

Flame retardant grades / Low viscosity

MVR (300 °C/1.2 kg) 19 cm $^3$ /10 min; flame retardant; UL 94V-2/1.5 mm and 3.0 mm; low viscosity; UV stabilized; easy release; injection molding - melt temperature 280 - 320 °C; available in transparent,

translucent and opaque colors

ISO Shortname

PC-FR

	Property	Test Condition	Unit	Standard	typical Value
Rŀ	eological properties				
С	Melt volume-flow rate	300 °C/ 1.2 kg	cm <sup>3</sup> /10 min	ISO 1133	19
С	Molding shrinkage, parallel	60x60x2 mm/ 500 bar	%	ISO 294-4	0.65
С	Molding shrinkage, normal	60x60x2 mm/ 500 bar	%	ISO 294-4	0.7
	Molding shrinkage, parallel/normal	Value range based on general practical experience	%	b.o. ISO 2577	0.5 - 0.7
Γ	Melt mass-flow rate	300 °C/ 1.2 kg	g/10 min	ISO 1133	20
Me	echanical properties (23 °C/50 % r. h.)	*		·	
С	Tensile modulus	1 mm/min	MPa	ISO 527-1,-2	2400
С	Yield stress	50 mm/min	MPa	ISO 527-1,-2	66
С	Yield strain	50 mm/min	%	ISO 527-1,-2	6.0
С	Nominal strain at break	50 mm/min	%	ISO 527-1,-2	> 50
Г	Stress at break	50 mm/min	MPa	ISO 527-1,-2	70
r	Strain at break	50 mm/min	%	b.o. ISO 527-1,-2	130
Γ	Flexural modulus	2 mm/min	MPa	ISO 178	2350
Γ	Flexural strength	2 mm/min	MPa	ISO 178	98
Г	Flexural strain at flexural strength	2 mm/min	%	ISO 178	7.0
Γ	Flexural stress at 3.5 % strain	2 mm/min	MPa	ISO 178	74
С	Charpy impact strength	23 °C	kJ/m²	ISO 179-1eU	N
С	Charpy impact strength	-30 °C	kJ/m²	ISO 179-1eU	N
Г	Charpy impact strength	-60 °C	kJ/m²	ISO 179-1eU	N
ľ	Charpy notched impact strength	23 °C/ 3 mm	kJ/m²	ISO 7391/b.o. ISO 179-1eA	65P(C)
	Charpy notched impact strength	-30 °C/ 3 mm	kJ/m²	ISO 7391/b.o. ISO 179-1eA	14C
Г	Izod notched impact strength	23 °C/ 3 mm	kJ/m²	ISO 7391/b.o. ISO 180-A	60P
Г	Izod notched impact strength	-30 °C/ 3 mm	kJ/m²	ISO 7391/b.o. ISO 180-A	15C
С	Puncture maximum force	23 °C	N	ISO 6603-2	5100
С	Puncture maximum force	-30 °C	N	ISO 6603-2	6000
С	Puncture energy	23 °C	J	ISO 6603-2	55
С	Puncture energy	-30 °C	J	ISO 6603-2	65
Г	Ball indentation hardness		N/mm²	ISO 2039-1	116



Property	Test Condition	Unit	Standard	typical Value
Thermal properties				
C Glass transition temperature	10 °C/min	°C	ISO 11357-1,-2	144
C Temperature of deflection under load	1.80 MPa	°C	ISO 75-1,-2	124
C Temperature of deflection under load	0.45 MPa	°C	ISO 75-1,-2	138
C Vicat softening temperature	50 N; 50 °C/h	°C	ISO 306	144
Vicat softening temperature	50 N; 120 °C/h	°C	ISO 306	145
C Coefficient of linear thermal expansion, parallel	23 to 55 °C	10 <sup>-4</sup> /K	ISO 11359-1,-2	0.65
C Coefficient of linear thermal expansion, transverse	23 to 55 °C	10 <sup>-4</sup> /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]	6.4 mm	Class	UL 94	V-0
C Oxygen index	Method A	%	ISO 4589-2	30
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)	3.0 mm	°C	IEC 60695-2-12	960
Application of flame from small burner	Method K and F/ 2.0 mm	Class	DIN 53438-1,-3	K1, F1
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 manufacture (00 00/F0 0/ m h )				
Electrical properties (23 °C/50 % r. h.)  CRelative permittivity	100 Hz		IEC 60250	2.4
, , ,	<del>-</del>		IEC 60250	3.1
C Relative permittivity	1 MHz	-		3.0
C Dissipation factor	100 Hz	10-4	IEC 60250	
C Dissipation factor	1 MHz	10 <sup>-4</sup>	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	225
Comparative tracking index CTI M	Solution B	Rating	IEC 60112	125M
Electrolytic corrosion	<u> </u>	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 % r. h.	%	ISO 62	0.12
C Density		kg/m³	ISO 1183-1	1200
Bulk density	Pellets	kg/m³	ISO 60	640
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			J	
C Injection molding-Melt temperature		°C	ISO 294	280
C Injection molding-Mold temperature	+	°C	ISO 294	80
C Injection molding-Injection velocity	+	mm/s	ISO 294	200
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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





#### Disclaimer

#### Typical value

These values are typical values only. Unless explicitly agreed in written form, the do not constitute a binding material specification or warranted values. Values may be affected by the design of the mold/die, the processing conditions and coloring/pigmentation of the product. Unless specified to the contrary, the property values given have been established on standardized test specimens at room temperature.

#### Genera

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#### Non Medical and non Food Contact Grade

This product is not designated for the manufacture of a pharmaceutical/medicinal product, medical device or of intermediate products for medical devices1). This product is also not registered for Covestro for the use in other specifically regulated applications, in particular applications requiring regulatory registration, approval or notification (e.g. including cosmetics, plant protection, food contact and others). If the intended use of the product is for the manufacture of a pharmaceutical, medical device or of intermediate products for medical devices or for other specifically regulated applications which may lead to a regulatory obligation of Covestro, Covestro must be contacted in advance to provide its agreement to sell such product for such purpose. Nonetheless, any determination as to whether a product is appropriate for use in a pharmaceutical, medical device or intermediate products for medical devices or for the use in other specifically regulated applications, must be made solely by the purchaser of the product without relying upon any representations by Covestro, irrespective of the existence of any regulatory obligation for the registration, approval or notification. 1) Please see the "Guidance on Use of Covestro Products in a Medical Application" document.

#### Recommended Processing and Drying Conditions

Barrel temperatures are valid for a standard 3-zone barrel. Temperature set-up for different barrel types may change according to configuration. Values for hold pressure as percentage of injection pressure may vary depending on, amongst others, part geometry, injection molding machine and injection mold. Drying conditions are for dry air dryers only. Drying times and drying temperatures may differ depending on valid dryer type. Further information is provided by your local Covestro support as well as in the following brochures: Injection Molding of High Quality Molded Parts - Drying; Determining the Dryness of Makrolon by TVI Test; The fundamentals of shrinkage in thermoplastics; Shrinkage and deformation of glass fiber reinforced thermoplastics [...]. https://www.plastics.covestro.com/Library/Overview.aspx

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