TECHNICAL DATA SHEET

V5.5

polymaker
3D PRINTING FILAMENT

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.

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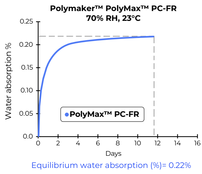
PHYSICAL PROPERTIES

PROPERTY	TESTING METHOD	TYPICAL VALUE
Density	ISO1183, GB/T 1033	1.2 g/cm^3 at 23°C
Melt index	260°C, 5kg	12-17 g/10min
Light transmission	N/A	N/A
Flame retardancy	UL94	V0

MOISTURE ABSORPTION CURVE

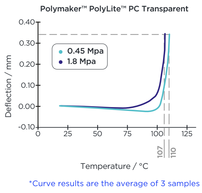


Equilibrium water absorption (%)= 0.22%

THERMAL PROPERTIES

PROPERTY	TESTING METHOD	TYPICAL VALUE
Glass transition temp.	DSC, 10°C/min	115°C
Melting temp.	DSC, 10°C/min	N/A
Crystalization temp.	DSC, 10°C/min	N/A
Decomposition temp.	TGA, 20°C/min	N/A
Vicat softening temp.	ISO 306, GB/T 1633	116°C
Heat deflection temp.	ISO 75 1.8MPa	107°C
Heat deflection temp.	ISO 75 0.45MPa	110°C

HDT CURVE



*Curve results are the average of 3 samples

MECHANICAL PROPERTIES

PROPERTY	TESTING METHOD	TYPICAL VALUE
Young's modulus (X-Y) Young's modulus (Z)	ISO 527, GB/T 1040	2634 ± 182 MPa 2743 ± 72 MPa
Tensile strength (X-Y) Tensile strength (Z)	ISO 527, GB/T 1040	67 ± 4.5 MPa 46 ± 4.8 MPa
Elongation at break (X-Y) Elongation at break (Z)	ISO 527, GB/T 1040	3.49 ± 0.7 % 2.2 ± 0.3 %
Bending modulus (X-Y) Bending modulus (Z)	ISO 527, GB/T 1040	2518 ± 53 MPa N/A
Bending strength (X-Y) Bending strength (Z)	ISO 527, GB/T 1040	96.6 ± 1.3 MPa N/A
Notched charpy impact strength (X-Y) Notched charpy impact strength (Z)	ISO 179, GB/T 1043	11.7 ± 1.6 kJ/m² N/A
Low temp. impact strength (X-Y)	ISO 179-1 / 1eA:2010, -30°C	7.5 ± 1.6 kJ/m²

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

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 chemicals at ambient temperature

Poor:
Material becomes unstable on contact with chemical at ambient temperature

RECOMMENDED PRINTING CONDITIONS

Nozzle temperature	250-270°C
Build plate temperature	90-105°C
Build surface treatment	PC and Textured PEI
Cooling fan	OFF
Closure chamber	Needed (70°C-100°C)

Printing speed	50-200mm/s
Drying temp. and time	75°C/6H
Retraction distance	1-3 (mm)
Retraction speed	20-40 (mm/s)
Annealing setting	90°C/2H

*Based on 0.4mm 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

PolyBox™ or PolyDryer™ Box

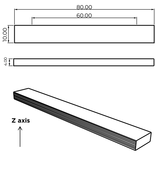
NOTE
It is highly recommended to use the PolyBox™ or PolyDryer™ Box when printing or storing.

HOW TO MAKE SPECIMENS

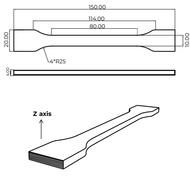
Printing temperature	260°C
Bed temperature	100°C
Top & bottom layer	3
Environmental Temperature	90°C

Infill	100%
Shell	2
Cooling fan	OFF

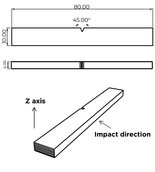
FLEXURAL TESTING SPECIMEN
ISO 178, GB/T 9341



TENSILE TESTING SPECIMEN
ISO 527, GB/T 1040



IMPACT TESTING SPECIMEN
ISO 179, GB/T 1043



*Based on testing with Polymaker™ PolyMax™ PC-FR (SKU: PC03001)

DISCLAIMER