polymaker

Innovators in 3D printing

Technical Data Sheet

PolyMax™ PC-FR

www.polymaker.com

V5.4

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	Typical Value
Effect of weak acids	Good
Effect of strong acids	Poor
Effect of weak alkalis	Fair
Effect of strong alkalis	Poor
Effect of oils and grease	Good

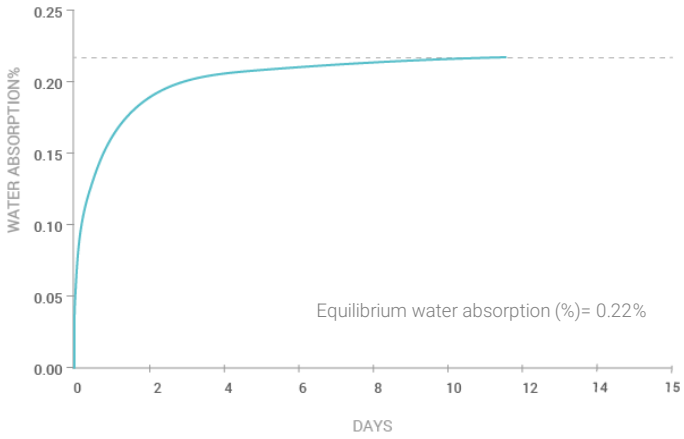
Note:

- Good: Material may get minor attack after long periods of storage with chemical at ambient temperature
- Fair: Material can be used for short time contact with chemical at ambient temperature
- Poor: Material becomes unstable on contact with chemical at ambient temperature

MOISTURE ABSORPTION CURVE

PolyMax™ PC-FR

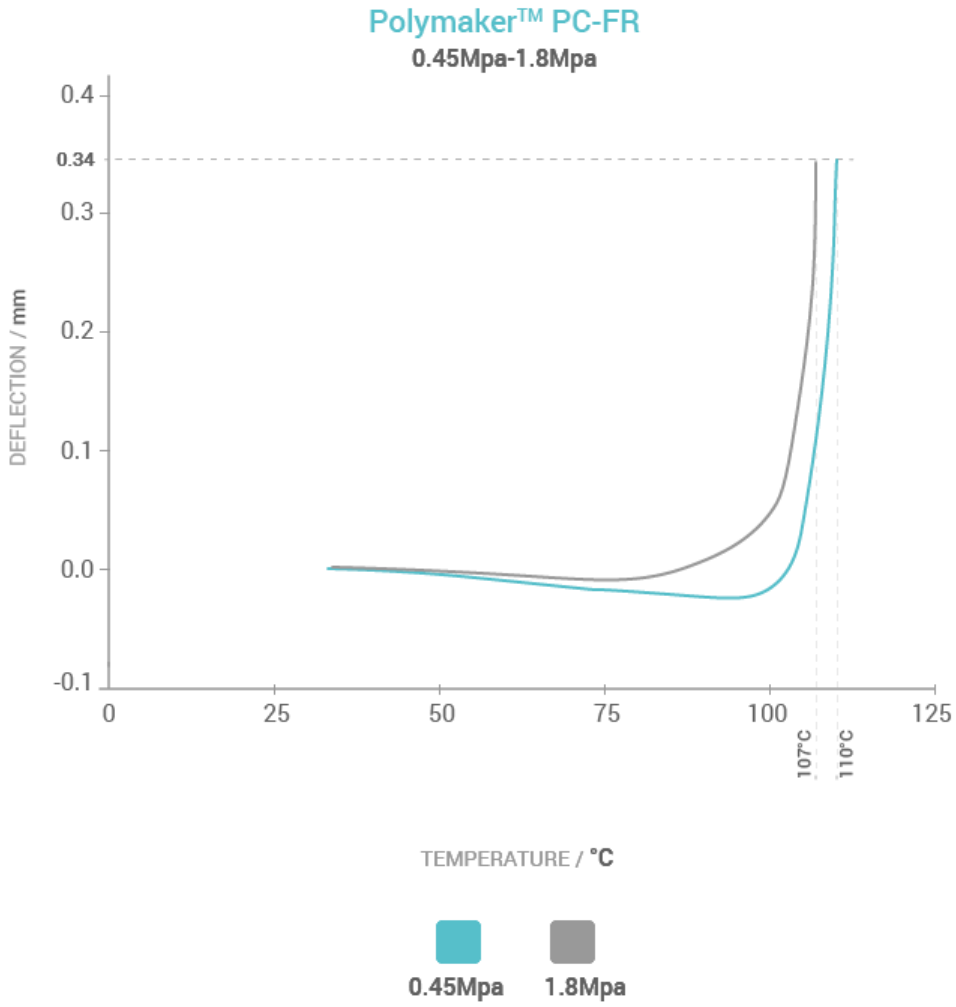
70%RH - 23°C



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

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
Notched Charpy impact strength (X-Y)	ISO 179, GB/T 1043	11.7 ± 1.6 kJ/m^2
Notched 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

Parameter	
Nozzle temperature	250 – 270 (℃)
Build surface treatment	Texture PEI (Glue when needed)
Build plate temperature	90 – 105 (˚C)
Cooling fan	OFF
Printing speed	50 - 200 (mm/s)
Retraction distance	1 - 3 (mm)
Retraction speed	20 - 40 (mm/s)
Closure Chamber	Needed (70-100˚C)
Recommended support material	-
Drying setting	75˚C for 6h
Annealing setting	90˚C for 2h

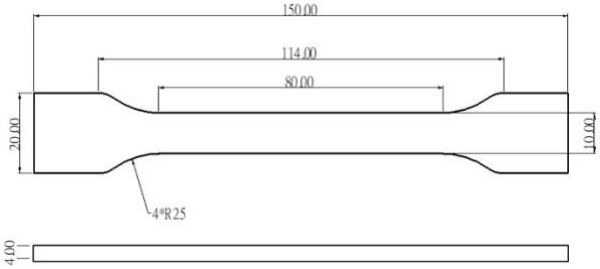
* Based on 0.4 mm nozzle. Printing conditions may vary with different nozzle diameters

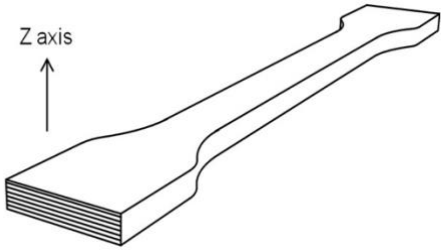
Note:

- 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

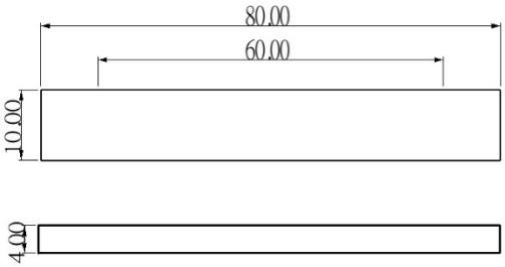
ISO 527, GB/T 1040

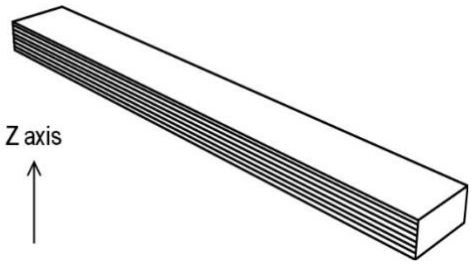




FLEXURAL TESTING SPECIMEN

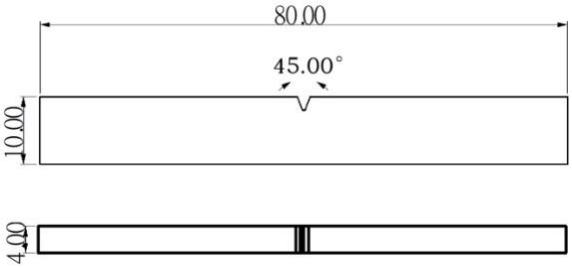
ISO 178, GB/T 9341

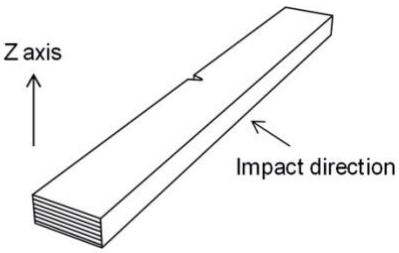




IMPACT TESTING SPECIMEN

ISO 179, GB/T 1043





HOW TO MAKE SPECIMENS

Printing temperature	260 °C
Bed temperature	100 °C
Shell	2
Top & bottom layer	3
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.

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