

Product Data Sheet, February 2014

Makrolon® Titan

Solid polycarbonate sheet



Your benefits:

- extreme impact strength
- C3 Classification according to DIN EN ISO 23125⁽¹⁾
- thermoformable

Solid **Makrolon® Titan** sheets are clear, polished, UV-stabilized polycarbonate sheets. They offer extreme impact strength that exceeds the physical properties of other products of their class. **Makrolon®** sheets resist temperatures of -100 to +120 °C, exhibit high optical clarity and have a good fire rating.

Applications:

Typical applications for **Makrolon® Titan** sheets include machine guards.

The sheets offer protection against involuntary breakage and willful destruction. **Makrolon® Titan** sheets can be thermoformed, cold-curved and machined with ease.

| | Test Conditions | Typical values ⁽²⁾ | Unit | Standard |
|---|------------------------------|-------------------------------|---------------------|-----------------|
| Physical | | | | |
| Density | | 1200 | kg/m ³ | ISO 1183-1 |
| Water absorption saturation | water at 23 °C | 0.30 | % | ISO 62 |
| Water absorption equilibrium | 23 °C, 50% relative humidity | 0.12 | % | ISO 62 |
| Refractive index | Procedure A | 1.587 | – | ISO 489 |
| Mechanical | | | | |
| Tensile modulus | 1 mm/min | 2350 | MPa | ISO 527-1,-2 |
| Yield stress | 50 mm/min | > 60 | MPa | ISO 527-1,-2 |
| Yield strain | 50 mm/min | 6 | % | ISO 527-1,-2 |
| Nominal strain at break | 50 mm/min | > 50 | % | ISO 527-1,-2 |
| Flexural modulus | 2 mm/min | 2350 | MPa | ISO 178 |
| Flexural strength | 2 mm/min | 90 | MPa | ISO 178 |
| Charpy impact strength | 23 °C, unnotched | non-break | kJ/m ² | ISO 179-1eU |
| Charpy impact strength | 23 °C, 3 mm, notched | 80P | kJ/m ² | ISO 179-1eA |
| Izod impact strength | 23 °C, 3.2 mm, notched | 90P | kJ/m ² | ISO 180-A |
| Thermal | | | | |
| Vicat softening temperature | 50 N, 50°C/h | 148 | °C | ISO 306 |
| Thermal conductivity | 23°C | 0.20 | W/(m.K) | ISO 8302 |
| Coefficient of linear thermal expansion | 23 to 55°C | 0.65 | 10 ⁻⁴ /K | ISO 11359-1, -2 |
| Temperature of deflection under load | 1.80 Mpa | 128 | °C | ISO 75-1, -2 |
| Temperature of deflection under load | 0.45 Mpa | 140 | °C | ISO 75-1, -2 |
| Electrical | | | | |
| Electrical strength | 1 mm | 34 | kV/mm | IEC 60243-1 |
| Volume resistivity | | 1E14 | Ohm.m | IEC 60093 |
| Surface resistivity | | 1E16 | Ohm | IEC 60093 |
| Relative permittivity | 100 Hz | 3.1 | – | IEC 60250 |
| Relative permittivity | 1 MHz | 3.0 | – | IEC 60250 |
| Dissipation factor | 100 Hz | 5 10 ⁻⁴ | – | IEC 60250 |
| Dissipation factor | 1 MHz | 95 10 ⁻⁴ | – | IEC 60250 |

(1) International harmonization of DIN EN 12415

(2) These values are measured on injection molded samples, and are not intended for specification purposes

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Light Transmission: Test Method according to DIN 5036

The stated values are typical values only.

| Light transmission % | 18 | 20 |
|---------------------------|----|----|
| Makrolon® Titan clear 099 | 79 | 76 |

Available sizes: Makrolon® sheets are available in thicknesses of 18/ 20 mm and in the following sizes; other sizes and colors on request.

Colors:

Makrolon® Titan clear 099

Sizes (standard):

3,050 x 2,050 mm

Permanent Service Temperature: The permanent service temperature without load is approx. 120 °C.

Fire Rating (*): Oxygen index (LOI) ISO 4589-2 Method A: 28% for Makrolon®

| Country | Standard | Rating | Thickness | Color |
|---------|----------|--------|------------|-----------|
| Germany | DIN 4102 | B2 | 18 – 20 mm | clear 099 |

(*) Fire certificates could be limited in time and scope, always check if the mentioned certificate is valid for the purchased Polycarbonate sheet type at the date of delivery. Polycarbonate sheets may change their fire behavior due to ageing and weathering. The indicated fire rating was tested on new / unweathered Product in accordance with the indicated fire classification standards.



Bayer MaterialScience

Bayer MaterialScience GmbH

Otto-Hesse-Straße 19/T9, 64293 Darmstadt, Germany

Tel. +49 6151 13 03-0

Fax +49 6151 13 03-500

www.bayersheeteurope.com