



**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

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## Survey of PLEXIGLAS® grades and relevant product groups

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

<sup>1</sup> Europ. Patent EP 1 164 633

### Survey of PLEXIGLAS® Grades and Relevant Product Groups

PLEXIGLAS® XT	
<p><b>PLEXIGLAS® XT 0A000</b> Standard solid sheet grade; largely UV-absorbing. Special grade (0A000 HQ) with high quality suitable for mirror coating.</p>	<p><b>PLEXIGLAS® XT 0A070</b> Standard grades of tubes and round rods; UV-transmitting.</p>
<p><b>PLEXIGLAS® XT 0A370</b> UV-transmitting and highly UV-resistant colourless solid sheet grade (e.g. for conservatories, sun terraces).</p>	<p><b>PLEXIGLAS® XT 0A770</b> UV-transmitting, highly UV-resistant colourless special grade for tanning bed canopies; thickness max. 3 mm.</p>
<p><b>PLEXIGLAS® XT 0A570 (UV 100)</b> Family of UV-absorbing and UV-protecting standard grades for glazing of pictures and exhibits.</p>	<p><b>PLEXIGLAS® XT Colours</b> Transparent, translucent, opaque, standard and special grades.</p>
<p><b>PLEXIGLAS® Hi-Gloss</b> 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><b>PLEXIGLAS® LED (for edge lighting)</b> UV-absorbing, "forward-diffusing" special grade for edge-lit and ultra-slim illuminated signs.</p>
<p><b>PLEXIGLAS® Optical</b> 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><b>PLEXIGLAS® Reflections</b> Attractively mirror-coated and reflective solid sheets with a metallic, high-gloss or satin-finished surface.</p>
<p><b>PLEXIGLAS® Satinice ODO10 DF</b> 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><b>PLEXIGLAS® Satinice SC/DC</b> 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><b>PLEXIGLAS® Resist 6 45, -65, -75, -100</b> Standard grades of solid sheets with higher, graded impact strength and reduced rigidity, UV-absorbing.</p>	<p><b>PLEXIGLAS® Textures</b> Solid sheets with a variety of classical surface textures, combined with trendy colours.</p>
<p><b>PLEXIGLAS® Heatstop XT / SP / WP <sup>2</sup></b> 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><b>PLEXIGLAS® Alltop SP <sup>2</sup></b> Group of multi-skin sheets with a water-dispersing coating on both surfaces.</p>
<p><b>PLEXIGLAS® Soundstop XT <sup>7</sup></b> UV-absorbing special grades of solid sheet, complies with ZTV-Lsw 06, EN 1793 and EN 1794 for noise barriers.</p>	<p><b>PLEXIGLAS® Resist SP / WP <sup>5</sup></b> 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>

<sup>2</sup> Europ. Patent EP 530 617

<sup>3</sup> Europ. Patent EP 548 822

<sup>4</sup> Europ. Patent EP 149 182

<sup>5</sup> Europ. Patent EP 733 754

<sup>6</sup> Europ. Patent EP 776 931

<sup>7</sup> Europ. Patent EP 600 332

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

Mechanical properties					
	PLEXIGLAS® GS OFOO; OZO9	PLEXIGLAS® XT OAOOO; OAO7O	PLEXIGLAS® Resist 45; 65; 75; 100	Unit	Test standard
<b>Density <math>\rho</math></b>	1.19	1.19	1.19	g/cm <sup>3</sup>	ISO 1183
<b>Impact strength <math>a_{cU}</math> (Charpy)</b>	15	15	45; 65; 75; no break	kJ/m <sup>2</sup>	ISO 179/1fu
<b>Notched impact strength <math>a_{cN}</math> (Izod)</b>	1.6	1.6	2.5; 4.5; 6.0; 6.5	kJ/m <sup>2</sup>	ISO 180/1 A
<b>Notched impact strength <math>a_{cN}</math> (Charpy)</b>	-	-	3.5; 6.5; 7.5; 8.0	kJ/m <sup>2</sup>	ISO 179/1eA
<b>Tensile strength <math>\sigma_M</math></b>				MPa	ISO 527-2/1B/5
- 40 °C	110	100	-		
23 °C	80	72	60; 50; 45; 40		
70 °C	40	35	-		
<b>Elongation at break <math>\epsilon_B</math></b>	5.5	4.5	-	%	ISO 527-2/1B/5
<b>Nominal elongation at break <math>\epsilon_{tB}</math></b>	-	-	10; 15; 20; 25	%	ISO 527-2/1B/50
<b>Flexural strength <math>\sigma_{fB}</math></b> Standard test specimen (80 x 10 x 4 mm <sup>3</sup> )	115	105	95; 85; 77; 69	MPa	ISO 178
<b>Compressive yield stress <math>\sigma_{dF}</math></b>	110	103	-	103	ISO 604
<b>Max. safety stress <math>\sigma_{max}</math> (up to 40 °C)</b>	5-10	5-10	5-10	MPa	-
<b>Modulus of elasticity <math>E_t</math></b> <b>(short-term value)</b>	3300	3300	2700; 2200; 2000; 1800	MPa	ISO 527-2/1B/1
<b>Min. cold bending radius</b>	330 x thickness	330 x thickness	270 x thickness; 210 x thickness; 180 x thickness; 150 x thickness	-	-
<b>Dynamic shear modulus <math>G</math> at approx. 10 Hz</b>	1700	1700	-	MPa	ISO 537
<b>Indentation hardness <math>H_{961/30}</math></b>	175	175	145; 130; 120; 100	MPa	ISO 2039-1
<b>Abrasion resistance in Taber abrader test</b> <b>(100 rev.; 5.4 N; CS-10F)</b>	20 -30	20 -30	20 -30; 30 -40; 30 -40; 30 -40	% Haze	ISO 9352
<b>Coefficient of friction <math>\mu</math></b>				-	-
plastic / plastic	0.8	0.8	-		
plastic / steel	0.5	0.5	-		
steel / plastic	0.45	0.45	-		
<b>Poisson's ratio <math>\mu_B</math></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
<b>Resistance to puck impact from thickness</b>	-	-	-; from 5mm; -; -	-	Similar to DIN 18 032. Part 3

### Thermal properties

	PLEXIGLAS® GS OF00; OZ09	PLEXIGLAS® XT OA000; OA070	PLEXIGLAS® Resist 45; 65; 75; 100	Unit	Test standard
<b>Coefficient of linear thermal expansion <math>\alpha</math> for 0 – 50 °C</b>	$7 \cdot 10^{-5}$ (= 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
<b>Possible expansion due to heat and moisture</b>	5	5	5; 6; 6; 8	mm/m	-
<b>Thermal conductivity <math>\lambda</math></b>	0.19	0.19	-	W/mK	DIN 52612
<b>U-value k for thickness</b>				W/m²K	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		
<b>Specific heat c</b>	1.47	1.47	1.47	J/gK	-
<b>Forming temperature</b>	160 – 175	150 – 160	150 – 160; 140 – 150; 140 – 150; 140 – 150	°C	-
<b>Max. surface temperature (IR radiator)</b>	200	180	-	°C	-
<b>Max. permanent service temperature</b>	80	70	70; 70; 70; 65	°C	-
<b>Reverse forming temperature</b>	> 80; > 90	> 80; > 80	> 80; > 80; > 75; > 70	°C	-
<b>Ignition temperature</b>	425	430	-	°C	DIN 51794
<b>Smoke gas volume</b>	very little	very little	very little	-	DIN 4102
<b>Smoke gas toxicity</b>	none	none	none	-	DIN 53436
<b>Smoke gas corrosiveness</b>	none	none	none	-	-
<b>Building material class</b>	B2	B2	B2	-	DIN 4102
<b>Combustion behavior</b>	Class 3 E	Class 3 E	- E	- -	BS 476, Part 7 + 6 DIN EN 13501
<b>Vicat softening temperature</b>	115	103	102; 100; 100; 97	°C	ISO 306, Method B 50
<b>Heat deflection temperature under load (HDT)</b>	-	-	-	°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	-	-

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## Acoustical properties

	PLEXIGLAS® GS OF00; OZO9	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 $n_D^{20}$	1.491	1.491	1.491	-	ISO 489

## Electrical properties

Volume resistivity $\rho_D$	> $10^{15}$	> $10^{15}$	> $10^{14}$	Ohm · cm	DIN VDE 0303, Part 3
Surface resistivity $\sigma_{RoA}$	$5 \cdot 10^{13}$	$5 \cdot 10^{13}$	> $10^{14}$	Ohm	DIN VDE 0303, Part 3
Dielectric strength $E_d$ (1 mm thickness)	~ 30	~ 30	-	kV/mm	DIN VDE 0303, Part 2
Dielectric constant $\epsilon$					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

## Behaviour towards water

	PLEXIGLAS® GS OF00; OZ09	PLEXIGLAS® XT OA000; OA070	PLEXIGLAS® Resist 45; 65; 75; 100	Unit	Test standard
<b>Water absorption (24 hrs, 23 °C) from dry state; specimen 60 x 60 x 2 mm<sup>3</sup></b>	41	38	41; 45; 46; 49	mg	ISO 62, Method 1
<b>Max. weight gain during immersion</b>	2,1	2,1	2,1	%	ISO 62, Method 1
<b>Permeability to</b>				g cm	-
				cm <sup>2</sup> h Pax	
water vapour	2,3 · 10 <sup>-10</sup>	2,3 · 10 <sup>-10</sup>	-		
N <sub>2</sub>	4,5 · 10 <sup>-15</sup>	4,5 · 10 <sup>-15</sup>	-		
O <sub>2</sub>	2,0 · 10 <sup>-14</sup>	2,0 · 10 <sup>-14</sup>	-		
CO <sub>2</sub>	1,1 · 10 <sup>-13</sup>	1,1 · 10 <sup>-13</sup>	-		
air	8,3 · 10 <sup>-15</sup>	8,3 · 10 <sup>-15</sup>	-		

**Röhm GmbH**  
Acrylic Products

Riedbahnstraße 70  
64331 Weiterstadt  
Germany

[www.plexiglas.de](http://www.plexiglas.de)  
[www.roehm.com](http://www.roehm.com)

® = registered trademark

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Certified to DIN EN ISO 9001 (Quality) and DIN EN ISO 14001 (Environment)

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