Makrolon® 2458

Bayer MaterialScience LLC - Polycarbonate

Friday, August 01, 2008

General Information

Product Description

Global grade; MVR 19 cm³/10 min; General purpose; Low viscosity; Easy release; Food contact quality; Good hydrolysis resistance; Injection molding; Available in transparent, translucent and opaque colors; Suitable for medical devices

General

Material Status	• Commercial: Active		
Availability	• North America		
Additive	• Mold Release		
Features	• Food Contact Acceptable • General Purpose • Good Mold Release	• High Flow • Hydrolysis Resistant • Low Viscosity	• Radiation Sterilizable
Uses	• Medical/Healthcare Applications		
Agency Ratings	• EU 2000/53/EC • EU 2002/96/EC	• EU 2003/11/EC • USP Class VI	• USP XXI, Class VI
RoHS Compliance	• RoHS Compliant		
Appearance	• Clear/Transparent • Colors Available	• Opaque • Translucent	
Forms	• Pellets		
Processing Method	• Injection Molding		
Multi-Point Data	• Creep Modulus vs. Time (ISO 11403-1) • Isochronous Stress vs. Strain (ISO 11403-1) • Isothermal Stress vs. Strain (ISO 11403-1)	• Secant Modulus vs. Strain (ISO 11403-1) • Shear Modulus vs. Temperature (ISO 11403-2) • Specific Volume vs Temperature (ISO 11403-2)	• Viscosity vs. Shear Rate (ISO 11403-2)

ASTM and ISO Properties [1]

Physical	Nominal Value (English)	Nominal Value (SI)	Test Method
Specific Gravity	1.20	1.20	ASTM D792
Density	0.0434 lb/in³	1200 kg/m³	ISO 1183 [2]
Melt Mass-Flow Rate (MFR) (300°C/1.2 kg)	20 g/10 min	20 g/10 min	ASTM D1238
Melt volume-flow rate (300°C/1.2 kg)	1.16 in³/10min	19.0 cm³/10min	ISO 1133 [2]
Molding Shrinkage (Flow)	0.0050 to 0.0070 in/in	0.50 to 0.70 %	ASTM D955
Molding Shrinkage (Across Flow)	0.0050 to 0.0070 in/in	0.50 to 0.70 %	ASTM D955
Water Absorption (24 hr, 73 °F (23 °C))	0.12 %	0.12 %	ASTM D570
Water Absorption (Saturation, 73 °F (23 °C))	0.30 %	0.30 %	ASTM D570
Water Absorption (Saturation)	0.30 %	0.30 %	ISO 62 [2]
Water Absorption (Equilibrium)	0.12 %	0.12 %	ISO 62 [2]
Viscosity number	51.0 cm³/g	51.0 cm³/g	ISO 307, 1157, 1628 [2]

Mechanical	Nominal Value (English)	Nominal Value (SI)	Test Method
Tensile Modulus [3]	350000 psi	2410 MPa	ASTM D638
Tensile modulus	348000 psi	2400 MPa	ISO 527-2 [2]
Tensile Strength (Yield)	9400 psi	64.8 MPa	ASTM D638
Tensile Stress (Yield)	9430 psi	65.0 MPa	ISO 527-2 [2]
Tensile Strength (Break)	8700 psi	60.0 MPa	ASTM D638

Makrolon® 2458

Bayer MaterialScience LLC - Polycarbonate

Friday, August 01, 2008

Mechanical	Nominal Value (English)	Nominal Value (SI)	Test Method
Tensile Elongation (Yield)	6.0 %	6.0 %	ASTM D638
Tensile Strain (Yield)	6.0 %	6.0 %	ISO 527-2 [2]
Tensile Elongation (Break)	120 %	120 %	ASTM D638
Nominal strain at break	> 50.0 %	> 50.0 %	ISO 527-2 [2]
Tensile Creep Modulus (1 hr)	319000 psi	2200 MPa	ISO 899-1 [2]
Tensile Creep Modulus (1000 hr)	276000 psi	1900 MPa	ISO 899-1 [2]
Flexural Modulus	340000 psi	2340 MPa	ASTM D790
Flexural Strength	12000 psi	82.7 MPa	ASTM D790
Impact	**Nominal Value (English)**	**Nominal Value (SI)**	**Test Method**
Charpy impact strength (73 °F (23 °C))	No Break	No Break	ISO 179/1eU [2]
Charpy impact strength (-22 °F (-30 °C))	No Break	No Break	ISO 179/1eU [2]
Notched Izod Impact			ASTM D256
73 °F (23 °C), 0.125 in (3.18 mm)	14.0 ft·lb/in	747 J/m	
73 °F (23 °C), 0.250 in (6.35 mm)	2.00 ft·lb/in	107 J/m	
Puncture energy (+23°C)	40.6 ft·lb	55.0 J	ISO 6603-2 [2]
Puncture energy (-30°C)	44.3 ft·lb	60.0 J	ISO 6603-2 [2]
Puncture - maximum force (+23°C)	1150 lbf	5100 N	ISO 6603-2 [2]
Puncture - maximum force (-30°C)	1370 lbf	6100 N	ISO 6603-2 [2]
Hardness	**Nominal Value (English)**	**Nominal Value (SI)**	**Test Method**
Rockwell Hardness			ASTM D785
M-Scale	75	75	
R-Scale	120	120	
Thermal	**Nominal Value (English)**	**Nominal Value (SI)**	**Test Method**
Deflection Temperature Under Load			ASTM D648
66 psi (0.45 MPa), Unannealed, 0.250 in (6.35 mm)	273 °F	134 °C	
Deflection Temperature Under Load			ISO 75-2 [2]
66 psi (0.45 MPa)	279 °F	137 °C	
Deflection Temperature Under Load			ASTM D648
264 psi (1.8 MPa), Unannealed, 0.250 in (6.35 mm)	259 °F	126 °C	
Deflection Temperature Under Load			ISO 75-2 [2]
264 psi (1.8 MPa)	257 °F	125 °C	
Glass Transition Temperature			ISO 11357-2 [2]
18 °F/min (10 °C/min)	290 °F	150 °C	
Vicat Softening Temperature			ASTM D1525
Rate A, Loading 2 (50 N)	291 °F	144 °C	
Vicat Softening Temperature			ISO 306 [2]
50°C/h, B (50N)	291 °F	144 °C	
CLTE (Flow)	0.000033 in/in/°F	0.000060 cm/cm/°C	ASTM D696
CLTE (Flow)	0.000033 in/in/°F	0.000060 cm/cm/°C	ISO 11359-2 [2]
CLTE (Transverse)	0.000033 in/in/°F	0.000060 cm/cm/°C	ISO 11359-2 [2]
Specific Heat	0.280 Btu/lb/°F	1170 J/kg/°C	ASTM C351
Thermal Conductivity	1.4 Btu·in/hr/ft²/°F	0.20 W/m/K	ASTM C177
Electrical	**Nominal Value (English)**	**Nominal Value (SI)**	**Test Method**
Surface Resistivity	1.0E+16 ohms	1.0E+16 ohms	ASTM D257
Surface resistivity	> 1.0E+15 ohms	> 1.0E+15 ohms	IEC 60093 [2]
Volume Resistivity	1.0E+16 ohm·cm	1.0E+16 ohm·cm	ASTM D257

Makrolon® 2458

Bayer MaterialScience LLC - Polycarbonate

Electrical	Nominal Value (English)	Nominal Value (SI)	Test Method
Volume resistivity	> 3.9E+14 ohm·in	> 1.0E+13 ohm·m	IEC 60093 [2]
Dielectric Strength [4] (73 °F (23 °C), in Oil)	810 V/mil	31.9 kV/mm	ASTM D149
Dielectric Constant			ASTM D150
60 Hz	3.000	3.000	
1E+6 Hz	2.900	2.900	
Relative Permittivity (100 Hz)	3.10	3.10	IEC 60250 [2]
Relative Permittivity (1 MHz)	3.00	3.00	IEC 60250 [2]
Dissipation Factor			ASTM D150
60 Hz	0.00080	0.00080	
1E+6 Hz	0.0100	0.0100	
Dissipation Factor (100 Hz)	0.00050	0.00050	IEC 60250 [2]
Dissipation Factor (1 MHz)	0.0090	0.0090	IEC 60250 [2]
Comparative tracking index	275	275	IEC 60112 [2]
Electric strength	810 V/mil	32 kV/mm	IEC 60243-1 [2]

Flammability	Nominal Value (English)	Nominal Value (SI)	Test Method
Flame Rating - UL			UL 94
0.118 in (3.00 mm)	HB	HB	
0.173 in (4.40 mm)	HB	HB	
0.236 in (6.00 mm)	HB	HB	
0.0590 in (1.50 mm)	V-2	V-2	
Burning Behav. at 1.6mm nom. thickn.			ISO 1210 [2]
0.06 in (1.50 mm), UL	V-2	V-2	
Burning Behav. at thickness h			ISO 1210 [2]
0.106 in (2.70 mm), UL	HB	HB	
Oxygen Index	28 %	28 %	ASTM D2863
Oxygen index	28 %	28 %	ISO 4589-2 [2]

UL 746	Nominal Value (English)	Nominal Value (SI)	Test Method
RTI Str (0.0590 in (1.50 mm))	257 °F	125 °C	UL 746
RTI Imp (0.0590 in (1.50 mm))	239 °F	115 °C	UL 746
RTI Elec (0.0590 in (1.50 mm))	257 °F	125 °C	UL 746

Optical	Nominal Value (English)	Nominal Value (SI)	Test Method
Refractive Index	1.586	1.586	ASTM D542
Transmittance (125 mil (3180 µm))	88.0 %	88.0 %	ASTM D1003
Haze (125 mil (3180 µm))	0.80 %	0.80 %	ASTM D1003

Additional Properties

Specific Volume, ASTM D792: 23.1 in³/lb
Flexural Stress, ASTM D790, 5% Strain: 12,000 psi
The value listed as Specific Heat, ASTM C351, was tested in accordance with ASTM D2766.
Arc Resistance, ASTM D495, Stainless Steel Electrodes: 11s
Arc Resistance, ASTM D495, Tungsten Electrodes: 120s

Processing Information

Injection	Nominal Value (English)	Nominal Value (SI)
Drying Temperature	250 °F	121 °C
Drying Time	4.0 hr	4.0 hr
Suggested Max Moisture	0.020 %	0.020 %
Rear Temperature	445 to 495 °F	229 to 257 °C

Makrolon® 2458

Bayer MaterialScience LLC - Polycarbonate

Injection	Nominal Value (English)		Nominal Value (SI)	
Middle Temperature	510 to 550	°F	266 to 288	°C
Front Temperature	530 to 570	°F	277 to 299	°C
Nozzle Temperature	510 to 530	°F	266 to 277	°C
Processing (Melt) Temp	535 to 565	°F	279 to 296	°C
Mold Temperature	150 to 220	°F	65.6 to 104	°C
Injection Pressure	10000 to 20000	psi	68.9 to 138	MPa
Injection Rate	Moderate-Fast		Moderate-Fast	
Back Pressure	50.0 to 100	psi	0.345 to 0.689	MPa
Screw Speed	50 to 75	rpm	50 to 75	rpm
Clamp Tonnage	3.0 to 5.0	tons/in²	41 to 69	MPa
Cushion	0.125 to 0.250	in	3.18 to 6.35	mm

Injection Notes

Inlet Air Temp: 250°F
Dew Point: </= 20°F
Hold Pressure: 50 - 70% of the injection pressure

Notes

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

[2] Tested in accordance with ISO 10350. 23°C/50%r.h. unless otherwise noted.

[3] 0.039 in/min (1.00 mm/min)

[4] Method A (Short-Time)