

TECHNICAL DATA SHEET

CRYLUX® LUMUINA

1. PRODUCT IDENTIFICATION

CRYLUX® Lumina is the brand name of POLYCASA PMMA cast sheet with special light diffusion characteristics.

The composition of the product is 95-99% PMMA, the same as CRYLUX® standard material. This formulation gives the material exceptional optical qualities.

Its innovative characteristics make CRYLUX® Lumina the right choice for the development of new designs in decoration, lighting and publicity.

CRYLUX® Lumina is available in thickness from 4mm to 10mm as standard material, but it is possible to produce from 3mm to 30mm upon request.

Thickness choice will be directly related to the kind of light source used (LED, fluorescent tubes, CCFL) size and configuration of the final panel. See our recommendations further in this document.

2. CHARACTERISTICS

CRYLUX® Lumina is the recommended Cast acrylic sheet for applications that require an homogenous distribution of light across the surface, when the sheet is illuminated through its edges.

By installing a light source next to a polished edge of the piece, the light passes uniformly through the surface, giving bright, even illumination to a picture or image on top of it. These special characteristics also allow a reduction in the frame profiles, improving its' appearance.

3. APPLICATIONS

- Ultra-slim frames for Point of Sale
- Illuminated urban displays
- Double-sided poster frames
- Safety signage
- Decorative lighting

4. FABRICATION AND FINISHING TECHNIQUES

CRYLUX® Lumina sheets are as easy to handle as standard material.

Sawing, drilling, gluing, printing, milling, mechanical polishing, thermoforming, hot bending do not offer any problems to this special product.

More detailed information on these items can be found in the "USER GUIDE", available on request.

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5. TECHNICAL DATA SHEET

| GENERAL | | | | |
|-------------------|---|------------------|------------------------------|------------------|
| Property | | Method | Units | CRYLUX® |
| | Density | ISO 1183 | g/cm ³ | 1.19 |
| | Water absorption | ISO 62, Method A | % | 0.2 |
| | Rockwell Hardness | ISO 2039-2 | M scale | 100 |
| MECHANICAL | | | | |
| Property | | Method | Units | CRYLUX® |
| | Tensile Strength | ISO 527 | MPa | 75 |
| | Elongation | ISO 527 | % | 6 |
| | Tensile Modulus | ISO 527 | MPa | 3400 |
| | Flexural Strength | ISO 178 | MPa | 120 |
| | Flexural Modulus | ISO 178 | MPa | 3200 |
| | Charpy (unnotched) | ISO 179 | kJ/m ² | 17 |
| | Charpy (notched) | ISO 179 | kJ/m ² | 2 |
| THERMAL | | | | |
| Property | | Method | Units | CRYLUX® |
| | Vicat Temp. (VST/B 50) | ISO 306 | °C | 110 |
| | Specific Heat Capacity | ISO 3146-C-60°C | J/g.K | 2.16 |
| | Linear thermal expansion | ISO 11359-2 | mm/m°C | 0.07 |
| | Thermal conductivity | DIN 52612 | W/m.K | 0.19 |
| | Max. service temperature continuous use | | °C | 80 |
| | Max service temperature short term use | | °C | 90 |
| | Degradation temperature | | °C | >280 |
| OPTICAL | | | | |
| Property | | Method | Units | CRYLUX® |
| | Light transmission) | EN 13468-2 | % | 92 |
| | Refractive index | ISO 489 | n ^D ₂₀ | 1.492 |
| ELECTRICAL | | | | |
| Property | | Method | Units | CRYLUX® |
| | Surface resistivity | IEC 60093 | Ω | 10 ¹⁴ |
| | Volume resistivity | IEC 60093 | Ω x m | 10 ¹⁵ |
| | Electrical strength | IEC 60243-1 | kV/mm | 10 |
| | Dielectric strength | DIN EN 60243-1 | kV/mm | 30 |
| | Dielectrical dissipation factor 50 Hz | DIN 53483-2 | | 0.06 |
| | Dielectrical dissipation factor 1 KHz | DIN 53483-2 | | 0.04 |
| | Dielectrical dissipation factor 1 MHz | DIN 53483-2 | | 0.02 |
| | Relative permittivity 50 Hz | DIN 53483-2 | | 2.7 |
| | Relative permittivity 1 KHz | DIN 53483-2 | | 3.1 |
| | Relative permittivity 1MHz | DIN 53483-2 | | 2.7 |

Note: These technical data of our products are typical ones; the actually measured values are subject to production variations

Resistance to chemicals

CRYLUX® Lumina sheets are – at room temperature – resistant to saturated hydrocarbons, aromatic free fuel and mineral oils, vegetable and animal fats and oils, water, aqueous salt solutions as well as diluted acids and alkalis. Aromatic hydrocarbons and hydrogen chlorides, ester, ether and ketones attack CRYLUX® Lumina.

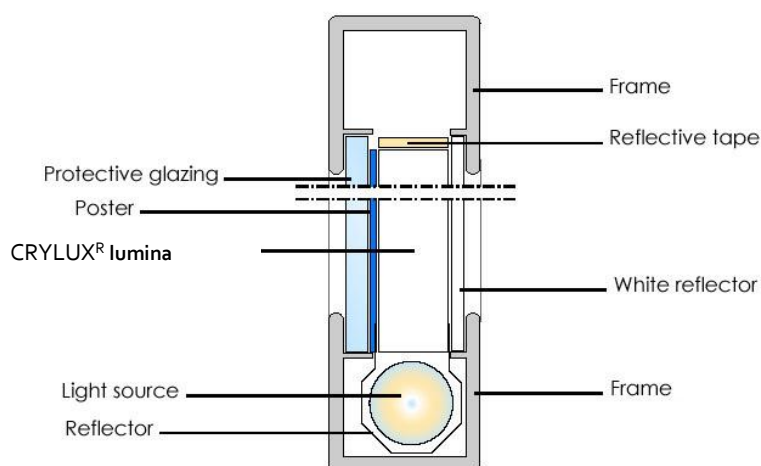
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6. WHY USE LUMINA TECHNOLOGY?

- Light entering by the edges is distributed across both surfaces of the sheet.
- Reduces light-box dimensions. Allows ultra-slim frames.
- Simplifies maintenance (tubes are very accessible for replacement).
- Can be used with any light source: tubes, LEDs, optical fibre, CCFLs ...
- Allows new designs. Can be curved and treated as standard material.
- Avoids shadows and hot spots due to the lights behind the image.
- Reduces problems of thermal damage.
- Suitable for single or double-panels.
- Completely neutral, it does not produce any change in colour values.

7. FRAME CONFIGURATION











8. SPECIAL RECOMMENDATIONS

In order to maximise the performance of CRYLUX® Lumina, the following points should be taken into consideration:




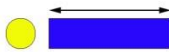



- For best results, edges should be polished, preferably with a diamond wheel. A high luminosity effect is obtained when polishing the four edges of the sheet (see Graphic 1). Once the edges are polished, they should be completely flat. Any curvature in the edge could cause a loss of light (due to successive internal reflections through the material). Laser cutting is not recommended.
- The frame or profile system should not only fix the sheet in place but also enhance its' edge lighting. Usually this type of frame is made from a high light reflecting material in order to increase light reflection efficiency and to avoid the loss of light. The light source should be placed as close as possible the edge of the sheet.
- The lighting efficiency will be improved by placing a white reflector between the assembly and CRYLUX® Lumina sheet. This white material should have maximum light reflection and minimal light absorption. We recommend our reference CRYLUX® 3014.
- When the sheet is illuminated by one or two edges only, the other non-illuminated edges must be covered with a reflective adhesive tape.
- CRYLUX® Lumina sheets are covered with a masking film for protection. We recommend keeping the protection film in place during material handling. Any scratch on the material surface will be visible when the sheet is illuminated.

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LED lighting
Recommended thickness

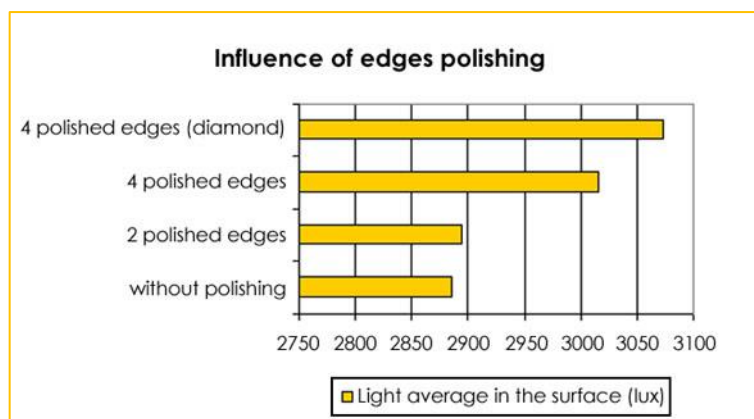
| Panel size | Panel dimension in mm | Light source configuration | CRYLUX® Lumina | |
|------------|-----------------------|--|-------------------|----------------------|
| | | | Optimal thickness | Acceptable thickness |
| > A0 | | > 1197 mm  | 10 mm | - |
| A0 | 1197 x 840 | 1197 mm  | 8mm | - |
| A1 | 840 x 595 | 595 mm  | 6 mm | 5mm |
| A2 | 595 x 420 | 420 mm  | 5mm | 4mm |
| A3 | 420 x 297 | 297 mm  | 5 mm | 4 mm |
| A3 | 420 x 297 | 297 mm  | 4 mm | 3 mm |
| A4 | 297x210 | 210 mm  | 4 mm | 3 mm |
| < A4 | | <210 mm  | 3mm | - |

Tests carried out with LED 50/50, 60u/m, 15W/m

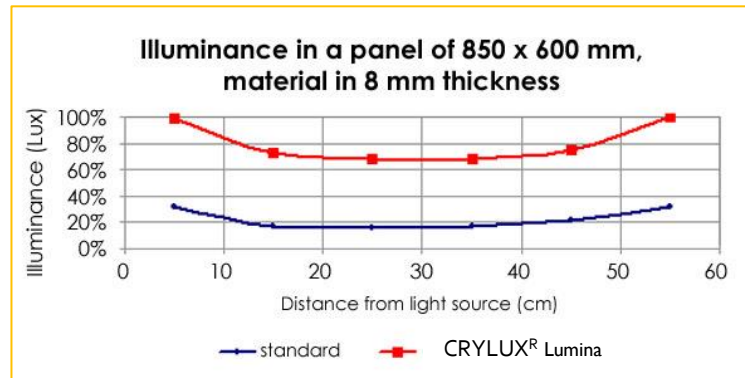
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■ Fluorescent tubes:
Recommended thickness

| Panel size | Panel dimension in mm | Light source configuration | CRYLUX® Lumina | |
|------------|-----------------------|---|-------------------|----------------------|
| | | | Optimal thickness | Acceptable thickness |
| > A0 | | > 1197 mm  | 15 mm | - |
| A0 | 1197 x 840 | 1197 mm  | 15 mm | 10 mm |
| A1 | 840 x 595 | 595 mm  | 10 mm | 8 mm |
| | 840 x 595 | 595 mm  | 15 mm | - |
| A2 | 595 x 420 | 420 mm  | 10 & 8 mm | 6 mm |
| A3 | 420 x 297 | 297 mm  | 10 mm | 6 mm |
| < A3 | | < 297 mm  | 6 mm | - |

Tests carried out tubes type T5

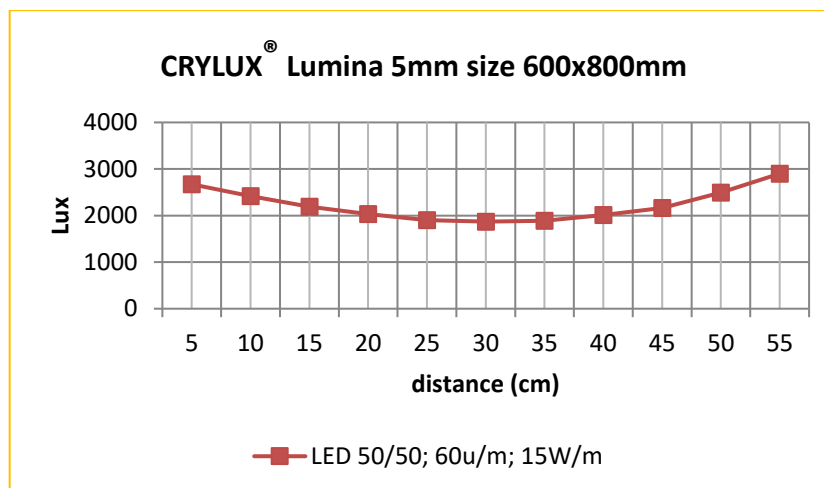
Lighting information


Graphic 1

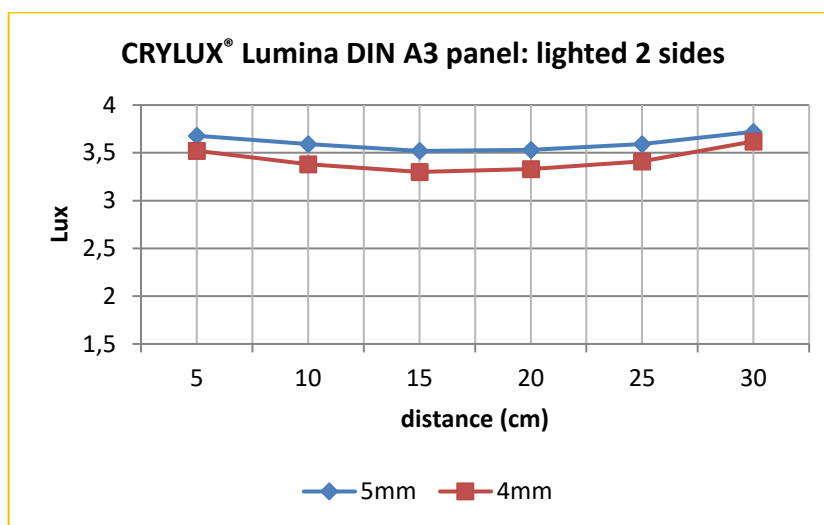
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Graphic 2

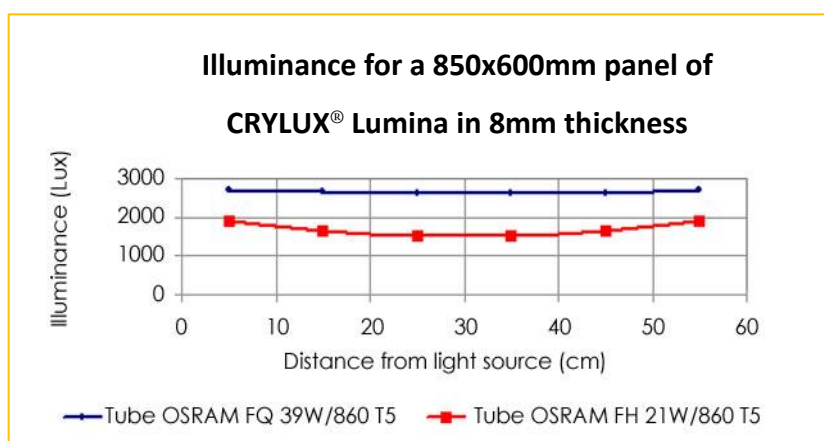
Graphics 1 and 2 were built up using a CRYLUX® Lumina sheet in 8 mm thickness. Frame dimensions were 850 x 600 mm, sheet was illuminated by 2 tubes (OSRAM FQ 39W/860).

Lighting performance CRYLUX® Lumina


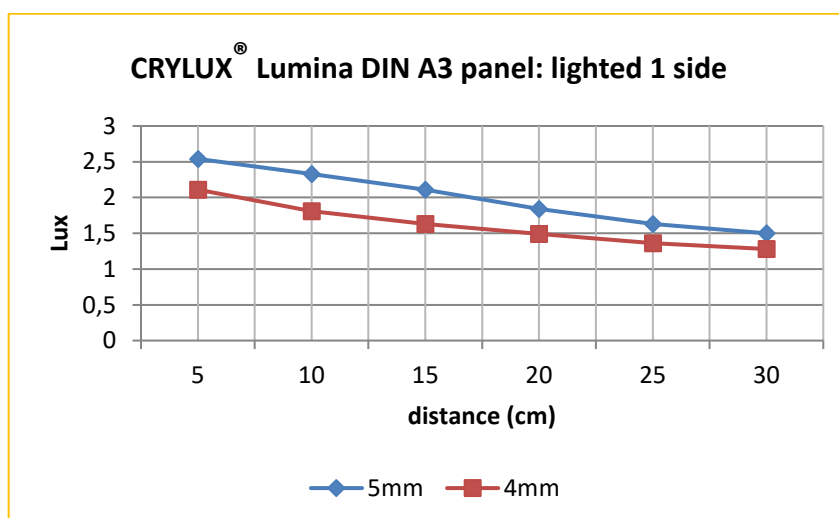
Graphic 3

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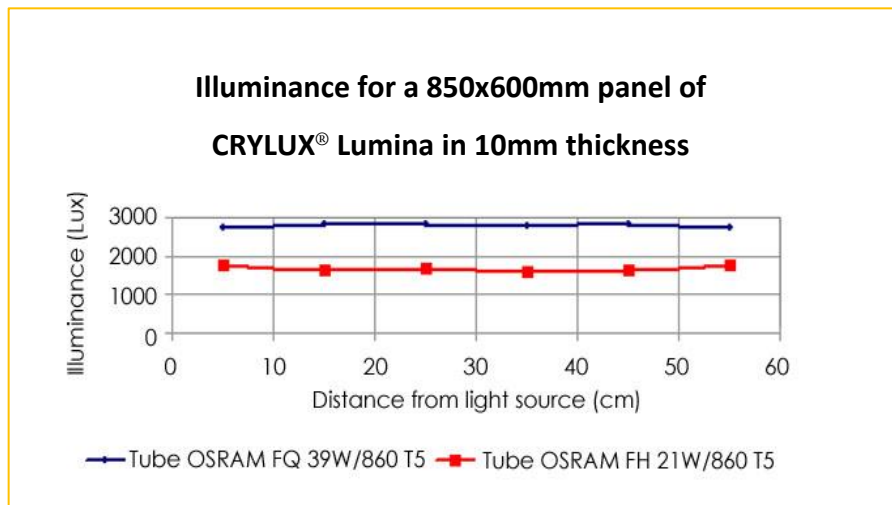
Graphic 4



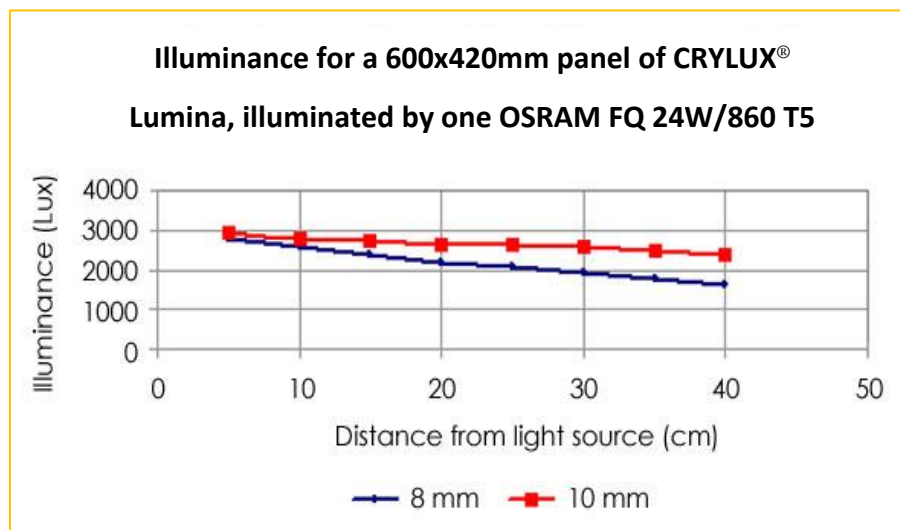
Graphic 5



Graphic 6

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Graphic 7



Graphic 8

Any modification in sheet thickness, light source or frame dimensions, will affect the final results.

NOTE:

Our technical recommendations are without legal obligation. The information given in this brochure is based on our knowledge and experience to date. It does not release the user from the obligation of carrying out their own tests and trials, in view of the many factors that may affect processing and application; neither do they imply any legally binding assurance of certain properties or of suitability for a specific purpose. It is the responsibility of those to whom we supply our products to ensure that any proprietary rights and existing laws and legislation are observed. Technical data of our products are typical ones; the actually measured values are subject to production variations