



Makrolon 1239

Speciality grades / Blow molding

Global grade; MVR 3.0 cm³/10 min; Blow molding; High viscosity; Branched; Food contact quality; Extrusion blow molding; Injection stretch blow molding; Available in transparent colors only; Water bottles

ISO Shortname

ISO 7391-PC,B,61-05-9

Property	Test Condition	Unit	Standard	Value
Rheological properties				
C Melt volume-flow rate	300 °C; 1.2 kg	cm ³ /(10 min)	ISO 1133	3.0
C Molding shrinkage, parallel	60x60x2; 310 °C / MT 90 °C; 500 bar	%	ISO 294-4	0.7
C Molding shrinkage, normal	60x60x2; 310 °C / MT 90 °C; 500 bar	%	ISO 294-4	0.75
Molding shrinkage, parallel/normal	Value range based on general practical experience	%	acc. ISO 2577	0.6 - 0.8
Melt mass-flow rate	300 °C; 1.2 kg	g/(10 min)	ISO 1133	3.0
Mechanical properties (23 °C/50 % r. h.)				
C Tensile modulus	1 mm/min	MPa	ISO 527-1,-2	2350
C Yield stress	50 mm/min	MPa	ISO 527-1,-2	65
C Yield strain	50 mm/min	%	ISO 527-1,-2	6.4
C Nominal strain at break	50 mm/min	%	ISO 527-1,-2	> 50
Stress at break	50 mm/min	MPa	ISO 527-1,-2	60
Strain at break	50 mm/min	%	acc. ISO 527-1,-2	95
C Tensile creep modulus	1 h	MPa	ISO 899-1	2200
C Tensile creep modulus	1000 h	MPa	ISO 899-1	1900
Flexural modulus	2 mm/min	MPa	ISO 178	2300
Flexural strength	2 mm/min	MPa	ISO 178	95
Flexural strain at flexural strength	2 mm/min	%	ISO 178	7.2
Flexural stress at 3.5 % strain	2 mm/min	MPa	ISO 178	72
C Charpy impact strength	23 °C	kJ/m ²	ISO 179-1eU	N
C Charpy impact strength	-30 °C	kJ/m ²	ISO 179-1eU	N
Charpy notched impact strength	23 °C; 3 mm	kJ/m ²	acc. ISO 179-1eA	70P
Charpy notched impact strength	-30 °C; 3 mm	kJ/m ²	acc. ISO 179-1eA	14C
Izod notched impact strength	23 °C; 3.2 mm	kJ/m ²	acc. ISO 180-A	85P
Izod notched impact strength	-30 °C; 3.2 mm	kJ/m ²	acc. ISO 180-A	14C
C Puncture maximum force	23 °C	N	ISO 6603-2	5600
C Puncture maximum force	-30 °C	N	ISO 6603-2	6500
C Puncture energy	23 °C	J	ISO 6603-2	60
C Puncture energy	-30 °C	J	ISO 6603-2	65
Ball indentation hardness		N/mm ²	ISO 2039-1	112
Thermal properties				
C Glass transition temperature	10 °C/min	°C	ISO 11357-1,-2	148
C Temperature of deflection under load	1.80 MPa	°C	ISO 75-1,-2	130
C Temperature of deflection under load	0.45 MPa	°C	ISO 75-1,-2	142
C Vicat softening temperature	50 N; 50 °C/h	°C	ISO 306	148
Vicat softening temperature	50 N; 120 °C/h	°C	ISO 306	149
C Coefficient of linear thermal expansion, parallel	23 to 55 °C	10 ⁻⁴ /K	ISO 11359-1,-2	0.7
C Coefficient of linear thermal expansion, transverse	23 to 55 °C	10 ⁻⁴ /K	ISO 11359-1,-2	0.7
C Oxygen index	Method A	%	ISO 4589-2	27
Thermal conductivity	23 °C	W/(m·K)	ISO 8302	0.20
Resistance to heat (ball pressure test)		°C	IEC 60695-10-2	138
Glow wire test (GWFI)	1.0 mm	°C	IEC 60695-2-12	850
Glow wire test (GWFI)	1.5 mm	°C	IEC 60695-2-12	850
Glow wire test (GWFI)	2.0 mm	°C	IEC 60695-2-12	850
Glow wire test (GWFI)	3.0 mm	°C	IEC 60695-2-12	960
Incandescent bar test		Rating	IEC 60707-BH	BH2/< 30 mm
Burning rate (US-FMVSS)	>=1.0 mm	mm/min	ISO 3795	passed
Flash ignition temperature	Procedure B	°C	ASTM D1929	470
Self ignition temperature	Procedure B	°C	ASTM D1929	540





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Electrical properties (23 °C/50 % r. h.)				
C Relative permittivity	100 Hz	-	IEC 60250	3.1
C Relative permittivity	1 MHz	-	IEC 60250	3.0
C Dissipation factor	100 Hz	10 ⁻⁴	IEC 60250	5
C Dissipation factor	1 MHz	10 ⁻⁴	IEC 60250	90
C Volume resistivity		Ohm·m	IEC 60093	1E14
C Surface resistivity		Ohm	IEC 60093	1E16
C Electric strength	1 mm	kV/mm	IEC 60243-1	33
C Comparative tracking index CTI	Solution A	Rating	IEC 60112	275
Comparative tracking index CTI M	Solution B	Rating	IEC 60112	< 100
Electrolytic corrosion		Rating	IEC 60426	A1
Other properties (23 °C)				
C Water absorption (Saturation value)	Water at 23 °C	%	ISO 62	0.30
C Water absorption (Equilibrium value)	23 °C; 50 % RH	%	ISO 62	0.12
C Density		kg/m ³	ISO 1183	1200
Water permeation	23 °C; 85 % RH; 100 µm film	g/(m ² ·24 h)	ISO 15106-1	15
Gas permeation	Oxygen; 100 µm film	cm ³ /(m ² ·24 h·bar)	acc. ISO 2556	700
Gas permeation	Oxygen; 25.4 µm (1 mil) film	cm ³ /(m ² ·24 h·bar)	acc. ISO 2556	2760
Gas permeation	Nitrogen; 100 µm film	cm ³ /(m ² ·24 h·bar)	acc. ISO 2556	130
Gas permeation	Nitrogen; 25.4 µm (1 mil) film	cm ³ /(m ² ·24 h·bar)	acc. ISO 2556	510
Gas permeation	Carbon dioxide; 100 µm film	cm ³ /(m ² ·24 h·bar)	acc. ISO 2556	4300
Gas permeation	Carbon dioxide; 25.4 µm (1 mil) film	cm ³ /(m ² ·24 h·bar)	acc. ISO 2556	16900
Bulk density	Pellets	kg/m ³	ISO 60	660
Material specific properties				
C Viscosity number		cm ³ /g	ISO 1628-4	64
Refractive index	Procedure A	-	ISO 489	1.587
Haze for transparent materials	3 mm	%	ISO 14782	< 0.8
Luminous transmittance (clear transparent materials)	1 mm	%	ISO 13468-2	79
C Luminous transmittance (clear transparent materials)	2 mm	%	ISO 13468-2	70
Luminous transmittance (clear transparent materials)	4 mm	%	ISO 13468-2	55
Processing conditions for test specimens				
C Injection molding-Melt temperature		°C	ISO 294	310
C Injection molding-Mold temperature		°C	ISO 294	90
C Injection molding-Injection velocity		mm/s	ISO 294	200

C These property characteristics are taken from the CAMPUS plastics data bank and are based on the international catalogue of basic data for plastics according to ISO 10350.

