

## Finnforest Kerto – a wood product for advanced structural engineering

Finnforest Kerto is a laminated veneer lumber (LVL) product used in all construction jobs from new buildings to renovation and repair.

The environmentally-friendly Kerto is used in a variety of applications demanding high strength: roof beams, floor joists and wall studs. It is also ideal as building part for frames, trusses, roofing decks and intermediate floor elements. Industrial applications are e.g. concrete formwork, door frames and scaffold planking.

Kerto® is made by gluing rotary peeled veneers from Finnish spruce into continuous panels (up to 2.5 m wide) which are then sawn to become beams or panels. Their thickness can range from 27 to 75 mm and have a maximum length of 25 m.

Kerto is produced at two of Finnforest's mills in Finland which have a total production capacity of 250,000 m<sup>3</sup> per annum. Wood procurement has been certified according to the Programme for the Endorsement of Forest Certification schemes (PEFC). The management system has been granted the ISO 9001:2000 quality certificate.

The quality management and quality control systems have been systematically created together with customers and the authorities during the product's history. Such close cooperation enhances the mutual trust towards Kerto's products and helps in developing and meeting customers' needs.

Although Europe is Kerto's main market, it is sold worldwide - the only LVL product today to do so! Kerto is produced according to the structural LVL standard HEN 13474 and thus fulfils the requirements of the Construction Product Directive (CPD). It also has national building code approvals in 19 countries.

### Strong, straight and dimensionally stable

Kerto has excellent strength properties. It has more load-carrying capacity than most traditional structures made from wood, and is stronger, straighter, lighter and more stable than commercially sawn timber.

Kerto's superior features make it the constructor's choice.

- **Strong:** high characteristic strength values, ideal for load-bearing structures
- **Dimensioning:** easy to optimise due to the extensive range of sizes
- **Straight:** dimensionally precise — does not warp or twist
- **Pleasant material:** sound-insulating, fire-safe, visually beautiful when specially sorted surface veneers are used
- **Easy to build with:** light in weight and excellent workability

- **Ecologically sustainable:**
  - Wood is the only 100% renewable construction raw material
  - The wood supply and manufacturing process has certified chains-of-custody according to the PEFC forest certification system (Programme for the Endorsement of Forest Certification schemes)
  - The manufacturing process of wood products is less energy consuming than that of other building materials
  - The energy that is needed for manufacturing is mainly bioenergy and is produced at production plants by burning by-products such as woodchips and sawdust
  - Wood acts as a CO<sup>2</sup> storage and over a longer time span does not emit any net CO<sup>2</sup>.

### **Two types of Kerto**

Kerto is available as Kerto-S and Kerto-Q.

In **Kerto-S**, the grains run longitudinally throughout its veneer layers. It is normally supplied in the form of straight beams but can easily be cut to the required shapes. It is an ideal choice for beams, joists, trusses and frames.

**Kerto-Q** is cross-bonded. This means that every fifth veneer is glued crosswise. This structure improves the panel's lateral bending strength and stiffness. The cross-veneers improve the ductility of the product and prevent cracking when used as a beam. There is also an essential reduction in moisture-dependent variations across the width of the panel. Because of its high shear strength, Kerto-Q is best used in floor and wall panels, as a stabilizer and as a structural component.

### **Success through innovation**

In addition to its standard use, a number of new applications are being developed, such as box beams, roof elements and ribbed panels for intermediate floors.

The extensive R&D work on Kerto has resulted in product and application know-how which has contributed to architecturally and aesthetically outstanding wooden buildings with special structures.

Developing these innovative solutions is carried out at several locations in Europe so as to meet the wishes and requirements of local construction markets. One of the leading R&D centres is the subsidiary Finnforest Merk, located in Aichach, Germany. It is a top supplier of demanding wooden structures which are designed and developed together with international experts. Currently, Finnforest Merk is coordinating a project that will supply wooden ceiling elements for Charles de Gaulle airport in Paris.

### Recent innovative wooden buildings built with Kerto

- Finnforest Modular Office FMO Tapiola, Espoo, Finland. The load-bearing structures and stressed skin elements in intermediate floors made of Kerto. FMO Tapiola is the winner of the 2006 Wood Award, Finland's most prestigious wood architectural competition.
- The concert hall of the Mariinsky Theatre, St. Petersburg, Russia. The acoustic wall and ceiling elements are made of Kerto.
- Sports arena – Joensuu, Finland. The upper and lower chord of the arch-shaped trusses of glulam. Diagonals and verticals of the truss, middle boat of the roof and entrance canopy of Kerto.
- School Hösmärinpuisto, Espoo, Finland. Ribbed slab elements for the intermediate floor. Frame of glulam and Kerto.
- Do-it-Yourself store Rautia in Klaukkala, Finland. Kerto-framed roof elements.

### Finnwood software - a user-friendly solution

Structural engineers and building designers can now design timber structures faster and with more choice by using Finnforest's Finnwood single member calculation software. The software helps the user choose the right Kerto product for each project and provides a selection of Finnforest's other timber products.

Today, thousands of professionals are using the Finnwood software in several European countries. It can be obtained free of charge from Finnforest's local offices.

### Kerto's milestones

|             |   |
|-------------|---|
| 1973        | Start-up of the Metsäliitto LVL project   |
| 1975        | Start-up of the Kerto LVL pilot plant in Punkaharju, Finland  |
| 1975 – 2001 | Matti Kairi acted as a key person who contributed to the development, production and marketing of Kerto                         |
| 1978        | First type approval of Kerto in Finland   |
| 1981        | First type approval of Kerto in Scandinavia and Germany<br>Start-up of Kerto production on a commercial scale in Lohja, Finland |
| 1982        | First product acceptance in the French and US markets. In the US the product is named Master Plank                              |
| 1982        | Breakthrough in Finland   |
| 1984        | Breakthrough in the USA   |
| 1986        | Start-up of the second Kerto production line in Lohja, Finland  |
| 1991        | Type approval of Kerto for structural panels in Germany   |
| 1992        | Breakthrough in Germany   |
| 1996        | Breakthrough in France  |
| 1998        | Start-up of the third Kerto production line in Lohja, Finland   |
| 2001        | Start-up of the second Kerto mill in Punkaharju, Finland  |
| 2005        | Start-up of the second Kerto production line in Punkaharju, Finland   |