

# OPTIX CELL CAST ACRYLIC SHEETS



## DESCRIPTION

PLASKOLITE ACRYLIC (Poly Methyl Methacrylate / PMMA) CELL CAST SHEETS are produced according to the ISO 7823-1:2003 standard and can be used both indoor and outdoor for a visual communication, architectural, interior design and other purposes.

OPTIX Cell Cast is available in wide range of thicknesses, translucent and opaque colors, special effects and Metal Reinforced grades (OPTIX Cell Cast SMR).

The complete range offers excellent transparency, bright clarity, long-life UV resistance and can be easily machined or thermoformed by standard techniques.

## TYPICAL PROPERTIES

| Properties                                  | Method      | Units             | Value              |
|---|-------------|-------------------|--------------------|
| <b>General</b>                              |             |                   |                    |
| Density                                     | ISO 1183    | g/cm <sup>3</sup> | 1.2                |
| Water Absorption                            | ISO 62 (1)  | %                 | 0.3                |
| <b>Mechanical</b>                           |             |                   |                    |
| Tensile Strength                            | ISO 527-2   | MPa               | 70                 |
| Elongation at break                         | ISO 527-2   | %                 | 4                  |
| Tensile Modulus                             | ISO 527-2   | MPa               | 3300               |
| Flexural Strength                           | ISO 178     | MPa               | 104                |
| Flexural Modulus                            | ISO 178     | MPa               | 3000               |
| Rockwell Hardness                           | M scale     |                   | 100                |
| Impact Resistance (Charpy unnotched)        | ISO 179/1fu | kJ/m <sup>2</sup> | 15                 |
| Impact Resistance (Izod notched)            | ISO 180/1A  | kJ/m <sup>2</sup> | 1.5                |
| <b>Optical</b>                              |             |                   |                    |
| Refractive Index                            | ISO 489     |                   | 1.49               |
| Light Transmission ( 3mm transparent sheet) | ASTM D1003  | %                 | 92                 |
| Haze ( 3mm transparent sheet)               | ASTM D1003  | %                 | < 1                |
| <b>Thermal</b>                              |             |                   |                    |
| Vicat Softening Temp.(50N)                  | ISO 306     | °C                | 105-112            |
| Heat Deflection Temp. (1.82 MPa)            | ISO 75-1    | °C                | 105                |
| Coeff. of Linear Thermal Expansion (0-500C) | ISO 11359-2 | °K -1             | 7x10 <sup>-5</sup> |
| Thermal Conductivity                        | ASTM C177   | W/mK              | 0.19               |
| Maximum Continuous Service Temp.            |             | °C                | 82                 |
| <b>Electrical</b>                           |             |                   |                    |
| Dielectric Strength                         | DIN 53481   | kV/mm             | 20-25              |
| Dielectric Constant (50Hz)                  | DIN 53483   |                   | 3.6                |
| Dissipation Factor tanδ (1 MHz)             | DIN 53483   |                   | 0.06               |
| Surface Resistivity                         | IEC 60093   | Ohm               | >10 <sup>15</sup>  |
| Volume Resistivity                          | IEC 60093   | Ohm.cm            | >10 <sup>15</sup>  |

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## DIMENSIONS

| Thickness, mm | Width, mm | Length, mm |
|---------------|-----------|------------|
| 3-6           | 2050      | 3050       |
| 8-35          | 2030      | 3050       |
| 40-60         | 2000      | 3000       |

Sheets are also available cut to size, according to customer requirements.

## TOLERANCES FOR DIMENSIONS

| Sheet Thickness, mm | Thickness, mm   | Width Tolerances, mm                 | Length Tolerances, mm                | Diagonals Tolerances, mm  | Flatness Tolerances   |
|---------------------|---|--------------------------------------|--------------------------------------|---|---|
| 3-25                | $\pm (0.4 + 0.1 \times \text{sheet nominal thickness})$ | Sheets cut in production: -0.0 /+3.0 | Sheets cut in production: -0.0 /+3.0 | Sheets cut in production: Length < 4000 mm - <3<br>Length < 4000 mm - < 4 | Max. allowed bowing - 0.5% from linear dimensions.<br>Max. allowed bowing across the width of the sheet - < 5 mm per meter of width.<br>Max. allowed bowing along the length of the sheet - < 5 mm per meter of length. |
| 28-30               | $\pm 2.0$   |                                      |                                      |   |   |
| 35-60               | - 2.0<br>+ 3.0  | Sheets cut to size: $\pm 1.0$        | Sheets cut to size: $\pm 1.0$        | Sheets cut to size: < 1   |   |

Flatness is measured on one single sheet placed on a flat and rigid surface.

## COLORS

OPTIX Cell Cast sheets are naturally colorless and exceptionally clear, however they can be pigmented to obtain a wide range of tints and colors. They are available transparent and in a wide range of translucent colors, opaque colors, opals and diffusers. OPTIX Cell Cast colored sheets maintain the same light transmission percentages regardless of the original sheet thickness (except for special types of opals, diffusers and LEDs). Please note that machining the sheet to a reduced thickness will increase the light transmission and may change the color shade of the reduced area.

For a list of updated colors, please contact PLASKOLITE Technical Support or your regional supplier.

## DEFINITIONS

### SHRINKAGE

As opposed to the extrusion process, cast PMMA sheets shrink isotropically (same in all directions).

OPTIX Cell Cast sheets may shrink up to 2% in each direction.

### FIRE TEST PERFORMANCE

PMMA is a combustible material and will burn if ignited. However, unlike other polymers, does not drop or produce toxic or corrosive gases and produces very little smoke, an important safety benefit.

OPTIX Cell Cast extruded acrylic sheets are classified:

- HB according to UL94.
- E according to UNE-EN ISO 13501.

### NOISE REDUCTION

OPTIX Cell Cast sheets are used widely as noise-reduction barriers along roads and highways.

CE Marking for OPTIX Cell Cast SMR sheets are available according to EN-14388 "Road Traffic Noise Reducing Device".

For more information visit our website at [www.plaskolite.com](http://www.plaskolite.com)

# OPTIX CELL CAST ACRYLIC SHEETS

## CHEMICAL RESISTANCE

OPTIX Cell Cast sheets have good resistance to water, alkalis, aqueous inorganic salt solutions and most common dilute acids. Some substances do not have any effect on OPTIX Cell Cast however some can cause staining, swelling, crazing, weakening or dissolve it completely.

For information regarding specific chemicals please refer to the OPTIX Cell Cast Guidebook or PLASKOLITE Technical Support.

Important Note: Any substance that comes with contact with Acrylic PMMA should be checked for compatibility. Even if the supplier confirms that the material is suitable for Acrylic PMMA, please apply it first to a hidden area to see if there are any effects. However this will cover you for short-time effects only. To assess long-term effects of substances on Acrylic PMMA, laboratory testing is required.

## ENVIRONMENTAL STRESS CRACKING

ESC (Environmental Stress Cracking) is a well-known phenomenon in plastics including Acrylic PMMA, and a common reason of product failure. ESC is a result of the combination of stress and chemical exposure. Under harsh chemical environment, stressed sheets will fail by cracking and crazing. The level of stress needed for ESC is lower than the normal failure mechanical stress of Acrylic PMMA in a chemical-free environment. Stresses can be induced during forming and fabrication. These can be eliminated by an annealing process (see OPTIX Cell Cast Guidebook for machining and forming instructions). Stresses can be induced also by improper installation (see OPTIX Cell Cast Guidebook for installation instructions). Cold bended sheets under permanent induced stress or sheets under periodic stress (fatigue) are also susceptible to ESC.

## GENERAL GUIDELINES

### STORAGE

OPTIX Cell Cast sheets must be stored with their original protective masking in a cool, dry and well-ventilated room, at a reasonable constant temperature, away from direct sunlight, excessive humidity, rain or solvent's vapors. Failing to store OPTIX Cell Cast in adequate conditions can produce distortions in the sheets and other effects, which will make later fabricating, a more difficult task.

Long term exposure to the sun or other heat sources can cause fusing of the protective polyethylene film to the sheet surface, impeding its removal.

OPTIX Cell Cast sheets are best stored horizontally on their delivery pallets. Pay attention to avoid pressure on the unsupported areas.

Never leave uncovered sheets or pallets. It is advisable to replace the original packaging over the stack after a sheet is removed from stock to avoid moisture absorption. If stored for long time, the use of dry-packaging is highly recommendable.

### PROTECTIVE FILM

Both surfaces of OPTIX Cell Cast sheet are protected by a fully recyclable polyethylene (PE) film. Keep this film in position as long as possible and remove only and immediately after installation.

Sharp objects, sharp particles or even small chips can penetrate the protective PE masking, and damage the surface, therefore always lay OPTIX Cell Cast on a clean smooth surface.

OPTIX Cell Cast protective film is suitable for thermoforming and laser cutting (except for satin sheets).

It is preferable to leave the protective film in position throughout machining to keep the sheet surface in perfect condition. Normal thermoforming temperatures do not affect the adhesive used for the film on OPTIX Cell Cast sheets and can therefore be left in place during most heating and forming operations. However, care should be taken to ensure there are no defects in the film (holes, scratches, bubbles), which could mark the part during the forming process. High-heat deep-draw thermoforming applications can cause the PE film to adhere more strongly. Printed film must be removed before thermoforming, to avoid transfer of the printing ink to the sheet's surface.

# OPTIX CELL CAST ACRYLIC SHEETS

## CLEANING & MAINTENANCE

OPTIX Cell Cast sheets are produced in clean-room environment and do not need to be cleaned before use. However, cleaning may be needed after fabrication, before sensitive processes such as vacuum metallization or printing or for maintenance during use.

If OPTIX Cell Cast sheets need to be cleaned, wash the sheet surface with clean fresh water with a mild soap. In order to verify that the soap you are using is compatible with Acrylic PMMA test a hidden area before cleaning. Use a clean soft cloth or sponge and rinse well. Do not scrub or use brushes. Dry with a soft cloth. The use of window cleaning fluids or solvents such as alcohols, turpentine, acetone, etc., can cause damage to the sheet.

## ENVIRONMENTAL ADVANTAGES

OPTIX Cell Cast sheets are environmentally friendly. The outstanding chemical stability and long-time resistance to aging and weathering of OPTIX Cell Cast sheets often ensures a long service time. The sheets and their polyethylene protective layers are fully recyclable. They do not contain any toxic materials, halogens or heavy metals, which may cause environmental damage or health risks. OPTIX Cell Cast sheets do not contain Bisphenol-A. Ozone Depleting Substances (ODP) are not used in the manufacture of OPTIX Cell Cast sheets and they do not release pollutant substances into the environment during manufacture. They do not produce toxic or corrosive gases when burning, fires can be extinguished with water.

OPTIX Cell Cast sheets can be used for energy recovery and chemical recycling. OPTIX Cell Cast scrap is not classified as hazardous waste small amounts can be disposed as household refuse. Large quantities should be disposed for recycling.

## RE-WORKING

### - HANDLING:

OPTIX Cell Cast is a rigid sheet, which with wrong handling can break, leaving sharp edges. Handling OPTIX Cell Cast must be done with care, always using protective gloves and shoes.

### - Burning Behavior:

OPTIX Cell Cast sheets are combustible, and if not extinguished, will burn to completion once ignited. When burning, in the presence of sufficient air, OPTIX Cell Cast releases CO<sub>2</sub> and water however if there is a lack of sufficient air, CO can be formed.

When storing or working with OPTIX Cell Cast, the necessary fire precautions must be considered, taking into account the burning behavior of OPTIX Cell Cast.

### - COLD BENDING:

Unlike thermoforming, cold-bended OPTIX Cell Cast will not keep its form unless installed into a frame. The sheet must be with perfect edges to avoid breakage during bending. The radius of the bend should not be below the minimum value in order to avoid high permanent stress, which can eventually cause small cracks or even break the sheet.

Minimum recommended bend radius is 300 times the thickness of the sheet.

These suggestions and data are based on information we believe to be reliable. They are offered in good faith, but without guarantee, as conditions and methods of use are beyond our control. We recommend that the prospective user determines the suitability of our materials and suggestions before adopting them on a commercial scale.