

Technical Data Sheet (TDS) – DPQA0001097-001
Anti-Fog Hard Coat on PMMA (Cast Acrylic)

Material Description

Anti-Fog Hard Coat applied to cast PMMA (acrylic) sheets provides a clear, abrasion-resistant surface with advanced moisture-diffusion properties that prevent fogging under high humidity or temperature variation. The coating enhances visibility and safety in environments where condensation typically impairs display readability.

Substrate

- Cast acrylic (PMMA)
- Typical thickness range: 1.0–20.0 mm
- Coating applied to one or both surfaces

Physical Properties

Property	Test Method	Units	Typical Value
Coating Thickness	Internal	µm	4 - 8
Adhesion (cross-hatch)	ISO 2409	Class	0
Pencil Hardness	ISO 15184	-	3H–4H
Surface Energy	ASTM D2578	mN/m	>40

Optical Properties

Property	Test Method	Units	Typical Value
Light Transmission	ASTM D1003	%	>88
Haze	ASTM D1003	%	>2
Refractive Index	ISO 489/A	-	~1.49
Optical Distortion	Internal	-	Low

Note

All values shown are typical and subject to variation depending on substrate grade, thickness, and processing. Anti-fog performance is influenced by ambient humidity, air flow, and application method. Material selection should be validated through customer-specific testing.

Mechanical Properties

Property	Test Method	Conditions	Typical Value
Scratch Resistance	ISO 1518	-	Improved
Abrasion Resistance	Taber CS-10F	500 cycles	<5% haze
Impact Resistance	ISO 179	unnotched	Substrate-limited
Edge Chipping Sensitivity	Internal	-	Moderate

Thermal Properties

Property	Test Method	Units	Typical Value
Service Temperature Range	-	°C	-40 to +80
Vicat Softening Temperature	ISO 306	°C	>110
Coefficient of Thermal Expansion (CTE)	ASTM D696	mm/m·°C	0.077

Fire Performance

Fire performance is governed by the PMMA substrate:

- UL 94 HB (typical)
- Compatible with BS 476 Part 7 Class 3
- Hard coating does not materially alter the fire rating

Chemical Resistance (General)

- Resistant to:
 - Dilute acids
 - Alcohols
 - Mild detergents
- Limited resistance to:
 - Oils
 - Fuels

• Not recommended for:

- Ketones
- Aromatic solvents
- Chlorinated solvents

Processing and Fabrication

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

Typical Applications

- Display covers exposed to humidity or rapid temperature changes
- Optical windows for cold storage or refrigerated displays
- Medical and diagnostic equipment with sterilisation cycles
- Outdoor instruments or enclosures subject to dew or condensation
- Protective lenses for breathing apparatus, visors, or mask systems

Design Considerations

- Ensure ventilation or moisture flow paths to maintain fog-resistance performance
- PMMA provides excellent clarity but requires handling care in high-impact areas
- Anti-fog coatings enhance visibility but may require special cleaning protocols
- Avoid abrasion of the coated surface during assembly or use
- Design must accommodate thermal expansion greater than that of glass

Disclaimer

Material properties are typical values and not guaranteed. Performance may vary based on environmental exposure, substrate grade, thickness, and processing. Anti-fog functionality should be validated under real-world use conditions specific to each application.