

Technical Data Sheet (TDS) - DPQA0001103-001
Anti-Reflection Hard Coat on Polycarbonate (PC)

Material Description

Anti-Reflection (AR) Coating applied via vacuum vapour deposition enhances the optical performance of cast PMMA by significantly reducing surface reflections and improving light transmission. The coating is engineered for applications where glare reduction, high clarity, and optical contrast are critical, without sacrificing abrasion resistance or cleanability.

This coating system is typically specified where minimising surface reflections and maximising display contrast are critical, such as in outdoor, automotive, medical, or high-ambient-light applications, while preserving the inherent impact resistance, optical clarity, and durability of polycarbonate.

- Polycarbonate (PC) – optical and engineering grades
- Typical thickness range: 0.5–10.0 mm
- Coating applied to one or both surfaces

Physical Properties

Property	Test Method	Units	Typical Value
Coating Thickness	Internal	µm	3–6
Adhesion (cross-hatch)	ISO 2409	Class	0–1
Pencil Hardness	ISO 15184	–	2H
Surface Resistivity	ASTM D257	Ω/sq	10 ⁶ –10 ⁸
Surface Energy	ASTM D2578	mN/m	>38

Mechanical Properties

Property	Test Method	Conditions	Units	Typical Value
Scratch Resistance	ISO 1518	–	–	Improved
Abrasion Resistance	Taber CS-10F	500 cycles	% haze	<5
Impact Resistance	ISO 180/1A	notched	kJ/m ²	Retained
Edge Chipping Sensitivity	Internal	–	–	Low (process-dependent)

Optical Properties

Property	Test Method	Conditions	Units	Typical Value
Light Transmission	ASTM D1003	3 mm	%	88-90
Haze	ASTM D1003	–	%	<1
Reflectance	internal	–	%	<1
Refractive Index	ISO 489/A	–	–	~1.586
Optical Distortion	Internal	–	–	Low

Note

Typical values are provided for reference and may vary with substrate grade, thickness, and processing method.

Anti-reflection performance depends on viewing angle, ambient light conditions, and the cleanliness of the coated surface.

Final material selection should be validated under application-specific conditions to ensure optical stability and environmental suitability.

Thermal Properties

Property	Test Method	Units	Typical Value
Service Temperature Range	–	°C	-40 to +120
HDT (1.8 MPa)	ISO 75	°C	~130
CTE	ASTM D696	mm/m·°C	0.065

Fire Performance

Fire performance is governed by the polycarbonate substrate, not the coating.

- Compatible with UL 94 V-2 and V-0 grades
- No adverse impact on EN 13501-1 ratings when correctly specified
- Coating does not contribute to flaming drips or smoke generation

Chemical Resistance (General)

- Resistant to:
 - Alcohols
 - Dilute detergents
 - Common cleaning agents

- Limited resistance to:
 - Oils and hydrocarbons
- Not recommended for prolonged exposure to:
 - Ketones
 - Aromatic solvents
 - Chlorinated solvents

Processing and Fabrication

Process	Compatibility
CNC machining	Excellent (post-coating preferred)
Laser cutting	Limited – validation required
Screen printing	Compatible
Digital printing	Compatible
Optical lamination	Fully compatible
Bonding systems	Must be validated

Typical Applications

- Display windows and optical lenses used in outdoor or high-glare environments
- Automotive and aerospace instrument clusters requiring low reflection and high contrast
- Medical and diagnostic equipment with light-critical visual interfaces
- Optical panels in kiosks, control rooms, and industrial touch displays
- Ruggedised screen covers where visual clarity and impact resistance must be preserved

Design Considerations

- Specify AR coating early to align with glare reduction, ambient light, and contrast requirements
- Coated surface should face the viewer or light source for optimal anti-reflective performance
- Avoid contamination or abrasion of the AR surface during handling and integration
- In-house controlled machining and edge finishing are recommended to preserve optical quality
- Optical bonding or lamination strategies should maintain surface flatness and minimise reflection from internal layers

Disclaimer

Typical values shown are not guaranteed. Final performance depends on substrate grade, coating thickness, processing conditions, and assembly validation.