

PaperShell

PaperShell is made by pressing kraft paper with a bio-based resin into fossil-free, load-bearing components, designed to replace carbon-intensive materials like aluminum, plastics, and fiberglass. Switching to PaperShell can cut CO₂e emissions by up to 98% and becomes carbon negative if circulated.

Durable and low-maintenance, our material is emission-free, odorless, and sourced from 100% biological origins. It resists scratches, impacts, and climate cycling, while withstanding high temperatures, UV exposure, and moisture without compromising integrity. Outdoors, it ages gracefully to a silver tone, offering long-term performance with minimal upkeep.

Highlights

Biogenic content

100%

Density

1,43g/cm³

T_g

145°C

Thickness¹

0.5-10mm

¹ Possibility to manufacture from 0.17 mm to 15 mm under special conditions.

Mechanical
PaperShell Original®

Area	Fiber direction 0°	Fiber direction 90°	Unit	Standard
Tensile strength	125	90	MPa	DIN EN ISO 527
Tensile modulus	17,5	12,5	GPa	DIN EN ISO 527
Tensile elongation	1,0	1,0	%	DIN EN ISO 527
Flexural strength	150	120	MPa	DIN EN ISO 178
Flexural modulus	14,0	10,0	GPa	DIN EN ISO 178
Flexural elongation	1,0	1,2	%	DIN EN ISO 178

Area	Result	Unit	Temp	Standard
Charpy unnotched	10,2	kJ/m2	RT	DIN EN ISO 179-1eU
Charpy unnotched	11,6	kJ/m2	-25°C	DIN EN ISO 179-1eU
Charpy unnotched	9,5	kJ/m2	+80°C	DIN EN ISO 179-1eU

Area	Result	Unit	Comment	Standard
Scratch resistance	0.29	dL	Requirement max dL 1.5	Polestar DVM-INT-024
Scratch resistance	3	N	3 N = Very slight gloss line visible	Polestar DVM-INT-017445

Environmental

PaperShell Original®

Area	Result	Unit	Standard
Heat resistance ¹	0	mm/min	FMVSS 302
Total emission of volatile organic compounds	61	µg/g	Volvo STD 429-0003
Climate cycling ²	0,22	%	Volvo TR 23644196-02
Moisture aging ³	6,3	%	Volvo TR 23644196-02
Biogenic content, no fossil carbon	100	%	Modified ASTM D6866-21
Biodegration	51	%	ISO 14855-1
Heat aging ⁴	Slight change in colour		Polestar DVM-INT-00709
Sound isolation ⁵	23	dB	SS-EN ISO 10140-1:2021

Geometrics PaperShell Original®	Area	Type	Result	Unit
	Thickness, component	min	0,5	mm
	Thickness, component	max	10,0	mm

Environmental PaperShell Shield®	Area	Result	Thickness	Air gap	Standard
	Fire classification	B-s2, d0	≥3 mm	0-40 mm	EN 13501-1:2018
Flat panels	Fire classification	B-s2, d0	≥3 mm	0-40 mm	EN 13501-1:2018
Wood Metal Sinus	Fire classification	B-s2, d0	2,5 mm	0-25 mm	EN 13501-1:2018

¹ Horizontal burning rate. ² 10 cycles a 6 h at 85°C, 12 h 95% RH at RT, 5 h -30°C. ³ 38°C, 95% RH, 1008 h. ⁴ 500 h, 95°C.
⁵ The weighted sound reduction index R_w relative to the one-sided area of the test object, 0.09 m².