Makrolon® FR6005

Designation according to ISO 1043: PC-I FR

Product description

Polycarbonate; impact modified; flame retardant; MVR (300 °C/1.2 kg) 9.0 cm³/10 min; medium viscosity; easy release; good surface quality

Applications

Injection molding; Electrical/Electronic; Housing parts

Typical Values

Rheological properties

Property	Test Condition	Value	Unit	Standard
Melt Volume-flow Rate (MVR)	300 °C/1.2 kg	9	cm³/10min	ISO 1133-1
Molding Shrinkage, parallel / normal	Value range based on general practical experience	0.6 - 0.8	%	b. o. ISO 2577

Mechanical properties (23 °C/50 % r. h.)

Property	Test Condition	Value	Unit	Standard
Tensile modulus	1 mm/min	2,300	MPa	ISO 527-1,-2
Yield Stress	50 mm/min	62	MPa	ISO 527-1,-2
Yield Strain	50 mm/min	6	%	ISO 527-1,-2
Nominal Strain at Break	50 mm/min	> 50	%	ISO 527-1,-2
Strain at Break	50 mm/min	135	%	b. o. ISO 527-1,-2
Stress at Break	50 mm/min	66	MPa	ISO 527-1,-2
Flexural Modulus	2 mm/min	2,400	MPa	ISO 178
Flexural Strength	2 mm/min	90	MPa	ISO 178
Izod Notched Impact Strength	23 °C; 3 mm	60P	kJ/m²	ISO 21305/b. o. ISO 180/A
Izod Notched Impact Strength	-10 °C; 3 mm	50P(C)	kJ/m²	ISO 21305/b. o. ISO 180/A
Izod Notched Impact Strength	-30 °C; 3 mm	15C	kJ/m²	ISO 21305/b. o. ISO 180/A
Charpy Notched Impact Strength	23 °C	68P	kJ/m²	ISO 21305/b. o. ISO 179/1eA
Charpy Notched Impact Strength	-10 °C	50C	kJ/m²	ISO 21305/b. o. ISO 179/1eA
Charpy Notched Impact Strength	-30 °C	20C	kJ/m²	ISO 21305/b. o. ISO 179/1eA

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Property	Test Condition	Value	Unit	Standard
Puncture Impact Properties - Maximum Force	23 °C	5,100	N	ISO 6603-2
Puncture Impact Properties - Maximum Force	-30 °C	6,100	N	ISO 6603-2
Puncture Energy	23 °C	54	J	ISO 6603-2
Puncture Energy	-30 °C	55	J	ISO 6603-2

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

Thermal properties

Property	Test Condition	Value	Unit	Standard
Temperature of Deflection under Load	1.80 MPa	121	°C	ISO 75-1,-2
Temperature of Deflection under Load	0.45 MPa	136	°C	ISO 75-1,-2
Vicat Softening Temperature	50 N; 50 °C/h	142	°C	ISO 306
Vicat Softening Temperature	50 N; 120 °C/h	144	°C	ISO 306
Coefficient of Linear Thermal Expansion, parallel	23 to 55 °C	0.7	10^{-4}/K	ISO 11359-1,-2
Coefficient of Linear Thermal Expansion, normal	23 to 55 °C	0.7	10^{-4}/K	ISO 11359-1,-2
Burning Behaviour	1.0 mm	V-0 (BK)		UL 94
Burning Behaviour	1.2 mm	V-1		UL 94
Burning Behaviour	1.5 mm	V-0		UL 94
Resistance to Heat (Ball Pressure Test)		134	°C	IEC 60695-10-2
Relative Temperature Index (Tensile Strength)	0.75 mm	115	°C	UL 746B
Relative Temperature Index (Tensile Impact Strength)	0.75 mm	105	°C	UL 746B
Relative Temperature Index (Electric Strength)	0.75 mm	115	°C	UL 746B
Glow Wire Test (GWFI)	1.0 mm	850	°C	IEC 60695-2-12
Glow Wire Test (GWFI)	1.5 mm	960	°C	IEC 60695-2-12
Glow Wire Test (GWFI)	3.0 mm	960	°C	IEC 60695-2-12
Glow Wire Test (GWIT)	1.0 mm	875	°C	IEC 60695-2-13
Glow Wire Test (GWIT)	1.5 mm	850	°C	IEC 60695-2-13
Glow Wire Test (GWIT)	3.0 mm	900	°C	IEC 60695-2-13

Electrical properties (23 °C/50 % r. h.)

Property	Test Condition	Value	Unit	Standard
Volume Resistivity		9E14	Ω·m	IEC 62631-3-1
Surface Resistivity		4E17	Ω	IEC 62631-3-2
Comparative Tracking Index (CTI)	Solution A	200		IEC 60112

2026-02-18 11:00:00 Distributed by Mito polimeri

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Other properties (23 °C)

Property	Test Condition	Value	Unit	Standard
Density		1,200	kg/m³	ISO 1183-1

Processing conditions for test specimens

Property	Test Condition	Value	Unit	Standard
Injection Molding - Melt Temperature		300	°C	ISO 294
Injection Molding - Mold Temperature		80	°C	ISO 294
Injection Molding - Injection Velocity		200	mm/s	ISO 294

Recommended processing and drying conditions

Property	Test Condition	Value	Unit	Standard
Melt Temperatures		280 - 320	°C	
Standard Melt Temperature		300	°C	
Barrel Temperatures	Rear	250 - 260	°C	
Barrel Temperatures	Middle	270 - 280	°C	
Barrel Temperatures	Front	280 - 290	°C	
Barrel Temperatures	Nozzle	290 - 300	°C	
Mold Temperatures		80 - 120	°C	
Hold Pressure (% of Injection Pressure)		50 - 75	%	
Plastic Back Pressure (specific)		50 - 150	bar	
Peripheral Screw Speed		0.05 - 0.2	m/s	
Shot-to-Cylinder Size		30 - 70	%	
Dry Air Drying Temperature		120	°C	
Dry Air Drying Time		2 - 3	h	
Moisture Content max. (%)		≤ 0.02	%	
Vent Depth		0.025 - 0.075	mm	

Health and Safety Information

Before working with this product, you must read and become familiar with the available information on its risks, proper use, and handling. Information is available in several forms, e.g., in particular in the currently valid safety data sheets and product labels. For further information contact your Covestro representative.

The Product Safety First Program | Covestro

Please note that for products manufactured in different colors, safety data may vary depending on the color variant.

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Disclaimer

General

The manner in which you use 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 to determine suitability for your processing and intended uses. Your analysis must at least include testing to determine suitability from a technical, health, safety, and environmental and regulatory standpoint. Such testing has not necessarily been done by Covestro, and Covestro has not obtained any approvals or licenses for a particular use or application of the product.

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 including technical assistance is given without warranty or guarantee and is subject to change without notice. It is expressly understood and agreed by you that you assume and hereby expressly release indemnify us and hold us harmless from all liability, in tort, contract or otherwise, incurred in connection with the use of our products, technical assistance, and information. 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 any claim of any patent relative to any material or its use. No license is implied or in fact granted under the claims of any patent.

Non Medical and non Food Contact

This product is not designated for the manufacture of a medical device or of intermediate products for medical devices (1). This product is also not designated for other specifically regulated applications (e.g. including cosmetics, plant protection, fertilisers, plant strengtheners, food processing, food contact and others). If the intended use of the product is for the manufacture of a medical device or of intermediate products for medical devices or for other specifically regulated applications 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 medical device or intermediate products for medical devices, for Food Contact products or cosmetic applications must be made solely by the purchaser of the product without relying upon any representations by Covestro.

1) Please see the Guidance on Use of Covestro Products in a Medical Application document.

Sample

Any samples provided by Covestro are for testing purposes only and not for commercial use.

Typical Value

These values are typical values only. Unless explicitly agreed in written form, they 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.

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Shrinkage

Shrinkage data is provided as a reference only, and is based on sample plaques molded under specific, controlled processing conditions. Shrinkage rates in production parts can vary and are influenced by several variables such as, but not limited to: part design (e.g. part size, thickness and geometry), mold design (e.g. gate type and location, runner design, mold materials, cooling system), molding conditions (e.g. processing temperature, mold temperature, packing time and pressure, injection speed).

We suggest materials be evaluated in existing applicable molds to achieve the most accurate shrinkage estimation for your specific application and processing practices. The final choice of shrinkage is the responsibility of the user of the material, and should be made based on your experience and testing results. We shall not be liable for any damage caused by the use of the shrinkage data as provided by us. If you have any questions, pls consult technical representatives from Covestro.

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.

Contact

Please use our contact form or contact us directly by sending an e-mail to technical-datasheets@cx.covestro.com .

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