

# Guidelines for installing and maintaining cladding and decking

User guide

**Stora Enso**  
**ThermoWood**

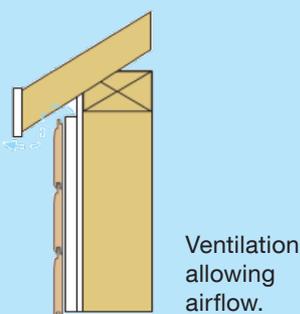


# Design guidelines for ThermoWood cladding

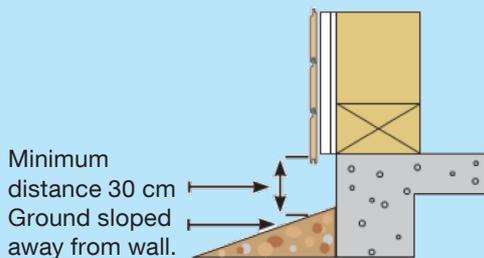
Stora Enso ThermoWood® shall not be used in ground contact or under such conditions that it is constantly or under prolonged periods exposed to water. The cladding boards shall be installed with adequate distance to the ground to and be ventilated to allow the wood to dry out between rainfalls. A minimum distance of 0,3 m from

ground to the boards is recommended. A ThermoWood cladding shall be designed to avoid water or plant residue being trapped in the construction. Prolonged exposure to water or decomposing debris in direct contact to the wood may lead to decay spreading into the ThermoWood.

## Upper wall detail



## Lower wall detail



# Fasteners and fixings

ThermoWood shall always be fixed with stainless steel nails or screws. Using normal steel will lead to rust stains and overall deterioration in the fixing due to the low pH of ThermoWood. Stainless steel should comply with the International Stainless Steel Standard code AISI 304. The number of fixings per board depends on the width. While it is desirable to have one fixing per width of board especially when using concealed or hidden nails, it is generally recommended that for boards over 125 mm width, two fixings are used over the width. However due to differences in

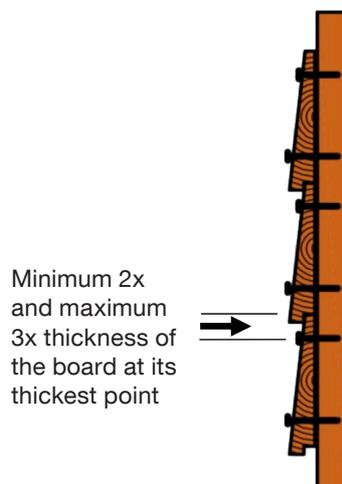
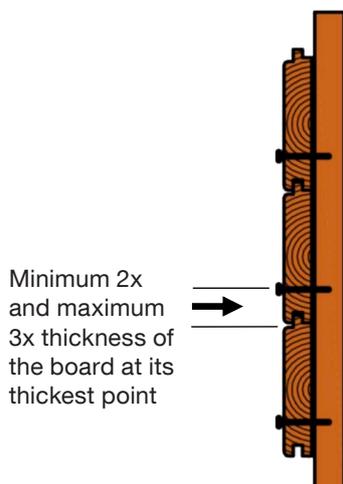
national requirements this might vary from country to country and national requirements should be followed. Distance between fixings shall not exceed 600 mm.

The nail position from the bottom of the board must be a minimum 2 times and maximum 3 times the thickness of the board. When fixing also at the upper part of the board the nail should be positioned minimum 2 times and maximum 3 times the thickness of the board at its thickest point down from the top of the board. The importance of this is that there

should be sufficient overlap between adjacent boards, but it is important not to have the fixing too close to the point where the overlap occurs.

The fixings shall not penetrate through the two adjoining boards. A sufficient clearance gap between each board should be maintained to allow for tangential movement and also free space for drying when the material is wet. The recommended clearance gap is between 2–3 % of the total width of the board.

See figures below.



Number and position of fixings for ThermoWood cladding. Two fixings should be used if board width exceeds 125 mm. Distance from edge 2–3 times of the board thickness. Spacing between the boards should be between 2–3 % of the total width of the board.

## Fixing with nails

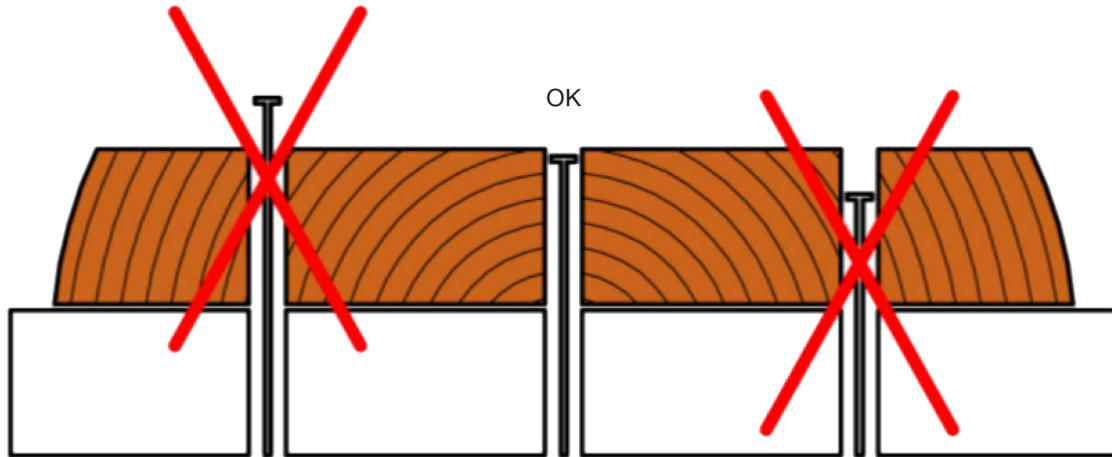
ThermoWood cladding can be fixed using traditional hammer and nail punch or with a nail gun. Nailing using hammer without nail punch is not recommended due to the risk of damage to the wood.

Recommended is stainless 60 mm x 2,5 mm annular ringed nails. Nail head designed in such a way as not to damage the wood fibres on the surface, but not to compress them like a screw head. Round heads have proven suitable.

The nails must not split the timber. Use of nails with cross carved lace is advantageous.

Pre drilling is recommended when fixings are placed close to board ends.

Fixing with a nail gun has been found to bring excellent nailing results and leads to little or no splitting of the material due to the fact that there is no hard impact made to the cladding boards, where as traditional nailing with hammer has the risk of accidental impact. When setting the pressure for the air nail gun, it shall be set so that the nail head finishes flush with the surface of the cladding or marginally (about 1 mm) below the surface (see the illustration below).



Recommended head penetration when fixing ThermoWood cladding.

## Fixing with screws

Pre drilling is recommended when ThermoWood is fixed with screws. Alternatively self-drilling screws are to be used. Pre drilling shall always be used close to board ends. Heads shall finish flush to the surface or penetrate marginally into the surface (1 mm).

# Design guidelines for ThermoWood decking

Stora Enso ThermoWood® shall not be used in ground contact or under such conditions that it is constantly or under prolonged periods exposed to water. A ThermoWood deck shall be designed to avoid water or plant residue being trapped in the construction. Prolonged exposure to water or decomposing debris in direct contact to the wood may lead to decay spreading into the ThermoWood. The deck shall be well ventilated to allow the wood to dry out between rainfalls.

## Ventilation of the ThermoWood deck

A ThermoWood deck must be installed with adequate ventilation below the deck. The distance between the deck and ground below the deck shall be minimum 50 mm. A water proof membrane below the joist is recommended to avoid capillary suction of water.

Joists are recommended to be maximum 50 mm wide. If joists wider than 50 mm are used, or if two joists are placed adjacent to each other, a distance element should be placed on top of the joist.

## Distance between trusses

Local regulation need to be checked and followed. Recommended distance between trusses depends on the dimension of the decking board. High walking traffic might require a even shorter span between trusses compared to the recommendation.

Thickness of decking board (mm)	Recommended c-c span between trusses (mm)
26	max. 450
42	max. 600

Table 1. Span recommendations for usual ground-based decking or ground-based stairs.

## General information working with ThermoWood

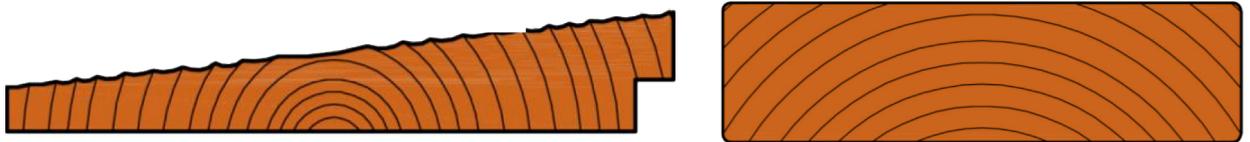
### Orientation of ThermoWood to avoid growth ring loosening

ThermoWood made from spruce shall be produced and installed so that the sapwood face (outer face) of the board is turned towards the weather exposed surface. The inner face (pith face) of the board shall always be oriented away from the weather exposed surface, see the figure below. Failure to follow this instruction will almost

certainly lead to some growth ring loosening around the pith.

Note that this does not apply to ThermoWood made from pine. ThermoWood made from pine can be used with either sapwood or heartwood side as weather exposed surface.

Spruce: sapwood / Weather exposed surface.



Spruce: Heartwood side / Inner (pith face) of board.

### Storage and working with ThermoWood material

Packages of ThermoWood® shall be stored protected against rain and snow. The packages should be stored flat with sufficient supports between packs to avoid distortion. Packs should be stored off the ground. Care should be taken to avoid unnecessary impacts or damages when cutting or moving the material, heavy handling could lead to unwanted splits or other damage. Sawing of ThermoWood can be carried out in the same way as working with other wood species. Safety equipment like glasses, gloves and masks should be worn. Sharp tools are recommended to give the best results. When using electric saws or planing equipment on site it is recommended to wear a dust mask as the dust particle size with ThermoWood is small, as might be expected with some hardwoods or MDF.

# Surface protection and maintenance

Surface treatment of ThermoWood, especially for deckings, extend the service-life and improves the performance of the wood. Therefore a surface treatment is recommended. Nevertheless, ThermoWood can be used without any additional surface protection.

Unprotected ThermoWood will start to grey and weather in quite a short period of time, as all natural wood products exposed to sun and weather. The process is slower on surfaces not directly exposed to the sun, which will have the effect that protected surfaces will keep the

brown ThermoWood colour for longer periods than exposed surfaces. When left without surface protection small fissures will appear in the surface and the softer early wood in the growth rings will start to erode – this again is a common weathering feature of all wood material over time. As all materials which are exposed to weathering, ThermoWood can be affected by surface mould and staining fungi. This will not affect the integrity of the cladding and will only have a negative aesthetic effect on the material. Keeping the surface clean reduces the risk that dirt or organic residue may initialize discoloration or biological growth.

## Oiling

Oiling provides added protection against weathering and the graying process can be made slower if pigmented oils or oils containing UV-absorbents are used. The ends of the boards should preferably be treated with oil before the boards are installed to provide additional protection of the material. Final oiling of the cladding should be done immediately after instalment for improved weather resistance of the surface.

Inorganic oils are recommended. Purely organic oils such as Linseed oil and Bankirai-oil are highly nutritious and have led to an increase of mould growth. Solvent borne oils have shown deeper penetration into the wood as compared to water borne.

Oil should be applied in a thin layer according to manufacturer's recommendations. Excessive use of oil does not improve protection of the wood, but may instead lead to build up on top of the surface and subsequent flaking, especially for oils containing UV-absorbents.

Surfaces should be oiled at regular intervals depending of the exposure to weather and UV-light.

Maintenance intervals are highly dependent on parameters like climatic conditions and mechanical wear. ThermoWood in an exposed position such as in a coastal area may require more frequent treatment.

## Coating

The material properties of ThermoWood are altered which reduces moisture penetration as compared to untreated spruce or pine. For this reason many coating systems are more slowly absorbed into the surface of the ThermoWood. ThermoWood is however still a more absorbent material than other building materials such as plastics and metals and adhesion of coatings still affords very good long term results. The reduced swelling and shrinking are of benefit to the long term performance of coatings over other timber substrates that show more pronounced movement and hence stressing of surface coatings.

Experience has shown that sawn surfaces provide improved adhesion of coatings as compared to

planed surfaces. Coatings specifically designed for use on timber should be used. These can be water-borne, solvent-borne (sometimes referred to as oil based) or high solids solvent-borne in nature.

Preferably all coatings should be applied in factory (or indoor conditions), but in any case outdoor coating should only be conducted in dry weather and not in conditions of extreme cold or high humidity. At least the first coat should be applied prior to fixing.

Maintenance period is highly dependent on design of cladding, on degree of weather exposure and on the type of coating used. Please consult coatings manufacturers for further information.

## Fire resistance

The effects of the ThermoWood process on softwoods do not greatly effect the fire resistance rating compared with normal kiln dried material. When testing the ThermoWood in accordance with the SBI (single burning item) test, the results found that it can reach fire class D. As with typical cladding materials such as Western Red Cedar or Larch it is possible to treat ThermoWood with commercially available fire retardant to obtain a fire rating of class 1 or class 0. Both WRC and the heartwood of larch have a treatability rating according to EN-350-2 of class of 4, ThermoWood falls into the same treatability class.

ThermoWood is a natural wood product without any chemicals added to it. When not glued or painted ThermoWood waste can be handled as any other untreated wood waste. ThermoWood is non-toxic and not classified as hazardous waste. ThermoWood can be burned as untreated wood. There are no significant differences between the compounds of smoke from ThermoWood as compared to those from normal wood. It produces about 30 % less energy than untreated wood, as the majority of the energy containing extractives has already been removed in the heat treatment process.

## Environment and health

ThermoWood contains no added chemicals or preservatives. No toxic or harmful components have been found in ThermoWood (VTT 2001). However if wood splinters penetrate the skin remove as soon as possible as with normal material.

ThermoWood dust has smaller particle size than normal softwoods. It is comparable to MDF (although lower density) or hardwood dust. The dust removal system may need to be adapted to the smaller particles, and the wearing of a mask is recommended.

## Certification for quality and environment

