Makrolon® 2405

Covestro - Polycarbonates - *Polycarbonate*

General Information

Product Description

Polycarbonate; MVR (300 °C/1.2 kg) 19 cm³/10 min; low viscosity; easy release; available in transparent, translucent and opaque colors;

Applications
- Injection molding; General purpose

General			
Material Status	• Commercial: Active		
Availability	• Africa & Middle East • Asia Pacific	• Europe • Latin America	• North America
Uses	• General Purpose		
Processing Method	• Injection Molding		
Resin ID (ISO 1043)	• PC		

Properties [1]

Physical	Nominal Value	Unit	Test Method
Density	1.20	g/cm³	ISO 1183
Apparent (Bulk) Density	0.66	g/cm³	ISO 60
Melt Volume-Flow Rate (MVR) (300°C/1.2 kg)	19	cm³/10min	ISO 1133
Molding Shrinkage			
Across Flow [2]	0.50 to 0.70	%	ISO 2577
Flow [2]	0.50 to 0.70	%	ISO 2577
Across Flow : 0.0787 in [3]	0.70	%	ISO 294-4
Flow : 0.0787 in [3]	0.65	%	ISO 294-4
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	348000	psi	ISO 527-1/1
Tensile Stress (Yield)	9430	psi	ISO 527-2/50
Tensile Stress (Break)	9430	psi	ISO 527-2/50
Tensile Strain (Yield)	6.0	%	ISO 527-2/50
Tensile Strain (Break)	130	%	ISO 527-2/50
Nominal Tensile Strain at Break	> 50	%	ISO 527-2/50
Tensile Creep Modulus (1 hr)	319000	psi	ISO 899-1
Tensile Creep Modulus (1000 hr)	276000	psi	ISO 899-1
Flexural Modulus [4]	341000	psi	ISO 178
Flexural Stress [4]			ISO 178
3.5% Strain	10600	psi	
--	14100	psi	
Flexural Strain at Flexural Strength [5]	7.1	%	ISO 178

Films	Nominal Value	Unit	Test Method
Water Vapor Transmission Rate (73°F, 85% RH, 3.9 mil)	0.97	g/100 in²/24 hr	ISO 15106-1
Gas Permeation			ISO 2556
Carbon Dioxide : 1.0 mil	18900	cm³/m²/bar/24 hr	
Carbon Dioxide : 3.9 mil	4000	cm³/m²/bar/24 hr	
Nitrogen : 1.0 mil	630	cm³/m²/bar/24 hr	
Nitrogen : 3.9 mil	130	cm³/m²/bar/24 hr	

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Oxygen : 1.0 mil	3150	cm³/m²/bar/24 hr	
Oxygen : 3.9 mil	700	cm³/m²/bar/24 hr	
Impact	**Nominal Value**	**Unit**	**Test Method**
Charpy Notched Impact Strength			ISO 179/1eA
-22°F, 0.118 in, Complete Break	6.7	ft·lb/in²	
73°F, 0.118 in, Partial Break	31	ft·lb/in²	
Charpy Unnotched Impact Strength			ISO 179/1eU
-76°F	No Break		
-22°F	No Break		
73°F	No Break		
Multi-Axial Instrumented Impact Energy			ISO 6603-2
-22°F	47.9	ft·lb	
73°F	40.6	ft·lb	
Multi-Axial Instrumented Impact Peak Force			ISO 6603-2
-22°F	1350	lbf	
73°F	1150	lbf	
Hardness	**Nominal Value**	**Unit**	**Test Method**
Ball Indentation Hardness	16700	psi	ISO 2039-1
Thermal	**Nominal Value**	**Unit**	**Test Method**
Deflection Temperature Under Load (66 psi, Unannealed)	279	°F	ISO 75-2/B
Deflection Temperature Under Load (264 psi, Unannealed)	255	°F	ISO 75-2/A
Glass Transition Temperature [6]	291	°F	ISO 11357-2
Vicat Softening Temperature			
--	295	°F	ISO 306/B120
--	293	°F	ISO 306/B50
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	1.4	Btu·in/hr/ft²/°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
Heat Resistance - Ball Pressure Test	277	°F	IEC 60695-10-2
Electrical	**Nominal Value**	**Unit**	**Test Method**
Surface Resistivity	1.0E+16	ohms	IEC 62631-3-2
Volume Resistivity	1.0E+14	ohms·m	IEC 62631-3-1
Electric Strength (0.0394 in)	860	V/mil	IEC 60243-1
Relative Permittivity			IEC 60250
100 Hz	3.10		
1 MHz	3.00		
Dissipation Factor			IEC 60250
100 Hz	5.0E-4		
1 MHz	9.0E-3		
Comparative Tracking Index			IEC 60112
Solution A	250	V	
Solution B [7]	125	V	
Electrolytic Corrosion	A1		IEC 60426
Flammability	**Nominal Value**	**Unit**	**Test Method**
Flame Rating			UL 94
0.11 in	HB		
0.014 in	V-2		
0.030 in	V-2		
Glow Wire Flammability Index			IEC 60695-2-12
0.030 in	1560	°F	
0.06 in	1610	°F	
0.12 in	1710	°F	
Glow Wire Ignition Temperature			IEC 60695-2-13
[illegible]	1610	°F	
	1610	°F	
	1610	°F	
	1610	°F	
x [8]	27	%	ISO

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Application of Flame from Small Burner [9] (78.7 mil)	K1, F1		DIN 53438-1, -3
Burning Rate - US-FMVSS (> 39.4 mil)	PASSED		ISO 3795
Flash Ignition Temperature	896	°F	ASTM D1929
Needle Flame Test			IEC 60695-11-5
Method F : 59.1 mil	60	sec	
Method F : 78.7 mil	120	sec	
Method F : 0.12 in	120	sec	
Method K : 59.1 mil	5	sec	
Method K : 78.7 mil	5	sec	
Method K : 0.12 in	10	sec	
Self Ignition Temperature	1022	°F	ASTM D1929
Optical	**Nominal Value**	**Unit**	**Test Method**
Refractive Index [10]	1.585		ISO 489
Light Transmittance			ISO 13468-2
39.37 mil	89.0	%	
78.74 mil	89.0	%	
118.1 mil	88.0	%	
157.5 mil	87.0	%	
Haze (118.1 mil)	< 0.800	%	ISO 14782
Additional Information	**Nominal Value**	**Unit**	**Test Method**
Test Specimen Production			ISO 294
Inj. Molding - Injection Velocity	472	in/min	
Inj. Molding - Melt Temperature	536	°F	
Inj. Molding - Mold Temperature	176	°F	

Processing Information

Injection	**Nominal Value**	**Unit**
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	482 to 500	°F
Middle Temperature	518 to 536	°F
Front Temperature	536 to 554	°F
Nozzle Temperature	554 to 572	°F
Processing (Melt) Temp	536 to 608	°F
Melt Temperature (Optimum)	572	°F
Mold Temperature	176 to 248	°F
Back Pressure	725 to 2180	psi
Vent Depth	9.8E-4 to 3.0E-3	in
Holding Pressure - % of Inj. Pressure	50 to 75	%
Peripheral Screw Speed	2 to 8	in/sec

Notes

[1] Typical properties: these are not to be construed as specifications.

[2] Value range based on general practical experience

[3] 60×60×2 mm; 500 bar

[4] 0.079 in/min

[5] 2.0 mm/min

[6] 10°C/min

[7] CTI M

[8] Procedure A

[9] Method K and F

[10] Method A

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