

Product Description

PLEXIGLAS® GS
PLEXIGLAS® XT

PLEXIGLAS® – the trademark for the world's first acrylic – was invented by us and first produced in 1933 by the casting process.

Today we manufacture PLEXIGLAS® GS (= cast) and PLEXIGLAS® XT (= extruded) in many different product forms.

Application Characteristics of PLEXIGLAS®

PLEXIGLAS® GS

PLEXIGLAS® XT

cast

extruded

absolutely colorless and clear	
break-resistant to impact-resistant (PLEXIGLAS RESIST® HP)	break-resistant to impact-resistant (PLEXIGLAS RESIST® 45 ... 100)
unequaled resistance to weathering and aging	
high-quality surface and planarity; high-gloss, textured or satin (PLEXIGLAS SATINICE® DC/SC)	very good surface; high-gloss, textured or satin (PLEXIGLAS SATINICE® AR/DF)
solid sheets, blocks, tubes, round and square rods	solid sheets, tubes, round rods, multi-skin sheets, corrugated sheets, mirror sheets
2 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 sizes up to 3050 x 2030 mm	standard sizes up to 4050 x 2050 mm (+ extra lengths)
over 50 standard colors	over 25 standard colors
good resistance to dilute 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 optimal, constant conditions
easily and firmly bonded, e.g. with reaction adhesives (e.g. ACRIFIX® 190, 192)	very easily bonded, also with solvent adhesives (e.g. ACRIFIX® 116, 117)
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

Survey of PLEXIGLAS® Grades and Relevant Product Groups

PLEXIGLAS® GS

PLEXIGLAS® GS 209

UV-absorbing special grade with increased heat deflection temperature and better chemical resistance

PLEXIGLAS® GS 215

STRETCHED

UV-absorbing special grade, flame-retarded, B1 to DIN 4102, increased toughness (for cold-curved glazing in buildings)

PLEXIGLAS® GS 218

UV-transmitting special grade for exacting demands (e.g. for optical waveguides)

PLEXIGLAS® GS 221

Standard grade for blocks over 90 mm thick, UV-absorbing

PLEXIGLAS® GS 222

Standard grade for blocks 30 to 80 mm thick, UV-absorbing

PLEXIGLAS® GS 231

UV-absorbing special grade for applications requiring high UV protection, as well as for areas with strong sunlight

PLEXIGLAS® GS 232

Standard grade for tubes, UV-absorbing

PLEXIGLAS® GS 233

Standard solid sheet grade from 2 to 25 mm thickness, largely UV-absorbing

PLEXIGLAS® GS 235

Clear special grade with increased heat deflection temperature, yet more easy to form (e.g. for sanitary-ware)

PLEXIGLAS® GS 238

UV-transmitting, clear special grade for food contact applications; product composition complies with Recommendation XXII of the German Health Office and with FDA Regulation § 177.1010; for indoor use.

PLEXIGLAS® GS 241, 245, 249

Special grades approved for aircraft glazing, UV-absorbing, of high optical quality

PLEXIGLAS® GS 1002

UV-absorbing, „forward-diffusing“ special grade for edge-lit, energy-saving and ultraslim illuminated signs

PLEXIGLAS® GS Colors

Transparent, translucent, opaque or fluorescent standard and special grades

PLEXIGLAS RESIST® HP

Special solid sheet grade with greater impact strength and lower rigidity, with high-gloss or satin surfaces, UV-absorbing, for windshields on two-wheeled vehicles, tradeshow booth construction and store fixtures, protective glazing etc.

PLEXIGLAS SATINICE®

SC and DC

Clear and colored standard grades with one (SC) and two (DC) satin surfaces for furniture, displays, illuminated signs and light objects

PLEXIGLAS SOUNDSTOP® GS

UV-absorbing special solid sheet grade, complies with ZTV-Lsw 88, EN 1793 and EN 1794 for noise barriers

PLEXIGLAS SOUNDSTOP®

GS CC

UV-absorbing special solid sheet grade with integrated PA threads, complies with ZTV-Lsw 88, EN 1793 and EN 1794 for noise barriers

PLEXIGLAS SUNACTIVE® GS ¹⁾

UV-transmitting, highly UV-resistant clear and transparent-colored special grades for tanning beds

PLEXIGLAS® GS SW and

PLEXIGLAS FREE FLOW®

GS SW

Clear and colored special grades offering ease/particular ease (FREE FLOW) of forming, with better chemical resistance and higher heat deflection temperature; for sanitary-ware

PLEXIGLAS truLED®

UV-absorbing special grades in specific colors for illuminated signs with LEDs or colored neon tubing

PLEXIGLAS® MULTICOLOR

Special solid sheet grades from 9 mm thickness, consisting of two or three transparent, translucent, opaque or fluorescent colored layers, with high-gloss, satin or textured surfaces; for applications with cutouts or decorative edge effects.

Textured PLEXIGLAS®

Trend Line

Standard grades of clear and transparent-colored solid sheets with a textured surface for balcony parapets, decorative glazing and promotional items

Our group of cast acrylic products furthermore comprises:

PLEXICOR®

Special grades of solid sheets and formed products made from mineral-filled, opaquely colored acrylic material with surface décors; for countertops and items of furniture, tradeshow booths and store fixtures

PARAPAN®

High-gloss solid acrylic sheets in 18 mm main thickness with special opaque standard and special colors for furniture fronts

1) Europ. patent EP 1 164 633

PLEXIGLAS® XT

PLEXIGLAS® XT 20070

Standard solid sheet grade; largely UV-absorbing

PLEXIGLAS® XT 20070 HQ

High-quality special grade of solid sheets, suitable for mirror coating, largely UV-absorbing

PLEXIGLAS® XT 24370

UV-transmitting and highly UV-resistant clear standard grade of solid sheet (for conservatories, patios, etc).

PLEXIGLAS® XT

29070 or 29080

Standard grades of PLEXIGLAS ALLTOP® SDP 16 double-skin sheets, and of tubes and round rods; UV-transmitting

PLEXIGLAS ALLTOP® SP ³⁾

Group of multi-skin sheets (The "Noble" Sheet) with a water-dispersing coating on both surfaces and inside the cavities

PLEXIGLAS® XT Colors

Transparent, translucent or opaque standard and special grades

PLEXIGLAS Gallery®

Family of UV-absorbing and UV-protecting standard grades for glazing of pictures and exhibits

PLEXIGLAS HEATSTOP®

XT / SP / WP ¹⁾

IR-reflecting standard grades that greatly reduce incident solar radiation of solid sheets, multi-skin sheets (The "Cool" Sheet) with a water-dispersing NO DROP ²⁾ coating on one side, and corrugated sheets (The "Cool" Sheet); for domed and continuous rooflights, patio and conservatory roofs etc.; UV-absorbing

PLEXIGLAS RESIST® ⁴⁾

45, -65, -75, -100

Standard grades of solid sheets with higher, graded impact strength and reduced rigidity, UV-absorbing

PLEXIGLAS RESIST®

SP / WP ⁵⁾

Groups of multi-skin sheets (The "Tough" Sheet) with higher impact strength, with a water-dispersing NO DROP ²⁾ coating on one side, and corrugated sheets (The "Tough" Sheet); UV-absorbing

PLEXIGLAS® XT RP

Satin, gray-transparent colored special grade made of special molding compound, with specific lighting-engineering performance for rear projection (RP)

PLEXIGLAS SATINICE®

AR and DF

Clear and colored standard grades with one (AR) and two (DF) satin surfaces for picture glazing, furniture, displays, illuminated signs and light objects

PLEXIGLAS SOUNDSTOP®

XT ⁶⁾

UV-absorbing special grades of solid sheet, in accordance with ZTV-Lsw 88, EN 1793 and EN 1794 for noise barriers

PLEXIGLAS® MIRROR XT

Various colored sheets of PLEXIGLAS® XT with one mirror surface, back-painted

Textured PLEXIGLAS®

Classic Line

Standard grades of clear and transparent-colored solid sheets with a textured surface for balcony parapets, decorative glazing and promotional items

PLEXIGLAS SUNACTIVE®

XT 24770

UV-transmitting, highly UV-resistant clear special grade for tanning bed canopies; thickness max. 3 mm

PLEXIGLAS SUPERCLEAR®

Group of UV-absorbing solid sheets of the highest optical quality, for optoelectronic applications

1) Europ. patent EP 548 822

2) Europ. patent EP 149 182

3) Europ. patent EP 530 617

4) Europ. patent EP 776 931

5) Europ. patent EP 733 754

6) Europ. patent EP 600 332

In addition to the mentioned products, we supply for various EUROPLEX® (films and sheets made of PMMA, PC, PSU, PPSU etc.) and ROHACELL® (PMI rigid foam).

Typical Property Values

(at 23 °C and 50 % relative humidity)

Mechanical properties	PLEXIGLAS® GS	PLEXIGLAS® XT	PLEXIGLAS RESIST®	Unit	Test standard
	233; 222; 209	20070; 29070	45; 65; 75; 100		
Density ρ	1.19	1.19	1.19	g/cm ³	ISO 1183
Impact strength a_{cU} (Charpy)	15	15	45; 65; 75;	kJ/m ²	ISO 179/1fu no break
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 a) –40 °C b) 23 °C c) 70 °C	110 80 40	100 72 35	– 60; 50; 45; 40 –	MPa	ISO 527-2/1B/5
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_{bB} , Standard test Φ specimen (80 x 10 x 4 mm ³)	115	105	95; 85; 77; 69	MPa	ISO 178 (5mm/min)
Compressive yield stress σ_{dF}	110	103	–	MPa	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;	MPa	ISO 2039-1 120; 100
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 a) plastic / plastic b) plastic / steel c) steel / plastic	0.8 0.5 0.45	0.8 0.5 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 (Test Certificate No. from FMPA Stuttgart)	–	12 mm (46/900 550)	–; 6 ¹⁾ ; (6); 6 ²⁾ mm (¹⁾ 46/901 869/Sm/C; ²⁾ 46/901 870/Sm/C)	–	similar to DIN 18032, part 3

Acoustical properties	PLEXIGLAS® GS 233; 222; 209	PLEXIGLAS® XT 20070; 29070	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: 4 mm 6 mm 10 mm	26 30 32	26 30 32	– – –	dB	–
Optical properties (of clear grades, at 3 mm thickness)	PLEXIGLAS® GS 233; 222; 209	PLEXIGLAS® XT 20070; 29070	PLEXIGLAS RESIST® 45; 65; 75; 100	Unit	Test standard
Transmittance τ_{D65}	~ 92	~ 92	~ 91	%	DIN 5036, Part 3
UV transmission	no; no; no	no; yes	no; no; no; no	–	–
Reflecion loss the visible range (for each surface)	4	4	4	%	–
Total energy transmittance g	85	85	85	%	DIN EN 410
Adsorption 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	PLEXIGLAS® GS 233; 222; 209	PLEXIGLAS® XT 20070; 29070	PLEXIGLAS RESIST® 45; 65; 75; 100	Unit	Test standard
Volume resistivity ρ_D	> 10^{15}	> 10^{15}	> 10^{14}	ohm · cm	DIN VDE 0303, Part 3
Surface resistivity R_{OA}	$5 \cdot 10^{13}$	$5 \cdot 10^{13}$	> 10^{14}	ohm	
Dielectric strength E_d (1 mm specimen thickness)	~ 30	~ 30	–	kV/mm	DIN VDE 0303, Part 2
Dielectric constant ϵ at 50 Hz at 0.1 MHz	3.6 2.7	3.7 2.8	– –	– –	DIN VDE 0303, Part 4
Dissipation factor $\tan \delta$ at 50 Hz at 0.1 MHz	0.06 0.02	0.06 0.03	– –	– –	DIN VDE 0303, Part 4
Tracking, CTI-Value	600	600	–	–	DIN VDE 0303, Part 1

Thermal properties	PLEXIGLAS® GS	PLEXIGLAS® XT	PLEXIGLAS RESIST®	Unit	Test standard
	233; 222; 209	20070; 29070	45; 65; 75; 100		
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, for thickness: 1 mm 3 mm 5 mm 10 mm	5.8 5.6 5.3 4.4	5.8 5.6 5.3 4.4	5.8 5.6 5.3 4.4	W/m²K	DIN 4701
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; > 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	non	non	non	–	DIN 53436
Smoke gas corrosiveness	non	non	non	–	–
Fire rating class	B 2, normally flammable	B 2 normally flammable	B 2, normally flammable	–	DIN 4102
	Class 3	Class 3	–	–	BS 476, Part 7 + 6
	TP(b)	TP(b)	–	–	BS 2782, Method 508A
	M 4	M 4	–	–	NF P 92 501 + 92 505
Vicat softening temperature	115	103	102; 100; 100; 97	°C	ISO 306, Method B 50
Heat deflection temperature under load (HDT) a) deflection 1.8 MPa b) deflection 0.45 MPa	105; 105; 107 113; 113; 115	95 100	94; 93; 92; 90; 99; 98; 96; 93	°C	ISO 75

Behavior towards water	PLEXIGLAS® GS 233; 222; 209	PLEXIGLAS® XT 20070; 29070	PLEXIGLAS RESIST® 45; 65; 75; 100	Unit	Test standard
Water absorption (24 hrs, 23 °C) from dry state; specimen 60 x 60 x 2 mm ³	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 water vapour	$2.3 \cdot 10^{-10}$	$2.3 \cdot 10^{-10}$	–	g cm — cm ² h Pa	–
N ₂	$4.5 \cdot 10^{-15}$	$4.5 \cdot 10^{-15}$	–		
O ₂	$2.0 \cdot 10^{-14}$	$2.0 \cdot 10^{-14}$	–		
CO ₂	$1.1 \cdot 10^{-13}$	$1.1 \cdot 10^{-13}$	–		
air	$8.3 \cdot 10^{-15}$	$8.3 \cdot 10^{-15}$	–		

Important notice

This is an international English-language information prepared for several markets.

It is essential that the selection of particular materials and their

methods of use conform with the requirements of national and local Building Regulations.

The availability of any particular product should be checked with your supplier.

Advice and delivery by:

Degussa AG
Business Unit Plexiglas

Röhm GmbH & Co. KG
Certified to DIN EN ISO 9001 (quality)
and DIN EN ISO 14001 (environment)

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PLEXIGLAS ALLTOP,
PLEXIGLAS HEATSTOP,
PLEXIGLAS RESIST,
PLEXIGLAS SATINICE,
PLEXIGLAS SOUNDSTOP,
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