Physical and mechanical properties Platowood Spruce

The Platowood technology is a refining process to improve the dimensional stability and durability of wood. The Platowood process consists of a wet and dry process step carried out at relatively high temperatures (160-180°C), without the use of toxic chemicals.

The accompanying chemical modification of the wood components (especially lignin and hemicelluloses) has an effect on the physical and mechanical properties of the wood. Below the important physical and mechanical properties of Platowood Spruce are shown.

Table 1. Physical and mechanical properties of Platowood Spruce

SHR-report 2.793-1w, 2.793-2w and 7.026		**Platowood Spruce**	
		Average	**Stdev**
Density	Kg/m3	414	28
Equilibrium moisture content - 65% RV (20°C) - 90% RV (20°C)	% %	5.2 9.8	
Shrinkage wet -> 65% RV - Radial - Tangential	% %	1.0 1.8	
Shrinkage wet -> oven dry - Radial - Tangential	% %	1.9 3.5	
Bending strength *	N/mm2	79	19
Modulus of elasticity*	N/mm2	10514	2665
Janka Hardness - Radial - Tangential - End grain	N N N	1990 1905 3440	354 280 463

* Clear test specimens (20x20 mm)

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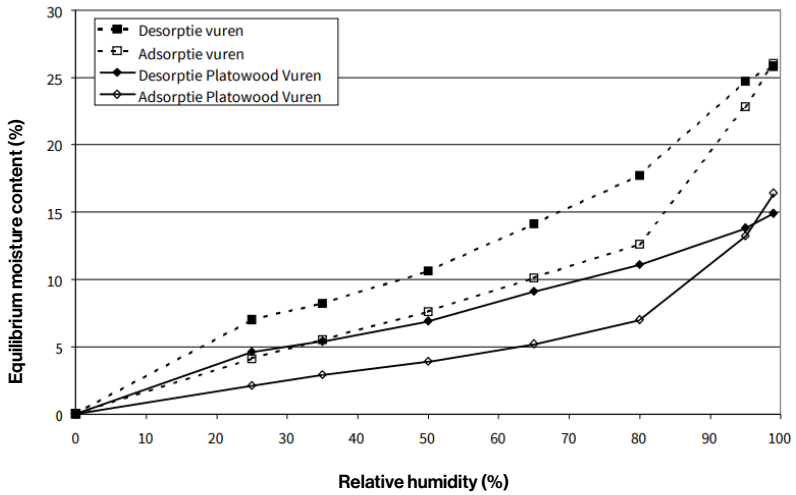
Physical properties of Platowood Spruce

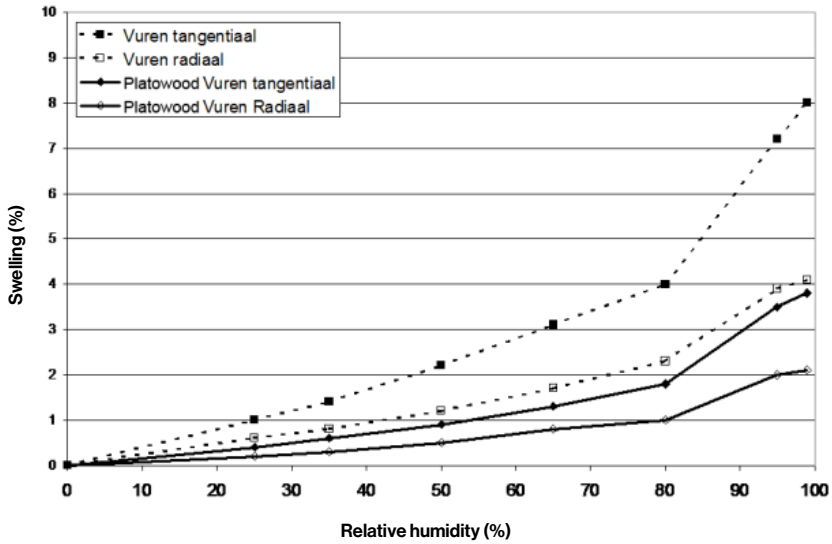
The Platowood process results in a clear decrease of the density (approx. 10%), caused by a lower moisture content (approx. 6%) and the evaporation of organic components (approx. 2.5-3% of extractives and reaction components). That Platowood wood has a considerably lower moisture content than the raw material is evident from the hysteresis curve of spruce wood, which is shown in figure 1.

Figure 1. Hysteresis of Platowood Spruce versus untreated spruce (SHR report 7.026)



The strongly reduced hygroscopicity (water absorption) leads to a considerable improvement of the dimensional stability, meaning the wood moves less (less shrinkage and swelling). The reduction of the shrinkage and swelling after the Platowood process is expressed in the so-called Anti swelling/shrinking efficiency (ASE). For the Platowood process this ASE amounts to approx. 50%!

Figure 2. Swelling (a) and shrinkage (b) of Platowood Spruce versus untreated spruce (SHR report 7.026)



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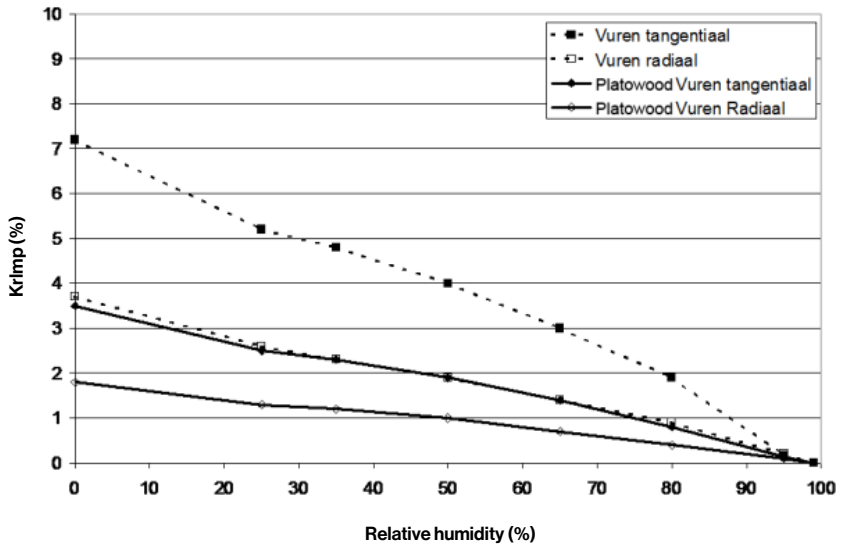

Mechanical properties of Platowood

With regard to the mechanical properties, in particular the bending strength and modulus of elasticity are important for the regular applications of wood. The bending strength of the European softwood species shows a limited decrease after the Platowood process (5-10%), while the bending strength of hardwood species shows a larger decrease (10-30%). In almost all wood species the modulus of elasticity increases slightly (0-5%), so the wood becomes stiffer. This also applies to the hardness on the end grain (5% increase). The hardness on the radial and tangential plane is almost unchanged after the Platowood process. For certain applications, especially structural, the impact strength, compressive strength and tensile strength are important. The Platowood process does lead to a decrease of the impact strength (approx. 30%), but this still falls within the range of the literature values. The tensile strength also shows a decrease (approx. 50%), while the compressive strength hardly changes at all.

When fastening Platowood it is important to use stainless steel screws and ring nails. Although the Platowood process shows a slight decrease (approx. 10%) in the resistance to withdrawal and pull-through of screws, Platowood wood can be fastened in the usual way. To prevent splitting it is necessary to pre-drill near the end grain or to use special stainless-steel screws equipped with a drill point.

If you want to use Platowood for a structural application, we kindly ask you to first consult the Information sheet Structural Applications with Platowood.

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