

Paged

Synergy of nature
and technology



Laminated Densified Wood ELKON®



About Our Company

For over 80 years Paged has been offering a wide range of products and services to its customers in Europe. We create value for our customers through responsible sourcing and smart investment in innovative products and services. We manufacture ELKON® since mid 1970s' from beech veneers sourced locally in Poland from FSC® and PEFC certified forests. Our plywood mill in Pisz operates in line with ISO 9001 quality management system, the ISO 14001 environmental management system and the occupational safety and hygiene management system PN 18001. We value the development of our employees, the continued improvement of our processes and product innovation to

deliver more sustainable solutions to our clients. As a business we strive to deliver the industry's best solutions and products to our partners. We stand behind our products and support local and global communities by seeking means to decrease our environmental footprint.

We are the only manufacturers of laminated densified wood ELKON® in Poland, which we supply into the distribution and power oil-immersed transformers manufacturers as an insulation material. In 1973 our company received the Technical Master award of Poland for the invention and production of ELKON®.



The mark of
responsible forestry

ELKON®



European beech (*Fagus sylvatica*) – beech wood is durable, dense (~720kg/m³) and abrasion resistant. Thanks to its natural characteristics it is perfect material for densifying. Thanks to its thick cell walls and compressed intercellular spaces, European beech provides for wood characterised by superior mechanical properties.

Laminated Densified Wood ELKON® is firstly impregnated with special resin and secondly pressed under high pressure to create extremely durable and chemically resistant product. ELKON® is widely used as electrical insulation material with moisture content of below 6%. It absorbs oil quickly and creates an electric bar-

rier in oil transformers. It is easy to machine, made from sustainable raw materials and low in weight – all attributes put it at an advantage against metal and composite materials.

ELKON® is produced by Paged according to EN 61061 from high quality beech veneers.

We use carefully selected beech veneers, with limited and minor natural defects. Thanks to this ELKON® can be used in demanding power units – electrical oil-immersed power transformers. With careful selection of beech veneers ELKON® used as a transformer insulation prevents partial discharge.





Highest Standards

We offer our customers individual construction of inner plies (parallel, perpendicular and mixed) to accommodate for various applications within the body of a transformer. 45° crossed fibres ideally serve the purpose of short-circuit impedance measurement.

To assure highest standards and provide for worry-free use, all veneers as well as pressed panels are scanned with metal detectors.

We work with the biggest and best transformer manufacturers in Poland and Globally. We test our products with external, technical laboratories and specialty certifying bodies. We also have our internal R&D division that focuses on new product development and on-going product improvements to help our customers reduce the cost of ownership of their products.

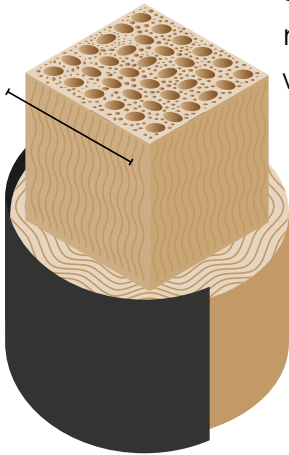
We cooperate with specialist wood service companies that provide turning, drilling, CNC machining and milling services. Thanks to this we can supply components machined upon drawing made from ELKON®



Natural Wood

1

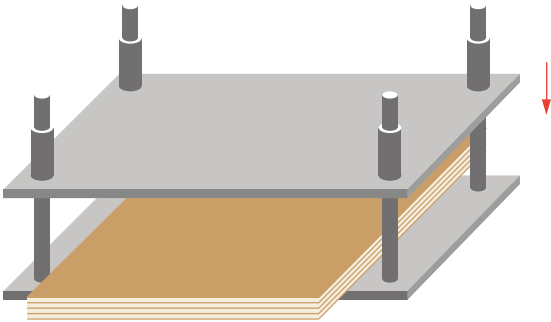
Durable, dense and abrasion resistant beech wood



Hot Pressing

3

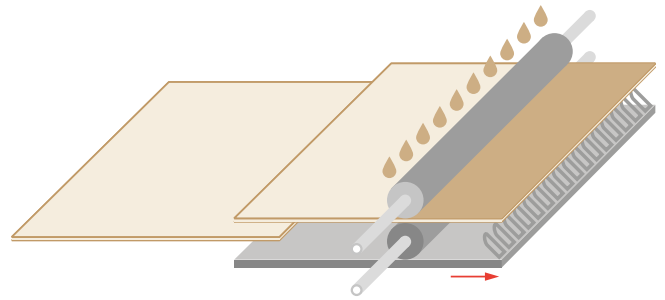
High pressure and high temperature pressing



2

Laminating

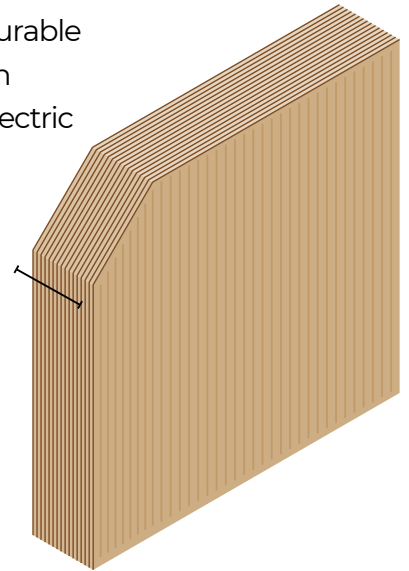
Impregnation with special thermosetting resin



4

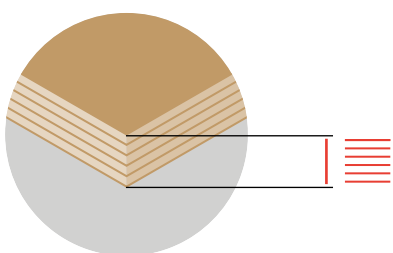
Laminated Densified Wood

Extremely durable material with superior dielectric properties

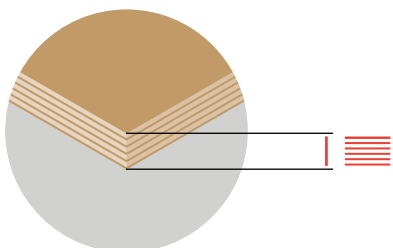




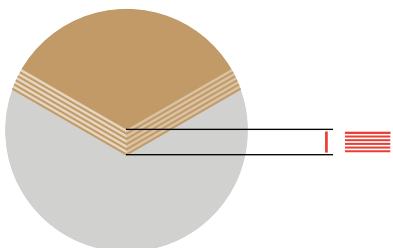
In our manufacturing process we use **2mm** thick European beech veneers.



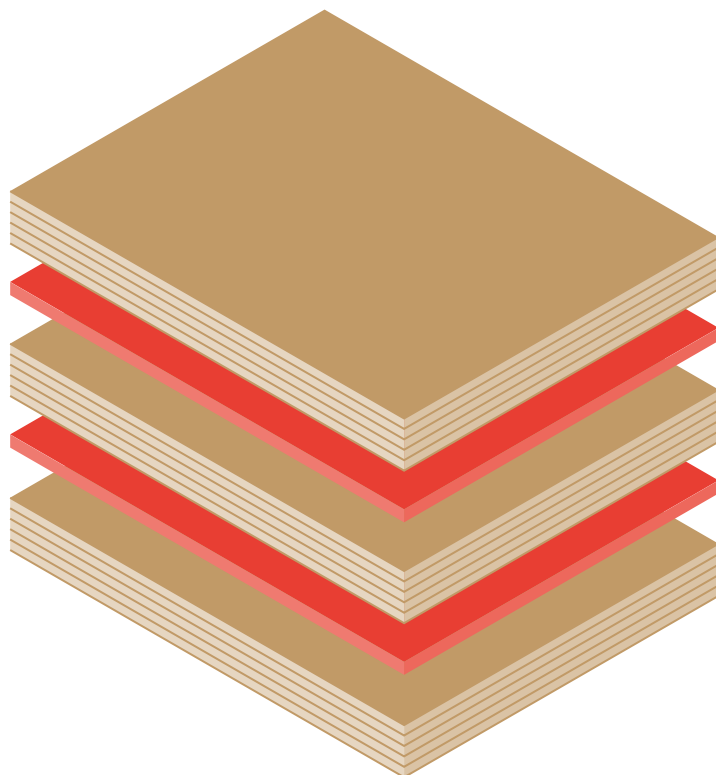
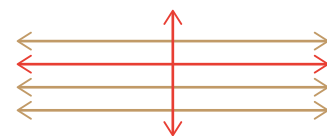
Post-densifying C2 – veneer thickness **1,4 – 1,5mm** – **circa 28%** compaction ratio
(Average density 950 kg/m³)



Post-densifying C4 – veneer thickness **1,1 – 1,2mm** – **circa 43%** compaction ratio
(Average density 1250 kg/m³)

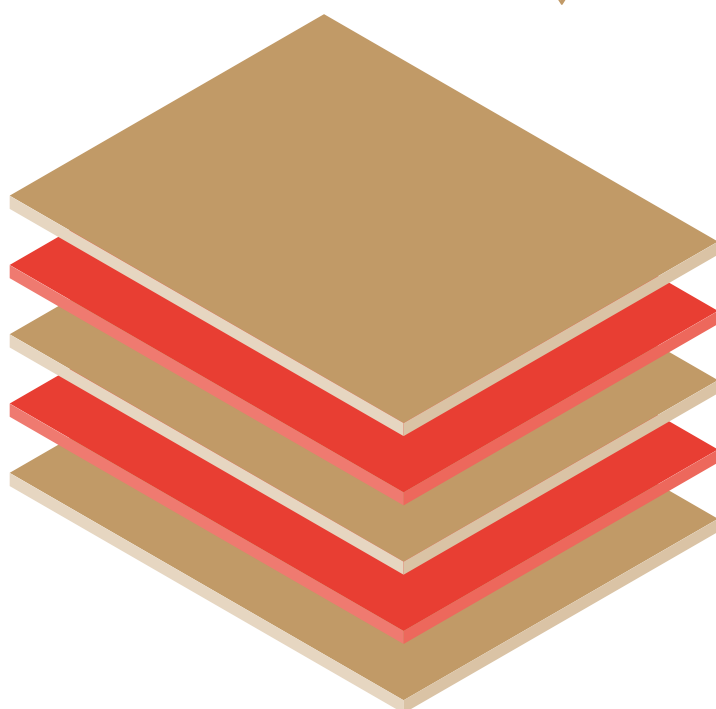
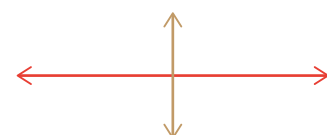


Parallel



Parallel laminated types contain up to 15% transverse fibers.

Perpendicular



Advantages

- superior dielectric properties
- high mechanical resistance, durability and consistent dimension stability
- low moisture <6%
- high oil absorption
- easy to machine
- low thermal conductivity
- easy and fast drying process

Our ability to manufacture a wide range of formats, thicknesses and product types according to EN 61061 combined with our unique offer of various veneer lay-outs (parallel, perpendicular and mixed) allow us to offer our customers the following elements:

- blocks
- pressure rings
- potential rings
- shield rings
- pressure beams
- block supports
- coil supports
- step blocks

Formats [mm]:

1500x1000
1500x1500
2000x1000
2200x1200
2000x1500



Thickness [mm]:

5 – 130

Other thicknesses and formats available upon request



Technical Data ELKON®	ELKON	P1	P2	P4	C2	C4	CPC5
	EN 61061	P1R	P2R	P4R	C2R	C4R	-
	DIN 7707	20210	20212	20214	20222	20224	-
		Parallel			Crosswise		Mixed

Physical properties

Density	EN 61061	g/cm ³	0,7-0,9	0,9-1,1	1,2-1,3	0,9-1,1	1,2-1,3	1,0-1,2
Oil absorption	EN 61061	%	30	25	7	25	7	15
Operating temperature limit	-	°C	105	105	105	105	105	105
Temperature limit for drying and impregnation	-	°C	140	140	140	140	140	140
Contamination of dielectric liquids	EN 61061	$\Delta tg \delta$	<0,1	<0,1	<0,1	<0,1	<0,1	<0,1

Mechanical properties*

*As measured in our in-house laboratory

Flexural strength	EN 61061 ISO 178	MPa	120	170	230	90	110	98
Modulus of elasticity in flexure	EN 61061 ISO 178	GPa	12	15	20	8	13	8
Compressive strength	EN 61061 ISO 604	MPa	80	80	130	210	240	98
			55	100	150	90	140	78

Electrical properties**

**As measured in external laboratory

Electric strength	EN 61061 EN 60243	kV/mm	12	12	12	12	12	12
Breakdown voltage	EN 61061 EN 60243	kV/25mm	>80	>80	>80	>80	>80	>80
Dissipation factor	EN 60250	$tg \delta$	0,01	0,01	0,01	0,01	0,01	0,01
Relative permittivity	EN 60250	ϵ_r	-	3,8	-	3,8	-	-



The data mentioned in this Technical Data Sheet are average values ascertained by current statistical returns and tests. The data above are provided purely for information and shall not be regarded as binding unless expressly agreed in a contract of sale.

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VIII Commercial Division of the National Court Register

Regional Court in Olsztyn

KRS NR 0000059338 | NIP 8490000016 | REGON 000123004

Share capital 219 450 000 zł – fully paid-in

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