

Covestro Engineered Plastics for the Lighting Market

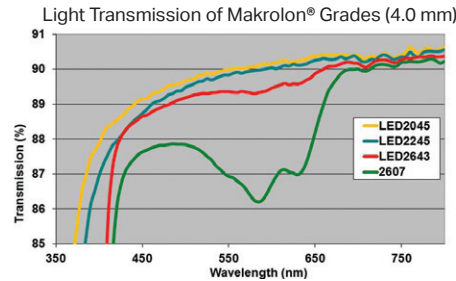
Makrolon® for LED Optics, Lenses, Covers, Enclosures and Light Pipes

LED2045, LED2245 and LED2643

- Excellent Stability to Heat and High Flux for LED Optics
- Optimize Product Life for Designs with High Heat Requirements Compared to PMMA (Acrylic)

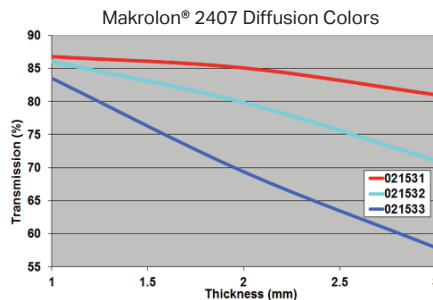
Flame Retardant FR7087

- Excellent Transparency with UL 94 V-0 and 5VA rating
- Suitable for Clear Electrical Enclosures



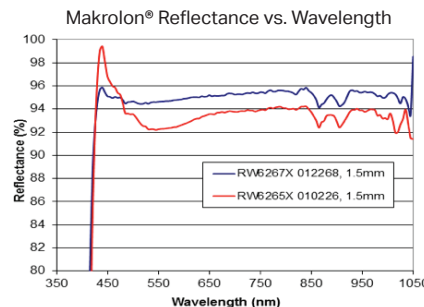
Light Diffusion Technology

- Provides Excellent LED Source Blocking Power and Efficient Light Diffusion
- Various Diffusion Levels Possible
- Available in Molding, Extrusion and Flame Retardant Grades
- Also Available in Film and Sheet Form



Reflective Technology

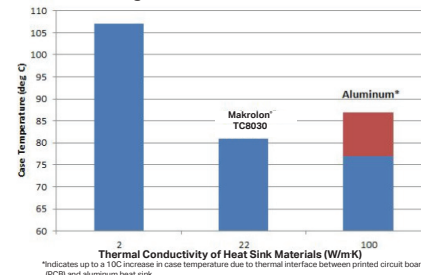
- Up to 96% Reflectance (Diffusive)
- Molded In Color to Eliminate Secondary Operations (such as Plating, Painting and Coating)
- Available in Molding or Extrusion Grades



Thermal Management Technology

- Thermal Conductivity of 10 or 22 W/m·K for Cost-Efficient Thermal Management
- Optimized Design by Reducing Components through Consolidation
- Reduced Manufacturing Complexity Utilizing In-Mold Assembly of Electronics
- Reduce Costs by up to 20% vs. Competitive Materials such as Die-Cast Aluminum

Thermal management of heat sink materials (W/m·K)



*Indicates up to a 10C increase in case temperature due to thermal interface between printed circuit board (PCB) and aluminum heat sink.



COVESTRO PRODUCT SELECTOR FOR LIGHTING APPLICATIONS

(Typical Properties for Natural Resins)

Product Family	Grade	Color	Description	UV Stabilized	¹ Melt Flow Rate (g/10 min)	Transmittance @ 2 mm (%)	Izod Impact (125in Notched) ft-lb/in	Heat Deflection Temperature (°C) .250 in / 264 psi	RTI Electrical / Mechanical w impact / Mechanical w/o Impact (°C)	UL 94 5VA (mm)	UL 94 V-0 (mm)	UL 94 V-2 (mm)	UL 746C	
LED Optics, Lenses, Covers, Enclosures, and Light Pipes	Makrolon®	LED2045	000000	Highest Transmission; Natural only		63	91	10	124	125 / 115 / 125			0.71	
	Makrolon®	LED2245	000000	Very High Transmission		36	90	11	122	125 / 115 / 125			0.75	f1
	Makrolon®	LED2245	550207	Very High Transmission; Ice (Clear Tint)		36	90	11	122	125 / 115 / 125			0.75	f1
	Makrolon®	LED2643	551053	UV-Stabilized; Clear Tint only	✓	13	89	15	125	125 / 115 / 125			0.75	f1
	Makrolon®	FR7087	550657	Flame Retardant; Clear Tint	✓	12	88	2	106	125 / 80 / 85	3.0	2.2	1.5	
Transparent Applications	Apec®	2097	551022	Highest Heat Resistance; High-heat polycarbonate (PC); Clear Tint	✓	8	88	No Break	175	150 / 130 / 150				
	Makrolon®	2407	550115	General Purpose; Clear Tint	✓	20	88	13	125	125 / 115 / 125			0.75	f1
	Makrolon®	6557	551045	Flame Retardant; General Purpose; Clear Tint	✓	10	88	15	124	125 / 115 / 125		3.0	1.5	f1
Light Diffusion, Lenses, Covers, and Enclosures	Makrolon®	2407	021531	Low Diffusion with High Light Transmission	✓	20	84	13	125	125 / 115 / 125			0.75	f1
	Makrolon®	2407	021532	Medium Diffusion with Medium Light Transmission	✓	20	77	13	125	125 / 115 / 125			0.75	f1
	Makrolon®	2407	021533	High Diffusion with Low Light Transmission	✓	20	67	13	125	125 / 115 / 125			0.75	f1
	Makrolon®	FR7087	021533	Flame Retardant, High Diffusion with Low Light Transmission	✓	12	66	2	106	125 / 80 / 85	3.0	2.2	1.5	
Reflective Applications	Makrolon®	RW6265X	010226	Highly Reflective Surface Up to 94% Reflectance; Flame Retardant; White		19		2	124	125 / 115 / 125		1.5		
	Makrolon®	RW6267X	012268	Highly Reflective Surface Up to 96% Reflectance; Flame Retardant; White	✓	19		2	124	125 / 115 / 125		1.5		
	Makrolon®	ET RW210	012346	Extrudable Highly Reflective Surface Up to 96% Reflectance; White		10		2	121	80 / 80 / 80				
Heat Sink Applications	Makrolon®	TC8010	999900	Thermal Conductivity of 10 W/m·K; 50% Lower Weight Compared to Aluminum; Black				2	137	- / 80 / 80		3.0 ²		
	Makrolon®	TC8030	999900	Thermal Conductivity of 22 W/m·K; 45% Lower Weight Compared to Aluminum; Black				2	135	- / 130 / 130		2.0		f1
Housing and Enclosure Applications (opaque only)	Bayblend®	FR3010	various	Optimized General Purpose; Flame Retardant; PC/ABS Blend		15		14	90	95 / 85 / 85	3.0	1.5		
	Makroblend®	EL703	various	Flame Retardant; Impact Modified; Improved Chemical Resistance; PC/PET Blend	✓	22		14	100	105 / 90 / 105	3.0	1.5		f1
	Makrolon®	6487	various	Flame Retardant; Increased Heat Resistance When Compared to Bayblend	✓	10		2	125	125 / 115 / 125	3.0	1.5		f1
Profile and Tube Applications	Makrolon®	ET3113	550115	Extrusion; Clear Tint	✓	6.5	88	17	126	125 / 115 / 125			0.75	f1
	Makrolon®	ET3113	021549	Extrusion; High Diffusion with Low Light Transmission	✓	6.5	70	17	126	125 / 115 / 125			0.75	f1
	Makrolon®	6717	550008	Extrusion; Clear Tint; Flame Retardant	✓	3	87	17	125	125 / 115 / 125		2.0		
	Makrolon®	6717	021549	Extrusion, High Diffusion with Low Light Transmission, Flame Retardant	✓	3	67	17	125	125 / 115 / 125		2.0		

¹ Melt Flow Rate (MFR) conditions: Apec® 330°C / 2.16kg, Bayblend® 240°C / 5kg, Makroblend® 265°C / 5kg, Makrolon® 300°C / 1.2kg

² Results based on internal Covestro testing



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