

Makrolon® 2856

Food contact grades / Medium viscosity

MVR (300 °C/1.2 kg) 9.0 cm³/10 min; food contact quality; medium viscosity; easy release; injection molding - melt temperature 280 - 320 °C; available in transparent, translucent and opaque colors

ISO Shortname

ISO 7391-PC,MR,(,)-09-9

Property	Test Condition	Unit	Standard	typical Value
Rheological properties				
C Melt volume-flow rate	300 °C/ 1.2 kg	cm³/10 min	ISO 1133	9.0
C Molding shrinkage, parallel	60x60x2 mm/ 500 bar	%	ISO 294-4	0.7
C Molding shrinkage, normal	60x60x2 mm/ 500 bar	%	ISO 294-4	0.75
Molding shrinkage, parallel/normal	Value range based on general practical experience	%	b.o. ISO 2577	0.6 - 0.8
Melt mass-flow rate	300 °C/ 1.2 kg	g/10 min	ISO 1133	10
Mechanical properties (23 °C/50 % r. h.)				
C Tensile modulus	1 mm/min	MPa	ISO 527-1,-2	2400
C Yield stress	50 mm/min	MPa	ISO 527-1,-2	65
C Yield strain	50 mm/min	%	ISO 527-1,-2	6.2
C Nominal strain at break	50 mm/min	%	ISO 527-1,-2	> 50
Stress at break	50 mm/min	MPa	ISO 527-1,-2	70
Strain at break	50 mm/min	%	b.o. ISO 527-1,-2	130
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	2400
Flexural strength	2 mm/min	MPa	ISO 178	97
Flexural strain at flexural strength	2 mm/min	%	ISO 178	7.1
Flexural stress at 3.5 % strain	2 mm/min	MPa	ISO 178	73
C Charpy impact strength	23 °C	kJ/m²	ISO 179-1eU	N
C Charpy impact strength	-30 °C	kJ/m²	ISO 179-1eU	N
Charpy impact strength	-60 °C	kJ/m²	ISO 179-1eU	N
Charpy notched impact strength	23 °C/ 3 mm	kJ/m²	ISO 7391/b.o. ISO 179-1eA	75P
Charpy notched impact strength	-30 °C/ 3 mm	kJ/m²	ISO 7391/b.o. ISO 179-1eA	16C
Izod notched impact strength	23 °C/ 3 mm	kJ/m²	ISO 7391/b.o. ISO 180-A	70P
Izod notched impact strength	-30 °C/ 3 mm	kJ/m²	ISO 7391/b.o. ISO 180-A	15C
C Puncture maximum force	23 °C	N	ISO 6603-2	5400
C Puncture maximum force	-30 °C	N	ISO 6603-2	6300
C Puncture energy	23 °C	J	ISO 6603-2	60
C Puncture energy	-30 °C	J	ISO 6603-2	65
Ball indentation hardness		N/mm²	ISO 2039-1	115

Makrolon® 2856

Property	Test Condition	Unit	Standard	typical Value
Thermal properties				
C Glass transition temperature	10 °C/min	°C	ISO 11357-1,-2	145
C Temperature of deflection under load	1.80 MPa	°C	ISO 75-1,-2	125
C Temperature of deflection under load	0.45 MPa	°C	ISO 75-1,-2	137
C Vicat softening temperature	50 N; 50 °C/h	°C	ISO 306	145
Vicat softening temperature	50 N; 120 °C/h	°C	ISO 306	146
C Coefficient of linear thermal expansion, parallel	23 to 55 °C	10 ⁻⁴ /K	ISO 11359-1,-2	0.65
C Coefficient of linear thermal expansion, transverse	23 to 55 °C	10 ⁻⁴ /K	ISO 11359-1,-2	0.65
C Burning behavior UL 94 [UL recognition]	0.75 mm	Class	UL 94	V-2
Burning behavior UL 94 [UL recognition]	2.5 mm	Class	UL 94	HB
C Oxygen index	Method A	%	ISO 4589-2	28
Thermal conductivity, cross-flow	23 °C; 50 % r. h.	W/(m·K)	ISO 8302	0.20
Resistance to heat (ball pressure test)		°C	IEC 60695-10-2	136
Relative temperature index (Tensile strength) [UL recognition]	1.5 mm	°C	UL 746B	125
Relative temperature index (Tensile impact strength) [UL recognition]	1.5 mm	°C	UL 746B	115
Relative temperature index (Electric strength) [UL recognition]	1.5 mm	°C	UL 746B	125
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	875
Glow wire test (GWFI)	3.0 mm	°C	IEC 60695-2-12	930
Glow wire test (GWIT)	0.75 mm	°C	IEC 60695-2-13	875
Glow wire test (GWIT)	1.5 mm	°C	IEC 60695-2-13	875
Glow wire test (GWIT)	3.0 mm	°C	IEC 60695-2-13	875
Glow wire test	1.5 mm	°C	b.o. EDF HN60 E.02	750
Glow wire test	3.0 mm	°C	b.o. EDF HN60 E.02	750
Application of flame from small burner	Method K and F/ 2.0 mm	Class	DIN 53438-1,-3	K1, F1
Needle flame test	Method K/ 1.5 mm	s	IEC 60695-11-5	5
Needle flame test	Method K/ 2.0 mm	s	IEC 60695-11-5	5
Needle flame test	Method K/ 3.0 mm	s	IEC 60695-11-5	10
Needle flame test	Method F/ 1.5 mm	s	IEC 60695-11-5	60
Needle flame test	Method F/ 2.0 mm	s	IEC 60695-11-5	60
Needle flame test	Method F/ 3.0 mm	s	IEC 60695-11-5	120
Burning rate (US-FMVSS)	>=1.0 mm	mm/min	ISO 3795	passed
Flash ignition temperature		°C	ASTM D1929	480
Self ignition temperature		°C	ASTM D1929	550
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 Electrical strength	1 mm	kV/mm	IEC 60243-1	34
C Comparative tracking index CTI	Solution A	Rating	IEC 60112	250
Comparative tracking index CTI M	Solution B	Rating	IEC 60112	125M
Electrolytic corrosion		Rating	IEC 60426	A1

Makrolon® 2856

Property	Test Condition	Unit	Standard	typical Value
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 % r. h.	%	ISO 62	0.12
C Density		kg/m³	ISO 1183-1	1200
Water vapor permeability	23 °C; 85 % RH/ 100 µm film	g/(m²·24 h)	ISO 15106-1	15
Gas permeation	Oxygen/ 100 µm film	cm³/(m²·24 h·bar)	b.o. ISO 2556	650
Gas permeation	Oxygen/ 25.4 µm (1 mil) film	cm³/(m²·24 h·bar)	b.o. ISO 2556	2760
Gas permeation	Nitrogen/ 100 µm film	cm³/(m²·24 h·bar)	b.o. ISO 2556	120
Gas permeation	Nitrogen/ 25.4 µm (1 mil) film	cm³/(m²·24 h·bar)	b.o. ISO 2556	510
Gas permeation	Carbon dioxide/ 100 µm film	cm³/(m²·24 h·bar)	b.o. ISO 2556	3800
Gas permeation	Carbon dioxide/ 25.4 µm (1 mil) film	cm³/(m²·24 h·bar)	b.o. ISO 2556	16900
Bulk density	Pellets	kg/m³	ISO 60	660
Material specific properties				
Refractive index	Procedure A	-	ISO 489	1.586
Haze for transparent materials	3 mm	%	ISO 14782	< 0.8
Luminous transmittance (clear transparent materials)	1 mm	%	ISO 13468-2	89
C Luminous transmittance (clear transparent materials)	2 mm	%	ISO 13468-2	89
Luminous transmittance (clear transparent materials)	3 mm	%	ISO 13468-2	88
Luminous transmittance (clear transparent materials)	4 mm	%	ISO 13468-2	87
Processing conditions for test specimens				
C Injection molding-Melt temperature		°C	ISO 294	300
C Injection molding-Mold temperature		°C	ISO 294	80
C Injection molding-Injection velocity		mm/s	ISO 294	200
Recommended Processing and Drying Conditions				
Melt Temperatures		°C	-	280 - 320
Standard Melt Temperature		°C	-	300
Barrel Temperatures - Rear		°C	-	250 - 270
Barrel Temperatures - Middle		°C	-	270 - 290
Barrel Temperatures - Front		°C	-	285 - 305
Barrel Temperatures - Nozzle		°C	-	270 - 305
Mold Temperatures		°C	-	70 - 110
Hold Pressure (% of injection pressure)		%	-	50 - 75
Plastic Back Pressure (specific)		bar	-	100 - 200
Peripheral Screw Speed		m/s	-	0.05 - 0.2
Shot-to-Cylinder Size		%	-	30 - 70
Dry Air Drying Temperature		°C	-	120
Dry Air Drying Time		h	-	4
Moisture Content max. (%)		%	-	<= 0,02
Vent Depth		mm	-	0.025 - 0.075

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.

Impact properties: N = non-break, P = partial break, C = complete break

Makrolon® 2856

Disclaimer

General

The manner in which you use and the purpose to which you put and utilize our products, technical assistance and information (whether verbal, written or by way of production evaluations), including any suggested formulations and recommendations, are beyond our control. Therefore, it is imperative that you test our products, technical assistance and information to determine to your own satisfaction whether they are suitable for your intended uses and applications. This application-specific analysis must at least include testing to determine suitability from a technical as well as health, safety and environmental standpoint. Such testing has not necessarily been done by us. Unless we otherwise agree in writing, all products are sold strictly pursuant to the terms of our standard conditions of sale which are available upon request. All information and technical assistance is given without warranty or guarantee, and is subject to change without notice. Any statement or recommendation not contained herein is unauthorized and shall not bind us. Nothing herein shall be construed as a recommendation to use any product in conflict with patents covering any material or its use. No license is implied or in fact granted under the claims of any patent. With respect to health, safety and environment precautions, the relevant Material Safety Data Sheets (MSDS) and product labels must be observed prior to working with our products.

Covestro AG
Polycarbonates Business Unit
Kaiser-Wilhelm-Allee 60
51373 Leverkusen
Germany
plastics@covestro.com
www.plastics.covestro.com