Technical Data Sheet (TDS) - DPQA0001091-001
Polycarbonate Sheet

Material Description

Polycarbonate (PC) is a high-impact, transparent thermoplastic offering exceptional toughness, thermal stability, and inherent flame resistance. It is widely used in safety-critical, impact-resistant, and regulated applications where mechanical durability and fire performance are essential.

Physical Properties

Property	Test Method	Units	Typical Value
Relative Density	ISO 1183	g/cm³	1.20
Water Absorption (24 h)	ISO 62	%	0.15
Moisture Absorption (sat.)	ISO 62	%	0.35
Hardness	ISO 2039-2	M Scale	70–75

Mechanical Properties

Property	Test Method	Conditions	Units	Typical Value
Tensile Strength at Yield	ISO 527	50 mm/min	MPa	60–65
Tensile Strength at Break	ISO 527	50 mm/min	MPa	65–70
Elongation at Yield	ISO 527	50 mm/min	%	6–7
Elongation at Break	ISO 527	50 mm/min	%	>100
Tensile Modulus	ISO 527	–	MPa	2300
Flexural Strength	ISO 178	2 mm/min	MPa	90
Flexural Modulus	ISO 178	2 mm/min	MPa	2300
Izod Impact Strength	ISO 180/1A	notched	kJ/m²	700–900
Charpy Impact Strength	ISO 179	unnotched	kJ/m²	no break

Thermal Properties

Property	Test Method	Units	Typical Value
Service Temperature Range	–	°C	−40 to +120
Heat Deflection Temp (HDT, 1.8 MPa)	ISO 75	°C	130
Vicat Softening Temperature	ISO 306	°C	145
Coefficient of Thermal Expansion	ASTM D696	mm/m·°C	0.065
Thermal Conductivity	ISO 8302	W/m·K	0.19
Specific Heat Capacity	–	kJ/kg·K	1.2

Optical Properties

Property	Test Method	Conditions	Units	Typical Value
Light Transmission (clear)	ASTM D1003	3 mm	%	88–90
Refractive Index	ISO 489/A	–	–	1.586
Haze	ASTM D1003	–	%	<1
Yellowness Index	ASTM D1925	–	–	<2

Electrical Properties

Property	Test Method	Units	Typical Value
Dielectric Strength	IEC 60243	kV/mm	30
Surface Resistivity	IEC 60093	Ω	$>10^{16}$
Volume Resistivity	IEC 60093	Ω·cm	$>10^{16}$

Fire Performance and Flammability

Standard	Classification	Notes
UL 94	V-2 (standard)	Self-extinguishing
UL 94 (FR grades)	V-0	No flaming drips
BS 476 Part 7	Class 1	Surface spread of flame
EN 13501-1	B-s1,d0 (FR grades)	Low smoke, no droplets
NF P 92-307	M1	Rail-approved grades
Limiting Oxygen Index (LOI)	ISO 4589	~25%

Fire-Retardant Polycarbonate vs Standard PC

Property	Standard PC	Fire-Retardant PC
UL 94	V-2	V-0
EN 13501-1	C–D	B-s1,d0
Smoke generation	Moderate	Low
Flaming droplets	None	None
Light transmission	88–90%	82–88%
Impact resistance	Very high	Slightly reduced
Typical applications	Industrial, machine guards	Rail, public spaces, medical

Chemical Resistance (General)

- Resistant to: dilute acids, alcohols, detergents
- Limited resistance to: hydrocarbons, oils
- Not recommended: aromatic solvents, ketones, chlorinated solvents

Processing and Fabrication

- CNC machining, drilling, routing: Excellent
- Cold bending: Possible within limits
- Thermoforming: Excellent
- Screen printing and digital printing: Compatible
- Hard-coat and anti-scratch coatings: Recommended for optical use

Typical Applications

- Safety glazing and machine guards
- Medical and laboratory equipment housings
- Transportation and rail interiors
- Industrial HMIs and control panels
- Impact-resistant display covers

Design Considerations

- High impact strength may require hard coatings for scratch resistance
- Thermal expansion must be considered in bonded assemblies
- Fire performance depends on grade, thickness, and assembly method
- Optical grades require controlled processing to avoid stress birefringence

Material properties are typical values and not guaranteed. Final performance depends on grade selection, thickness, processing conditions, and finished assembly validation.