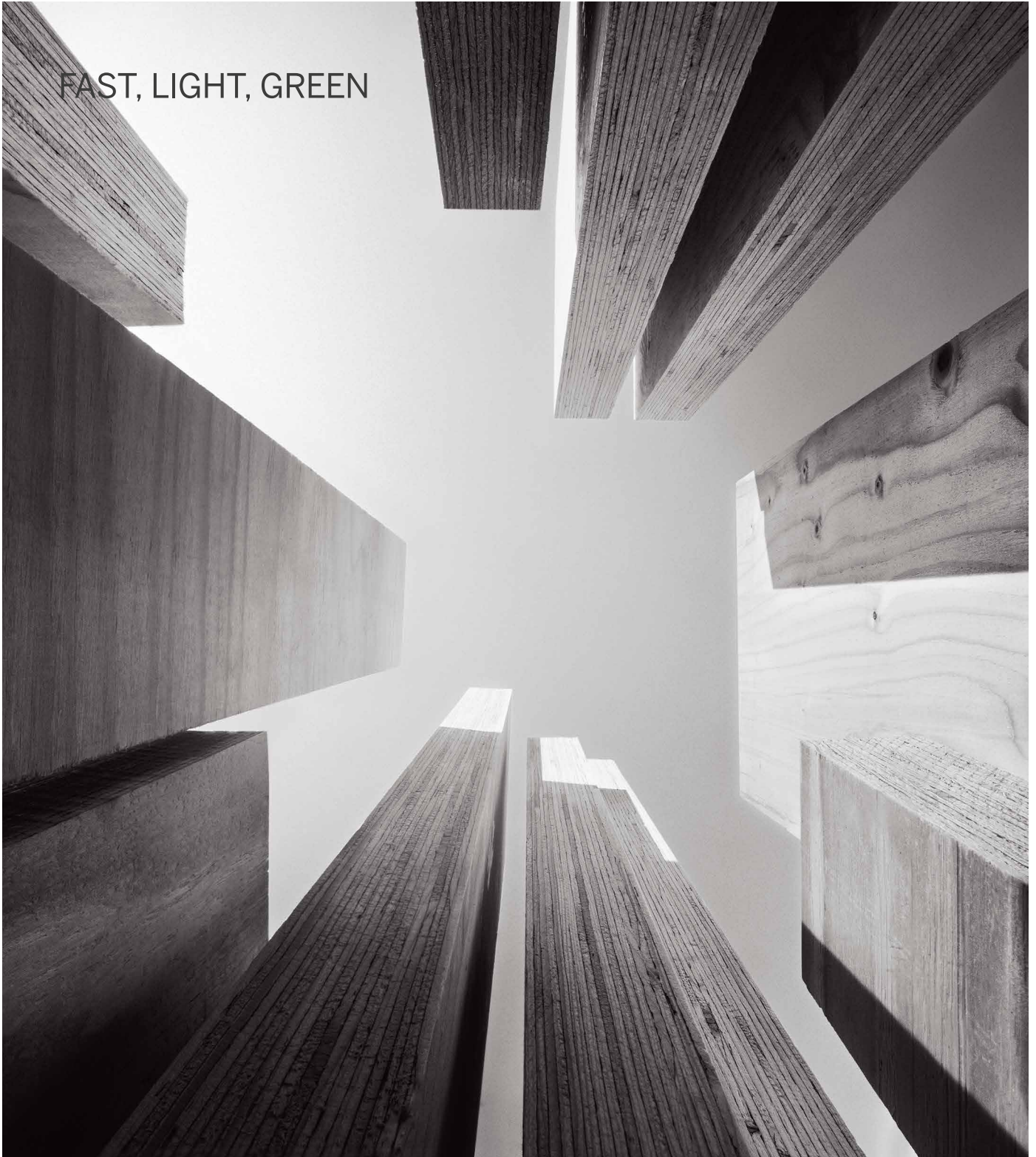


Kerto[®] LVL

for load-bearing
applications

FAST, LIGHT, GREEN



Kerto LVL

Strong and dimensionally stable



Kerto® LVL (laminated veneer lumber) is an engineered wood product used in all types of construction projects, from new buildings to renovation and repair. Kerto LVL is strong, lightweight and dimensionally stable. It does not warp or twist.



Clamart Sports Centre, image by Sergio Grazia



Kerto LVL is produced from 3 mm thick, rotary-peeled softwood veneers that are glued together to form a continuous sheet. The sheet is cut to length and sawn into beams, planks or panels in the sizes that customers require. Kerto LVL products are CE marked and certified by Eurofins Expert Services Oy.

EXAMPLES OF USE

- Beams
- Joists
- Trusses
- Frames
- Components of roof, floor and wall elements
- Components for the door and vehicle industry
- Concrete formwork
- Scaffold planking

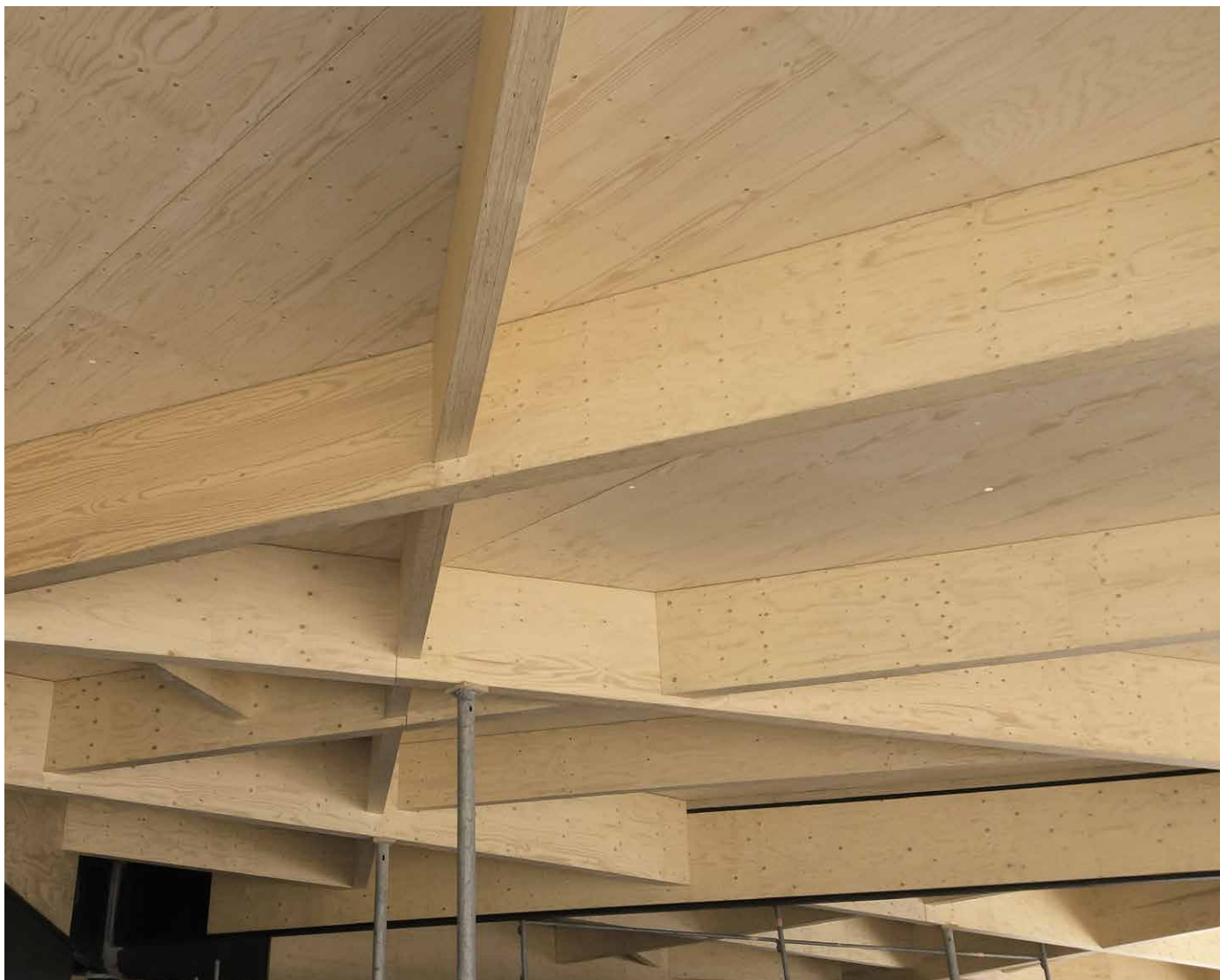
ENVIRONMENTALLY FRIENDLY CONSTRUCTION MATERIAL

Renewable and recyclable wood is a highly eco-effective building material throughout its life cycle. The wood raw material for Kerto LVL comes from sustainably managed forests, ensuring that the origin of the raw material is traceable. The majority of the wood comes from PEFC certified northern forests.

The manufacturing of Kerto LVL products consumes only a small amount of energy and results in low carbon dioxide and other emissions. In addition, wooden structures store carbon.

The manufacturing is mainly based on renewable energy, and the energy and material efficiency of the production processes is continuously being improved.

Kerto LVL S-beam enables long spans



In Kerto LVL S-beam, the veneer grains are oriented longitudinally through all the layers. The finished panel is cross-cut and rip-sawn to order. S-beam is normally supplied in the form of straight beams but it can also be specially cut and shaped as required.

Kerto LVL S-beam combines excellent technical performance with ease of use. Its essential qualities include strength, dimensional precision and stability. It is the ideal choice for beams whenever long spans and minimal deflections are required. Kerto LVL S-beam fulfills the requirements for strength class LVL 48 P.

Kerto LVL S-beams are suitable for all roof shapes, also performing well as joists and lintels, in trussed constructions and frames. S-beam is also a widely used material in the manufacture of prefabricated components.

Kerto LVL's light weight is of great advantage in repair and renovation work. Erection and installation can be carried out by fitters, without any heavy hoisting machinery, even in confined spaces.

OVERALL DIMENSIONS

	Minimum (mm)	Maximum (mm)
Thickness	27	75
Width/height	40	2,500
Length	2,000*	25,000**

* Short lengths are available on request (< 2,000 mm).

** For products wider than 1,830 mm, maximum length is 20,000 mm.



SPAN TABLES FOR KERTO LVL

Kerto LVL is suitable for floor, roof and wall structures. Its unique properties offer material efficiency and fast installation both for prefabrication production and on-site assembly. Span tables for Kerto LVL beams, panels and studs are presented on Metsä Wood web site. The tables help designers to work faster and more efficiently. For more information see Metsä Wood website at www.metsawood.com.

Kerto LVL Q-panel stabilises structures



Kerto LVL Q-panel is a load-bearing, dimensionally stable panel that can be used in the most demanding structures. Q-panel can be used in Kerto LVL elements that enable stiff and high-quality floor and roof structures. Holes for example for HVAC equipment can be machined to the elements. Holes do not significantly reduce the load-bearing capacity when designed and machined according to the instructions.

Kerto LVL Q-panel is cross-bonded Kerto LVL in which one fifth of the veneers are glued crosswise. Cross-bonded structure improves the lateral bending strength and stiffness of the panel, thus increasing the shear strength when used as a beam. Reduction of moisture deformations in width direction of the panel is achieved by crosswise veneers in the lay-up. Kerto LVL Q-panel with thicknesses 27–75 mm fulfil the requirements for strength class LVL 36 C and thicknesses 21–24 mm fulfil the requirements for strength class LVL 32 C.

Full length Kerto LVL Q-panel is a popular material in floor and wall panels because it stabilises the whole structure. Good fire resistance is achieved with a properly chosen thickness. Q-panel provides a functional solution in structural components, particularly when a high shear strength is one of the requirements. Like all Kerto LVL products, Q-panel is known for its strength, straightness and dimensional stability.

OVERALL DIMENSIONS

	Minimum (mm)	Maximum (mm)
Thickness	21	75
Width/height	200	2,500
Length	2,000*	25,000**

* Short lengths are available on request (< 2,000 mm).

** For products wider than 1,830 mm, maximum length is 20,000 mm.

KERTO LVL Q-PANEL: VENEER STRUCTURE

Thickness (mm)	qty	Lay-up
21	7	I-III-I
21	7	II-I-II
24	8	II-II-II
27	9	II-III-II
30	10	II-III-II
33	11	II-III-II
39	13	II-III-III-II
45	15	II-III-III-II
51	17	II-III-III-III-II
57	19	II-III-III-III-II
63	21	II-III-III-III-III-II
69	23	II-III-III-III-III-II
75	25	II-III-III-III-III-II

I = veneer grain direction along the main panel direction
 - = veneer grain direction across the main panel direction

Kerto LVL Qp-beam for high and rigid roof beams

Kerto LVL Qp-beam is a dimensionally accurate roof beam that can be used in the roof structures of new constructions and repairs. Qp-beam enables spacious rooms and reduces the need for supporting lines.

The structure of Kerto LVL Qp-beam is unique: slender and high, but rigid. Qp-beam can be produced higher and more slender than the traditional Kerto LVL S-beam. Using Qp-beams increases the cost efficiency of construction projects. Reduction of moisture deformations in height direction of the beam is achieved by crosswise veneers in the lay-up.

OVERALL DIMENSIONS

	Minimum (mm)	Maximum (mm)
Thickness	39	75
Width/Height	500*	830
Length	2,000*	20,000

*Short lengths (< 2,000 mm) are available on request



Kerto LVL T-stud for wall studs

Kerto LVL T-stud has a similarly oriented structure as Kerto LVL S-beam but is made from lighter veneers. The straightness and dimensional stability of T-stud is similar to S-beam. These properties make T-stud ideal for load-bearing and non-bearing structures in external and internal walls. Kerto LVL T-stud fulfills the requirements for strength class LVL 32 P.

Straight and high walls can be easily constructed with Kerto LVL T-stud. Different sheathing materials can be used with T-stud and they are easy to fasten with conventional wood working tools.

OVERALL DIMENSIONS

	Minimum (mm)	Maximum (mm)
Thickness	27	75
Width/Height	40	200*
Length	2,000	16,000*

*Special widths and lengths are available on request



Kerto LVL L-panel enables material efficiency

Kerto LVL L-panel has similarly oriented structure as Kerto LVL Q-panel but is made from lighter veneers. L-panel combines excellent technical performance with lightweight and dimensional stability. Kerto LVL L-panel with thicknesses 27–69 mm fulfil the requirements for strength class LVL 25 C and thicknesses 21–24 mm fulfil the requirements for strength class LVL 22 C.

The panel is designed for both horizontal and vertical use in light-duty and non-load bearing applications. Use of large L-panel sizes ensures material efficiency and minimises installation time.

OVERALL DIMENSIONS

	Minimum (mm)	Maximum (mm)
Thickness	27	69
Width/Height	200	2,500
Length	2,000*	25,000**

*Short lengths (< 2,000 mm) and widths under 200 mm on request

** Products wider than 1,830 mm, maximum length 20,000 mm



Kerto LVL for wood construction



Kerto LVL products make construction fast, light and green.

The construction industry is undergoing a major transition, with construction moving from building sites to off-site manufacturing. Using prefabricated wooden elements significantly reduces the time spent at the construction site. Elements and modules are assembled in factory conditions and delivered to building sites for quick installation. Cut-to-size Kerto LVL products and optimised element production ensure material efficiency with minimal waste. The lightweight and strength properties of engineered wood products like Kerto LVL make off-site construction a very attractive option.

Wood is renewable material and the only major construction material that stores carbon. At the end of their life, Kerto LVL products can be recycled or utilised in bioenergy production.

KERTO LVL PRODUCTS ARE USED IN A VARIETY OF APPLICATIONS IN THE CONSTRUCTION INDUSTRY, FOR EXAMPLE:

- Roof, wall and floor elements
- Modules
- Timber frames
- Load-bearing structures
- Scaffolding and working platforms





Kerto LVL for industrial applications

Kerto LVL is an excellent material to use in a wide variety of industrial applications. Dimensional stability, straightness and dimensional accuracy enable efficient manufacturing. Kerto LVL is easy to machine and handle in industrial processes.

- Components for prefabricated housing industry
- Doors and door frames
- Composite windows
- Concrete formwork
- Vehicle industry



Kerto LVL for distributors

Premium products, reliable supply chain and professional support are the cornerstones of a great partnership. Kerto LVL products are sold through a range of distribution partners that include leading DIY chains and national builders' merchants.



DESIGN VALUES AND PHYSICAL PROPERTIES FOR KERTO LVL PRODUCTS

KERTO LVL S-BEAM, KERTO LVL Q-PANEL AND KERTO LVL T-STUD

PROPERTY	SYMBOL	S-BEAM ¹⁾ 21–75 mm	Q-PANEL ²⁾ 21–24 mm	Q-PANEL ²⁾ 27–75 mm	T-STUD ³⁾ 27–75 mm	UNIT
Fullfills strength class		LVL 48 P	LVL 32 C	LVL 36 C	LVL 32 P	
Bending strength (5% fractile)						
Edgewise (depth 300 mm)	$f_{m,0,edge,k}$	44.0	28.0	32.0	27.0	N/mm ²
Size effect parameter	s	0.12	0.12	0.12	0.15	-
Flatwise, parallel to grain	$f_{m,0,flat,k}$	50.0	32.0	36.0	32.0	N/mm ²
Flatwise, perpendicular to grain	$f_{m,90,flat,k}$	-	7.0 ⁶⁾	8.0	-	N/mm ²
Tensile strength (5% fractile)						
Parallel to grain (length 3000 mm)	$f_{t,0,k}$	35.0	19.0	26.0	22.0	N/mm ²
Perpendicular to grain, edgewise	$f_{t,90,edge,k}$	0.8	6.0	6.0	-	N/mm ²
Compressive strength (5% fractile)						
Parallel to grain	$f_{c,0,k}$	35.0 ⁵⁾	19.0 ⁵⁾	26.0 ⁵⁾	26.0 ⁵⁾	N/mm ²
Perpendicular to grain, edgewise	$f_{c,90,edge,k}$	6.0	9.0	9.0	4.0	N/mm ²
Perpendicular to grain, flatwise	$f_{c,90,flat,k}$	2.2	2.2	2.2	0.8	N/mm ²
Shear strength (5% fractile)						
Edgewise	$f_{v,0,edge,k}$	4.2	4.5	4.5	3.6	N/mm ²
Flatwise, parallel to grain	$f_{v,0,flat,k}$	2.3	1.3	1.3	2.0	N/mm ²
Flatwise, perpendicular to grain	$f_{v,90,flat,k}$	-	0.6	0.6	-	N/mm ²
Modulus of elasticity (mean)						
Parallel to grain, along	$E_{0,mean}$	13,800	10,000	10,500	9,600	N/mm ²
Perpendicular to grain, edgewise	$E_{90,edge,mean}$	430	2,400	2,400	-	N/mm ²
Perpendicular to grain, flatwise	$E_{90,flat,mean}$	130	130	130	-	N/mm ²
Parallel to grain, across	$E_{90,mean}$	-	1,200 ⁶⁾	2,000	-	N/mm ²
Shear modulus (mean)						
Edgewise	$G_{0,edge,mean}$	600	600	600	500	N/mm ²
Flatwise, parallel to grain	$G_{0,flat,mean}$	380	80	120	320	N/mm ²
Dimensional variation coefficient ⁴⁾						
Thickness		0.0024	0.0024	0.0024	0.0024	-
Width / Height		0.0032	0.0003	0.0003	0.0032	-
Length		0.0001	0.0001	0.0001	0.0001	-
Other properties						
Characteristic density	ρ_k	480	480	480	410	kg/m ³
Mean density	ρ_{mean}	510	510	510	440	kg/m ³
Moisture content (on mill delivery)		10 %	10 %	10 %	10 %	-
Performance in fire, charring rate	β_n	0.7	0.7	0.7	0.75	mm/min
Euroclass with regard to reaction to fire		D-s1,d0	D-s1,d0	D-s1,d0	D-s1,d0	-

¹⁾ Kerto LVL S-beam Declaration of Performance MW/LVL/311-001/CPR/DOP and Eurofins certificate EUFI29-20000676-C. Kerto LVL S-beam (21-75mm) fullfills the requirements for strength class LVL 48 P.

²⁾ Kerto LVL Q-panel Declaration of Performance MW/LVL/312-001/CPR/DOP and Eurofins certificate EUFI29-20000676-C. Kerto LVL Q-panel with thicknesses 27–75 mm fulfil the requirements for strength class LVL 36 C and thicknesses 21–24 mm fulfil the requirements for strength class LVL 32 C.

³⁾ Kerto LVL T-stud Declaration of Performance MW/LVL/314-001/CPR/DOP. Kerto LVL T-stud fullfills the requirements for strength class LVL 32 P.

⁴⁾ Dimensional change of cross-section due to change of moisture content (change of moisture content% × dimensional variation coefficient × dimension)

⁵⁾ In service class 2 the values are recommended to be divided by 1.2

⁶⁾ For the lay-up I-III-I the values 14.0 and 3,300 can be used instead of 7.0 and 1,200

DESIGN VALUES AND PHYSICAL PROPERTIES FOR KERTO LVL PRODUCTS

KERTO LVL Qp-BEAM AND KERTO LVL L-PANEL

PROPERTY	SYMBOL	Qp-BEAM 1) 39–51 mm	Qp-BEAM 1) 54–75 mm	L-PANEL 2) 21–24 mm	L-PANEL 2) 27–69 mm	UNIT
Fullfills strength class				LVL 22 C	LVL 25 C	
Bending strength (5% fractile)						
Edgewise (depth 300 mm)	$f_{m,0,edge,k}$	36.0	38.0	19.0	20.5	N/mm ²
Size effect parameter	s	0.12	0.12	0.15	0.15	-
Flatwise, parallel to grain	$f_{m,0,flat,k}$	36.0	36.0	22.5	25.0	N/mm ²
Flatwise, perpendicular to grain	$f_{m,90,flat,k}$	7.5	6.5	5.5	7.0	N/mm ²
Tensile strength (5% fractile)						
Parallel to grain (length 3000 mm)	$f_{t,0,k}$	28.0	30.0	15.0	17.0	N/mm ²
Perpendicular to grain, edgewise	$f_{t,90,edge,k}$	3.0	2.5	4.0	4.0	N/mm ²
Compressive strength (5% fractile)						
Parallel to grain	$f_{c,0,k}$	28.0 ⁴⁾	30.0 ⁴⁾	18.0 ⁴⁾	19.0 ⁴⁾	N/mm ²
Perpendicular to grain, edgewise	$f_{c,90,edge,k}$	6.0	6.0	8.0	8.0	N/mm ²
Perpendicular to grain, flatwise	$f_{c,90,flat,k}$	2.2	1.8	2.0	2.0	N/mm ²
Shear strength (5% fractile)						
Edgewise	$f_{v,0,edge,k}$	4.2	4.1	4.0	4.0	N/mm ²
Flatwise, parallel to grain	$f_{v,0,flat,k}$	1.3	1.3	1.2	1.2	N/mm ²
Flatwise, perpendicular to grain	$f_{v,90,flat,k}$	-	-	0.5	0.5	N/mm ²
Modulus of elasticity (mean)						
Parallel to grain, along	$E_{0,mean}$	11,700	12,300	6,700	7,500	N/mm ²
Perpendicular to grain, edgewise	$E_{90,edge,mean}$	430	430	1,700	1,700	N/mm ²
Perpendicular to grain, flatwise	$E_{90,flat,mean}$	130	130	-	-	N/mm ²
Parallel to grain, across	$E_{90,mean}$	2,000	2,000	700	1,300	N/mm ²
Shear modulus (mean)						
Edgewise	$G_{0,edge,mean}$	600	600	500	500	N/mm ²
Flatwise, parallel to grain	$G_{0,flat,mean}$	120	120	70	70	N/mm ²
Dimensional variation coefficient 3)						
Thickness		0.0024	0.0024	0.0024	0.0024	-
Width / Height		0.0032	0.0032	0.0032	0.0032	-
Length		0.0001	0.0001	0.0001	0.0001	-
Other properties						
Characteristic density	ρ_k	480	480	440	440	kg/m ³
Mean density	ρ_{mean}	510	510	410	410	kg/m ³
Moisture content (on mill delivery)		10 %	10 %	10 %	10 %	-
Performance in fire, charring rate	β_n	0.7	0.7	0.7	0.7	mm/min
Euroclass with regard to reaction to fire		D-s1,d0	D-s1,d0	D-s1,d0	D-s1,d0	-

1) Kerto LVL Qp-panel Declaration of Performance MW/LVL/313-001/CPR/DOP and VTT-S-05156-11.

2) Kerto LVL L-panel Declaration of Performance MW/LVL/318-001/CPR/DOP.

Kerto LVL L-panel with thicknesses 27–69 mm fulfil the requirements for strength class LVL 25 C and thicknesses 21–24 mm fulfil the requirements for strength class LVL 22 C.

3) Dimensional change of cross-section due to change of moisture content (change of moisture content% × dimensional variation coefficient × dimension)

4) In service class 2 the values are recommended to be divided by 1.2

TOLERANCES OF KERTO LVL PRODUCTS

	Size (mm)	Min	Max
Thickness	≤ 27 mm	-1.0 mm	+1.0 mm
	27 < t ≤ 57 mm	-2.0 mm	+2.0 mm
	t > 57 mm	-3.0 mm	+3.0 mm
Width/height	< 400 mm	-2.0 mm	+2.0 mm
	≥ 400 mm	-0.5 %	+0.5 %
Length	all	-5.0 mm	+5.0 mm

In moisture content of 10 +/- 2 %, special tolerances on request.

SANDING OF KERTO LVL AFFECTS PRODUCT THICKNESSES.

- Optical sanding reduces the original nominal thickness by approximately 2 mm. The standard thickness tolerances apply to the sanded nominal thickness. Structural design shall be made according to the sanded nominal thickness.
- Calibrated sanding reduces the original nominal thickness by approximately 3 mm. The thickness tolerance of calibrated sanded products is +/- 0.5 mm from the target thickness. The dark glue line may become visible as it is allowed to sand through the face veneers. Structural design shall be made according to the sanded nominal thickness.

Further processing

Kerto LVL products can be further processed in several ways according to end-use and customer's particular preferences. The further processing service is an integral part of the customer service and supply chain. Further processing takes place at the production plant or at a service centre in a particular country, whichever is more convenient and economically efficient for the customer.



FURTHER PROCESSING

Kerto LVL S-beams can be further processed in various ways according to end-use requirements.

Sanding	Optical sanding, 2 sided only Calibrated sanding, 2 sided only
Machining	Beams machined to special size and shape, notches and holes
Multiple-gluing (GLVL) - not CE marked	Heavy duty beams from 78 mm up to 144 mm , higher beams available on request
Temporary weather protection	WeatherGuard
Treatment against mould	MouldGuard
Treatment against termites (Australia)	H2S-treatment

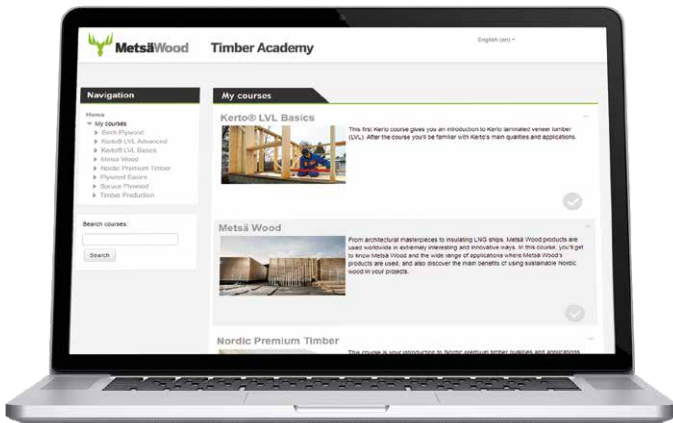
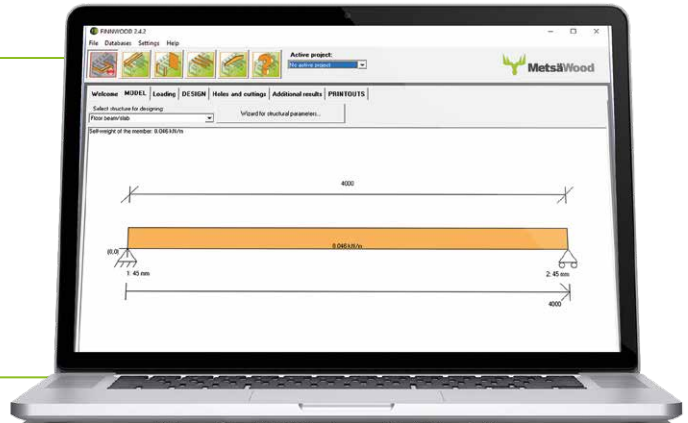


Tools for Kerto LVL

FINNWOOD DESIGN SOFTWARE

Individual structures made of Kerto LVL and other Metsä Wood products can be designed and optimised with Finnwood software. The user-friendly interface makes designing structural members such as floor joists and roof beams fast and effective. Finnwood designs are in accordance with Eurocode 5 and its national annexes. Finnwood can be obtained free of charge from the country websites of Metsä Wood.

www.metsawood.com/finnwood



TIMBER ACADEMY E-LEARNING

Timber Academy is a free online e-learning platform. The material includes Kerto LVL basic and Kerto LVL expert courses, as well as courses related to Metsä Wood's other main product groups.

Register for free and start learning at timberacademy.metsawood.com

BIM DESIGN OBJECTS AVAILABLE FOR LEADING BUILDING DESIGN SOFTWARE

You can easily design Kerto LVL using ready-made BIM design objects. Kerto LVL products are available directly in several leading building design software and product library tools. Supported software includes AutoCAD, Revit, ArchiCAD, SketchUp, Dlubal Software and many more.

For more information, go to www.metsawood.com/bim

KERTO LVL MANUAL

Kerto LVL Manual is a user guide for the structural designer and helps in the design of wooden structures according to Eurocode 5. The manual also offers a comprehensive info package about Kerto LVL products and their applications.

The Kerto LVL manual is available at www.metsawood.com/kertomanual



Open Source Wood

The only way to make construction more sustainable is by building with wood on a global scale. The world needs a Plan B.

A successful future demands a fundamental reinvention and rethinking of how we build with wood – by developing prefabricated elements. We need to build faster, more affordably, more efficiently and more openly. That's why we launched the Open Source Wood Initiative.

Open Source Wood is an open platform for sharing knowledge and innovation in modular wood construction. Open Source Wood gathers ideas and designs from all corners of the world and makes them available to everyone, free of charge. You can share your ideas, see what others have done and connect with other professionals.

Join the initiative at opensourcewood.com.

Kerto LVL references

As a leading supplier of wood products, Metsä Wood knows from experience that Nordic premium wood is the best renewable raw material in the world. When used correctly, it saves money, time and environment.

Use of Kerto LVL makes construction FAST, LIGHT and GREEN.



Mjøstårnet, Norway
The world's tallest wood building



Metsä Wood Pärnu mill, Estonia
Fast construction with wooden roof elements



Blueprint Robotics, USA
Prefabricated wooden elements



Pro Nemus, Finland
Metsä Group's visitor centre, a showcase of engineered wood



Östermalm market, Sweden
Temporary market hall

For more inspiration, visit www.metsawood.com/references

Metsä Wood is one of the leading European producers of engineered wood products. We are committed to serving three segments: construction, industrial and distribution customers. Our primary products are Kerto® LVL, plywood and other wood products.

In 2019, Metsä Wood's sales were EUR 0.4 billion, and it employs approximately 1,500 people. Metsä Wood is part of Metsä Group.

For more information and contacts:
www.metsawood.com

