LUNAWOOD

WWW.LUNAWOOD.COM

# Love for the Forest

The forest is a place of beauty and ancient mystery – it is timeless yet constantly changing, quiet but full of life. For the ones that entrust the forest with their lives, it offers life-enhancing, truly sustainable resources. The forest adds quality to modern life and it breathes life into buildings and people's homes. Wood is the top choice for any man-made material. It is not just our earliest building material – we believe it can also be the most practical and modern one.

It´s our love and understanding for the forest that has made us experts of wood. We begin by selecting the very best of the best raw material from northern forests. Through a process that´s as natural as the wood itself, we make it even better: more durable, more beautiful and long-lasting. After all there´s no greater endurance test than the rain, wind, frost and snow of the north – it is the quality tag of nature.

Contemporary architects and builders seem to agree with us. They, and we, value sustainability but also believe that people feel better and healthier when living in harmony with natural materials. We see the beauty of wood, it is pleasant to touch and it ages nicely. In everything we make and do, we aim for nothing less than to rebuild the connection between people and the forest.

The forest is for the people who cherish life and freedom. It rewards generously the ones that keep on pushing their boundaries. The forest is a treasure chest for those with the desire to design creatively. For us, it is the past, present and the future.

**Lunawood**
**– Love for the Forest.**


There are three mills and management in four locations in Finland. From Finland we get the best slowly grown, northern wood for our Thermowood products.

# Lunawood

Oy Lunawood Ltd, established in 2000, is an innovative pioneer in the thermal modification of wood. It has grown to be the global market leader of thermally modified wood. The company status is based on the quality of its products and production capacity.

Oy Lunawood Ltd has grown rapidly and today employs 80 people at three production plants in Iisalmi, Kaskinen and Joensuu with the management and sales office in Lahti in Finland. The annual production capacity has risen to 105,000 $m^3$ and this has made the company the number one Thermowood producer in the world. Lunawood exports 94% of its products.

The company is proud of its high quality products matched only by its personal and expert service. As the leading producer of thermally modified wood, its reputation is built upon innovation, reliability and cooperation. Oy Lunawood Ltd maintains a fully inclusive operating procedure with customers and partners alike enabling the sharing of knowledge, the dissemination of product news and a robust communications network.

The high quality of Lunawood Thermowood and Thermowood Plastic Composite (TWPC) starts from the raw material. The main wood species modified are PEFC certified Scots pine and Norway spruce, which are graded in accordance with our specific and strict requirements. For Scots pine, only sound knotted heartwood originated from top log is suitable for our products. The properties and quality requirements of the spruce that we use in production are close to those of pine.

**Lunawood**
**– From Sustainable Forests**

# Premium Material

Finland – the land of thousands of lakes and forests. For countless years, the northern climate has created unique, slowly grown, natural wood. At Lunawood we thermally modify this high quality raw material into Thermowood. We enhance the wood's natural properties and, at the same time, respect and preserve the environment.

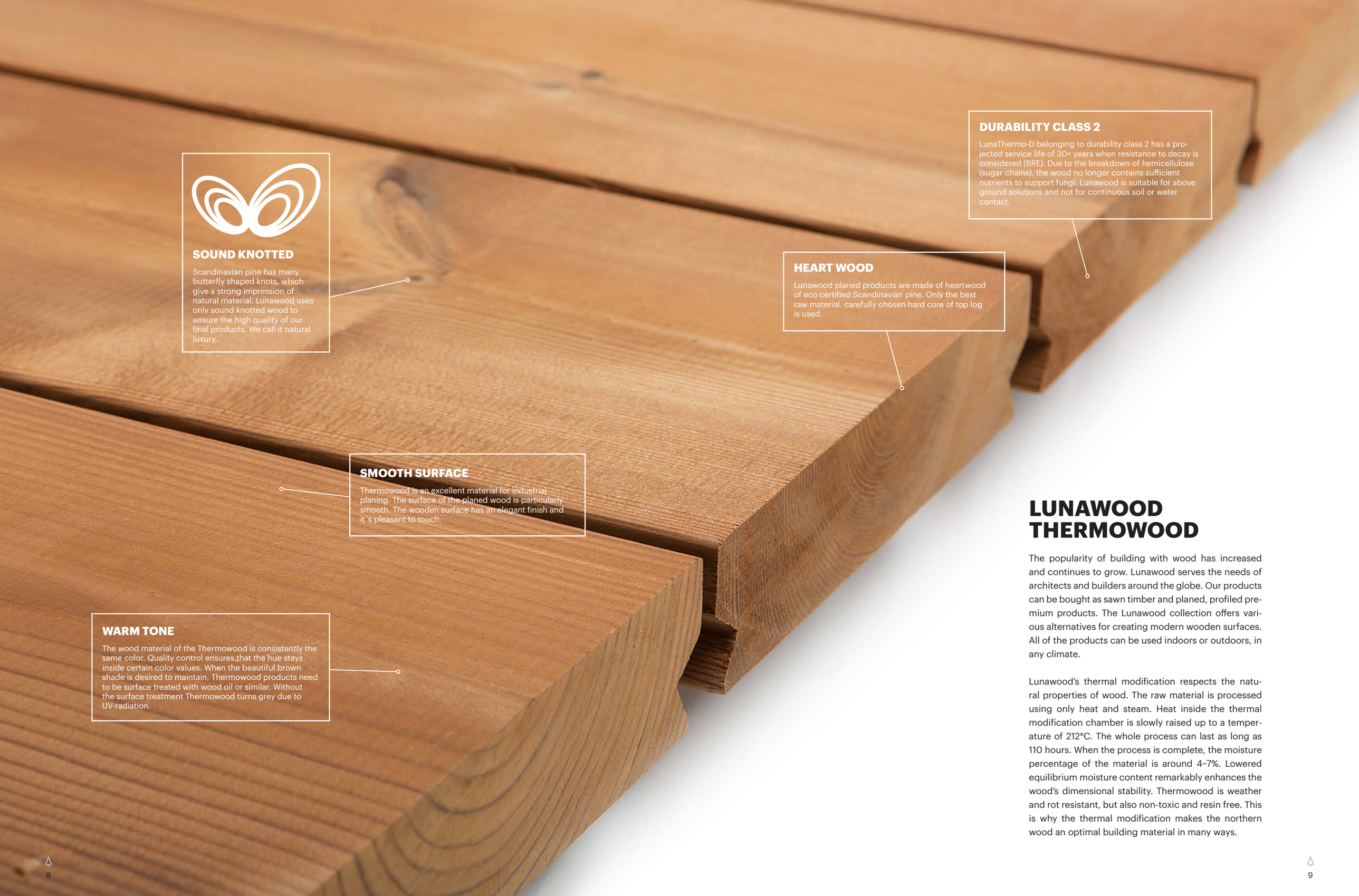
Everything starts from Sustainable Finnish forests. The northern wood grows under cold, harsh weather conditions that make the trees grow slowly. Lunawood has a profound knowledge of the wood and high respect for the material. Only the best raw material – carefully chosen timber – is used. Our premium quality Thermowood is manufactured from the heartwood of PECF certified Scandinavian pine and spruce.

## Proficiency for premium quality

Lunawood is a pioneer in modern thermal modification processes and products. Our experts work continuously to develop the best practices and the best product quality for the favor of our clients. The Thermowood manufacturing process is highly advanced and proficient and it respects the natural properties of the wood. The patented production process is based on the gradual thermal modification of the wood, wherein the chemical and physical properties undergo a permanent change. Details of every single board are quality controlled for the thermal modification. The process itself uses only water vapor and heat; no chemicals are used.

## Natural premium

By combining the knowledge of nature, wood materials and sustainability, Lunawood has become an expert in modern wood modification. Thermally modified timber by Lunawood is an excellent product for building projects of all sizes, for covering different surfaces in both interior and exterior, for fitting with different styles and to complement building with other materials, such as glass, cement, steel or stone.



### SOUND KNOTTED

Scandinavian pine has many butterfly shaped knots, which give a strong impression of natural material. Lunawood uses only sound knotted wood to ensure the high quality of our final products. We call it natural luxury.

### SMOOTH SURFACE

Thermowood is an excellent material for industrial planing. The surface of the planed wood is particularly smooth. The wooden surface has an elegant finish and it´s pleasant to touch.

### WARM TONE

The wood material of the Thermowood is consistently the same color. Quality control ensures that the hue stays inside certain color values. When the beautiful brown shade is desired to maintain, Thermowood products need to be surface treated with wood oil or similar. Without the surface treatment Thermowood turns grey due to UV-radiation.

### HEART WOOD

Lunawood planed products are made of heartwood of eco certified Scandinavian pine. Only the best raw material, carefully chosen hard core of top log is used.

### DURABILITY CLASS 2

LunaThermo-D belonging to durability class 2 has a projected service life of 30+ years when resistance to decay is considered (BRE). Due to the breakdown of hemicellulose (sugar chains), the wood no longer contains sufficient nutrients to support fungi. Lunawood is suitable for above ground solutions and not for continuous soil or water contact.

# LUNAWOOD THERMOWOOD

The popularity of building with wood has increased and continues to grow. Lunawood serves the needs of architects and builders around the globe. Our products can be bought as sawn timber and planed, profiled premium products. The Lunawood collection offers various alternatives for creating modern wooden surfaces. All of the products can be used indoors or outdoors, in any climate.

Lunawood's thermal modification respects the natural properties of wood. The raw material is processed using only heat and steam. Heat inside the thermal modification chamber is slowly raised up to a temperature of 212°C. The whole process can last as long as 110 hours. When the process is complete, the moisture percentage of the material is around 4–7%. Lowered equilibrium moisture content remarkably enhances the wood's dimensional stability. Thermowood is weather and rot resistant, but also non-toxic and resin free. This is why the thermal modification makes the northern wood an optimal building material in many ways.

# Why to use Lunawood

### DIMENSIONAL STALIBITY

Lowered equilibrium moisture content of Thermowood makes it dimensionally stable and the material retains its shape far better than untreated wood.

### RESIN FREE

Resin is removed from the wood during the thermal modification process. As a result, the wood does not secrete resin even in high temperatures.

### NON TOXIC

Thermowood is produced using only natural methods, heat and steam. Lunawood products are completely natural and free from chemical additives

### ALL CLIMATES

Thermowood does not react to changes in temperature or humidy as drastically as untreated wood. Material is proven to work well in different climates.

### WEATHER ENDURANCE

As a result of thermal modification, Finnish types of woods are transformed into durable, weather endurance building material. LunaThermo-D has decay resistance class 2.

### THERMAL INSULATION

Tests have shown that the thermal conductivity of Thermowood is reduced by around 20-25% compared to untreated coniferous wood.

# LUNAWOOD FACADE

Thermowood is an outstanding choice for exterior claddings and facades. Our product range also provides wide cladding boards produced by utilizing glue lamination technology. Thanks to the thermal modification and gluing, we are able to offer 210 mm wide sound knotted, durable cladding boards with outstanding dimensional stability. Thermowood allows Scandinavian softwood to be successfully used in hot and humid weather conditions. In addition, all our cladding products have the European conformity CE mark.

## 30-year expected service life

Uncoated LunaThermo-D exterior cladding can provide a 30-year desired service life. This fact is based on a number of conditions including the quality of the workmanship at the time of installation and the exposure of the cladding to the weather including location, elevation, and design. If coated over, the life of the product, LunaThermo-D will have a 60-year desired service life – providing that the coating is maintained in-line with the coating manufacturer recommendations over the service life of the product.

## Visual quality

Due to the high temperature of Thermowood treatment process, resin is removed from the wood. This ensures a high visual quality for both uncoated and coated LunaThermo-D claddings. The color of the wood is affected by the treatment temperature and time – the higher the temperature the darker the appearance. As with all softwoods, variances occur and are due to varying densities. When LunaThermo-D is exposed to UV-light, it will turn beautiful silver grey unless protected by a pigmented surface protection.

# LUNAWOOD DECKING

Lunawood is an outstanding decking material due to its stability and durability. Improved insulation properties make Lunawood an excellent choice for decking since it balances the changes of heat and cold and makes it pleasant to walk on even when barefoot. Lunawood decking is resin- and toxic-free, lightweight, and easy to install. Lunawood's unique PROFIX hidden fixing clip enables quick and easy installation of the deck and creates a clean and elegant appearance without visible screws. It is an ecological and chemical-free solution for creating the finishing touch to any outdoor surrounding.

### Beautiful and durable

Our decking products are also available as factory oiled. Two coats of pigmented wood oil are applied in a controlled factory environment creating an even coating and consistent color tone. The product is ready to be installed and does not require immediate coating to secure the color preservation.

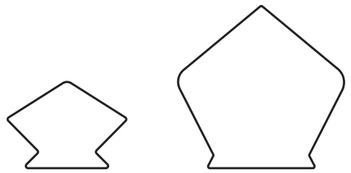
In addition, our product range provides wide decking boards produced by using glue lamination technology. We are able to offer 210 mm wide sound knotted deck boards with hidden PROFIX fixing due to thermal modification and gluing. The dimensional stability and bending strength are exceptionally good.

bre

BRE [the trading name of Building Research Establishment Limited] is a British independent and impartial, research-based consultancy, testing and training organization, which offers expertise in every aspect of the built environment and associated industries.

BRE is able to conclude that the expected service life for LunaThermo-D used in the UK for exterior cladding and decking will be 30 years when following manufacturer's guidance and best practice construction principles.

**PROFIX hidden fixing system**



PROFIX2 PROFIX3

# LUNAWOOD SOLAR SHADES

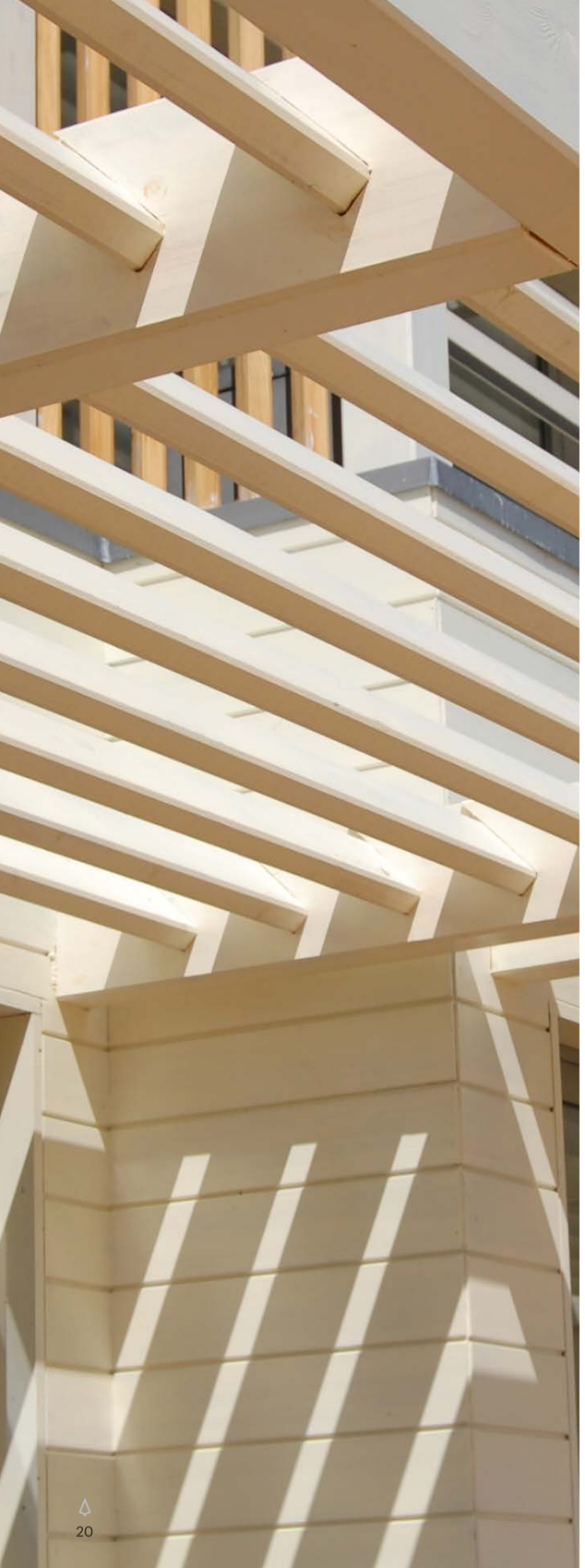
Lunawood Thermowood solar shades are an ecological way of cooling buildings without consuming extra energy. When using Lunawood, you can prevent excessive solar from overheating the interiors with material that binds $CO^2$ and hence is lowering the carbon footprint of the building. Further, due to the stability of Lunawood you can use it in mobile sunscreen systems with opening and closing mechanisms. Solar shade profiles can be used in many ways indoors and outdoors; fences, partitions, effect walls, ceilings etc. Thermowood is a modern architectural material and the combination with steel, concrete and glass creates a beautiful contemporary look with a soft, natural finish.

# LUNAWOOD INTERIOR

The appearance of Lunawood is pleasant to touch and warm with a rich tone. It is highly suitable for paneling and flooring; creating a cozy atmosphere in any interior. The boards are light, easy to cut, shape and install. In addition to its attractive appearance the thermal modification of wood eliminates the risk of harmful emissions such as formaldehydes. This makes the wood pure, safe and hygienic for indoor use even for those consumers prone to wood-related reactions. We believe that people feel better and healthier when surrounded by natural materials.

### Sauna & Spa

Lower thermal conductivity and improved stability of thermally modified wood makes Lunawood an excellent product in hot and humid environments. Furthermore, it is a hygienic material without resin and this broadens the variety of end uses and applications. Thermowood is one of the most used materials in saunas and is excellent for spa interiors.



# LUNAWOOD FRAMES AND JOISTS

Thermowood is an endurable, safe material for many kinds of garden and outdoor structures.
Out of our planed profiles it´s easy to create a dream wooden garden with pergolas and partition walls. It will become a natural eyecatcher as an attractive walk-way, ideal for climbing plants with its airy construction. Pergolas provide privacy and give shade to cool off from the heat of the sun. A stylish partition wall defines the borders in gardens or built environment in a natural way.

The profiles for outdoor structures, such as Luna Post and Luna SHP, are made for these kinds of purposes. It is also possible to use Lunawood profiles as a building material for fences and gates and decking structures underneath the deck boards. Just note that Thermowood should not be in direct contact with the ground or in permanently wet situations. The air should be able to circulate between the wood and the ground.

# GOOD TO KNOW ABOUT THERMOWOOD

## TWO HEAT TREATMENT CLASSES

Lunawood produces two standard thermal modification classes, LunaThermo-S and LunaThermo-D. The difference between the classes centres on differing heat treatment temperatures.

**LunaThermo-S**

LunaThermo-S, where S stands for stability, has an attractive shade of light brown and the stability is greatly improved. It is heat treated with milder temperatures (190ºC). LunaThermo-S products are suitable mainly for indoor applications, but can also be used in protected outdoor areas as well.

**LunaThermo-D**

LunaThermo-D, where D stands for durability, has a darker brown tone. Its durability and stability are improved significantly. LunaThermo-D is thermally modified using higher temperatures (212ºC) and products are suitable for both outdoor and indoor use.

## DURABILITY

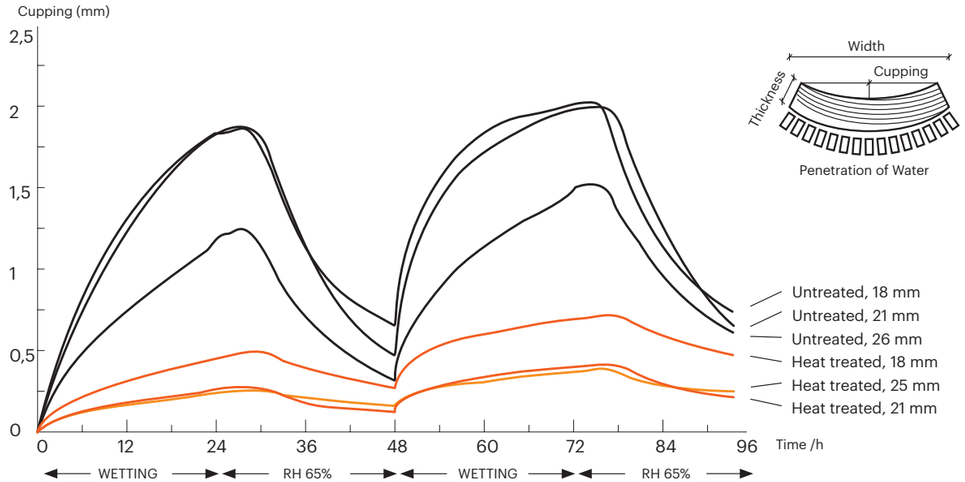
LunaThermo-D belonging to durability class 2 has a projected service life of 30+ years when resistance to decay is considered (BRE). This applies to exterior cladding and decking applications. However the decking material is subject to surface-wear and loading which decreases the reasonable expected service life to 15–20 years. Thermowood is not recommended for use in direct contact with the ground.

## EQUILIBRIUM MOISTURE CONTENT

After the thermal process the equilibrium moisture content of Lunawood is 4–7%. In outdoor use (+20 Celsius, RH 85%) the equilibrium moisture content of LunaThermo-D pine stabilizes at 10% (EN 13183).



## STABILITY DIAGRAM OF EXTERIOR CLADDING BOARDS




Cupping of exterior cladding boards: Comparison between LunaThermo-D and untreated Scandinavian pine and spruce in different thicknesses.
Source: Jari Virta, Helsinki University of Technology

### DURABILITY CLASSES OF DIFFERENT WOOD SPECIES

| | | | | | |
|---|---|---|---|---|---|
| **1** highest | Ipe | Teak | Cumaru | Impregnated wood A class | |
| **2** | **LUNATHERMO-D** | Iroko | Merbau | Western Red Cedar (WRC) | Impregnated wood AB class |
| **3** | **LUNATHERMO-S** | Western Red Cedar (WRC) | Siberian Larch | Douglas Fir | |
| **4** | Norway Spruce | Scots Pine | Douglas Fir | | |
| **5** weakest | Birch | Aspen | European Ash | | |

Timber in durability class 2 is suitable for exterior applications above ground without the need for further treatment.

## FASTENING

**By hand**

Thermal processing makes wood slightly more susceptible to splitting. For this reason we recommend using self-tapping screws with a coarse thread or pre-drilled holes before fixing. The screws should be stainless steel and suitable for fastening wood. When using nails, they should not be closer than 7 cm from the end of the board or use pre-drilled nail holes. When using a conventional hammer, it is advisable to use a nail punch for the last 2–3 mm.
Tongue and grooved boards should be fastened using pre-drilled holes from over the top of the tongue so that the screw or thin nail is driven in at an angle of less than 40 degrees. In the installation the heart side should always be the weather-exposed face.

**By pneumatic nailing machine**

Good results can be achieved by using a small pneumatic nailing machine. However the pressure must be adjusted so that the nails are not driven too deeply into the wood.

**Gluing**

Gluing of Lunawood Thermowood is possible. However the gluing and compression time may be 4–6 times longer compared to untreated wood. Always follow the glue manufacturers' guidelines.

## INSTALLATION

**Decking**
When building a deck it is always recommended to keep the deck off the ground to improve the air circulation below. The gap between the boards should be at least 6 mm to secure air ventilation and promote drainage of rainwater. Any gap next to an adjoining wall should be at least 6 mm and the gap between two board ends should be 1–2 mm to allow for any movement.

**Cladding**
In claddings, ventilation should be provided behind the boards (min. 25 mm). Please also note that there should be at least 30 cm between the ground and lower edge of the cladding. Screws or nails can be used for mounting. They need to be stainless steel.

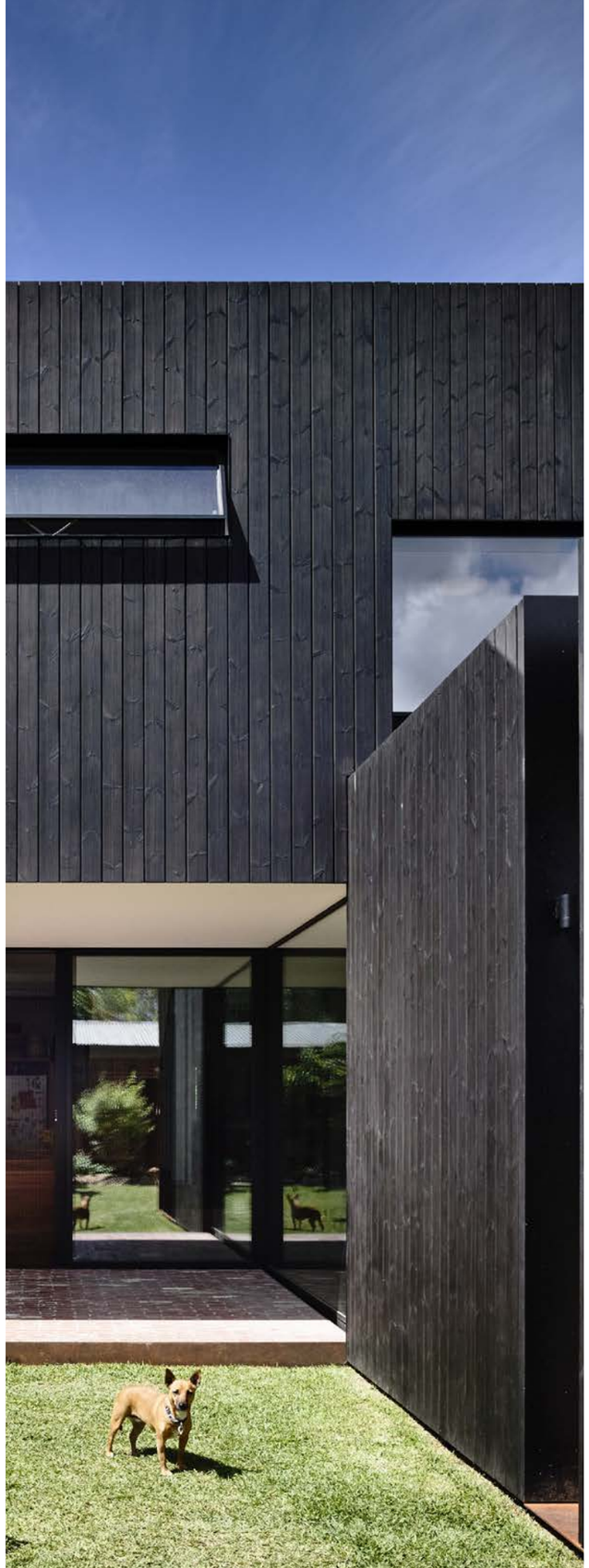
**Milling**
If Lunawood is intended to be milled, the blades should be in good and sharp condition to ensure good end results. The light, fine-grained saw dust is readily extracted with no adhesion to the cutter blades. Furthermore, due to the fine-grained sawdust, it is recommended to use a respiratory protection mask.

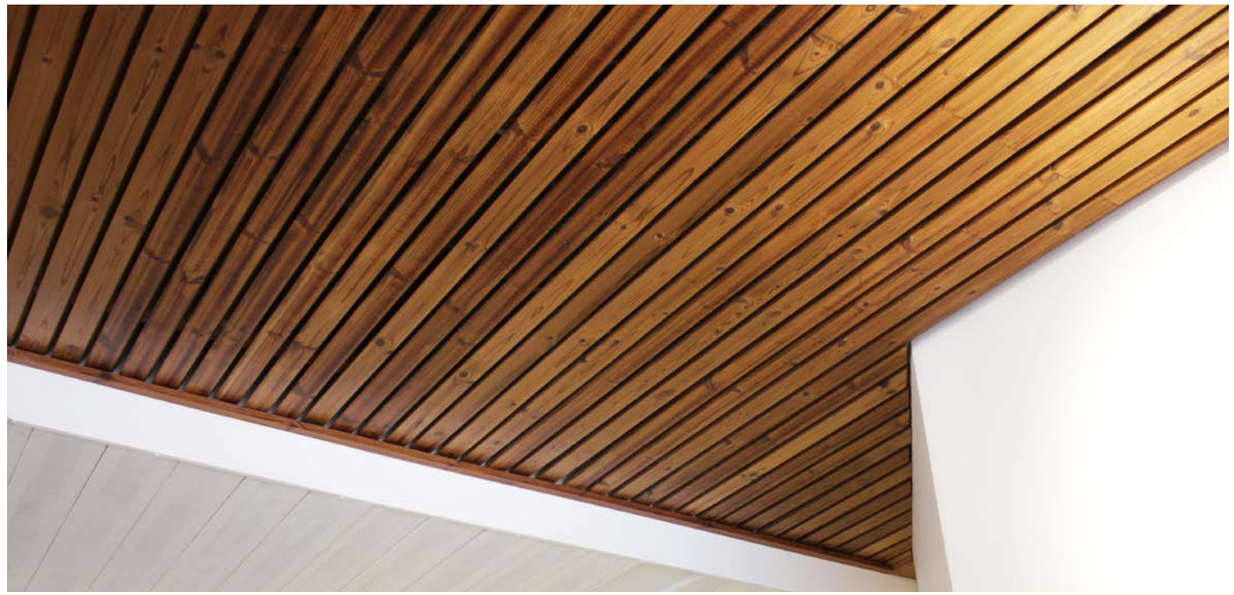
**Planing**
Lunawood can be planed with a normal planer or planing machine. Planing Lunawood gives its surface a superior quality. The planing machine should be adjusted for hardwood species and the planing speed is less than with untreated similar wood. The raw material after thermal processing may be convex and therefore the feed rollers should be adjusted accordingly to prevent the boards from splitting.

**Sanding**
Sanding may not be needed with Lunawood at all because the quality of the surface is so good after being planed and milled. However, if Lunawood is sanded the resin free material keeps your sandpaper in good shape for a longer period of time.

**Sawing**
Sawing Lunawood is just as easy as sawing ordinary wood. However, the blade should be a sharp, fine-toothed saw and the wood should be fed slowly.







## SURFACE TREATMENT

**Outdoors**
Lunawood Thermowood should be surface treated before installation or immediately after installation if the beautiful brown color is to be retained. Treating the boards with tinted or pigmented wood oil, wax, wood-protecting stain, varnish or paint – which contains a UV-filter – can retain the surface color. The surface treatment can be applied either before or immediately after installation using only a thin coat. Any excess should be wiped off. However, one should always follow the manufacturer's recommended guidelines.

The surface treatment should be renewed as necessary. The need for re-treating varies depending on the climate, amount of usage and the degree of exposure to UV-light. With opaque painted untreated wood the typical interval between maintenance is approximately 5 years. With Lunawood Thermowood the maintenance interval in painting can be greatly extended, possibly three times longer than usual. By using a more stable material considerable costs can be saved in cladding and decking, taking into consideration the entire lifespan of the product.

**Indoors**
Normal paints, wood oils, waxes, and varnishes can be used indoors. For saunas, paraffin oil can be used in addition to a surface treatment agent to emphasize the color of Thermowood and protect it from impurities.

## THE USE OF LUNAWOOD WITHOUT SURFACE TREATMENT

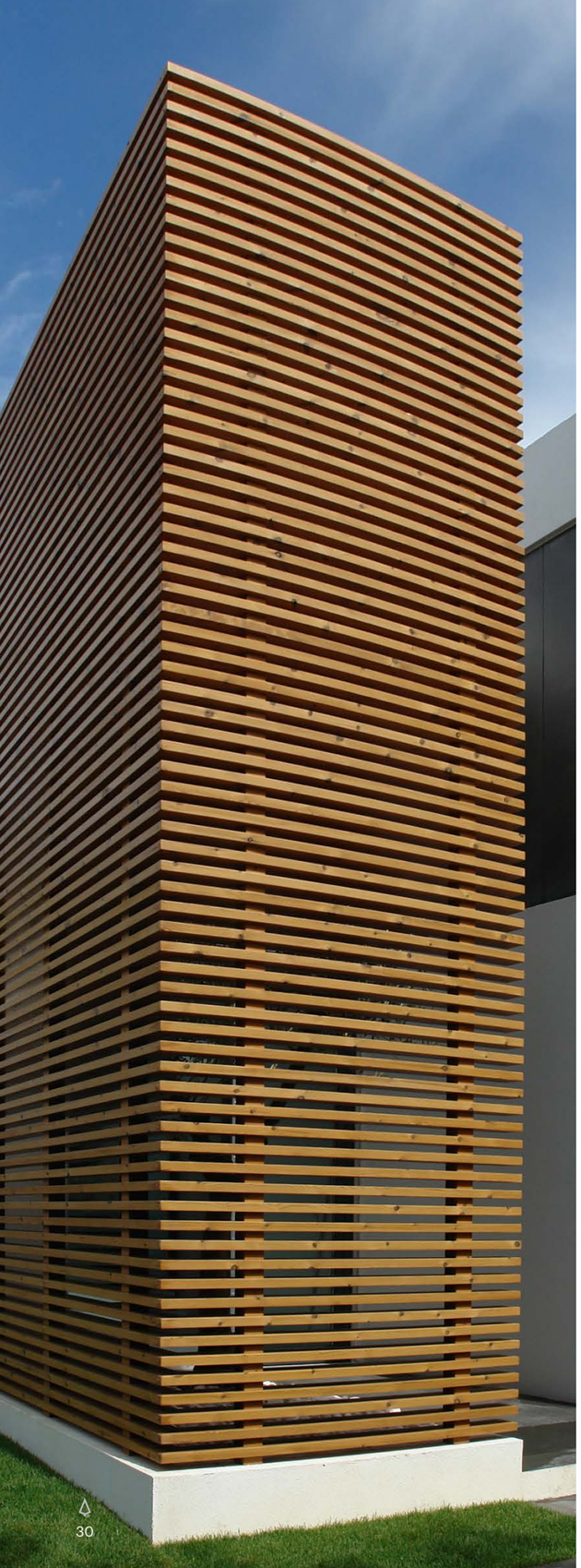
Lunawood recommends surface treatment for Thermowood always when the end use application is exposed to weather. With all wood materials it is typical that after time fine cracks and splinters appear on the surface. Though Thermowood has lower potential for these defects, they still exist and coating protects the wood from them.

If unfinished Thermowood is used or it has been coated with non-pigmented wood oil, the brown color of the surface will fade and turn to grey over time due the influence of UV. The weathered grey appearance of the Thermowood is elegant and the beneficial properties in durability against decay remain intact. However, horizontally planed surfaces such as terraces, which are exposed to surface wear and downright rain and sun, require protective coating to ensure long service life considering the mechanical properties. In other words surface treatment with, for example, wood oil is the best way to protect wooden decks. Further coating protects Lunawood from airborne impurities allowing for easier cleaning.

If the color of Thermowood has started to fade, the original brown color can be restored using an effective washing solution designed for wood and/or by sanding. After restoring the color a surface treatment can be applied with e.g. brown-pigmented wood oil.

## STRENGTH

Bending strength properties are somewhat reduced with heat treatment class LunaThermo-D. Therefore it is not recommended to use Lunawood in load bearing structures without additional support; or without strength calculations being carried out on a case-by-case basis.



**PEFC** is the world's largest forest certification system. Two thirds of the world's certified forests are certified according to PEFC requirements. PEFC certification demonstrates that forests are managed in a sustainable fashion.
www.pefc.org

International KOMO certification guarantees the degree of resistance to decay. The KOMO certificate confirms that Lunawood Thermo-D –class materials meet the quality requirements set for their biological durability and production.
www.komo.nl

**The CE marking** is the manufacturer's declaration that the product is in conformity with the EU requirements that apply to it. All Lunawood exterior cladding products are CE-marked, which guarantees their performance

**The International ThermoWood Association** supervises its member companies' quality of production. This supervision is conducted by Finotrol Oy as an independent third party. Finotrol Oy awards a certificate to companies that meet the quality requirements, on which basis the International ThermoWood Association awards companies the right to use the TMT certification label.
www.thermowood.fi

All our products are manufactured in **Finland**.
www.avainlippu.fi/en



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## Nordic Swan Ecolabel

The Nordic Swan Ecolabel is a voluntary ecolabelling scheme that evaluates a product's impact on the environment throughout the whole life cycle. The label guarantees among other things that climate requirements are taken into account, and that $CO^2$ emissions (and other harmful gases) are limited – where it is most relevant. By buying Nordic Swan Ecolabelled products and services, the consumer can contribute to a more sustainable environment, and be among the millions of people who daily make climate-friendly choices.

Products carrying the Nordic Swan Ecolabel meet extremely high environmental and often climate requirements. Criteria is also set with regard to quality, health aspects and performance/functionality. Following information package is handed over to the Ecolabel organization for measuring. Also on-site investigation is carried out.

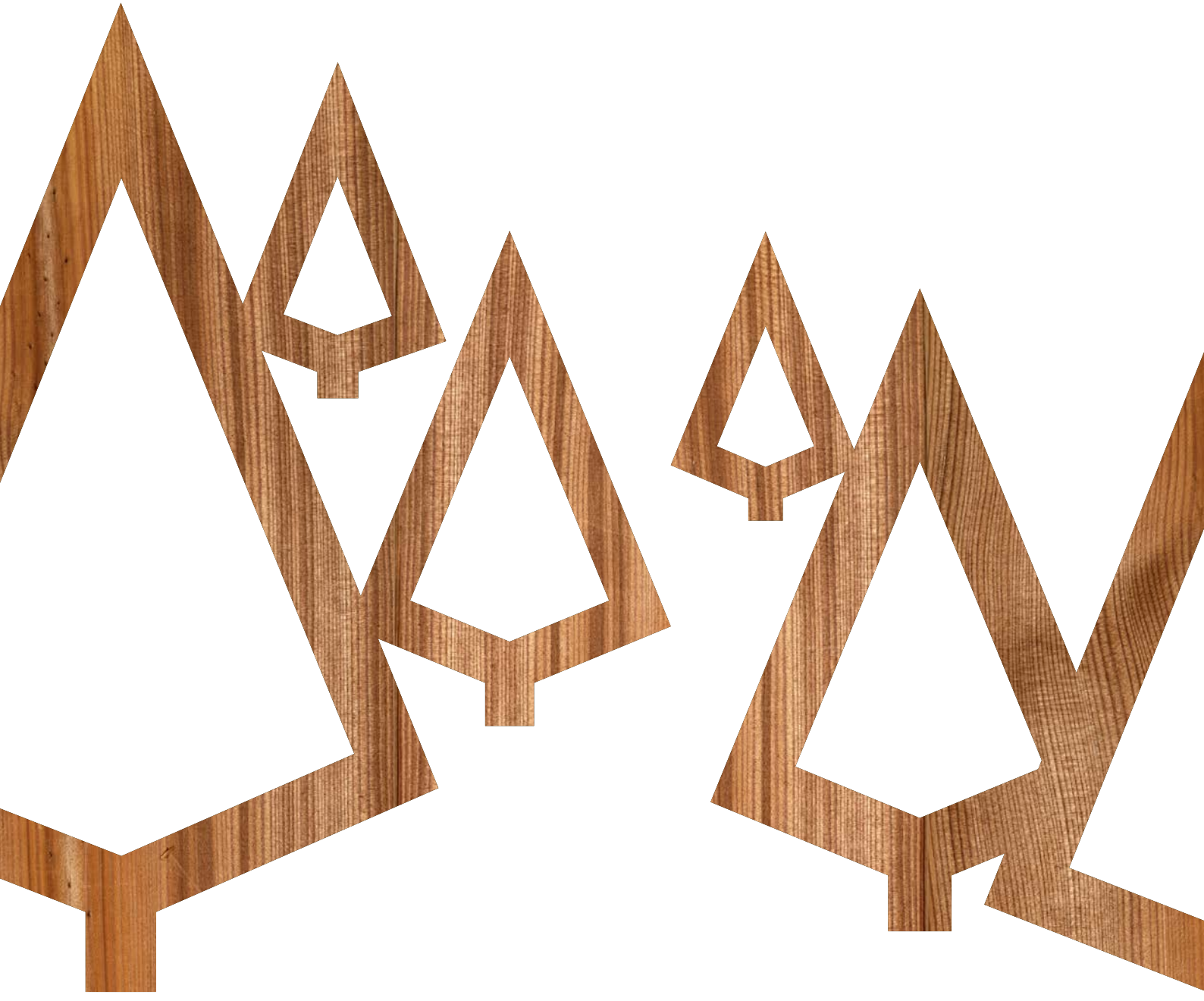
1. Description of the products
2. Environmental requirements
   - 2.1 Chemical requirements
   - 2.2 Sustainable forestry
   - 2.3 Biological durability and use classes
   - 2.4 Energy and climate
   - 2.5 Wood during use and disposal
3. Quality and regulatory requirements

**Nordic Ecolabelling of durable wood**
Nordic Ecolabelled durable wood is an alternative to conventionally impregnated wood and is characterised like following:

- It has no added heavy metals or biocides in the products. **Lunawood has none.**
- It does not cause problems or require special processing in the waste phase. **Lunawood products can be recycled by burning.**
- It is produced from sustainable forestry. **Lunawood chain of custody complies with the PEFC International Standard.**
- It has a sufficient biological durability against weathering and rotting in exterior end-uses (above ground solutions). **Lunawood products meet Durability class EN 350-1 Class 2, above ground solutions.**

**Why to choose products with Nordic Ecolabel?**
- The Nordic Ecolabel is a well-known and well-reputed trademark in the Nordic region.
- Reducing environmental impact often creates scope for lowering costs, such as by cutting the consumption of energy and chemicals.
- Environmentally suitable operations prepare the manufacturer for future environmental legislation.
- The Nordic Ecolabel not only covers environmental issues but also quality requirements, since the environment and quality often go hand in hand. This means that a Nordic Ecolabel licence can also be seen as a mark of quality.

**Regulations for the Nordic Ecolabelling of products and services**
www.nordic-ecolabel.org



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