

**Makrolon® LED2245**

 Covestro - Polycarbonates - *Polycarbonate*
**General Information**
**Product Description**

 MVR (300°C/1.2 kg) 34 cm<sup>3</sup>/10 min; light guides; optics and lenses; PC with highest transmission; low viscosity; easy release; injection molding - melt temperature 250 - 300°C

**General**

Material Status	• Commercial: Active		
Availability	• Africa & Middle East	• Europe	• North America
	• Asia Pacific	• Latin America	
Features	• Good Mold Release	• High Clarity	• Low Viscosity
Uses	• Lenses	• Lighting Applications	• Optical Applications
RoHS Compliance	• RoHS Compliant		
Processing Method	• Injection Molding		
ISO Designation	• ISO 7391-PC,MRT,(,)-24-9		

**Properties <sup>1</sup>**

Physical	Nominal Value	Unit	Test Method
Density (73°F)	1.19	g/cm <sup>3</sup>	ISO 1183
Apparent (Bulk) Density <sup>2</sup>	0.66	g/cm <sup>3</sup>	ISO 60
Melt Volume-Flow Rate (MVR) (300°C/1.2 kg)	34	cm <sup>3</sup> /10min	ISO 1133
Molding Shrinkage <sup>3</sup>			ISO 294-4
Across Flow : 536°F, 0.0787 in	0.70	%	
Flow : 0.0787 in	0.65	%	
Water Absorption (Saturation, 73°F)	0.30	%	ISO 62
Water Absorption (Equilibrium, 73°F, 50% RH)	0.12	%	ISO 62
Mechanical	Nominal Value	Unit	Test Method
Tensile Modulus (73°F)	341000	psi	ISO 527-1/1
Tensile Stress (Yield, 73°F)	9140	psi	ISO 527-2/50
Tensile Stress (Break, 73°F)	8700	psi	ISO 527-2/50
Tensile Strain (Yield, 73°F)	6.0	%	ISO 527-2/50
Tensile Strain (Break, 73°F)	130	%	ISO 527-2/50
Nominal Tensile Strain at Break (73°F)	> 50	%	ISO 527-2/50
Flexural Modulus <sup>4</sup> (73°F)	341000	psi	ISO 178
Flexural Stress <sup>4</sup>			ISO 178
73°F	14100	psi	
3.5% Strain, 73°F	10600	psi	
Flexural Strain at Flexural Strength <sup>5</sup> (73°F)	7.1	%	ISO 178
Impact	Nominal Value	Unit	Test Method
Charpy Notched Impact Strength <sup>6</sup>			ISO 179/1eA
-22°F, Complete Break	5.7	ft·lb/in <sup>2</sup>	
73°F, Partial Break	29	ft·lb/in <sup>2</sup>	
Charpy Unnotched Impact Strength			ISO 179/1eU
-76°F	No Break		
-22°F	No Break		
73°F	No Break		
Notched Izod Impact Strength <sup>6</sup>			ISO 180/A
-22°F, Complete Break	5.7	ft·lb/in <sup>2</sup>	
73°F, Partial Break	26	ft·lb/in <sup>2</sup>	



Multi-Axial Instrumented Impact Energy			ISO 6603-2
-22°F		44.3 ft·lb	
73°F		40.6 ft·lb	
Multi-Axial Instrumented Impact Peak Force			ISO 6603-2
-22°F		1330 lbf	
73°F		1100 lbf	
<b>Hardness</b>	<b>Nominal Value</b>	<b>Unit</b>	<b>Test Method</b>
Ball Indentation Hardness	16700	psi	ISO 2039-1
<b>Thermal</b>	<b>Nominal Value</b>	<b>Unit</b>	<b>Test Method</b>
Deflection Temperature Under Load (66 psi, Unannealed)	280	°F	ISO 75-2/B
Deflection Temperature Under Load (264 psi, Unannealed)	257	°F	ISO 75-2/A
Glass Transition Temperature <sup>7</sup>	293	°F	ISO 11357-2
Vicat Softening Temperature			
--	295	°F	ISO 306/B120
--	293	°F	ISO 306/B50
Ball Pressure Test (277°F)	Pass		IEC 60695-10-2
CLTE - Flow (73 to 131°F)	3.6E-5	in/in/°F	ISO 11359-2
CLTE - Transverse (73 to 131°F)	3.6E-5	in/in/°F	ISO 11359-2
Thermal Conductivity <sup>8</sup> (73°F)	1.4	Btu·in/hr/ft <sup>2</sup> /°F	ISO 8302
RTI Elec (0.06 in)	257	°F	UL 746B
RTI Imp (0.06 in)	239	°F	UL 746B
RTI Str (0.06 in)	257	°F	UL 746B
<b>Electrical</b>	<b>Nominal Value</b>	<b>Unit</b>	<b>Test Method</b>
Surface Resistivity	1.0E+16	ohms	IEC 60093
Volume Resistivity (73°F)	1.0E+16	ohms·cm	IEC 60093
Electric Strength (73°F, 0.0394 in)	860	V/mil	IEC 60243-1
Relative Permittivity			IEC 60250
73°F, 100 Hz	3.10		
73°F, 1 MHz	3.00		
Dissipation Factor			IEC 60250
73°F, 100 Hz	5.0E-4		
73°F, 1 MHz	9.5E-3		
Comparative Tracking Index			IEC 60112
Solution A	250	V	
Solution B	125	V	
<b>Flammability</b>	<b>Nominal Value</b>	<b>Unit</b>	<b>Test Method</b>
Flame Rating			UL 94
0.11 in, CL	HB		
0.030 in, CL	V-2		
Glow Wire Flammability Index			IEC 60695-2-12
0.04 in	1560	°F	
0.06 in	1610	°F	
0.12 in	1710	°F	
Glow Wire Ignition Temperature			IEC 60695-2-13
0.030 in	1610	°F	
0.06 in	1610	°F	
0.12 in	1650	°F	
Oxygen Index <sup>9</sup>	28	%	ISO 4589-2
Burning Rate <sup>10</sup> (> 39.4 mil)	passed		ISO 3795
Flash Ignition Temperature	896	°F	ASTM D1929
Self Ignition Temperature	1022	°F	ASTM D1929
<b>Optical</b>	<b>Nominal Value</b>	<b>Unit</b>	<b>Test Method</b>
Refractive Index <sup>11</sup>	1.584		ISO 489
Light Transmittance			ISO 13468-2
39.37 mil	90.0	%	
78.74 mil	90.0	%	
	> 89.0	%	
	> 89.0	%	
	< 0.500	%	ISO

### Processing Information

<b>Injection</b>	<b>Nominal Value</b>	<b>Unit</b>
Drying Temperature - Dry Air Dryer	248	°F
Drying Time - Dry Air Dryer	2.0 to 3.0	hr
Suggested Max Moisture	< 0.020	%
Suggested Shot Size	30 to 70	%
Rear Temperature	446 to 464	°F
Middle Temperature	482 to 500	°F
Front Temperature	500 to 518	°F
Nozzle Temperature	500 to 518	°F
Processing (Melt) Temp	482 to 572	°F
Mold Temperature	176 to 248	°F
Back Pressure	725 to 2180	psi
Vent Depth	9.8E-4 to 3.0E-3	in

#### **Injection Notes**

Standard Melt Temperature: 270°C  
Hold Pressure (% of Injection Pressure): 50 - 75%  
Peripheral Screw Speed: 0.05 - 0.2 m/s

#### **Notes**

- <sup>1</sup> Typical properties: these are not to be construed as specifications.
- <sup>2</sup> Pellets
- <sup>3</sup> 60x60x2mm, 500 bar
- <sup>4</sup> 0.079 in/min
- <sup>5</sup> 2.0 mm/min
- <sup>6</sup> 3.0 mm
- <sup>7</sup> 10°C/min
- <sup>8</sup> Across Flow
- <sup>9</sup> Procedure A
- <sup>10</sup> US-FMVSS
- <sup>11</sup> Method A

