

# NL11

## Material Data Sheet

**NL11** is a natural and sustainable core material, compatible with existing composite core applications offering excellent FST (fire, smoke and toxicity) properties with good mechanical and processing characteristics.

**NL11** has been specifically developed to meet fire regulations in rolling stock applications.

The low density of this material, its flexibility and excellent conformability make it possible to be easily integrated into fast cycles of production.

This product can be processed by hand layup, vacuum bagging and infusion processes and will withstand manufacturing temperatures up to 150°C.

The unique properties of **NL11** such as: a closed air filled cell structure, low water absorption, rot resistance, excellent fire resistance and high level of noise and vibration attenuation make it an excellent core material to the composites industry - perfectly aligned with the new green classifications.



**Lightweight**



**Fire resistance**



**Thermal insulation**



**Vibration damping**



**Sustainable and energy efficient**

### PROCESS GUIDELINES

RESIN UPTAKE (*) (per m <sup>2</sup> at 1mm)	270g
MAXIMUM PROCESSING TEMPERATURE	180°C
VACUUM BAG PROCESSING	up to 150°C
AUTOCLAVE CURE PROCESSING	possible
COEFFICIENT OF THERMAL EXPANSION (ASTM E831-06)	aprox. 110 X 10 <sup>-6</sup> /°C at RT

### KEY FEATURES

- Good drapeability
- Print blocking capability
- Stable material
- Lower resin consumption
- Resin compatibility (Excelent for: Epoxy, Polyester, Phenolic, Vynilester and Polyurethane)

#### MECHANICAL PROPERTIES OF THE CORE MATERIAL

DENSITY (Kg/m <sup>3</sup> )	ASTM C271	120-180
COMPRESSIVE STRENGTH (MPa)	ASTM C365	0,3*
COMPRESSIVE MODULUS (MPa)	ASTM C365	5,1*
TENSILE STRENGTH (MPa)	ASTM C297	0,6*
SHEAR STRENGTH (MPa)	ASTM C273	0,9*
SHEAR MODULUS (MPa)	ASTM C273	5,9*
THERMAL CONDUCTIVITY (W/mK)	ASTM E1530	0,042*
LOSS FACTOR (at 1KHz)	ASTM E756	0,022*

#### MECHANICAL PROPERTIES OF THE CORE MATERIAL IN A COMPOSITE <sup>(1)</sup>

FLEXURAL STRENGTH AT YIELD (MPa)	ASTM D790	37*
FLEXURAL MODULUS (GPa)	ASTM D790	3,5*
SHEAR STRENGTH AT YIELD (MPa)	ASTM C392	0,8*
SHEAR MODULUS (MPa)	ASTM C392	44*
COMPRESSIVE STRENGTH AT YIELD (MPa)	ASTM C365	1,2*
COMPRESSIVE MODULUS (MPa)	ASTM C365	19*
WATER ABSORPTION (%)	ASTM C272	<4*
PANEL DENSITY	-	0,605*

<sup>(1)</sup> Samples made by Infusion (0.6 bar) with epoxy resin ref. SR8100/cat ref. SD8824 and two layers of 300g/m<sup>2</sup> glass fibre roving, on each side, sandwich thickness: 6,5 mm; cure at 60°C; samples tested after 5 days of manufacturing.

\* Typical values

#### FIRE, SMOKE AND TOXICITY PROPERTIES\*

FLAMMABILITY	NF 92-501	M1
TOXICITY	NFX 10-702	F1
SMOKE	NFX 10-100	F1

\* Standard: NF F16-101  
3mm thickness



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