

What is PMMA-XT EN

PMMA-XT (acrylic glass, extruded)

PMMA-XT (extruded polymethyl methacrylate / acrylic glass) – amorphous, crystal-clear thermoplastic, weather-resistant and light

PMMA-XT is extruded polymethyl methacrylate – the well-known crystal-clear plastic also known as acrylic glass or under brand names such as Plexiglas®. "XT" stands for the extruded production method (as opposed to cast GS). PMMA-XT combines a high light transmission of about 92 % with very good weathering and UV resistance, high stiffness and a hard, high-gloss surface – at only about half the weight of glass.

Classification and basic character

PMMA belongs to the amorphous thermoplastics and therefore has no defined melting point, but softens above the glass transition temperature (around 105 °C). The extruded variant XT is drawn from the melt into sheets and rods; it has a tighter thickness tolerance and a lower molecular weight than cast PMMA (GS). This makes XT particularly well suited to thermoforming, bending and laser cutting, but somewhat more sensitive to stress cracking caused by solvents. PMMA is stiff, hard and crystal-clear, yet brittle and notch-sensitive.

Optics, weathering resistance and surface

The outstanding feature of PMMA is its optics: with a light transmission of about 92 % it is more transparent than glass and barely yellows even after years of weathering. The surface is high-gloss and considerably more scratch-resistant than that of polycarbonate. Added to this is excellent weathering and UV resistance, which makes PMMA the preferred material for displays, luminaires, glazing and outdoor applications.

How PMMA-XT is made and processed

PMMA-XT is produced by extrusion of polymethyl methacrylate into sheets, rods and tubes. From these semi-finished products we machine and laser-cut precision parts – milling, drilling, sawing, turning and especially laser cutting produce clean results; laser cutting creates a glossy, flame-polished edge. PMMA can also be thermoformed, bent, polished and bonded very well. Because of its brittleness and stress-cracking sensitivity, we use sharp tools and avoid solvent-based cutting fluids.

Mechanical, thermal and chemical properties

PMMA-XT reaches a tensile strength of about 72 MPa with a tensile modulus around 3,300 MPa and a density of about 1.19 g/cm³ – it is stiff and hard, but brittle (elongation at break only about 4.5 %, notched impact strength about 1.6 kJ/m²). The service temperature ranges from about -40 °C up to a continuous +70 °C, short-term to around 90 °C; the Vicat softening temperature is about 103 °C. PMMA is resistant to dilute acids and alkalis, water and fats, but is attacked by many solvents, alcohols and esters and then tends to stress cracking.

When PMMA-XT is the right choice

PMMA-XT is worthwhile whenever transparency, weathering resistance and economical processing are required – for example:

- Displays, POS and advertising media, signs and illuminated advertising
- Covers and diffusers in lighting technology
- Protective and partition screens, machine guards and sneeze guards
- Laser-cut transparent components with a glossy edge
- Weathering-resistant outdoor glazing and visual panels

When PMMA-XT is NOT the right choice

Equally important are the limits of the material:

- Impact- and shatter-resistant applications – PMMA is brittle; use polycarbonate (PC) for high impact strength
- Contact with solvents, alcohols or aggressive cleaners (risk of stress cracking)
- Continuous service above about 70 °C – then use more temperature-resistant materials
- Components with fire-safety requirements – PMMA is only normally flammable (B2 / UL 94 HB)
- Very tight tolerances on thick, high-optical parts – then cast PMMA (GS)

What does PMMA-XT cost?

PMMA-XT is an economical transparent plastic and is priced below polycarbonate and considerably below high-performance engineering plastics. As a rough guide, semi-finished stock prices are in the range of about 4–10 €/kg. The component price is determined mainly by the semi-finished shape and dimension, material utilisation (offcut), machining or laser effort and lot size. We are happy to quote binding prices on request based on your drawing.

Note: extruded PMMA (XT) is usually cheaper than cast PMMA (GS) and particularly economical for laser cutting.

Processing at Liedtke

PMMA-XT machines and laser-cuts excellently – milling, drilling, sawing and laser cutting produce clean, dimensionally accurate results; laser cutting delivers a glossy, flame-polished edge. We also offer bending, polishing, bonding and thermoforming. Because of its brittleness and stress-cracking sensitivity, we use sharp tools and adapted cutting parameters and avoid aggressive coolants. This is how we reliably produce transparent precision and visual parts – from single pieces to series production.

Advantages and disadvantages at a glance

An honest assessment – and how the disadvantages can be mitigated in practice:

Advantages

- Crystal-clear with about 92 % light transmission, non-yellowing
- Very good weathering and UV resistance
- Hard, high-gloss, scratch-resistant surface
- Light (about half the weight of glass), well suited to laser cutting and thermoforming
- Economical and suitable for food contact

Disadvantages

- Brittle and notch-sensitive – low impact strength (not shatter-proof)
- Sensitive to solvents, alcohols and esters (stress cracking)
- Continuous service limited to about 70 °C
- Only normally flammable (B2 / UL 94 HB)

Practical tip: PMMA-XT plays to its strengths wherever transparency, optics and weathering resistance matter – for example in displays, luminaires and glazing. Where shatter and impact resistance are the priority, we recommend tough polycarbonate (PC); for thick, high-optical or chemically more demanding parts, cast PMMA (GS).

Typical Properties

- High light transmission (~92 %), crystal-clear
- Very good weathering and UV resistance
- Hard, high-gloss surface
- High stiffness
- Good laser-cutting (glossy edge)

Product Examples

- Displays, POS and advertising media, signs
- Luminaire covers and diffusers
- Protective, partition and sneeze-guard screens
- Laser-cut transparent components
- Sight windows and machine guards
- Weathering-resistant outdoor glazing

Typical Industries

- Advertising and display technology
- Lighting and illumination technology
- Mechanical and plant engineering
- Furniture and shop fitting
- Building and architecture
- Food industry

- Good thermoforming, polishing and bonding
- Low weight
- Suitable for food contact

	Test Method	Unit	Value
General Properties			
Density	DIN EN ISO 1183-1	g / cm ³	1.19
Water absorption (24 h)	DIN EN ISO 62	%	0.2
Light transmission (3 mm)	DIN 5036-3	%	~ 92
Flammability	UL 94 / DIN 4102		HB / B2
Mechanical Properties			
Tensile strength (23 °C)	DIN EN ISO 527	MPa	72
Elongation at break	DIN EN ISO 527	%	4.5
Tensile modulus	DIN EN ISO 527	MPa	3300
Flexural strength	DIN EN ISO 178	MPa	105
Notched impact strength (Charpy)	DIN EN ISO 179	kJ / m ²	1.6
Thermal Properties			
Glass transition temperature	ISO 11357	°C	~ 105
Vicat softening temperature	DIN EN ISO 306, Vicat B 50	°C	103
Heat deflection temperature	DIN EN ISO 75, method A, HDT	°C	95
Service temperature, long-term	Average	°C	-40 ... 70
Coefficient of linear thermal expansion	DIN 53752	10 ⁻⁶ / K	70
Electrical Properties			
Volume resistivity	DIN EN 62631-3-1	Ω * cm	>10 ¹⁵
Dielectric strength	IEC 60243	kV / mm	~ 30

The values stated are typical average values for transparent, extruded PMMA (PMMA-XT); they serve as an aid to material selection and are not a legally binding warranty of specific properties. PMMA is amorphous and has no melting point. The material is attacked by many solvents, alcohols and esters and then tends to stress cracking – media resistance must be verified case by case. Food-contact suitability depends on the grade. Price information is a rough, non-binding guide and may vary depending on market situation, grade, dimension and quantity.