

## Treating and processing wood

Wood is a natural, non-homogeneous material which reacts to changes in the surrounding humidity by varying its volume.

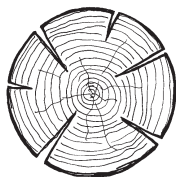
Humidity makes the wood swell - it increases in volume while any decrease in humidity will make it shrink in volume.

As wood is a non-homogeneous material, these changes in volume will affect some parts of the wood more than others in different directions. This not only changes the volume but the timber itself can change shape, by buckling, twisting and cracking.

The extent to which wood warps is not equal in all directions:

- in the direction of the fibres (length) insignificant
- in the direction of the medullar ray (from the core outwards) < 5%
- in the direction of year rings < 10 %

The effects of warping are most apparent when the timber has just been cut and the trunk begins to dry. At first no change can be observed in the shape of the timber since it is only free water that is diffused from the cell hollows. When the air humidity becomes so low that the wood can release moisture into the air around it the wood starts losing humidity from its fibres and cell



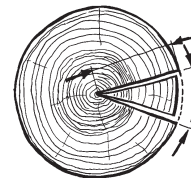
membranes. This is the time when changes in volume and the shape of the timber occur (shrinkage reaction). The trunk becomes only slightly shorter in length.

Its diameter decreases too - in dry conditions (WH = 0%) up to 5% and often splits in the process. In the direction of the year rings, in other words tangentially, this value is 10%.

Jahrringe, also tangential, liegt dieser Wert bei 10 %.

What happens?

The atmospheric moisture drops or is very low. The humidity in the wood also drops until it is equal to the degree of humidity in the air. Simultaneously, the wood tries to contract: in length very little, in width (radial-medullar ray) several times greater and in the direction of the year rings (circumferential/ tangential) double the magnitude of the radial-medullar rays. Due to these variations in shrinking in different directions stresses occur around the neutral core, which can cause the wood to split in the event of great moisture loss. After any drying of the timber, the "piece of pie" in the diagram will be smaller and slimmer.



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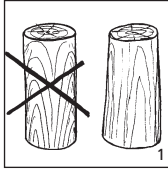


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### Round timber poles – de-barked

De-barked means:

Firstly, the timber is turned under two rotating cutter heads with a feeler element placed in front of each tool which carefully limits the amount milled. A maximum of 2 cm is milled all round. Larch is de-barked practically splint free. This way, the natural unevenness of the timber is preserved.



Its lower part remains thicker than its upper end, and if it was oval-shaped this will not change. Likewise, any curves in the timber will merely be slightly flattened.

We chose this type of manufacture because the natural irregular structure does not get lost. These irregular timbers hinder the subsequent processing of the logs in the factory and this does not permit industrial production of play equipment. That is why every product is completely built by hand and dismantled for transportation.

### Handcrafted production

1. careful selection of wood and individual treatment leads to a unique product even if it is a standard item;
2. our method of assembly allows for good fit when reassembled even though it is not modular;
3. social comradeship in the workshop leads to 'happy' equipment.

### ~~Circular milling~~

The timber is processed into uniformly shaped trunks by means of a stationary milling cutter with a pre-determined cutting diameter. This method removes any irregularities and provides a raw material that is easily used in production and processed with templates and other facilities. The disadvantage is that the easily impregnated sapwood especially at the lower end of the trunk is milled off leaving the more difficult to impregnate core at the surface. Moreover, wood fibres are cut, which open and take in moisture if the pole is installed upside down.

These disadvantages do not occur in de-barking. Therefore, we use de-barked trunks instead of milled trunks – with a few exceptions depending on the technical requirements.



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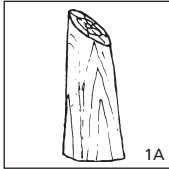
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### Angle cut

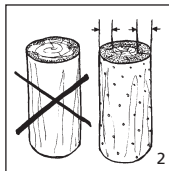
Vertical support posts with angle cut in the end grain section as constructional wood preservation. As an additional protection, paraffin wax is



1A painted on to the upper-end grain areas

### Perforated

Whenever we use chemical wood preservation for construction parts which come into contact with the ground, the wood is boiler pressure impregnated according to DIN 68800, hazards class 4. The particularly endangered earth/air zone of the wood is perforated by a number of small bore holes with a diameter of 3 mm, depth 30 mm, before they are impregnated 40 cm



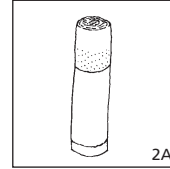
above and below ground level. This ensures that the impregnating agent penetrates the part of the timber that is most prone to fungus. We copied this process from the German Federal Post Office.

Much of the Richter equipment is built using unimpregnated timbers, such as mountain larch, oak, robinia.

### Fürstenberg Permadur System

In special cases such as one-legged pieces of equipment and for the climbing forest trunks, we use the patented Fürstenberg Permadur System

as an additional protective measure in the earth/air zone, which is particularly susceptible to wood-destroying fungi.



The service life of the posts is increased by the sheathing method, which cuts off the essential supply of oxygen to the fungi. The plastic protective sheath also serves to prevent the copper and zinc ions – poisonous to the fungi – in the brass foil underneath it from seeping into the soil.



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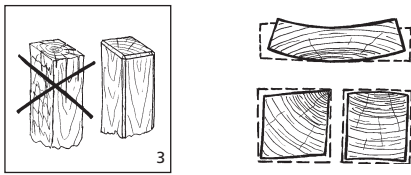


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### Core-free

As stress around a core is not built up in an open system, but in a closed and, in the present case, ring-shaped system, any change in shape generally results in splitting.

To reduce such formation of cracks in timber used for play equipment, wood is cut in such a way that core-free cross-sections are obtained. But even by eliminating splits as one of the major causes of changes in volume, craftsmen working

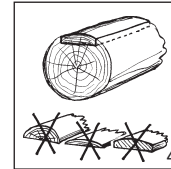


the wood still have to consider the shrinking of core-free timber (and swelling if humidity is absorbed - increasing its volume). By using appropriate and professional processing and manufacturing methods these properties inherent in wood become effectively controllable.



### Claddings

Claddings are edge boards that are sawn on three sides and that are produced by cutting into thick round timber. The outside of the tree is ma-



nually white-peeled on a rotary saw. This way an irregularly structured surface is obtained.

This processing by hand is very costly in production and in subsequent treatment. Using any of the known mechanical processing methods for boards and/or planks aimed at imitating the structure of claddings will result in a lumpy, rustic board without natural structure.

### Stability

Besides the formal advantage of the cladding structure, the use of claddings allows a considerable improvement in quality in comparison to the use of timber-halves of soft wood as this way a greater quantity of material per surface area is used. The claddings of towers have a thickness ranging from 3 to 6 cm and a width from 14 to 18 cm, while at the thinnest point of their half-rounding they are still about 1 cm thick enabling, among other things, wide spacing between screws. This adds lateral stability to the sides of the walls and roofs of our play equipment.



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