

## Covestro Makrolon® ET2613 Polycarbonate

Category : Polymer , Thermoplastic , Polycarbonate (PC) , Polycarbonate, Extruded , Polycarbonate, UV Stabilized

### Material Notes:

Main characteristics:• High toughness• Good heat resistance• Glass-like transparency, optical quality• High dimensional accuracy and stability  
Grade characteristics:• Extrusion• Medium viscosity• UV stabilized  
Formerly Makrolon 2603 MAS157As of 1 September 2015, Bayer MaterialScience was separated from Bayer AG and officially adopted its new name – Covestro.

Order this product through the following link:

[http://www.lookpolymers.com/polymer\\_Covestro-Makrolon-ET2613-Polycarbonate.php](http://www.lookpolymers.com/polymer_Covestro-Makrolon-ET2613-Polycarbonate.php)

Physical Properties	Metric	English	Comments
Bulk Density	0.660 g/cc	0.0238 lb/in <sup>3</sup>	pellets; ISO 60
Density	1.20 g/cc	0.0434 lb/in <sup>3</sup>	ISO 1183-1
Moisture Absorption at Equilibrium	0.12 %	0.12 %	ISO 62, 50% RH
Water Absorption at Saturation	0.30 %	0.30 %	ISO 62
Water Vapor Transmission	15.0 g/m <sup>2</sup> /day @Thickness 0.100 mm	0.966 g/100 in <sup>2</sup> /day @Thickness 0.00394 in	85% RH, film; ISO 15106-1
Oxygen Transmission	67.0 cc-mm/m <sup>2</sup> -24hr-atm @Thickness 0.100 mm	170 cc-mil/100 in <sup>2</sup> -24hr-atm @Thickness 0.00394 in	670 cc/m <sup>2</sup> -24hr-bar; film; b.o. ISO 2556
	70.0 cc-mm/m <sup>2</sup> -24hr-atm @Thickness 0.0254 mm	178 cc-mil/100 in <sup>2</sup> -24hr-atm @Thickness 0.00100 in	2760 cc/m <sup>2</sup> -24hr-bar; film; b.o. ISO 2556
Nitrogen Transmission	12.0 cc-mm/m <sup>2</sup> -24hr-atm @Thickness 0.100 mm	30.5 cc-mil/100 in <sup>2</sup> -24hr-atm @Thickness 0.00394 in	120 cc/m <sup>2</sup> -24hr-bar; film; b.o. ISO 2556
	13.0 cc-mm/m <sup>2</sup> -24hr-atm @Thickness 0.0254 mm	33.0 cc-mil/100 in <sup>2</sup> -24hr-atm @Thickness 0.00100 in	510 cc/m <sup>2</sup> -24hr-bar; film; b.o. ISO 2556
Carbon Dioxide Transmission	380 cc-mm/m <sup>2</sup> -24hr-atm @Thickness 0.100 mm	965 cc-mil/100 in <sup>2</sup> -24hr-atm @Thickness 0.00394 in	3800 cc/m <sup>2</sup> -24hr-bar; film; b.o. ISO 2556
	429 cc-mm/m <sup>2</sup> -24hr-atm @Thickness 0.0254 mm	1090 cc-mil/100 in <sup>2</sup> -24hr-atm @Thickness 0.00100 in	16900 cc/m <sup>2</sup> -24hr-bar; film; b.o. ISO 2556

Physical Properties	0.0070 cm/cm Metric	0.0070 in/in English	Comments
Linear Mold Shrinkage, Flow	@Thickness 2.00 mm	@Thickness 0.0787 in	60x60x2 mm; 500 bar; ISO 294-4
Linear Mold Shrinkage, Transverse	0.0075 cm/cm @Thickness 2.00 mm	0.0075 in/in @Thickness 0.0787 in	60x60x2 mm; 500 bar; ISO 294-4
Melt Flow	13 g/10 min @Load 1.20 kg, Temperature 300 °C	13 g/10 min @Load 2.65 lb, Temperature 572 °F	ISO 1133

Mechanical Properties	Metric	English	Comments
Puncture Resistance	5400 N @Temperature 23.0 °C	1210 lb (f) @Temperature 73.4 °F	ISO 6603-2
	6300 N @Temperature -30.0 °C	1420 lb (f) @Temperature -22.0 °F	ISO 6603-2
Ball Indentation Hardness	115 MPa	16700 psi	ISO 2039-1
Tensile Strength at Break	70.0 MPa	10200 psi	50 mm/min; ISO 527-1,-2
Tensile Strength, Yield	65.0 MPa	9430 psi	50 mm/min; ISO 527-1,-2
Elongation at Break	>= 50 %	>= 50 %	Nominal, 50 mm/min; ISO 527-1,-2
	130 %	130 %	50 mm/min; b.o. ISO 527-1,-2
Elongation at Yield	6.3 %	6.3 %	50 mm/min; ISO 527-1,-2
Tensile Modulus	2.35 GPa	341 ksi	1 mm/min; ISO 527-1,-2
Flexural Strength	96.0 MPa	13900 psi	2 mm/min; ISO 178
Flexural Yield Strength	72.0 MPa @Strain 3.50 %	10400 psi @Strain 3.50 %	2 mm/min; ISO 178
Flexural Modulus	2.35 GPa	341 ksi	2 mm/min; ISO 178
Izod Impact, Notched (ISO)	14.0 kJ/m <sup>2</sup> @Thickness 3.20 mm, Temperature -30.0 °C	6.66 ft-lb/in <sup>2</sup> @Thickness 0.126 in, Temperature -22.0 °F	complete break; b.o. ISO 180-A
	80.0 kJ/m <sup>2</sup> @Thickness 3.20 mm, Temperature 23.0 °C	38.1 ft-lb/in <sup>2</sup> @Thickness 0.126 in, Temperature 73.4 °F	partial break; b.o. ISO 180-A
Charpy Impact Unnotched	NB @Temperature 23.0 °C	NB @Temperature 73.4 °F	ISO 179-1eU

Mechanical Properties	<sup>NB</sup> Metric	<sup>NB</sup> English	Comments ISO 179-1eU
	@Temperature -30.0 °C	@Temperature -22.0 °F	
	<b>NB</b>	<b>NB</b>	ISO 179-1eU
	@Temperature -60.0 °C	@Temperature -76.0 °F	
Charpy Impact, Notched	1.60 J/cm <sup>2</sup>	7.61 ft-lb/in <sup>2</sup>	complete break; ISO 7391/b.o. ISO 179-1eA
	@Thickness 3.00 mm, Temperature -30.0 °C	@Thickness 0.118 in, Temperature -22.0 °F	
	7.00 J/cm <sup>2</sup>	33.3 ft-lb/in <sup>2</sup>	partial break; ISO 7391/b.o. ISO 179-1eA
	@Thickness 3.00 mm, Temperature 23.0 °C	@Thickness 0.118 in, Temperature 73.4 °F	
Puncture Energy	60.0 J	44.3 ft-lb	ISO 6603-2
	@Temperature 23.0 °C	@Temperature 73.4 °F	
	65.0 J	47.9 ft-lb	ISO 6603-2
	@Temperature -30.0 °C	@Temperature -22.0 °F	
Tensile Creep Modulus, 1 hour	2200 MPa	319000 psi	ISO 899-1
Tensile Creep Modulus, 1000 hours	1900 MPa	276000 psi	ISO 899-1

Thermal Properties	Metric	English	Comments
CTE, linear, Parallel to Flow	65.0 µm/m-°C	36.1 µin/in-°F	ISO 11359-1,-2
	@Temperature 23.0 - 55.0 °C	@Temperature 73.4 - 131 °F	
CTE, linear, Transverse to Flow	65.0 µm/m-°C	36.1 µin/in-°F	ISO 11359-1,-2
	@Temperature 23.0 - 55.0 °C	@Temperature 73.4 - 131 °F	
Thermal Conductivity	0.200 W/m-K	1.39 BTU-in/hr-ft <sup>2</sup> -°F	cross-flow; ISO 8302
Hot Ball Pressure Test	138 °C	280 °F	IEC 60695-10-2
Deflection Temperature at 0.46 MPa (66 psi)	138 °C	280 °F	ISO 75-1,-2
Deflection Temperature at 1.8 MPa (264 psi)	126 °C	259 °F	ISO 75-1,-2
Vicat Softening Point	145 °C	293 °F	50°C/h; ISO 306
	@Load 5.10 kg	@Load 11.2 lb	
	146 °C	295 °F	120°C/h; ISO 306
	@Load 5.10 kg	@Load 11.2 lb	

Glass Transition Temp, Tg Thermal Properties	147 °C Metric	297 °F English	10°C/min: ISO 11357-1,-2 Comments
UL RTI, Electrical	125 °C	257 °F	UL 746B
UL RTI, Mechanical with Impact	115 °C	239 °F	UL 746B
UL RTI, Mechanical without Impact	125 °C	257 °F	UL 746B
Flammability, UL94	HB	HB	
	@Thickness 2.50 mm	@Thickness 0.0984 in	
	V-2	V-2	
	@Thickness 0.750 mm	@Thickness 0.0295 in	
Flash Point	480 °C	896 °F	ASTM D 1929
	550 °C	1020 °F	self ignition; ASTM D 1929
Oxygen Index	29 %	29 %	Method A; ISO 4589-2
Glow Wire Test	850 °C	1560 °F	GWFI; IEC 60695-2-12
	@Thickness 0.750 mm	@Thickness 0.0295 in	
	850 °C	1560 °F	GWFI; IEC 60695-2-12
	@Thickness 1.50 mm	@Thickness 0.0591 in	
	875 °C	1610 °F	GWIT; IEC 60695-2-13
	@Thickness 0.750 mm	@Thickness 0.0295 in	
	875 °C	1610 °F	GWIT; IEC 60695-2-13
	@Thickness 1.50 mm	@Thickness 0.0591 in	
	875 °C	1610 °F	GWIT; IEC 60695-2-13
	@Thickness 3.00 mm	@Thickness 0.118 in	
	960 °C	1760 °F	GWFI; IEC 60695-2-12
	@Thickness 3.00 mm	@Thickness 0.118 in	

Electrical Properties	Metric	English	Comments
Volume Resistivity	1.00e+16 ohm-cm	1.00e+16 ohm-cm	IEC 60093
Surface Resistance	1.00e+16 ohm	1.00e+16 ohm	IEC 60093
Dielectric Constant	3.0	3.0	IEC 60250
	@Frequency 1.00e+6 Hz	@Frequency 1.00e+6 Hz	
	3.1	3.1	IEC 60250

Electrical Properties	Metric	English	Comments
Dielectric Strength	34.0 kV/mm	864 kV/in	IEC 60243-1
	@Thickness 1.00 mm	@Thickness 0.0394 in	
Dissipation Factor	0.00050	0.00050	IEC 60250
	@Frequency 100 Hz	@Frequency 100 Hz	
Comparative Tracking Index	0.0095	0.0095	IEC 60250
	@Frequency 1.00e+6 Hz	@Frequency 1.00e+6 Hz	
Comparative Tracking Index	125 V	125 V	CTI M; Solution B; IEC 60112
	250 V	250 V	Solution A; IEC 60112

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