polymaker

Innovators in 3D printing

Technical Data Sheet

PolyMax™ PC-FR

www.polymaker.com

V5.1

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	ISO1183, GB/T1033	1.2 g/cm^3 at 23°C
Melt index	260°C, 5 kg	12-17 g/10min
Light transmission	N/A	N/A
Flame retardancy	UL94	V0

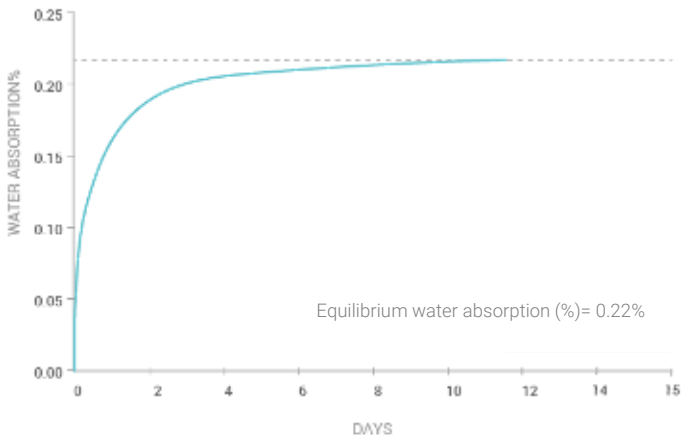
CHEMICAL RESISTANCE DATA

Property	Testing Method
Effect of weak acids	Slight resistant
Effect of strong acids	Not resistant
Effect of weak alkalis	Slight resistant
Effect of strong alkalis	Not resistant
Effect of organic solvent	Not resistant
Effect of oils and grease	No data available

MOISTURE ABSORPTION CURVE

PolyMax™ PC-FR

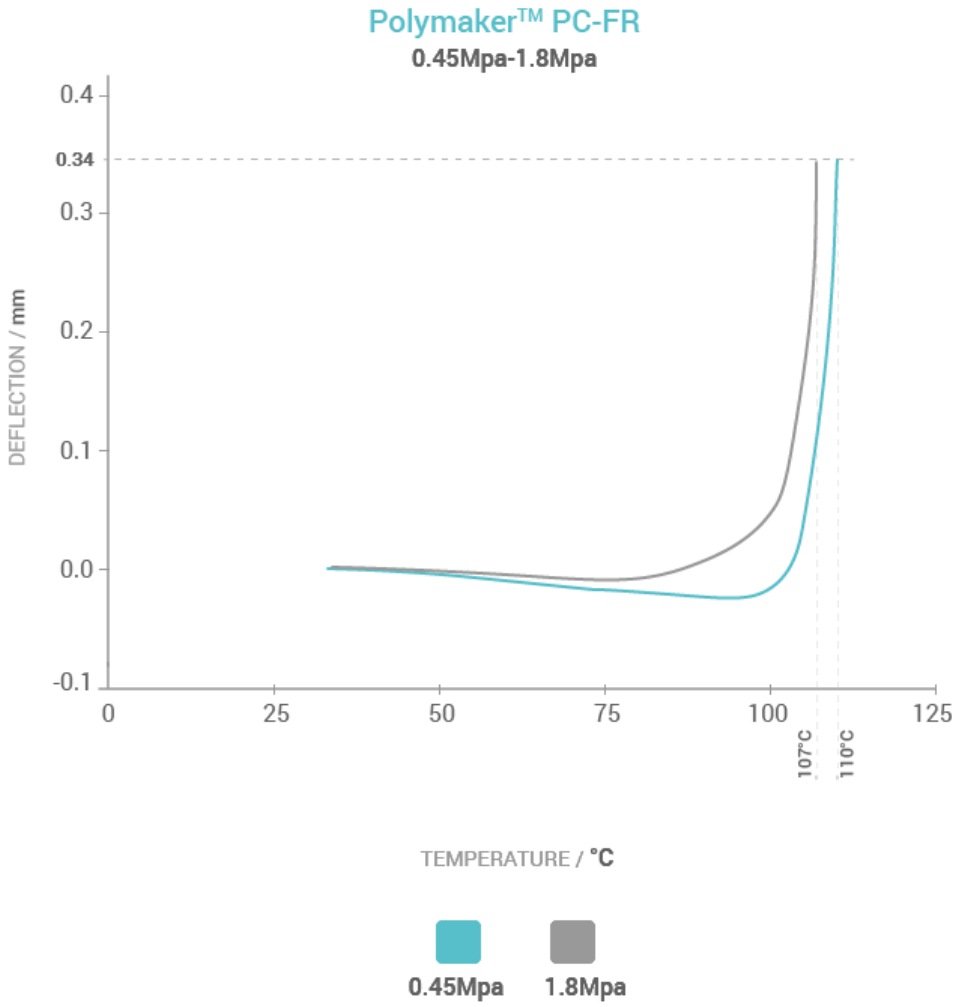
70%RH - 23°C



THERMAL PROPERTIES

Property	Testing Method	Typical Value
Glass transition temperature	DSC, 10°C/min	115 °C
Melting temperature	DSC, 10°C/min	N/A
Crystallization temperature	DSC, 10°C/min	N/A
Decomposition temperature	TGA, 20°C/min	N/A
Vicat softening temperature	ISO 306 GB/T 1633	116 °C
Heat deflection temperature	ISO 75 1.8MPa	107 °C
Heat deflection temperature	ISO 75 0.45MPa	110 °C
Thermal conductivity	N/A	N/A
Heat shrinkage rate	N/A	N/A

HDT CURVE



MECHANICAL PROPERTIES

Property	Testing Method	Typical Value
Young's modulus (X-Y)	ISO 527, GB/T 1040	2634 ± 182 MPa
Young's modulus (Z)		2743 ± 72 MPa
Tensile strength (X-Y)	ISO 527, GB/T 1040	67 ± 4.5 MPa
Tensile strength (Z)		46 ± 4.8 MPa
Elongation at break (X-Y)	ISO 527, GB/T 1040	3.49 ± 0.7 %
Elongation at break (Z)		2.2 ± 0.3 %
Bending modulus (X-Y)	ISO 178, GB/T 9341	2518 ± 53 MPa
Bending modulus (Z)		N/A
Bending strength (X-Y)	ISO 178, GB/T 9341	96.6 ± 1.3 MPa
Bending strength (Z)		N/A
Charpy impact strength (X-Y)	ISO 179, GB/T 1043	11.7 ± 1.6 kJ/m^2
Charpy impact strength (Z)		N/A
Low temperature impact strength (X-Y)	ISO 179-1/1eA:2010, -30°C	7.5 ± 1.6 kJ/m^2

RECOMMENDED PRINTING CONDITIONS

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

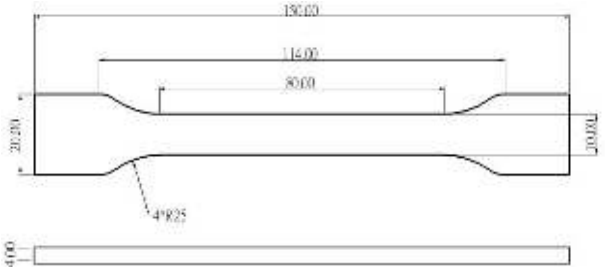
Parameter	
Nozzle temperature	250 – 270 (℃)
Build surface material	Any surface
Build surface treatment	PVA glue or MAGIGOO PC
Build plate temperature	90 - 105 (˚C)
Cooling fan	OFF
Printing speed	30-50 (mm/s)
Raft separation distance	0.2 (mm)
Retraction distance	1 (mm)
Retraction speed	20 (mm/s)
Environmental temperature	90-100 (˚C)
Threshold overhang angle	45 (˚)
Recommended support material	PolyDissolve™ S2

Note:

- When printing with PolyMax™ PC-FR, it is recommended to use an enclosure. For large part, it is recommended to use a heated chamber.
- It is recommended to anneal the printed part right after the printing process to release the residual internal stress. Annealing settings: 90˚C for 2h

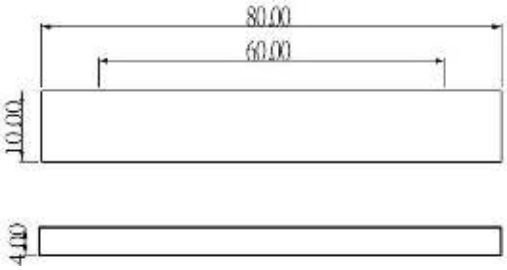
TENSILE TESTING SPECIMEN

ISO 527, GB/T 1040



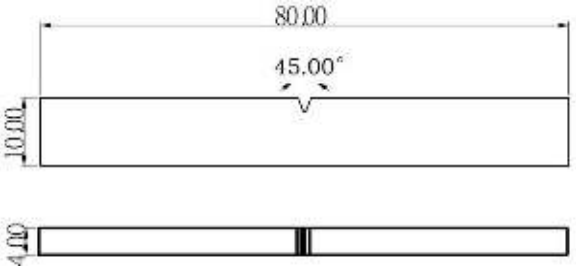
FLEXURAL TESTING SPECIMEN

ISO 178, GB/T 9341



IMPACT TESTING SPECIMEN

ISO 179, GB/T 1043



HOW TO MAKE SPECIMENS

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

Printing temperature	270 °C
Bed temperature	105 °C
Shell	2
Top & bottom layer	4
Infill	100%
Environmental temperature	90˚C
Cooling fan	OFF

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.

Each user is responsible for determining the safety, lawfulness, technical suitability, and disposal/ recycling practices of Polymaker materials for the intended application. Polymaker makes no warranty of any kind, unless announced separately, to the fitness for any use or application. Polymaker shall not be made liable for any damage, injury or loss induced from the use of Polymaker materials in any application.