Makrolon® 6717

Flame retardant grades / High viscosity, branched

MVR (300 °C/1.2 kg) 3.0 cm³/10 min; flame retardant; UL 94V-0/2.0 mm; high viscosity; branched; UV stabilized; easy release; injection molding - melt temperature 280 - 320 °C; extrusion; available in transparent, translucent and opaque colors

ISO Shortname

ISO 7391-PC,MFLR,(,,)-05-9

	Property	Test Condition	Unit	Standard	typical Value
Rheological properties					
C	Melt volume-flow rate	300 °C/ 1.2 kg	cm³/10 min	ISO 1133	3.0
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	3.0
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	67
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	65
	Strain at break	50 mm/min	%	b.o. ISO 527-1,-2	105
	Flexural modulus	2 mm/min	MPa	ISO 178	2400
	Flexural strength	2 mm/min	MPa	ISO 178	98
	Flexural strain at flexural strength	2 mm/min	%	ISO 178	7.1
	Flexural stress at 3.5 % strain	2 mm/min	MPa	ISO 178	75
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	70P
	Charpy notched impact strength	-30 °C/ 3 mm	kJ/m²	ISO 7391/b.o. ISO 179-1eA	14C
	Izod notched impact strength	23 °C/ 3 mm	kJ/m²	ISO 7391/b.o. ISO 180-A	60P
	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	5500
C	Puncture maximum force	-30 °C	N	ISO 6603-2	6400
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

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	Property	Test Condition	Unit	Standard	typical Value
Thermal properties					
C	Glass transition temperature	10 °C/min	°C	ISO 11357-1,-2	146
C	Temperature of deflection under load	1.80 MPa	°C	ISO 75-1,-2	127
C	Temperature of deflection under load	0.45 MPa	°C	ISO 75-1,-2	139
C	Vicat softening temperature	50 N; 50 °C/h	°C	ISO 306	146
	Vicat softening temperature	50 N; 120 °C/h	°C	ISO 306	147
C	Coefficient of linear thermal expansion, parallel	23 to 55 °C	10^{-4}/K	ISO 11359-1,-2	0.70
C	Coefficient of linear thermal expansion, transverse	23 to 55 °C	10^{-4}/K	ISO 11359-1,-2	0.70
C	Burning behavior UL 94 [UL recognition]	2.0 mm	Class	UL 94	V-0
C	Oxygen index	Method A	%	ISO 4589-2	43
	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	139
	Relative temperature index (Tensile strength) [UL recognition]	2.0 mm	°C	UL 746B	125
	Relative temperature index (Tensile impact strength) [UL recognition]	2.0 mm	°C	UL 746B	115
	Relative temperature index (Electric strength) [UL recognition]	2.0 mm	°C	UL 746B	125
	Glow wire test (GWFI)	0.75 mm	°C	IEC 60695-2-12	960
	Glow wire test (GWFI)	1.5 mm	°C	IEC 60695-2-12	960
	Glow wire test (GWFI)	3.0 mm	°C	IEC 60695-2-12	960
	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	900
	Glow wire test (GWIT)	3.0 mm	°C	IEC 60695-2-13	900
	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	120
	Needle flame test	Method K/ 2.0 mm	s	IEC 60695-11-5	120
	Needle flame test	Method K/ 3.0 mm	s	IEC 60695-11-5	120
	Needle flame test	Method F/ 1.5 mm	s	IEC 60695-11-5	120
	Needle flame test	Method F/ 2.0 mm	s	IEC 60695-11-5	120
	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	450
	Self ignition temperature		°C	ASTM D1929	510
	Vertical Bunsen burner test	1.0 mm/ 60 s	-	FAR 25.853(a)	passed
	Vertical Bunsen burner test	3.0 mm/ 60 s	-	FAR 25.853(a)	passed
	Vertical Bunsen burner test	1.0 mm/ 12 s	-	FAR 25.853(b)	passed
	Vertical Bunsen burner test	3.0 mm/ 12 s	-	FAR 25.853(b)	passed
	Smoke density (with flame)	Ds 4 min	-	ASTM E662	< 200
	Smoke toxicity (with flame)	CO	ppm	AITM 3.0005; BSS 7239	200
	Smoke toxicity (with flame)	SO2-H2O	ppm	AITM 3.0005; BSS 7239	< 20
	Smoke toxicity (with flame)	NO-NO2	ppm	AITM 3.0005; BSS 7239	< 5
	Smoke toxicity (with flame)	HF	ppm	AITM 3.0005; BSS 7239	< 5
	Smoke toxicity (with flame)	HCL	ppm	AITM 3.0005; BSS 7239	< 1
	Smoke toxicity (with flame)	HCN	ppm	AITM 3.0005; BSS 7239	not detectable

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	Property	Test Condition	Unit	Standard	typical Value
Recommended Processing and Drying Conditions					
	Melt Temperatures		°C	-	280 - 320
	Standard Melt Temperature		°C	-	300
	Barrel Temperatures - Rear		°C	-	250 - 260
	Barrel Temperatures - Middle		°C	-	270 - 280
	Barrel Temperatures - Front		°C	-	280 - 290
	Barrel Temperatures - Nozzle		°C	-	290 - 300
	Mold Temperatures		°C	-	80 - 120
	Hold Pressure (% of injection pressure)		%	-	50 - 75
	Plastic Back Pressure (specific)		bar	-	50 - 150
	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	-	2-3
	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