



## MIRAKO-Thermowood

Wood with a range of new characteristics for new fields of application

### What is Thermowood?

This is wood with characteristics modified via an **ecological thermal process**. High temperatures of between 170 and 230°C adjust the characteristics of the wood without the need for additives.

### Which chemical processes take place in the wood?

When subjected to heat and moisture the cell wall organization changes which considerably reduces the moisture absorption capacity. Hemicellulose (short elements of sugar) is broken down. The reduced water absorption capacity of the wood creates an environment unsuitable for fungi growth which translates into an improvement in the durability of the wood. The hemicellulose remains left following this treatment in the wood close off hollow spaces in the cell wall and join up the wood during the cooling phase.

### What are the characteristics of Thermowood in comparison to non heat-treated wood?

The advantages are as follows:

- A reduction in swelling and shrinking (of about 50%)
- A higher dimensional stability
- A reduction in the stresses inside the wood
- A higher durability (against fungi and weathering)
- A reduction in the equilibrium moisture content of the wood which translates into less moisture (by up to 50%) in an identical climate compared to non heat-treated wood
- As a result of the reduction in equilibrium moisture content Thermowood is more stable than normal wood in changeable climatic conditions.
- The possibility to create new shades such as a warm brown or a blackish furmed oak shade
- All colour changes are general and homogeneous throughout the cross-section
- A light improvement in thermal insulation

However, in addition to the advantages there are also some disadvantages:

- The density decreases by up to 15% which means that the stability is lower than the stability of non heat-treated wood. Therefore, it makes no sense to use Thermowood for static applications
- The wood is brittle and tends to splinter.
- Thermowood is not resistant to ultraviolet rays and has to be protected using pigments
- The heat treatment cannot prevent the greying of wood
- Thermowood is not more resistant against blue fungus stain than non heat-treated wood

## Which fields of application are appropriate for Thermowood?

Thermowood can be used in all applications which demand the following characteristics:

- Durability
- Dimensional stability
- Visual effects (e.g. dark shades)

Outdoor applications	Indoor applications
<ul style="list-style-type: none"> <li>• Front elements</li> <li>• Garden furniture</li> <li>• Terrace flooring</li> <li>• Windows and shutters</li> <li>• Doors</li> <li>• Bowers</li> <li>• Windbreakers</li> <li>• Baffle boards</li> </ul>	<ul style="list-style-type: none"> <li>• Floorings</li> <li>• Furniture</li> <li>• Ceiling panelling</li> <li>• Saunas and baths</li> </ul>

## A comparison of different species of wood?

Species of wood	Durability class <sup>1,2</sup>		Equilibrium moisture content in climate 20°C/65% <sup>3</sup>	
	Not thermally treated	Thermally treated	Not thermally treated	Thermally treated
TEAK	1	---	10,5	---
BEECH	5	1	11,5	4,0
ASH	5	1	11,0	4,0
OAK	2	No scientific results up to now	13,0	4,8

<sup>1</sup> Division of durability classes according to DIN 350-2

<sup>2</sup> Species of wood classified in accordance with DIN 250-2

Class	Definition	Life expectancy in moderate climate	Life expectancy in tropical climate
1	Very durable	Over 25 years	Over 15 years
2	Durable	15 to 25 years	10 to 15 years
3	Moderately durable	10 to 15 years	5 to 10 years
4	Low durability	5 to 10 years	2 to 5 years
5	Not durable	2 to 5 years	Less than 2 years

<sup>3</sup> approximate values

## Thermowood – a result of an ecological process

In contrast with more conventional preservative treatments no additional chemicals are used in the process. This brings a host of environmental benefits which are appreciated by many end-users who, for various reasons, do not wish to use chemicals to preserve the timber they use in external environments