

Kerto® LVL



Thermal end use conditions

Kerto® LVL products can be used in the same conditions as standard softwood plywood. Kerto LVL can continuously be used in temperatures of less than 100 °C. The maximum short term exposure temperature is 120 °C and the minimum suitable temperature is -200 °C. The mechanical values of Kerto LVL can be used for temperatures below or equal to 50 °C for a prolonged period of time.

Thermal conductivity

Thermal conductivity coefficient λ for wood products is density and moisture dependent. For calculation of thermal insulation, the thermal conductivity of 0.13 W/(m K) should be used for S-beam, Q-panel, Qp-beam, T-stud and Kate and 0.12 W/(m K) for L-panel.

Ignition temperature

Like all wood products, Kerto LVL is classified as a combustible material. The ignition temperature of Kerto LVL is about 270 °C, when it is exposed to flame. Spontaneous ignition does not occur in temperatures below 400 °C. The ignition temperature of wood is also dependent on the duration of the exposure to high temperatures, see Figure 2. Ignition temperature decreases when the duration of exposure increases. After 20 hours of exposure the lower ignition temperature limit stays as constant at 120 °C.

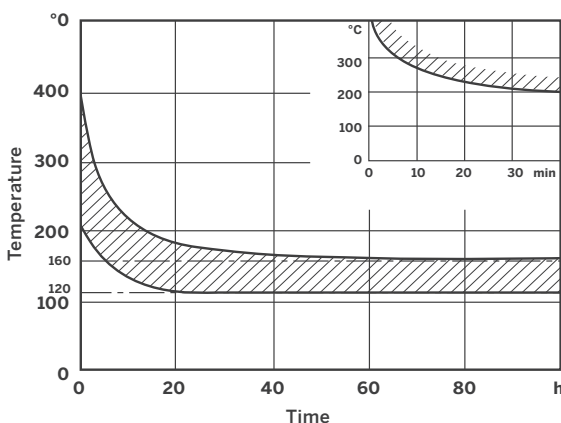


Figure 2. The ignition temperature of wood in relation to time, when it is exposed to high temperature for a longer period of time (density of wood $\geq 400 \text{ kg/m}^3$ and moisture content about 15 %). (Source: Holzbrandschutzhandbuch)

Heat capacity

Heat capacity of Kerto LVL products is the same as for Finnish softwoods: $c = 1880 \text{ J/(kg K)}$ when product's moisture content is 20 %.

Thermal deformations

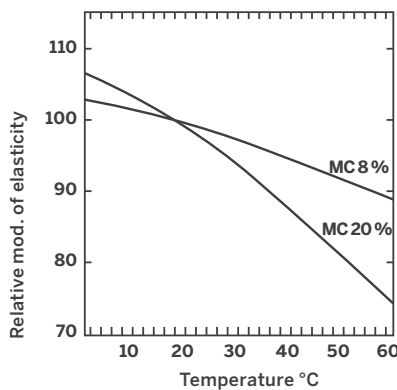
Thermal expansion of Kerto LVL is minimal and it can generally be disregarded, unlike swelling due to moisture. The coefficient of thermal expansion in the direction of wood fibres is in the range from $3.5 \text{ to } 5.0 \times 10^{-6}/\text{K}$.

Example: If temperature changes from 15 °C to 30 °C, the length of Kerto LVL beam changes correspondingly:

$$10\,000 \text{ mm} \rightarrow 10\,000 + (15 \times 4.0 \times 10^{-6}) \times 10\,000 = 10\,000.6 \text{ mm}.$$

Effect of temperature to strength properties

At normal ambient temperatures, the properties of Kerto LVL products are not sensitive to temperature variations. However, when the temperature rises from 20 °C to 100 °C, the strength of the products decreases 50 %. An increase in temperature has a smaller effect on the modulus of elasticity of Kerto LVL products than on its strength, see Figure 1.



For temperatures up to 50 °C, the declared mechanical values for Kerto LVL are applicable.

Figure 1. Effect of the temperature to the modulus of elasticity of Kerto LVL products, moisture content 8 % and 20 % (Source: RIL 162-1 Timber structures I, 1997)

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