Technical Data Sheet (TDS) – DPQA0001121-001
Marine Grade Anti-Reflection PMMA (Cast Acrylic)

Material Description

Marine Grade Anti-Reflection (AR) PMMA is a high-performance cast acrylic designed for display cover lenses and viewing windows in demanding marine applications. A vacuum-deposited AR surface treatment significantly reduces surface reflections and improves light transmission, enhancing display contrast, clarity and readability in high ambient light conditions.

The optical surface incorporates a super-hydrophobic easy-clean layer, providing anti-fingerprint performance while helping to repel water and surface contamination. This combination delivers excellent optical performance, cleanability and durability for marine navigation, control and instrumentation applications.

Marine-grade durability | Salt-spray tested for 28 days in accordance with JIS Z 2371

Substrate

- Cast acrylic (PMMA)
- Typical thickness range: 1.0–10.0 mm
- Coating applied to one or both surfaces

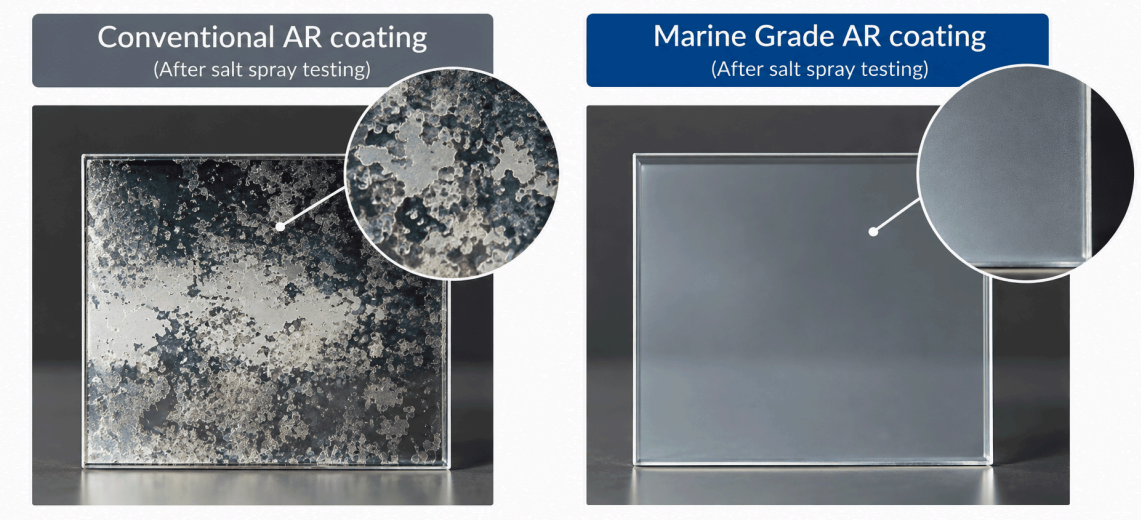
Material and Coating Stack

Super Hydrophobic Layer
Anti-Salt Water AR Layer
Hard Coat Layer
PMMA Substrate
Hard Coat Layer
Anti-Salt Water AR Layer

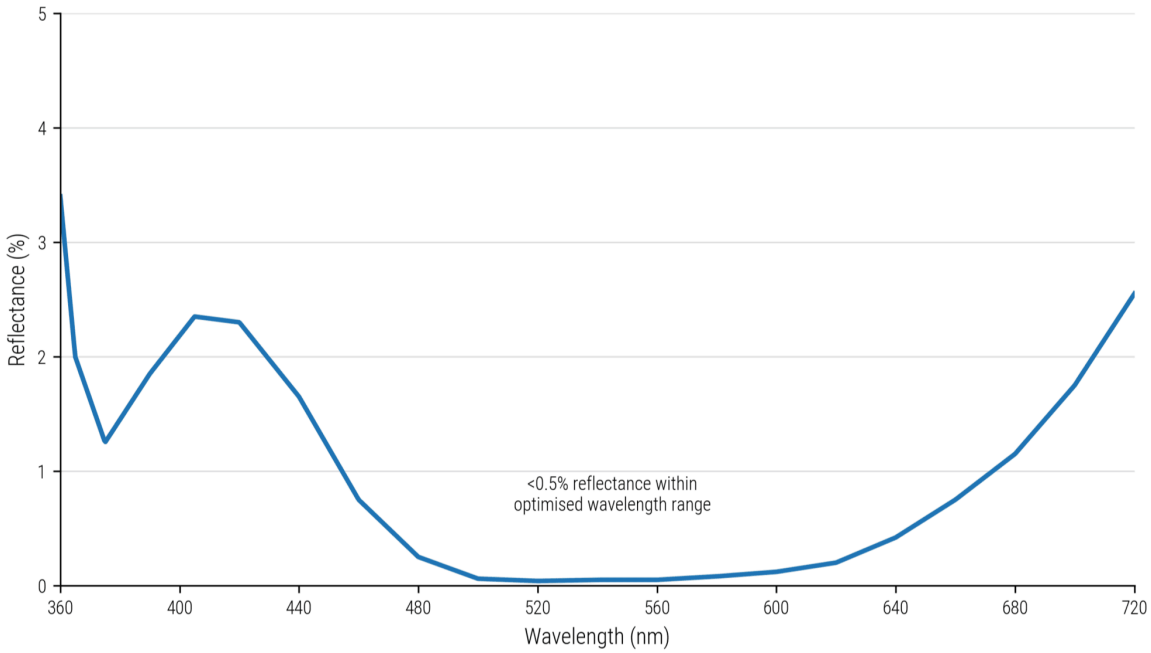
Salt Spray Resistance — JIS Z 2371

The AR surface has been evaluated for resistance to prolonged salt-laden environments using JIS Z 2371 salt spray testing, supporting its suitability for demanding marine applications.

Test duration: 28 days (672 hours)
Test method: Salt spray testing to JIS Z 2371
Test solution: 5% sodium chloride (NaCl) in deionised water, pH 6.5 - 7.2
Typical chamber temperature: 35 ± 1 °C
Humidity: 100%
Purpose: Evaluation of resistance to prolonged salt-spray exposure



AR Optical Performance



Optical Properties

Property	Test Method	Units	Typical Value
Light Transmission	JIS K 7105	%	98
Light Reflectance	JIS K 7105	%	<0.5% minimum
Refractive Index	ISO 489/A	-	~1.49
Optical Appearance	Visual	-	High Clarity

Physical Properties

Property	Test Method	Results
Abrasion Resistance	Steel wool #0000; 1.5 kgf, 50 cycles	No change in appearance
Adhesion (cross-hatch)	ISO 2409	0
Pencil Hardness	ISO 15184	5H–6H
Impact Strength	DIN 53453	4kJ/m²
Contact Angle	Water contact angle	115°
Salt Water Resistance	Salt water spray test to JIS Z2371, 28 days	No change in appearance

Thermal Resistance

Property	Test Method	Results
Thermal Cycling / Adhesion	-30°C to +80°C	No deterioration observed after 500 cycles
Heat Resistance	80°C	No deterioration observed after 1,000 hours
Hot Water / Adhesion	Immersion in water at 60°C	No deterioration observed after 240 hours
Coefficient of Thermal Expansion (CTE)	ASTM D696	0.077 mm/m.°C

Xenon Light Resistance

Property	Test Method	Results
Light Exposure / Adhesion	Xenon Lamp Exposure	No deterioration observed after 500 hours

Chemical Resistance

Chemical / Material	Test Conditions	Results
Ammonia	Cotton rub test	No deterioration observed after 10,000 cycles
Hydrochloric Acid (3%)	Immersion	No deterioration observed after 1,000 hours
Sodium Hydroxide (10%)	Immersion	No deterioration observed after 1,000 hours
Ethanol	Immersion	No deterioration observed after 1,000 hours
Artificial Sweat	Immersion	No deterioration observed after 240 hours
Hair Cream	Surface exposure, 60°C / 95% RH	No deterioration observed after 1,000 hours
Hand Cream	Surface exposure, 60°C / 95% RH	No deterioration observed after 1,000 hours
Hair Shampoo	Surface exposure, 60°C / 95% RH	No deterioration observed after 1,000 hours
Olive Oil	Surface exposure, 60°C / 95% RH	No deterioration observed after 1,000 hours

Fire Performance

Fire performance is governed by the PMMA substrate:

• UL 94 HB (typical)

• Hard coating does not materially alter the fire rating

Note

All values shown are typical and subject to variation depending on substrate grade, thickness, and processing. Anti-reflection performance is optimised for high-clarity display applications and demanding marine environments. Final material selection should be validated against the requirements of the intended application.

Processing and Fabrication

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

Typical Applications

- Marine navigation and multifunction displays
- Chart-plotters and sonar displays
- Marine instrumentation and control panels
- Outdoor and high ambient-light displays
- Touchscreen display cover lenses
- Optical windows and viewing panels
- Bridge and cockpit electronics
- Other salt-laden or demanding environments

Design Considerations

- Protect AR surfaces from damage during machining and assembly
- Avoid excessive mechanical stress or clamping of the PMMA
- Allow for thermal expansion when designing mounting and bond lines
- Use compatible cleaning agents to maintain AR and hydrophobic performance
- Consider display-to-lens air gap and viewing angle when optimising optical performance
- Allow adequate edge sealing for prolonged marine exposure
- Avoid adhesives or sealants that may attack PMMA or the functional surfaces
- Consider substrate thickness and impact requirements for the final application