



Product Data Sheet, January 2010

Makrolon® GP

Solid polycarbonate sheet

**Your benefits:**

- extreme impact strength
- resistance to a wide range of temperatures
- good fire rating

Solid Makrolon® 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.

Makrolon® GP clear 099 is a clear transparent sheet with high light transmission.

Makrolon® NR clear 099 is a transparent sheet with a matt finish and improved UV resistance on one side.

Makrolon® GP white 130 and **white 150** are translucent sheets offering good light diffusion combined with a pleasant white color.

Makrolon® GP umbra 775 sheets are brown-colored and transparent.

Makrolon® FR clear 099 is a clear transparent sheet with improved fire classification acc. to UL94.

Makrolon® FG clear 099 is a clear transparent sheet suitable for food-contact and medical applications.

Applications:

Typical applications for Makrolon® GP sheets include machine guards, lighting fixtures, signs, wall and door partitions. The sheets offer protection against involuntary breakage and wilful destruction. Makrolon® GP sheets can be thermoformed, cold-curved and machined with ease.

	Test Conditions	Typical Values	Unit	Test Method
PHYSICAL				
Density		1.2	g/cm ³	ISO 1183-1
Moisture absorption	after storage in standard climate 23 °C/50 % RH	0.15	%	ISO 62-4
	after storage in water at 23 °C until saturation	0.35	%	ISO 62-1
Refractive index	20 °C	1.586	-	ISO 489
MECHANICAL				
Tensile stress at yield		> 60	MPa	ISO 527-2/1B/50
Elongation at yield		6	%	ISO 527-2/1B/50
Tensile strength		> 60	MPa	ISO 527-2/1B/50
Elongation at break		> 70	%	ISO 527-2/1B/50
Elastic modulus		2,400	MPa	ISO 527-2/1B/1
Limiting flexural stress		approx. 90	MPa	ISO 178
Impact strength	Charpy, unnotched	no break	kJ/m ²	ISO 179/1fU
	Charpy, notched	approx. 11	kJ/m ²	ISO 179/1eA
	Izod, notched	approx. 10	kJ/m ²	ISO 180/1A
	Izod, notched †	approx. 70	kJ/m ²	ISO 180/4A
THERMAL				
Vicat softening temperature	Method B50	148	°C	ISO 306
Thermal conductivity		0.2	W/m K	DIN 52612
Coeff. of linear thermal expansion		0.065	mm/m °C	DIN 53752-A
Heat deflection temperature under load	Method A: 1.80 MPa	127	°C	ISO 75-2
	Method B: 0.45 MPa	139	°C	ISO 75-2
ELECTRICAL				
Dielectric strength		35	kV/mm	IEC 60243-1
Volume resistivity		10 ¹⁶	Ohm-cm	IEC 60093
Surface resistivity		10 ¹⁴	Ohm	IEC 60093
Dielectric constant	at 10 ³ Hz	3.1		IEC 60250
	at 10 ⁶ Hz	3		IEC 60250
Dissipation factor	at 10 ³ Hz	0.0005		IEC 60250
	at 10 ⁶ Hz	0.009		IEC 60250

The mechanical properties were measured on sheets of 4 mm or 3 mm¹ thickness.

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**S-Line**

Bayer Sheet Europe S-Line, the standard product line, represents a range of certified quality products which offer the reliable solution for most applications.

Light Transmission:

Test Method according to DIN 5036

The stated thicknesses are not all available as standard. Please ask us for more information. The stated values are typical values only.

Light transmission %	0.75	1	1,5	2	3	4	5	6	8	10	12	15
Makrolon® GP clear 099	90	90	89	89	88	87	87	86	85	83	82	80
Makrolon® NR clear 099		83	83	82	82	80						
Makrolon® GP white 130				40	30	23	18	13				
Makrolon® GP white 150				60	50	40	33	28	20			
Makrolon® GP umbra 775						75	69	65	62	53		
Makrolon® FR clear 099					88	86	85	84				

Available sizes:

Makrolon® sheets are available in thicknesses of 0.75 – 15 mm and in the following sizes; other sizes, colors and sheet thicknesses on request.

Colors:

Makrolon® GP clear 099

Makrolon® NR clear 099

Makrolon® GP white 130

Makrolon® FR clear 099

Makrolon® GP white 150

Makrolon® FG clear 099

Makrolon® GP umbra 775

Sizes (standard):

2,050 x 1,250 mm

3,050 x 2,050 mm

Permanent Service Temperature:

The permanent service temperature without load is approx. 120 °C.

Fire Rating (*):

Oxygen index (LOI) 28% ISO 4589-2 Method A.

Country	Standard	Rating	Thickness	Color
Germany	DIN 4102	B1 (indoors) burning droplets	1 – 6 mm 2 – 3 mm	clear 099 white 150
		B2	≥ 0.75 mm	all colors
	DIN 5510-2	S4 SR2 ST2 S3 SR2 ST1	2 mm 3 – 8 mm	clear 099 clear 099
France	NF P 92-501&505 NF F 16-101&102	M2 F2	1 – 15 mm 0.75 – 15 mm	clear 099 clear 099
USA	UL94	V0	≥ 2 mm	FR clear 099
Europe	EN 13501-1	B s1 d0 B s2 d0 B s1 d0	1 – 3 mm 4 mm 1 – 3 mm	clear 099 clear 099 white 150

Glow wire flammability index, IEC 60695-2-12, in °C (*):

	0.75	1	1.5	2	3	4	5	6	12
Makrolon® GP clear 099	850	850	800	800	850	960		960	960
Makrolon® GP white 130				900	960	960			
Makrolon® GP white 150				960	960				

(* fire certificates are limited in time, always check if the mentioned certificate is still valid)

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