

PolyMax™ PC-FR

PolyMax™ PC-FR, creation from Covestro's Makrolon® family, could achieve V0 performance in the UL94 flame retardancy test and displays excellent toughness, strength and heat resistance. This filament opens new applications in the automotive, railway and aerospace industries.

Physical Properties

Property	Testing method	Typical value
Density	ASTM D792 (ISO 1183, GB/T 1033)	1.2 (g/cm ³ at 21.5°C)
Melt index	260 °C, 5 kg	17-21 (g/10 min)
Glass transition temperature	DSC, 10 °C/min	115 (°C)
Vicat Softening temperature	ASTM D1525 (ISO 306 GB/T 1633)	116 (°C)
Heat Deflection Temperature	ISO 75 0.45 MPa	110 (°C)
Heat Deflection Temperature	ISO 75 1.8 MPa	107 (°C)

Tested with 3D printed specimen of 100% infill

Mechanical Properties

Property	Testing method	Typical value
Young's modulus (X-Y)	ASTM D638 (ISO 527, GB/T 1040)	2634 ± 182 (MPa)
Tensile strength (X-Y)	ASTM D638 (ISO 527, GB/T 1040)	67 ± 4.5 (MPa)
Elongation at break (X-Y)	ASTM D638 (ISO 527, GB/T 1040)	3.9 ± 0.7 (%)
Bending modulus (X-Y)	ASTMD790 (ISO 178, GB/T 9341)	2518 ± 53 (MPa)
Bending strength (X-Y)	ASTMD790 (ISO 178, GB/T 9341)	96.6 ± 1.3 (MPa)
Charpy impact strength (X-Y)	ASTM D256 (ISO 179, GB/T 1043)	11.7 ± 1.3 (kJ/m ²)
Young's modulus (Z)	ASTM D638 (ISO 527, GB/T 1040)	2743 ± 72 (MPa)
Tensile strength (Z)	ASTM D638 (ISO 527, GB/T 1040)	46 ± 4.8 (MPa)
Elongation at break (Z)	ASTM D638 (ISO 527, GB/T 1040)	2.2 ± 0.3 (%)
Charpy notched impact strength (X-Y)	ISO 179-1/1eA:2010, -30 °C	7.5 ± 1.6 (kJ/m ²)

All testing specimens were printed under the following conditions:

nozzle temperature = 255 °C, printing speed = 50 mm/s, build plate temperature = 110 °C, infill = 100%, Chamber temperature = 65 °C

Specimens of low temperature charpy impact strength were printed under the following conditions:

nozzle temperature = 270 °C, printing speed = 60 mm/s, build plate temperature = 110 °C, infill = 100%, Chamber temperature = 90 °C

All specimens were conditioned at room temperature for 24h prior to testing

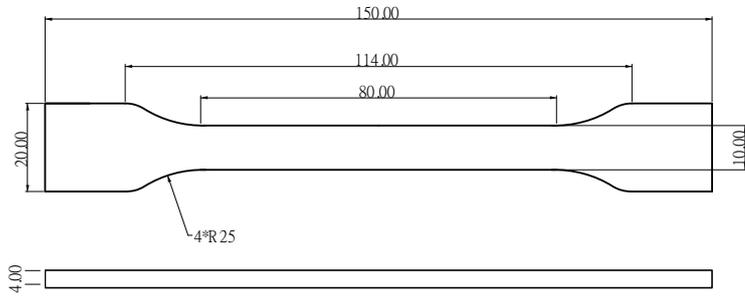
Recommended printing conditions

Parameter	
Nozzle temperature	250-270 (°C)
Build Surface material	almost any surface with a thin coat of PVA glue or MAGIGOO PC
Build plate temperature	90-105 (°C)
Cooling fan	Turned off
Printing speed	30-50 (mm/s)
Raft separation distance	0.2 (mm)
Retraction distance	1-3 (mm)
Retraction speed	60 (mm/s)
Recommended environmental temperature	90-100 (°C)
Threshold overhang angle	45 (°)
Recommended support material	PolyDissolve S2

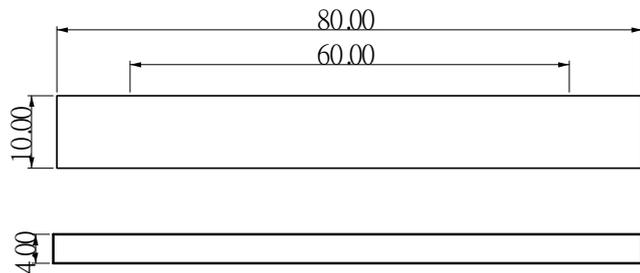
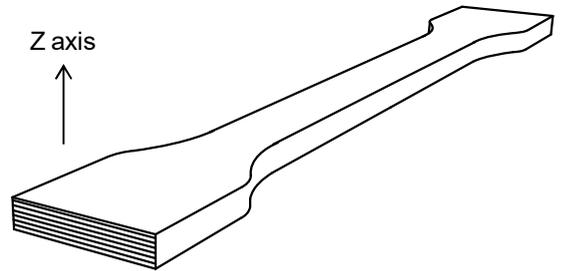
Based on 0.4 mm nozzle and Simplify 3D v.4.0. Printing conditions may vary with different nozzle diameters

- For better part strength and to relieve the residual stress, annealing the parts at 100°C for 2 hour right after printing

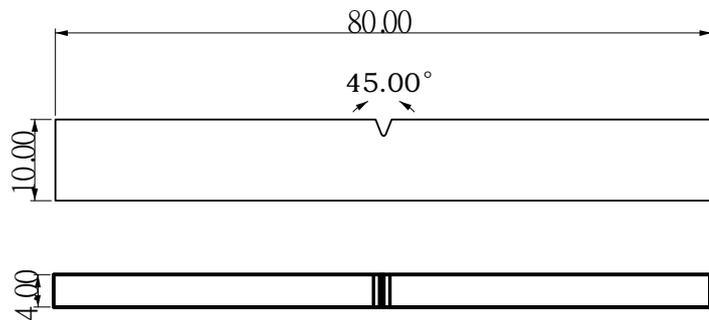
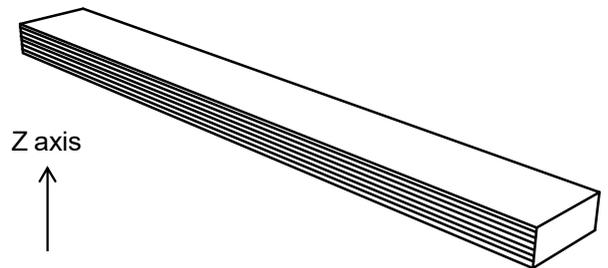
- PolyMax™ PC-FR needs be dried before printed, if it has been stored in air for long time



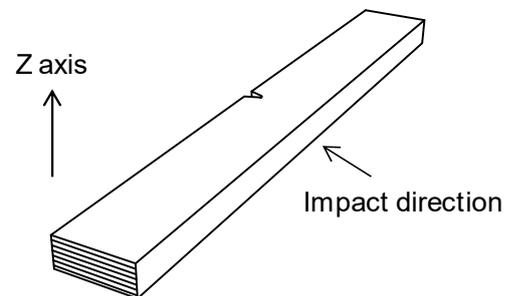
Tensile testing specimen; ASTM D638 (ISO 527, GB/T 1040)



Flexural testing specimen; ASTM D790 (ISO 178, GB/T 9341)



Impact testing specimen; ASTM D256 (ISO 179, GB/T 1043)



Disclaimer:

The typical values presented in this data sheet are intended for reference and comparison purposes only. They should not be used for design specifications or quality control purposes. Actual values may vary significantly with printing conditions. End-use performance of printed parts depends not only on materials, but also on part design, environmental conditions, printing conditions, etc. Product specifications are subject to change without notice.

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