

Technical Data Sheet Exolon® FR

Exolon® FR

Exolon® FR – flame-retardant solid polycarbonate sheet (PC), UL 94 V-0 / EN 45545-2 / FAR 25.853, extremely impact-resistant

Typical Properties

- Excellent fire classification (UL 94 V-0, EN 45545-2, FAR 25.853)
- Extremely high impact strength (Charpy unnotched: no break)
- Wide temperature range (-100 ... +120 °C)
- High heat deflection temperature (continuous use ~ 120 °C)
- High optical clarity (grade clear 099)
- Good electrical insulator
- Easy to thermoform, cold-bend and machine (DX grade)
- Grades: clear 099, UV clear 2099 (outdoor), DX white 139 (diffuser)

Typical Industries

- Rail vehicle and railway industry (EN 45545-2)
- Lighting technology
- Electrical engineering and electronics
- Aerospace (FAR 25.853)
- Mechanical and plant engineering (protective guards)
- Safety and fire-protection technology

	Test Method	Unit	Value
Physical Properties			
Density	ISO 1183-1	kg / m ³	1200
Water absorption (saturation, water 23 °C)	ISO 62	%	0.3
Water absorption (23 °C, 50 % r.h.)	ISO 62	%	0.12
Refractive index (method A)	ISO 489		1.587
Optical Properties (light transmission, DIN 5036)			
clear 099 (3 mm)	DIN 5036	%	88
clear 099 (5 mm)	DIN 5036	%	85
DX white 139 (3 mm)	DIN 5036	%	53
Mechanical Properties			
Modulus of elasticity (1 mm/min)	ISO 527-1, -2	MPa	2400
Yield stress (50 mm/min)	ISO 527-1, -2	MPa	>60
Yield strain (50 mm/min)	ISO 527-1, -2	%	6
Nominal strain at break (50 mm/min)	ISO 527-1, -2	%	>50
Flexural modulus (2 mm/min)	ISO 178	MPa	2400
Flexural strength (2 mm/min)	ISO 178	MPa	>90

	Test Method	Unit	Value
Charpy impact strength (23 °C, unnotched)	ISO 179-1eU	kJ / m ²	no break
Charpy impact strength (23 °C, 3 mm, notched)	ISO 179-1eU	kJ / m ²	70P
Izod impact strength (23 °C, 3.2 mm, notched)	ISO 180-A	kJ / m ²	60P
Thermal Properties			
Vicat softening temperature (50 N; 50 °C/h)	ISO 306	°C	146
Heat deflection temperature (1.8 MPa)	ISO 75-1, -2	°C	127
Heat deflection temperature (0.45 MPa)	ISO 75-1, -2	°C	139
Continuous service temperature (no load)		°C	~ 120
Temperature range		°C	-100 ... +120
Coefficient of thermal expansion (23–55 °C)	ISO 11359-1, -2	10 ⁻⁴ / K	0.70
Thermal conductivity (23 °C)	ISO 8302	W / (m·K)	0.2
Electrical Properties			
Dielectric strength (1 mm)	IEC 60243-1	kV / mm	34
Volume resistivity	IEC 60093	Ω·m	10 ¹⁴
Surface resistivity	IEC 60093	Ω	10 ¹⁶
Dielectric constant (100 Hz)	IEC 60250		3.1
Dielectric constant (1 MHz)	IEC 60250		3
Dissipation factor (100 Hz)	IEC 60250	10 ⁻⁴	10
Dissipation factor (1 MHz)	IEC 60250	10 ⁻⁴	90
Fire Classification			
UL 94 (≥ 2.0 mm)	UL 94		V-0
EN 45545-2 (rail vehicles)	EN 45545-2		R1/HL1, R3/HL2, R4/HL3, R22– R24/HL3
Aviation	FAR 25.853		Part 1 (a)(1) (i)/(ii)

Exolon® FR is a flame-retardant solid polycarbonate sheet (grades clear 099, UV clear 2099, DX white 139). The values stated are typical characteristic values (measured on injection-moulded specimens, not intended for specification purposes); they serve as an aid to material selection and are not a legally binding warranty of specific properties. Fire certificates are limited in time and scope; the fire behaviour may change through ageing and weathering and must be confirmed for the specific thickness and grade. Polycarbonate is sensitive to many solvents, alkalis and hydrocarbons and then tends to stress cracking. As the properties also depend on grade, dimension and processing, the actual values may deviate somewhat. Exolon® is a registered trademark.