



Makrolon® LED2045

Grades / Light guides

MVR (250 °C/2.16 kg) 17 cm³/10 min; light guides; PC with highest transmission; low viscosity; easy release; injection molding - melt temperature 260 - 300 °C; available in color code 000000 only

ISO Shortname

PC

Property	Test Condition	Unit	Standard	typical Value
Rheological properties				
C Melt volume-flow rate	250 °C/ 2.16 kg	cm³/10 min	ISO 1133	17.0
Melt volume-flow rate	300 °C/ 1.2 kg	cm³/10 min	ISO 1133	61
C Molding shrinkage, parallel	60x60x2 mm/ 500 bar	%	ISO 294-4	0.6
C Molding shrinkage, normal	60x60x2 mm/ 500 bar	%	ISO 294-4	0.65
Mechanical properties (23 °C/50 % r. h.)				
C Tensile modulus	1 mm/min	MPa	ISO 527-1,-2	2350
C Yield stress	50 mm/min	MPa	ISO 527-1,-2	63
C Yield strain	50 mm/min	%	ISO 527-1,-2	6.0
C Nominal strain at break	50 mm/min	%	ISO 527-1,-2	> 50
Stress at break	50 mm/min	MPa	ISO 527-1,-2	55
Strain at break	50 mm/min	%	b.o. ISO 527-1,-2	100
Flexural modulus	2 mm/min	MPa	ISO 178	2350
Flexural strength	2 mm/min	MPa	ISO 178	97
Flexural strain at flexural strength	2 mm/min	%	ISO 178	7.3
Flexural stress at 3.5 % strain	2 mm/min	MPa	ISO 178	72
C Charpy impact strength	23 °C	kJ/m²	ISO 179/1eU	N
Charpy impact strength	-60 °C	kJ/m²	ISO 179/1eU	N
Charpy notched impact strength	23 °C/ 3 mm	kJ/m²	ISO 21305/based on ISO 179/1eA	50P(C)
Charpy notched impact strength	-30 °C/ 3 mm	kJ/m²	ISO 21305/based on ISO 179/1eA	12C
Izod notched impact strength	23 °C/ 3 mm	kJ/m²	ISO 21305/based on ISO 180/A	50P
Izod notched impact strength	-30 °C/ 3 mm	kJ/m²	ISO 21305/based on ISO 180/A	12C
C Puncture impact properties - maximum force	23 °C	N	ISO 6603-2	4700
C Puncture impact properties - maximum force	-30 °C	N	ISO 6603-2	5700
C Puncture energy	23 °C	J	ISO 6603-2	50
C Puncture energy	-30 °C	J	ISO 6603-2	55
Ball indentation hardness		N/mm²	ISO 2039-1	115



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Property	Test Condition	Unit	Standard	typical Value
Thermal properties				
C Glass transition temperature	10 °C/min	°C	ISO 11357-1,-2	144
C Temperature of deflection under load	1.80 MPa	°C	ISO 75-1,-2	124
C Temperature of deflection under load	0.45 MPa	°C	ISO 75-1,-2	137
C Vicat softening temperature	50 N; 50 °C/h	°C	ISO 306	145
Vicat softening temperature	50 N; 120 °C/h	°C	ISO 306	146
C Coefficient of linear thermal expansion, parallel	23 to 55 °C	10 ⁻⁴ /K	ISO 11359-1,-2	0.65
C Coefficient of linear thermal expansion, normal	23 to 55 °C	10 ⁻⁴ /K	ISO 11359-1,-2	0.65
C Burning behavior UL 94 [UL recognition]	0.71 mm	Class	UL 94	V-2 (NC)
C Oxygen index	Method A	%	ISO 4589-2	27
Thermal conductivity, through-plane	23 °C; 50 % r. h.	W/(m·K)	ISO 8302	0.20
Resistance to heat (ball pressure test)		°C	IEC 60695-10-2	136
Relative temperature index (Tensile strength) [UL recognition]	0.71 mm	°C	UL 746B	125
Relative temperature index (Tensile impact strength) [UL recognition]	0.71 mm	°C	UL 746B	115
Relative temperature index (Electric strength) [UL recognition]	0.71 mm	°C	UL 746B	125
Burning rate (US-FMVSS)	>=1.0 mm	mm/min	ISO 3795	passed
Flash ignition temperature		°C	ASTM D1929	480
Self ignition temperature		°C	ASTM D1929	550
Electrical properties (23 °C/50 % r. h.)				
C Relative permittivity	100 Hz	-	IEC 60250	3.1
C Relative permittivity	1 MHz	-	IEC 60250	3.0
C Dissipation factor	100 Hz	10 ⁻⁴	IEC 60250	5
C Dissipation factor	1 MHz	10 ⁻⁴	IEC 60250	90
C Volume resistivity		Ohm·m	IEC 60093	1E14
C Surface resistivity		Ohm	IEC 60093	1E16
C Electrical strength	1 mm	kV/mm	IEC 60243-1	34
C Comparative tracking index CTI	Solution A	Rating	IEC 60112	225
Comparative tracking index CTI M	Solution B	Rating	IEC 60112	125M
Other properties (23 °C)				
C Water absorption (saturation value)	Water at 23 °C	%	ISO 62	0.30
C Water absorption (equilibrium value)	23 °C; 50 % r. h.	%	ISO 62	0.12
C Density		kg/m³	ISO 1183-1	1190
Bulk density	Pellets	kg/m³	ISO 60	660
Material specific properties				
Refractive index	Procedure A	-	ISO 489	1.584
Haze for transparent materials	3 mm	%	ISO 14782	< 0.5
Luminous transmittance (clear transparent materials)	1 mm	%	ISO 13468-2	90
C Luminous transmittance (clear transparent materials)	2 mm	%	ISO 13468-2	90
Luminous transmittance (clear transparent materials)	3 mm	%	ISO 13468-2	> 89
Luminous transmittance (clear transparent materials)	4 mm	%	ISO 13468-2	> 89
Luminous transmittance (clear transparent materials)	400 nm; 4mm	%	ISO 13468-2	> 87.5
Processing conditions for test specimens				
C Injection molding - Melt temperature		°C	ISO 294	280
C Injection molding - Mold temperature		°C	ISO 294	80
C Injection molding - Injection velocity		mm/s	ISO 294	200





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Property	Test Condition	Unit	Standard	typical Value
Recommended processing and drying conditions				
Melt temperatures		°C	-	250-300
Standard Melt temperature		°C	-	270
Barrel Temperatures - Rear		°C	-	230-240
Barrel Temperatures - Middle		°C	-	250-260
Barrel Temperatures - Front		°C	-	260-270
Barrel Temperatures - Nozzle		°C	-	260-270
Mold Temperatures		°C	-	80 - 120
Hold Pressure (% of injection pressure)		%	-	50 - 75
Plastic Back Pressure (specific)		bar	-	50 - 150
Peripheral Screw Speed		m/s	-	0.05 - 0.2
Shot-to-Cylinder Size		%	-	30 - 70
Dry Air Drying Temperature		°C	-	120
Dry Air Drying Time		h	-	2-3
Moisture Content max. (%)		%	-	<= 0,02
Vent Depth		mm	-	0.025 - 0.075

C These property characteristics are taken from the CAMPUS plastics data bank and are based on the international catalogue of basic data for plastics according to ISO 10350.

Impact properties: N = non-break, P = partial break, C = complete break

