

PLEXIGLAS®

Solid sheet, block, multi-skin sheet, corrugated sheet, tube and rod

PLEXIGLAS® GS/XT

Application Characteristics of PLEXIGLAS®

| PLEXIGLAS® GS | PLEXIGLAS® XT |
|--|--|
| cast | extruded |
| absolutely colorless and clear | absolutely colorless and clear |
| break-resistant to impact-resistant (PLEXIGLAS® Resist) | break-resistant to impact-resistant (PLEXIGLAS® Resist 45–100) |
| unequalled resistance to weathering and aging | unequalled resistance to weathering and ageing |
| high-quality surface and planarity; high-gloss, matt (PLEXIGLAS® Satinice) | very good surface; high-gloss, textured or matt (PLEXIGLAS® Satinice) |
| solid sheets, blocks and round rods | solid sheets, tubes, round rods, multi-skin sheets, corrugated sheets |
| 2 mm to 160 mm solid sheet/block thickness | 1.5 to 25 mm solid sheet thickness, multi-skin sheets 8, 16 and 32 mm thick |
| standard size 3050 x 2030 mm up to 25 mm thick standard size 3000 x 2000 mm from 30 mm thick | standard size for solid sheets 3050 x 2050 mm (+ extra lengths) |
| over 40 standard colours | over 20 standard colours |
| good resistance to diluted acids and to alkalis, limited resistance to organic solvents | good resistance to diluted acids and to alkalis, limited resistance to organic solvents. |
| very easy to work, similar to hardwood | easy to work, similar to hardwood |
| easy to thermoform over a wide range of conditions | very easy to thermoform under optimum, constant conditions |
| easily and firmly bonded, e.g. with reaction adhesives (e.g. ACRIFIX® 2R 0190, 1R 0192) | very easily bonded, also with solvent adhesives (e.g. ACRIFIX® 1S 0116, 1S 0117) |
| burns more or less like hardwood; very little smoke generation; combustion gases are non-toxic and non-corrosive | burns more or less like hardwood; very little smoke generation; combustion gases are non-toxic and non-corrosive |
| max. service temperature approx. 80°C | max. service temperature approx. 70°C |

PLEXIGLAS®

Solid sheet, block, multi-skin sheet, corrugated sheet, tube and rod

Survey of PLEXIGLAS® grades and relevant product groups

| PLEXIGLAS® GS | |
|---|---|
| PLEXIGLAS® GS OF00 Standard solid sheet (and also rod) grade from 2 to 25 mm thickness, largely UV-absorbing. | PLEXIGLAS® GS OF00 Standard grade for blocks from 30 mm thickness, UV-absorbing. |
| PLEXIGLAS® LED (for backlighting) UV-absorbing grades especially for backlighting, with LED-optimised properties, such as maximum transmission and optimum light diffusion. | PLEXIGLAS® LED (for edge lighting) Transparent, UV-absorbing, "forward-diffusing" special grades for edge-lit and ultra-slim illuminated signs and light objects. |
| PLEXIGLAS® Resist Special solid sheet grade with greater impact strength and lower rigidity, with high-gloss or matt surfaces, UV absorbing, for windscreens on two-wheeled vehicles, trade show booth construction and store fixtures, protective glazing. | PLEXIGLAS® Satinice Colourless and coloured standard grades with one (SC) and two (DC) satin surfaces for furniture, displays, illuminated signs and light objects. |
| PLEXIGLAS® GS Colours Transparent, translucent, opaque, fluorescent standard and special grades. | PLEXIGLAS® GS OA31 UV-absorbing special grade for applications requiring high UV protection, as well as for areas with strong sunlight. |
| PLEXIGLAS® GS OZ09 UV-absorbing special grade with increased heat deflection temperature and better chemical resistance. | PLEXIGLAS® GS OZ18 UV-absorbing special grade for exacting demands (e.g. for fibre-optic cables). |
| PLEXIGLAS® GS 241, 245, 249 Special grades approved for aircraft glazing, UV-absorbing, of high optical quality. | PLEXIGLAS® GS 24581 UV-transmitting, highly UV-resistant colourless and transparent-coloured special grades for tanning beds. |
| PLEXIGLAS® Soundstop GS UV-absorbing special solid sheet grade, complies with ZTV-Lsw O6, EN 1793 and EN 1794 for noise barriers. | PLEXIGLAS® Soundstop GS CC UV-absorbing solid sheets with integrated PA threads, complies with ZTV-Lsw O6, EN 1793 and EN 1794 for noise barriers. |
| PARAPAN® High-gloss solid acrylic sheets in 18 mm main thickness with special opaque standard and special colours for furniture fronts. | |

¹ Europ. Patent EP 1 164 633

PLEXIGLAS®

Solid sheet, block, multi-skin sheet, corrugated sheet, tube and rod

Survey of PLEXIGLAS® Grades and Relevant Product Groups

| PLEXIGLAS® XT | |
|--|---|
| <p>PLEXIGLAS® XT 0A000 Standard solid sheet grade; largely UV-absorbing. Special grade (0A000 HQ) with high quality suitable for mirror coating.</p> | <p>PLEXIGLAS® XT 0A070 Standard grades of tubes and round rods; UV-transmitting.</p> |
| <p>PLEXIGLAS® XT 0A370 UV-transmitting and highly UV-resistant colourless solid sheet grade (e.g. for conservatories, sun terraces).</p> | <p>PLEXIGLAS® XT 0A770 UV-transmitting, highly UV-resistant colourless special grade for tanning bed canopies; thickness max. 3 mm.</p> |
| <p>PLEXIGLAS® XT 0A570 (UV 100) Family of UV-absorbing and UV-protecting standard grades for glazing of pictures and exhibits.</p> | <p>PLEXIGLAS® XT Colours Transparent, translucent, opaque, standard and special grades.</p> |
| <p>PLEXIGLAS® Hi-Gloss A noble appearance and special deep-view effect are the characteristics of these high-gloss solid sheets, which are available in various colours.</p> | <p>PLEXIGLAS® LED (for edge lighting) UV-absorbing, "forward-diffusing" special grade for edge-lit and ultra-slim illuminated signs.</p> |
| <p>PLEXIGLAS® Optical Transparent solid sheets with a non-scratch coating and very good abrasion and chemical resistance. Available with a high-gloss (HC) or matt (HCM) surface finish.</p> | <p>PLEXIGLAS® Reflections Attractively mirror-coated and reflective solid sheets with a metallic, high-gloss or satin-finished surface.</p> |
| <p>PLEXIGLAS® Satinice ODO10 DF Solid sheets and tubes satin-finished on both sides and with diffuser beads evenly distributed throughout the material, for light objects, signs and illuminated signs.</p> | <p>PLEXIGLAS® Satinice SC/DC Colourless and coloured (multi-coloured), co-extruded standard and special grades with one (SC) and two (DC) satin surfaces for furniture, displays, illuminated signs and light objects.</p> |
| <p>PLEXIGLAS® Resist 6 45, -65, -75, -100 Standard grades of solid sheets with higher, graded impact strength and reduced rigidity, UV-absorbing.</p> | <p>PLEXIGLAS® Textures Solid sheets with a variety of classical surface textures, combined with trendy colours.</p> |
| <p>PLEXIGLAS® Heatstop XT / SP / WP ³ IR-reflecting standard grades that greatly reduce incident solar radiation of solid sheets, multi-skin sheets with a water-dispersing NO DROP 4 coating on one side, and corrugated sheets; for domed and continuous rooflights, patio and conservatory roofs, etc.; UV-absorbing.</p> | <p>PLEXIGLAS® Alltop SP ² Group of multi-skin sheets with a water-dispersing coating on both surfaces.</p> |
| | <p>PLEXIGLAS® Resist SP / WP ⁵ Groups of multi-skin sheets with higher impact strength, with a water-dispersing NO DROP coating on one side, and corrugated sheets; UV-absorbing.</p> |
| <p>PLEXIGLAS® Soundstop XT ⁷ UV-absorbing special grades of solid sheet, complies with ZTV-Lsw 06, EN 1793 and EN 1794 for noise barriers.</p> | |

² Europ. Patent EP 530 617

³ Europ. Patent EP 548 822

⁴ Europ. Patent EP 149 182

⁵ Europ. Patent EP 733 754

⁶ Europ. Patent EP 776 931

⁷ Europ. Patent EP 600 332

PLEXIGLAS®

Solid sheet, block, multi-skin sheet, corrugated sheet, tube and rod

Typical property values (at 23°C and 50% relative humidity)

| Mechanical properties | | | | | |
|---|-----------------------------|-------------------------------|---|-------------------|-------------------------------------|
| | PLEXIGLAS® GS OFOO; OZO9 | PLEXIGLAS® XT OA000; OA070 | PLEXIGLAS® Resist 45; 65; 75; 100 | Unit | Test standard |
| Density ρ | 1.19 | 1.19 | 1.19 | g/cm ³ | ISO 1183 |
| Impact strength a_{cU} (Charpy) | 15 | 15 | 45; 65; 75; no break | kJ/m ² | ISO 179/1fu |
| Notched impact strength a_{iN} (Izod) | 1.6 | 1.6 | 2,5; 4,5; 6,0; 6,5 | kJ/m ² | ISO 180/1 A |
| Notched impact strength a_{cN} (Charpy) | - | - | 3,5; 6,5; 7,5; 8,0 | kJ/m ² | ISO 179/1eA |
| Tensile strength σ_M | | | | MPa | ISO 527-2/1B/5 |
| - 40 °C | 110 | 100 | - | | |
| 23 °C | 80 | 72 | 60; 50; 45; 40 | | |
| 70 °C | 40 | 35 | - | | |
| Elongation at break ϵ_B | 5.5 | 4.5 | - | % | ISO 527-2/1B/5 |
| Nominal elongation at break ϵ_{tB} | - | - | 10; 15; 20; 25 | % | ISO 527-2/1B/50 |
| Flexural strength σ_{fB} Standard test specimen (80 x 10 x 4 mm ³) | 115 | 105 | 95; 85; 77; 69 | MPa | ISO 178 |
| Compressive yield stress σ_{dF} | 110 | 103 | - | 103 | ISO 604 |
| Max. safety stress σ_{max} (up to 40 °C) | 5-10 | 5-10 | 5-10 | MPa | - |
| Modulus of elasticity E_t (short-term value) | 3300 | 3300 | 2700; 2200; 2000; 1800 | MPa | ISO 527-2/1B/1 |
| Min. cold bending radius | 330 x thickness | 330 x thickness | 270 x thickness; 210 x thickness; 180 x thickness; 150 x thickness | - | - |
| Dynamic shear modulus G at approx. 10 Hz | 1700 | 1700 | - | MPa | ISO 537 |
| Indentation hardness $H_{961/30}$ | 175 | 175 | 145; 130; 120; 100 | MPa | ISO 2039-1 |
| Abrasion resistance in Taber abrader test (100 rev.; 5.4 N; CS-10F) | 20 -30 | 20 -30 | 20 -30; 30 -40; 30 -40; 30 -40 | % Haze | ISO 9352 |
| Coefficient of friction μ | | | | - | - |
| plastic / plastic | 0.8 | 0.8 | - | | |
| plastic / steel | 0.5 | 0.5 | - | | |
| steel / plastic | 0.45 | 0.45 | - | | |
| Poisson's ratio μ_B (dilatation speed of 5% per min; up to 2% dilatation; at 23 °C) | 0.37 | 0.37 | 0.41; 0.42. 0.41; 0.43 | - | ISO 527-1 |
| Resistance to puck impact from thickness | - | - | -; from 5mm; -; - | - | Similar to DIN 18 032. Part 3 |

PLEXIGLAS®

Solid sheet, block, multi-skin sheet, corrugated sheet, tube and rod

Thermal properties

| | PLEXIGLAS® GS OF00; OZ09 | PLEXIGLAS® XT OA000; OA070 | PLEXIGLAS® Resist 45; 65; 75; 100 | Unit | Test standard |
|--|-----------------------------|-------------------------------|---|--------------------|------------------------------------|
| Coefficient of linear thermal expansion α for 0 – 50 °C | $7 \cdot 10^{-5}$ (= 0,07) | $7 \cdot 10^{-5}$ (= 0,07) | $7 \cdot 10^{-5}$; $8 \cdot 10^{-5}$; $9 \cdot 10^{-5}$; $11 \cdot 10^{-5}$ (0,07; 0,08; 0,09; 0,11) | 1/K (mm/m °C) | DIN 53752-A |
| Possible expansion due to heat and moisture | 5 | 5 | 5; 6; 6; 8 | mm/m | - |
| Thermal conductivity λ | 0.19 | 0.19 | - | W/mK | DIN 52612 |
| U-value k for thickness | | | | W/m ² K | DIN 4701 |
| 1 mm | 5.8 | 5.8 | 5.8 | | |
| 3 mm | 5.6 | 5.6 | 5.6 | | |
| 5 mm | 5.3 | 5.3 | 5.3 | | |
| 10 mm | 4.4 | 4.4 | 4.4 | | |
| Specific heat c | 1.47 | 1.47 | 1.47 | J/gK | - |
| Forming temperature | 160 – 175 | 150 – 160 | 150 – 160; 140 – 150; 140 – 150; 140 – 150 | °C | - |
| Max. surface temperature (IR radiator) | 200 | 180 | - | °C | - |
| Max. permanent service temperature | 80 | 70 | 70; 70; 70; 65 | °C | - |
| Reverse forming temperature | > 80; > 90 | > 80; > 80 | > 80; > 80; > 75; > 70 | °C | - |
| Ignition temperature | 425 | 430 | - | °C | DIN 51794 |
| Smoke gas volume | very little | very little | very little | - | DIN 4102 |
| Smoke gas toxicity | none | none | none | - | DIN 53436 |
| Smoke gas corrosiveness | none | none | none | - | - |
| Building material class | B2 | B2 | B2 | - | DIN 4102 |
| Combustion behavior | Class 3 E | Class 3 E | - E | - - | BS 476, Part 7 + 6 DIN EN 13501 |
| Vicat softening temperature | 115 | 103 | 102; 100; 100; 97 | °C | ISO 306, Method B 50 |
| Heat deflection temperature under load (HDT) | - | - | - | °C | ISO 75 |
| deflection 1.8 MPa | 105; 107 | 95 | 94; 93; 92; 90 | - | - |
| deflection 0.45 MPa | 113; 115 | 100 | 99; 98; 96; 93 | - | - |

PLEXIGLAS®

Solid sheet, block, multi-skin sheet, corrugated sheet, tube and rod

Acoustical properties

| | PLEXIGLAS® GS OF00; OZ09 | PLEXIGLAS® XT OA000; OA070 | PLEXIGLAS® Resist 45; 65; 75; 100 | Unit | Test standard |
|--|-----------------------------|-------------------------------|--------------------------------------|------|---------------|
| Sound velocity (at room temperature) | 2700 – 2800 | 2700 – 2800 | - | m/s | - |
| Weight sounded reduction index R_w at thickness | | | | dB | - |
| 4 mm | 26 | 26 | - | | |
| 6 mm | 30 | 30 | - | | |
| 10 mm | 32 | 32 | - | | |

Optical properties

| | | | | | |
|---|--------|---------|----------------|---|------------------|
| Transmittance T_{D65} | ~ 92 | ~ 92 | ~ 91 | % | DIN 5036, Part 3 |
| UV transmission | no; no | no; yes | no; no; no; no | - | - |
| Reflection loss the visible range (for each surface) | 4 | 4 | 4 | % | - |
| Total energy transmittance g | 85 | 85 | 85 | % | DIN EN 410 |
| Absorption in the visible range | < 0.05 | < 0.05 | < 0.05 | % | - |
| Refractive index n_{D20} | 1.491 | 1.491 | 1.491 | - | ISO 489 |

Electrical properties

| | | | | | |
|---|-------------------|-------------------|-------------|----------|-------------------------|
| Volume resistivity ρ_D | > 10^{15} | > 10^{15} | > 10^{14} | Ohm · cm | DIN VDE 0303, Part 3 |
| Surface resistivity σ_{RoA} | $5 \cdot 10^{13}$ | $5 \cdot 10^{13}$ | > 10^{14} | Ohm | DIN VDE 0303, Part 3 |
| Dielectric strength E_d (1 mm thickness) | ~ 30 | ~ 30 | - | kV/mm | DIN VDE 0303, Part 2 |
| Dielectric constant ϵ | | | | | DIN VDE 0303, Part 4 |
| at 50 Hz | 3.6 | 3.7 | - | - | |
| at 0.1 MHz | 2.7 | 2.8 | - | - | |
| Dissipation factor $\tan \delta$ | | | | | DIN VDE 0303, Part 4 |
| at 50 Hz | 0.06 | 0.06 | - | - | |
| at 0.1 MHz | 0.02 | 0.02 | - | - | |
| Tracking, CTI-Value | 600 | 600 | - | - | DIN VDE 0303, Part 1 |

PLEXIGLAS®

Solid sheet, block, multi-skin sheet, corrugated sheet, tube and rod

Behaviour towards water

| | PLEXIGLAS® GS OFOO; OZ09 | PLEXIGLAS® XT OA000; OA070 | PLEXIGLAS® Resist 45; 65; 75; 100 | Unit | Test standard |
|---|-----------------------------|-------------------------------|--------------------------------------|-----------------------|---------------------|
| Water absorption (24 hrs, 23 °C) from dry state; specimen 60 x 60 x 2 mm³ | 41 | 38 | 41; 45; 46; 49 | mg | ISO 62, Method 1 |
| Max. weight gain during immersion | 2,1 | 2,1 | 2,1 | % | ISO 62, Method 1 |
| Permeability to | | | | g cm | - |
| | | | | cm ² h Pax | |
| water vapour | 2,3 · 10 ⁻¹⁰ | 2,3 · 10 ⁻¹⁰ | - | | |
| N ₂ | 4,5 · 10 ⁻¹⁵ | 4,5 · 10 ⁻¹⁵ | - | | |
| O ₂ | 2,0 · 10 ⁻¹⁴ | 2,0 · 10 ⁻¹⁴ | - | | |
| CO ₂ | 1,1 · 10 ⁻¹³ | 1,1 · 10 ⁻¹³ | - | | |
| air | 8,3 · 10 ⁻¹⁵ | 8,3 · 10 ⁻¹⁵ | - | | |

Röhm GmbH
Acrylic Products

Riedbahnstraße 70
64331 Weiterstadt
Germany

www.plexiglas.de
www.roehm.com

® = registered trademark

PLEXIGLAS is a registered trademark of Röhm GmbH, Darmstadt, Germany.
Certified to DIN EN ISO 9001 (Quality) and DIN EN ISO 14001 (Environment)

This information and all further technical advice is based on our present knowledge and experience. However, it implies no liability or other legal responsibility on our part, including with regard to existing third party intellectual property rights, especially patent rights. In particular, no warranty, whether express or implied, or guarantee of product properties in the legal sense is intended or implied. We reserve the right to make any changes according to technological progress or further developments.

The customer is not released from the obligation to conduct careful inspection and testing of incoming goods. Performance of the product described herein should be verified by testing, which should be carried out only by qualified experts in the sole responsibility of a customer. Reference to trade names used by other companies is neither a recommendation, nor does it imply that similar products could not be used.