

# EXEL TRAIN PROFILES



## EXELENCE VALUE

Exel Composites has a long history with high-quality, innovative composite solutions to leading train and tram manufacturers. We offer to the transportation industry engineered solutions that look good, weigh less, last longer, carry more load and/require less maintenance.

The EXEL train profiles are solving our customer challenges by

- Reducing weight
  - fuel cost savings
- Eliminating panel corrosion and denting
  - lifetime cost savings
- Best surface quality
  - ready for painting/coating
- Largest and most complicated profiles
  - freedom in design innovation
- Thinnest wall structures in composites
- Combining different features in one profile
  - lifetime quality, less components
- Fabrication
  - ready for assembly

## SUPERIOR PRODUCT FEATURES

- Low weight
- High energy efficiency
- Corrosion resistant properties
- Class 1 paintable surface
- Fire Retardancy
- High dimensional stability

Composite is also a sustainable long term solution.

## OUTER BODY PANELS

Composite profiles on the outer body can be produced over a meter wide, with integrated design and functional elements. These parts are typically adhesively bonded to the steel frame of the train and painted, together with the rest of the body. Bonding and painting is straightforward, requiring minimal surface preparation.

## INTERIOR PARTS

Based on the versatile material features together with superior shape capabilities compared to other materials, inner train systems can be re-designed towards lower weight and lower total cost. The profile can span the whole ceiling from window to window. Typical applications are roof systems, air conditioning ducts and heating channels.

## EXEL OFFERING

- pultrusion profiles with traditional construction
- high performance optimized pultrusion profile shapes and construction
- wide range of materials:
  - › resins
    - » polyester
    - » polyurethane
    - » epoxy
  - › reinforcements
    - » glassfiber
    - » carbonfiber
    - » natural fiber
- machining options
  - › cutting and mitering
  - › drilling and milling
  - › colour/coating options
  - › through coloured resin systems



## TECHNICAL DATA SHEET

	UNIT	TEST METHOD	EXEL TRAIN PROFILES			
General information	Applications		Exterior body, interior roof			
	Structure		MUM			
	Resin type		Polyester			
	Reinforcement		E-glassfiber			
	Color		White			
	Surface Finish		Very good	Very good	Plain	
	Sanding		Sandable	Not sandable	Non visual parts (mat structure)	
	Wall thickness	MM		3	3	3
Physical Properties	Specific Gravity	g/cm3		1,8 - 2	1,8 - 2	1,8 - 2
	Fiber Weight Content	Weight - %		45 - 50 %	45 - 50 %	45 - 50 %
	Fiber Volume Content	Volume - %		ca 35 %	ca 35 %	ca 35 %
	Water Absorption	Weight - %	EN ISO 62	2 - 5 %	2 - 5 %	2 - 5 %
Mechanical properties	Tensile modulus LW	Gpa	EN ISO 527-4	17	17	17
	Tensile modulus CW	Gpa	EN ISO 527-4	5	5	5
	Tensile Strength LW	Mpa	EN ISO 527-4	170	170	170
	Tensile Strength CW	Mpa	EN ISO 527-4	30	30	30
	Flexural Strength LW	Mpa	EN ISO 14125	170	170	170
	Flexural Strength CW	Mpa	EN ISO 14125	70	70	30
	Impact Strength, weight drop		DIN 52306	OK : 227g ball - 3m height	OK : 227g ball - 3m height	OK : 227g ball - 3m height
Application Specific Properties	Fire classification		EN 45545	HL2 : R1, R6	HL2 : R1, R6	HL2 : R1, R6
	Thermal elongation LW	10 <sup>-6</sup> K <sup>-1</sup>	Typical property	10	10	10
	Thermal elongation CW	10 <sup>-6</sup> K <sup>-1</sup>	Typical property	30	30	30
	Thermal conductivity	W/mK	Typical property	0.3 - 0.4	0.3 - 0.4	0.3 - 0.4
	Arc Resistance	sec.		na	na	na
	Electric Strength - 1" axial in oil			na	na	na
	Permittivity 60HZ	kV/mm		na	na	na

LW= lengthwise

CW= cross wise

**MECHANICAL PROPERTIES:** values are minimum values

**DISCLAIMER:** this information is provided as service to our customers and to the best of Exel knowledge, Exel can't be held responsible for it's results. For each new profile a formal specification will be agreed upon order.