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Makrolon® 2458

Covestro - Polycarbonates - Polycarbonate

Thursday, December 21, 2023

General Information

Product Description

MVR (300°C/1.2 kg) 19 cm³/10 min; medical devices; suitable for ETO and steam sterilization at 121°C; biocompatible according to many ISO 10993-1 test requirements; low viscosity; easy release; injection molding - melt temperature 280 - 320°C; available in transparent and opaque colors

General

Material Status	• Commercial: Active		
Regional Availability	• Africa & Middle East • Asia Pacific	• Europe • Latin America	• North America
Features	• Biocompatible • Ethylene Oxide Sterilizable	• Good Mold Release • Low Viscosity	• Steam Sterilizable
Uses	• Medical Devices	• Medical/Healthcare Applications	
Agency Ratings	• ISO 10993-1		
RoHS Compliance	• RoHS Compliant		
Appearance	• Clear/Transparent	• Colors Available	
Processing Method	• Injection Molding		
ISO Shortname	• ISO 7391-PC,MR,(,,)-18-9		

ASTM & ISO Properties [1]

Physical	Typical Value (English)		Typical Value (SI)		Test Method
Density (73°F (23°C))	1.20	g/cm³	1.20	g/cm³	ISO 1183
Apparent (Bulk) Density [2]	0.66	g/cm³	0.66	g/cm³	ISO 60
Melt Mass-Flow Rate (MFR) (300°C/1.2 kg)	20	g/10 min	20	g/10 min	ISO 1133
Melt Volume-Flow Rate (MVR) (300°C/1.2 kg)	19	cm³/10min	19	cm³/10min	ISO 1133
Molding Shrinkage					
Across Flow	0.50 to 0.70	%	0.50 to 0.70	%	ISO 2577
Flow	0.50 to 0.70	%	0.50 to 0.70	%	ISO 2577
Across Flow : 536°F (280°C), 0.0787 in (2.00 mm) [3]	0.70	%	0.70	%	ISO 294-4
Flow : 0.0787 in (2.00 mm) [3]	0.65	%	0.65	%	ISO 294-4
Water Absorption					ISO 62
Saturation, 73°F (23°C)	0.30	%	0.30	%	
Equilibrium, 73°F (23°C), 50% RH	0.12	%	0.12	%	

Mechanical	Typical Value (English)		Typical Value (SI)		Test Method
Tensile Modulus (73°F (23°C))	348000	psi	2400	MPa	ISO 527-1/1
Tensile Stress					ISO 527-2/50
Yield, 73°F (23°C)	9430	psi	65.0	MPa	
Break, 73°F (23°C)	10200	psi	70.0	MPa	

Makrolon® 2458

Covestro - Polycarbonates - Polycarbonate

Mechanical	Typical Value (English)		Typical Value (SI)		Test Method
Tensile Strain					ISO 527-2/50
Yield, 73°F (23°C)	6.1	%	6.1	%	
Break, 73°F (23°C)	130	%	130	%	
Nominal Tensile Strain at Break					ISO 527-2/50
73°F (23°C)	> 50	%	> 50	%	
Tensile Creep Modulus					ISO 899-1
1 hr	319000	psi	2200	MPa	
1000 hr	276000	psi	1900	MPa	
Flexural Modulus [4] (73°F (23°C))	341000	psi	2350	MPa	ISO 178
Flexural Stress [4]					ISO 178
73°F (23°C)	14100	psi	97.0	MPa	
3.5% Strain, 73°F (23°C)	10600	psi	73.0	MPa	
Flexural Strain at Flexural Strength [5]					ISO 178
73°F (23°C)	7.1	%	7.1	%	

Impact	Typical Value (English)		Typical Value (SI)		Test Method
Charpy Notched Impact Strength [6]					ISO 179/1eA
-22°F (-30°C), Complete Break	6.7	ft·lb/in²	14	kJ/m²	
73°F (23°C), Partial Break	31	ft·lb/in²	65	kJ/m²	
Charpy Unnotched Impact Strength					ISO 179/1eU
-76°F (-60°C)	No Break		No Break		
-22°F (-30°C)	No Break		No Break		
73°F (23°C)	No Break		No Break		
Notched Izod Impact Strength [6]					ISO 180/A
-22°F (-30°C), Complete Break	7.1	ft·lb/in²	15	kJ/m²	
73°F (23°C), Partial Break	31	ft·lb/in²	65	kJ/m²	
Multi-Axial Instrumented Impact Energy					ISO 6603-2
-22°F (-30°C)	47.9	ft·lb	65.0	J	
73°F (23°C)	40.6	ft·lb	55.0	J	
Multi-Axial Instrumented Impact Peak Force					ISO 6603-2
-22°F (-30°C)	1350	lbf	6000	N	
73°F (23°C)	1150	lbf	5100	N	

Hardness	Typical Value (English)		Typical Value (SI)		Test Method
Ball Indentation Hardness	16700	psi	115	MPa	ISO 2039-1

Makrolon® 2458

Covestro - Polycarbonates - Polycarbonate

Thermal	Typical Value	(English)	Typical Value	(SI)	Test Method
Deflection Temperature Under Load					
66 psi (0.45 MPa), Unannealed	282	°F	139	°C	ISO 75-2/B
264 psi (1.8 MPa), Unannealed	257	°F	125	°C	ISO 75-2/A
Glass Transition Temperature [7]	295	°F	146	°C	ISO 11357-2
Vicat Softening Temperature					
--	295	°F	146	°C	ISO 306/B120
--	293	°F	145	°C	ISO 306/B50
Ball Pressure Test (280°F (138°C))	Pass		Pass		IEC 60695-10-2
CLTE					ISO 11359-2
Flow : 73 to 131°F (23 to 55°C)	3.6E-5	in/in/°F	6.5E-5	cm/cm/°C	
Transverse : 73 to 131°F (23 to 55°C)	3.6E-5	in/in/°F	6.5E-5	cm/cm/°C	
Thermal Conductivity [8] (73°F (23°C))	1.4	Btu·in/hr/ft²/°F	0.20	W/m/K	ISO 8302
Electrical	**Typical Value**	**(English)**	**Typical Value**	**(SI)**	**Test Method**
Surface Resistivity	1.0E+16	ohms	1.0E+16	ohms	IEC 60093
Volume Resistivity (73°F (23°C))	1.0E+16	ohms·cm	1.0E+16	ohms·cm	IEC 60093
Electric Strength					IEC 60243-1
73°F (23°C), 0.0394 in (1.00 mm)	860	V/mil	34	kV/mm	
Relative Permittivity					IEC 60250
73°F (23°C), 100 Hz	3.10		3.10		
73°F (23°C), 1 MHz	3.00		3.00		
Dissipation Factor					IEC 60250
73°F (23°C), 100 Hz	5.0E-4		5.0E-4		
73°F (23°C), 1 MHz	9.0E-3		9.0E-3		
Comparative Tracking Index (Solution A)	250	V	250	V	IEC 60112
Flammability	**Typical Value**	**(English)**	**Typical Value**	**(SI)**	**Test Method**
Oxygen Index [9]	28	%	28	%	ISO 4589-2
Flash Ignition Temperature	896	°F	480	°C	ASTM D1929
Self Ignition Temperature	1022	°F	550	°C	ASTM D1929
Optical	**Typical Value**	**(English)**	**Typical Value**	**(SI)**	**Test Method**
Refractive Index [10]	1.586		1.586		ISO 489
Light Transmittance					ISO 13468-2
39.37 mil (1000 µm)	89.0	%	89.0	%	
78.74 mil (2000 µm)	89.0	%	89.0	%	
118.1 mil (3000 µm)	88.0	%	88.0	%	
157.5 mil (4000 µm)	87.0	%	87.0	%	
Haze (118.1 mil (3000 µm))	< 0.800	%	< 0.800	%	ISO 14782

Processing Information

Injection	Typical Value	(English)	Typical Value	(SI)
Drying Temperature - Dry Air Dryer	248	°F	120	°C
Drying Time - Dry Air Dryer	2.0 to 3.0	hr	2.0 to 3.0	hr
Suggested Max Moisture	< 0.020	%	< 0.020	%
Suggested Shot Size	30 to 70	%	30 to 70	%
Rear Temperature	482 to 500	°F	250 to 260	°C

Makrolon® 2458

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Injection	Typical Value (English)		Typical Value (SI)	
Middle Temperature	518 to 536	°F	270 to 280	°C
Front Temperature	536 to 554	°F	280 to 290	°C
Nozzle Temperature	554 to 572	°F	290 to 300	°C
Processing (Melt) Temp	536 to 608	°F	280 to 320	°C
Mold Temperature	176 to 248	°F	80 to 120	°C
Back Pressure	725 to 2180	psi	5.00 to 15.0	MPa
Vent Depth	9.8E-4 to 3.0E-3	in	0.025 to 0.075	mm

Injection Notes

Peripheral Screw Speed: 0.05 - 0.2 m/s
Hold Pressure (% of Injection Pressure): 50 - 75%
Standard Melt Temperature: 300°C

Notes

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

[2] Pellets

[3] 60x60x2mm, 500 bar

[4] 0.079 in/min (2.0 mm/min)

[5] 2.0 mm/min

[6] 3 mm

[7] 10°C/min

[8] Across Flow

[9] Procedure A

[10] Method A