INSTRUMENT PLASTICS
OPTICAL FILTERS FOR ELECTRONIC DISPLAYS

MANUFACTURERS OF OPTOLITE CONTRAST ENHANCEMENT FILTERS
SHIELDED WINDOWS – INSTRUMENT GLASSES
POLARISING FILTERS

OPTOLITE™ CLEAR HSR
CONTRAST ENHANCEMENT FILTERS FOR ELECTRONIC DIPLAYS

Optolite™ Clear HSR (High scratch resistance) is a highly durable optically clear material. Key features include high chemical, scratch and impact resistance. It is especially suited to LCD's and other display applications (Instrument covers, windows) where these characteristics are of a particular importance. An early version of this polymer was sold under the trade name CR-39®

LCDs often suffer from a number of problems:

- Soft front surface polariser
  – can be subject to damage from scratching, dirt, moisture, fingermarks, etc.
- Front surface reflections
  – in certain lighting conditions these may cause display reading difficulties
- Restricted viewing angles
  – caused by LCD construction and method of operating
- Possible Ultra Violet degradation in strong sunlight
- Shielding from electromagnetic interference
- Sourcing of bezels
  – not always possible or feasible with so many different LCD sizes available

Choice of Optolite Clear HSR

Instrument Plastics Ltd offer their Optolite Clear HSR (High Scratch Resistant) filter to overcome these problems on LCDs. It is also especially recommended in display applications requiring the characteristics mentioned below.

Optolite Clear HSR has both outstanding abrasion resistance, up to 20 times that of acrylics, and excellent impact resistance. It is also chemical resistant, being immune to the effects of virtually all common solvents.

Further, it is lightweight, approximately half that of glass, and exhibits optical properties comparable to crown glass. Its maximum continuous operating temperature is in excess of 100°C.

Optolite Clear HSR is available with selected optional cast-in non-glare finishes to overcome front surface reflections. These finishes can improve readability whilst offering advantages in that they cannot chip, peel or rub off.

Optolite Clear HSR is cast in-house down to 0.5mm thickness for applications where maximum viewing angle is required or where space is at a premium. Thicker filters are manufactured for when impact resistance takes priority. Tight thickness tolerances are supplied for specialised applications.

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An optional Ultra-Violet inhibitor is also available to restrict potentially harmful UV rays when certain displays are operated out-of-doors in strong sunlight conditions.

A further option incorporates a blackened stainless steel mesh for electromagnetic shielding. Full edge termination service are available. These mesh filters typically give a protection of 60-70dB over the frequency range 100KHz to 1GHz and 35dB up to 10GHz. Effective shielding is becoming increasing important with the introduction of new legislation.

Instrument
Plastics Ltd also offers full silk screening services. A silk screened border onto the reverse side of the filter and perhaps incorporating a logo, provides an attractive and inexpensive way of producing a bezel. This may also enhance the aesthetic appearance of the system. Double sided adhesive tape can be used for attaching the filter quickly and easily to the display.

TECHNICAL DATA - OPTOLITE CLEAR HSR

MECHANICAL PROPERTIES	TEST	UNITS	VALUES
Abrasion Resistance	D1044	(x Acrylic)	20
Hardness	D785	Rockwell	M95-M100
Tensile Strength	D638	MPa	34-41
Compressive Strength	D695	MPa	155
Flexural Yield Strength	D790	MPa	52-59
Flexural Modulus	D790	GPa	17-23
THERMAL PROPERTIES	**TEST**	**UNITS**	**VALUES**
MX. Recommended operating temp (no load) 100°C			100°C
Intermittant (1 Hr)			150°C
Specific Heat	C351	KJ/Kg/K	2.3
Coeff. of Linear thermal Expansion	D696	Linear Coeff/°C	8-14x10–5
Thermal Conductivity	C177	J/S/M/K	0.2
Burning Rate	D635	mm/min	<25
Combustion (Self Ignition)	D1829	°C	382
OTHER PROPERTIES	**TEST**	**UNITS**	**VALUES**
Specific Gravity @ 25°C (Glass)	D792	g/cm3	1.31 (2.5)
Refractive index @ 546 Nm @ 20°C (Glass)	D542		1.500 (1.52)
Light Transmission		%	90

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RESISTANCE TO CHEMICAL REAGENTS

(% increase in weight after 7 days immersion at 25°C)

ACID	% CHANGE	SOLVENTS	% CHANGE
30% Sulphuric Acid	0.5	95% Ethyl Alcohol	0.1
10% Nitric Acid	0.7	Acetone	0.5
10% Hydrochloric Acid	0.4	Carbon tetrachloride	0.6
		Gasoline	0.1
ALKALI		Benzene	0.7
10% Amm. Hydroxide	0.8	Toluene	0.6
10% Sodium Hydroxide	0.5	Distilled Water	0.7

Standard stock thicknesses: 0.5, 1.0, 1.5, 2.0, 3.0, 4.0, 5.0, 6.0 mm
Other non standard thickness and tight tolerances available on request.

Instrument Plastics Limited has a policy of continual improvement of products and so reserves the right to change the product specification without notice.

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