SIMONA® PC FR RAIL

Flame retardent interior linings for rail vehicles

With SIMONA® PC FR RAIL you're always on the safe side. Specially developed to meet the requirements of the DIN EN 45545 standard, our low-flammability SIMONA® PC FR RAIL sheets provide maximum safety for the interior lining of rail vehicles.

Fig. 1: Lining of a backrest and armrest made of SIMONA® PC FR RAIL

Product details

- Excellent surface quality
- Broad service temperature range
- Excellent fire properties:
  DIN EN 45545: HL2, R1 for 1 – 3 mm
  UL 94: V0
- Excellent thermoforming properties that enable high degrees of complexity in shaping
- Low shrinkage values in processing
- High tensile modulus of elasticity
- Moisture absorption comparable with that of other polycarbonates

Areas of use

SIMONA® PC FR RAIL is mainly used as an interior lining material for rail vehicles. It can be deployed in the following areas, for example:

- Back linings
- Seats
- Armrests
- Wall linings
- Window panels
- Partitions
- Ceiling elements
- Shelving

Standard range of SIMONA® PC FR RAIL sheets

Dimensions	3.000 x 2.000 mm
Thickness	1 - 3 mm
Colour	natural
Surface	smooth

Other dimensions, colours and embossing/textures available on request

Processing information

SIMONA® PC FR RAIL can be further processed by commonly used processing methods.

Thermoforming

- Drying temperature: 90 °C (predrying to prepare for thermoforming)
- Drying time: 60 min/1 mm wall thicknesses
- Heating temperature range: 190 - 210 °C
- Mould temperature: 60 °C

Machining

- Rotational speed: 2,400 to 2,500 rpm
- Forward feed: 22 m/min

Connecting and joining

SIMONA® PC FR RAIL products can be connected to other plastics, metals, etc. by welding and gluing.

If you have any questions about processing our products, please contact our Technical Service Centre:
tsc@simona.de

SIMONA® PC FR RAIL

For the highest demands in terms of service capability and material safety

Fire protection conforming to standard

DIN EN 45545 was developed on the basis of existing fire protection regulations for rail vehicles being operated within the International Union of Railways (UIC) and various European countries. It regulates fire protection requirements for materials used in rail vehicles on a Europe-wide basis.
The standard defines three different Hazard Levels (HL) as well as test methods and test requirements for materials used, in accordance with the respective Hazard Level (R requirement clauses).

SIMONA® PC FR RAIL meets the requirements of **HL2 for R1**, which covers about 80% of the interior components used in rail transport. Consequently, the product is ideal for use as an interior lining material in rail vehicles. All the other requirement classes that SIMONA® PC FR RAIL complies with can be seen from the table below.

Specifications of SIMONA® PC FR RAIL

Density	g/cm³	DIN EN ISO 1183	1.36
Tensile modulus of elasticity	MPa	DIN EN ISO 527	5,172
Yield stress	MPa	DIN EN ISO 527	59.8
Elongation at yield	%	DIN EN ISO 527	2.8
Notched impact strength	KJ/m²	DIN EN ISO 179	3.81
Vicat B	°C	DIN EN ISO 306	95.9

The specifications indicated are average figures, measured on a 3 mm sample sheet at a surface temperature of 23 °C.

Overview of important fire tests and requirement properties of plastics for railway applications in accordance with DIN EN 45545

	Reference to test method	Parameter, unit	Maximum/ Minimum	DIN EN 45545 requirements to achieve HL2 for R1	SIMONA® PC FR RAIL complies with				
					R1 (3 mm): HL2 ✔	**R2:** HL2 ✔	**R6:** HL2 ✔	**R19:** HL1 ✔	**R21:** HL1 ✔
Lateral flame spread	T02 ISO 5658-2	CFE kWm^{-2}	Min.	20 a	22.87	13 a	–	–	–
Cone calorimeter Heat release rate	T03.01 ISO 5660-1, 50 kWm^{-2}	MARHE kWm^{-2}	Max.	90	66.36	- a	90	75*	75*
Smoke development	T10.01 EN ISO 5659-2, 50 kWm^{-2}	Ds(4) dimension-less	Max.	300	216.67	300	300	–	300
Smoke development	T10.02 EN ISO 5659-2, 50 kWm^{-2}	VOF4 min	Max.	600	474	600	600	–	–
FTIR smoke gas analysis	T11.01 EN ISO 5659-2, 50 kWm^{-2}	CITG dimension-less	Max.	0.9	0.0365 (4 min) 0.0664 (8 min)	0.9	0.9	–	1.2*

**The test load of 25 kWm^{-2} required by DIN EN 45545 is lower than the test load of 50 kWm^{-2} actually applied in this case.*

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