

Optimma™

Optical Hard-Coated Acrylic

The New & Innovative High Performance Coating



Panel Graphic Limited have developed the new & innovative high performance **Optimma™** coating.

This impressive **scratch resistant**, high strength & **flawless optical quality** coating is the perfect solution for today's demanding environments. The surface hardness is among the **best ever** seen on plastics, combined with an impact strength that far exceeds glass with half the weight.

Optimma™ is very well suited for protection purposes, for use in industrial or public space environments where durability as well as a high degree of visual perfection is required.

Panel Graphic Limited offers **Optimma™** on acrylic in the thicknesses:
0.8mm, 1.0mm, 1.5mm, 2.0mm, 3.0mm, 4.0mm & 5.0mm
Maximum sheet size close to 1.5 square metres.

Panel Graphic Limited can offer **Optimma™** coated windows supplied to customer specification, machined complete with a silk screen printing & adhesive gasket application.

Protection of displays for electronic devices



Optimma - Acrylic with Optical Clear Hard-Coat both sides				
	Test	Unit	Acrylic (substrate)	Coating
OPTICAL PROPERTIES				
Refractive index	ISO 489		1.49	1.52
Light transmittance				
Total	ASTM D-1003	%		92
Haze	ASTM D-1003	%		0.5
Pencil hardness			N/A	6-8H*
Mar resistance – Tabor abrader (100 times)	ISO 9352	haze %	40	1.5
MECHANICAL PROPERTIES				
Tensile strength				
Rupture	ASTM D-638	MPa		64
Modules of elasticity	ASTM D-638	MPa		3.2×10^3
Elongation at rupture	ASTM D-638	%		2.2
Flexural strength				
Rupture	ISO 178	MPa		91
Modules of elasticity	ISO 178	Mpa		3.2×10^3
Compressive strength				
Yield	ISO 604	MPa		120
Modules of elasticity	ISO 604	3.2×10^3		
Impact strength (Charpy)	ISO 179/1FU	Mpa		17
Rockwell Hardness	ISO 2039-2	kJ/m^2		100
THERMAL PROPERTIES				
Temperature of deflection under load	ISO 75-2/A	°C		100
Vicat softening temperature	ISO 306	°C		110
Coefficient of thermal expansion	ISO11359	$\text{mm/m } ^\circ\text{C}^{-1}$		0.07
Coefficient of thermal conductivity	ASTM D-177	W/m K		0.21
Specific heat		J/g °C		N/A
				1.5
ELECTRICAL PROPERTIES				
Surface resistivity, 28 °C, 75% RH	ASTM D-257	Ohm		$>10^{16}$
Volume resistivity	ASTM D-257	Ohm-cm		$>10^{16}$
Dielectric strength, short time test	ASTM D-149	kV/mm		20

*Initial surface hardness is somewhat dependent on substrate thickness (ability to "support" the coating)

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MISCELLANEOUS PROPERTIES				
Flammability (Burning rate)	ISO 1210	mm/min	33	N/A
UL 94 Rating			HB	N/A
Water absorption (Weight gain on immersion for 24 hrs)	ISO 62, Method 1	%	0.3	N/A
Soluble matter lost after immersion		%	0.0	0.0
Specific Gravity	ISO 1183	g/cm ³	1.19	N/A
CHEMICAL RESISTANCE				
Immersion, 7 days at 25°C acc. to:	ASTM D-543			
Hydrochloric acid, HCl (10%)	--		N/A	No change
Sodium chloride, NaCl (10%)	--		N/A	No change
Sea water	--		N/A	No change
Sodium Hydroxide, NaOH (48%)	--		N/A	No change
Ethyl Alcohol (95%)	--		N/A	No change
Acetic acid (5%)	--		N/A	No change
Citric acid (10%)	--		N/A	No change
Mineral oil	--		N/A	No change
Olive oil	--		N/A	No change
Ethyl acetate	--		N/A	Dissolved
Turpentine	--		N/A	No change
Methyl Alcohol	--		N/A	Slightly swollen
Kerosene	--		N/A	No change
Acetone	--		N/A	Dissolved

General processing and application guidelines:

Material can be cut and milled using high-speed routers and cutters suited for machining PMMA.

When laser cutting, pay attention to the fact that substrate and coating show different refractive indices; this is why proper adjustment of the laser beam is essential.

Ultrasonic welding is not possible unless the Hardcoat layer is machined away.

When screen-printing, please note that the chemical properties of the coating is much different from PMMA; this is why we recommended to test compatibility (adhesion) between preferred Screen ink system and substrate.