rules for installing wood fibre sarking boards in roof structures

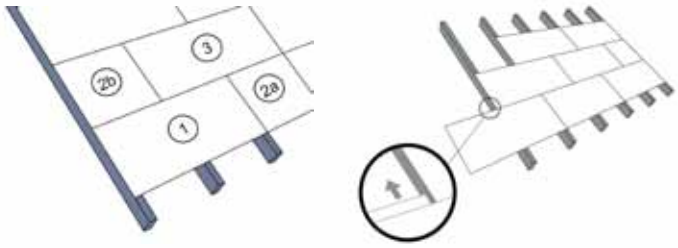
The most typical application for Hofatex® UD / Hofatex® Kombi boards is to apply them directly above the rafters and under the lathing, counter-lathing and roof covering.

If the whole surface below the roof is not supported with a continuous structure the prescribed maximum axial spacing below between the rafters must be respected. This maximum spacing also applies when filling the space between the rafters with additional insulation. This rule is very important in order to prevent the boards from bending.

Hofatex® UD / Hofatex® Kombi board thickness in mm	22	35	52	60	80	100
Maximum axial spacing of rafters in mm	850	950	1000	1050	1100	1150



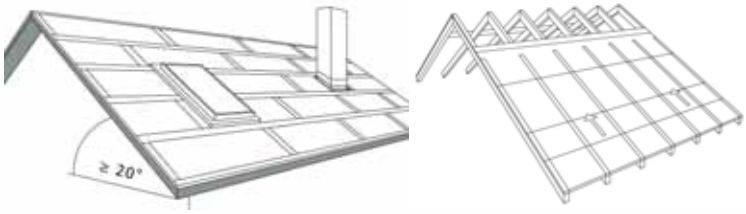
Boards are laid with their longer side facing horizontally beginning at the eaves edge and moving up towards the apex. **Tongues of boards must always be directed towards the roof ridge so that water will not sit in the grooves**. After the first row is laid, the second row can be started using cut-offs left from the first row to make a brickwork pattern. The minimum spacing between vertical joints must be at least 30cm apart to ensure the strength of the insulation layer. Thanks to the tongue and groove joint system, board joints do not have to be positioned directly above the rafters, but can be made in between.



In terms of work safety it is necessary to follow some additional rules. When Hofatex® UD / Hofatex® Kombi boards are in place it is only safe to walk directly above the rafters – the Hofatex® boards would need to be supported below by a timber sub-deck otherwise. These boards are not designed to take a heavy, concentrated load between the rafters in the event of a fall or similar. Walking on the roof is made possible by ensuring there is continuous and interconnected lathing and counter-lathing.

Water tightness

The Hofatex® UD / Hofatex® Kombi boards create a watertight layer above the rafters. If the roof pitch is less than 20° it is necessary to cover all the vertical and horizontal joints with Hofatex® ABK Tape or Hofatex® PE Tape.
This tape must always seal the area where the wood fibre boards meet up with any penetrating structures (e.g. skylight, chimney, ventilation duct etc.) and where the roof pitch changes.
Taped surfaces must first be treated with Hofatex® Primus primer coat to ensure perfect water tightness in the glued joint.



When all the junctions are treated correctly for water tightness, the wood fibre boards can be left freely exposed to the weather conditions for up to 3 months except when there are heavy snow loads.

Board fixing and anchoring

Wood fibre insulation boards are secured by placing lathing and counter-lathing over the wood fibre layer, and these three layers are all screwed into place with double-threaded screws for timber. The main purpose of this fixing method is to create a secure fixing through the lathing, counter-lathing and wood fibre boards so that the load is evenly transferred to the rafters. The minimum required amount of fixing materials shall be provided by the supplier.

Rules for correct installation on external walls

Hofatex® UD and Hofatex® Kombi boards can also be used for thermally insulating an exterior wall with a ventilated façade. Hofatex® SysTem boards are used for direct contact or rendered façades.
When constructing a ventilated cavity it is necessary to alternate where the short horizontal battens go between the longer vertical battens in adjacent rows, to ensure the stability of the system. The minimum required spacing is 30cm. Hofatex® UD, Hofatex® Kombi and Hofatex® SysTem all have tongue and groove board edges. This joint ensures a watertight connection that can also be made between battens. All butt edges must be securely attached.

It is necessary to pay attention to the direction in which the tongue faces. The tongues on the horizontal side of the boards must face upwards (towards the roof of the building) so that water will not sit in the grooves. When installing boards on a frame structure it is also necessary to pay attention to details near opening structures (e.g. doors and windows). The wood fibre board at the edges of openings for doors and windows should be a solid complete board rather than where a tongue and groove joint meets, to ensure shape stability.

Hofatex® UD, Hofatex® Kombi and Hofatex® SysTem are resistant to occasional dampness. However they must not be permanently moistened by direct rain, so the bottom row of wood fibre boards sits in a base profile at least 30cm above ground or pavement level. It is necessary to use other waterproof thermal insulation, e.g. XPS insulation, below the damp proof course and below the wood fibre at the very bottom of the wall.

Fixing and anchoring to the frame structure

The best method for fixing wood fibre boards onto a timber frame structure or a solid structure involves using plastic fasteners which have a plastic 60mm diameter plate to stop thermal bridging. A minimum of three insulation screws must secure one wood fibre board to a timber stud. These screws must have a minimum 6mm diameter with a minimum length of 30mm to allow anchoring into the frame structure. The maximum vertical spacing allowed between these insulation screws is 25cm.

An optional method for fixing wood fibre boards to a timber frame structure is to use wide-backed staples made from a minimum of 1.8mm thick wire, and which have a width of 27.5mm and a leg length of at least 30mm. The maximum spacing of staples allowed in a timber frame structure is 150mm, so the prescribed minimum requirement for 1m^2 is 16 staples.

Rules for correct installation on floor structures
Application of Hofatex® Standard

Hofatex® wood fibre insulation boards for floor systems are laid so that they are tightly butted up to each other on a smooth, dry and even floor surface. It is necessary to maintain the required expansion gap around the room perimeter or preferably use an acoustic flanking strip. In order to improve the acoustic properties of the floor it is advisable to lay at least two layers of different products on top of each other, or alternatively the same board but with different thicknesses. When laying two layers, it is necessary to bear in mind that the second layer boards are placed so that the joints of each layer do not overlap.

Health + Responsibility = HOFATEX® insulate with wood

Certification of Hofatex®
Wood Fibre Boards

All Hofatex® products are certified, their manufacture is supervised by experts and they are tested by reputable European institutes. General supervision for Hofatex® products is carried out by the DIBt Institute in Berlin (Deutsches Institut für Bautechnik – German Institute for Building Technology), and the products have been awarded an "Allgemeine Bauaufsichtliche Zulassung" Certificate declaring the Hofatex® products meet the building standard DIN EN 13 171. The testing and supervision of the Hofatex® Product Certification is carried out by LGA, Nürnberg (Landesgewerbeanstalt – National Industrial Institute), and other tests (e.g. thermal conductivity test, sound insulation test, compression test etc.) are carried out by CSI, Prague (Centre of Construction Engineering). The products were proven to be ecologically friendly and biologically safe when tested by IBN, Neubeuern (Institut für Baubiologie und Oekologie – Institute for Building Biology and Ecology) which issues the Baubiologisches Gutachten Certificate.

Zulassungsnummer:
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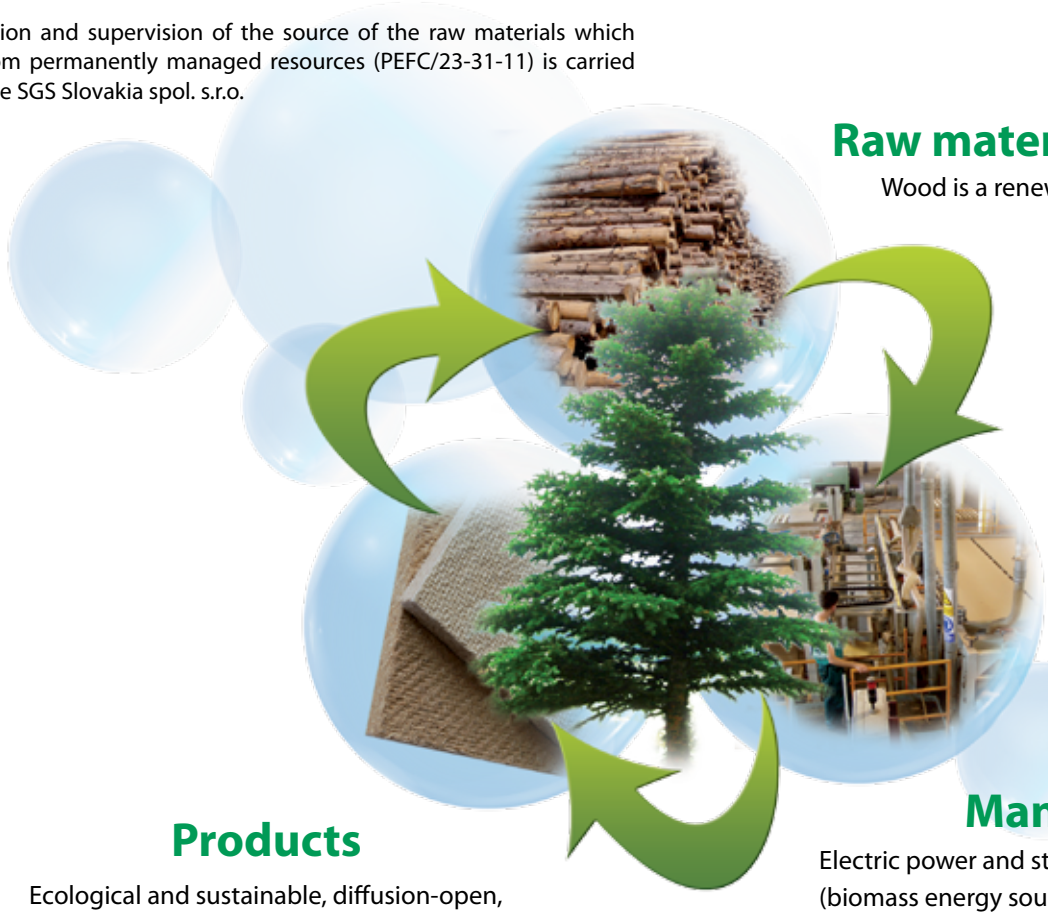
LGA
Bautechnik

PEFC
PEFC/23-31-11

CSI

Certification and supervision of the source of the raw materials which come from permanently managed resources (PEFC/23-31-11) is carried out by the SGS Slovakia spol. s.r.o.



Raw material
Wood is a renewable raw material

Products
Ecological and sustainable, diffusion-open, reduced energy consumption , completely natural

Manufacturing
Electric power and steam from renewable resources (biomass energy source)
The natural glue in wood, lignin resin, is released

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