polymaker

Innovators in 3D printing

Technical Data Sheet

PolyMide™ PA6-CF

www.polymaker.com

V5.0

PolyMide™ PA6-CF

PolyMide™ PA6-CF is a carbon fiber reinforced PA6 (Nylon 6) filament. The carbon fiber reinforcement provides significantly improved stiffness, strength and heat resistance with outstanding layer adhesion.

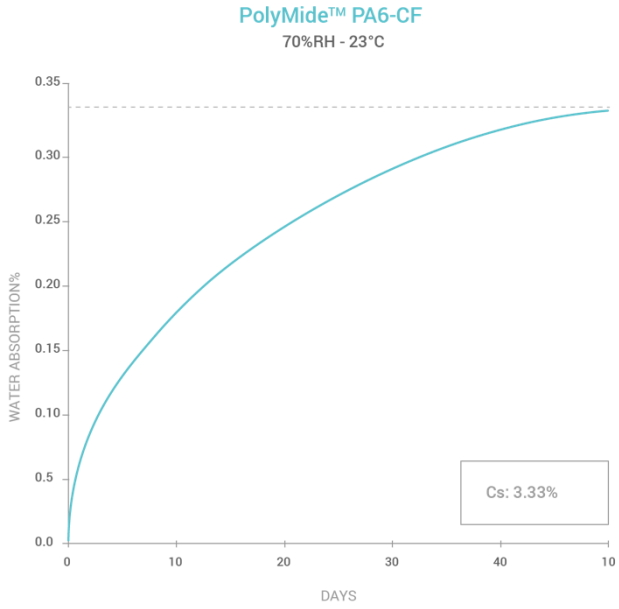
PHYSICAL PROPERTIES

Property	Testing Method	Typical Value
Density	ISO1183, GB/T1033	1.17 g/cm^3 at 21°C
Melt Index	300°C, 2.16 kg	20.5 g/10min
Light Transmission	N/A	N/A
Flame retardancy V2	UL94	V2

CHEMICAL RESISTANT DATA

Property	Testing Method
Effect of weak acids	Not 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	Resistance
Effect of Sunlight	No data available

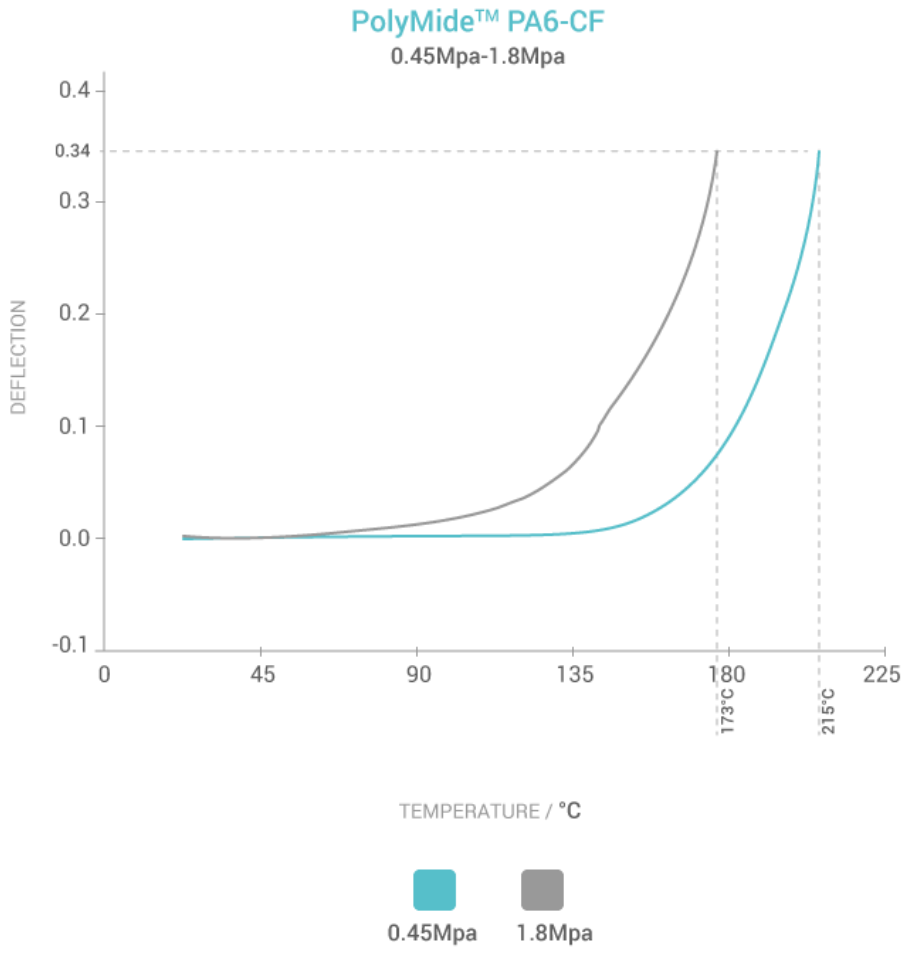
MOISTURE ABSORPTION CURVE



THERMAL PROPERTIES

Property	Testing Method	Typical Value
Glass transition	DSC, 10°C/min	74.2 °C
Melting temperature	DSC, 10°C/min	218.5 °C
Crystallization temperature	DSC, 10°C/min	184.6 °C
Decomposition temperature	TGA, 20°C/min	>370 °C
Vicat softening temperature	ISO 306 GB/T 1633	N/A
Heat deflection temperature	ISO 75 1.8MPa	173 °C
Heat deflection temperature	ISO 75 0.45MPa	215 °C
Thermal conductivity	N/A	N/A
Heat shrinkage rate	N/A	N/A

HDT CURVE



MECHANICAL PROPERTIES (Dry state)

Property	Testing Method	Typical Value
Young's modulus (X-Y)	ISO 527, GB/T 1040	7453 ± 656 MPa
Young's modulus (Z)		4354 ± 206 MPa
Tensile strength (X-Y)	ISO 527, GB/T 1040	105. ± 5.0 MPa
Tensile strength (Z)		67.7 ± 4.7 MPa
Elongation at break (X-Y)	ISO 527, GB/T 1040	3.0 ± 0.3 %
Elongation at break (Z)		2.5 ± 0.7 %
Bending modulus (X-Y)	ISO 178, GB/T 9341	8339 ± 369 MPa
Bending modulus (Z)		N/A
Bending strength (X-Y)	ISO 178, GB/T 9341	169.0 ± 4.7 MPa
Bending strength (Z)		N/A
Charpy impact strength (X-Y)	ISO 179, GB/T 9343	13.34 ± 0.5 kj/m^2
Charpy impact strength (Z)		N/A

Note:
All specimens were annealed at 80˚C for 24h and dried for 48h prior to testing

MECHANICAL PROPERTIES (Moisture Conditioned)

Property	Testing Method	Typical Value
Young's modulus (X-Y)	ISO 527, GB/T 1040	5666 ± 469 MPa
Young's modulus (Z)		4713 ± 282 MPa
Tensile strength (X-Y)	ISO 527, GB/T 1040	81.7 ± 6.0 MPa
Tensile strength (Z)		64.4 ± 5.6 MPa
Elongation at break (X-Y)	ISO 527, GB/T 1040	4.6 ± 0.5 %
Elongation at break (Z)		1.8 ± 0.4 %
Bending modulus (X-Y)	ISO 178, GB/T 9341	6387 ± 1120 MPa
Bending modulus (Z)		N/A
Bending strength (X-Y)	ISO 178, GB/T 9341	152.2 ± 15.7 MPa
Bending strength (Z)		N/A
Charpy impact strength (X-Y)	ISO 179, GB/T 9343	32.8 ± 1.03 kj/m^2
Charpy impact strength (Z)		N/A

Note:
All specimens were annealed at 80 °C for 24h, and conditioned at 70% RH/23 °C and ambient temperature for 15 days prior to testing

HOW TO MAKE SPECIMENS

Printing temperature	300 °C
Bed temperature	45 °C
Shell	2
Top & bottom layer	4
Infill	100%
Environmental temperature	25 – 50 (recommended) (˚C)
Cooling fan	OFF

Note:

- Abrasion of the brass nozzle happens quite often when printing PolyMide™ PA6-CF. Normally, the life of a brass nozzle would be approximately 9h. A wear-resistance nozzle, such as hardened steel and ruby nozzle, is highly recommended to be used with PolyMide™ PA6-CF.
- PolyMide™ PA6-CF is sensitive to moisture and should always be stored and used under dry conditions (relative humidity below 20%).
- If PolyMide™ PA6-CF is used as the support material for itself, please remove the support structure before excessive moisture absorption. Otherwise the support structure can be permanently bonded to the model.
- After the printing process, it is recommended to anneal the model in the oven at 80 - 100°C for 1 - 3 hours.
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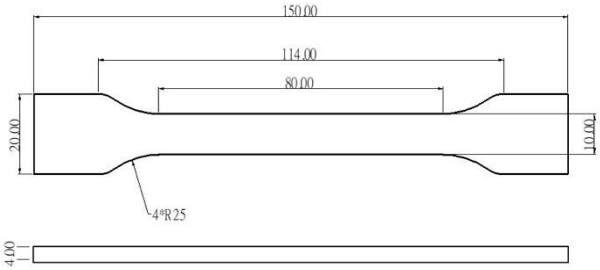
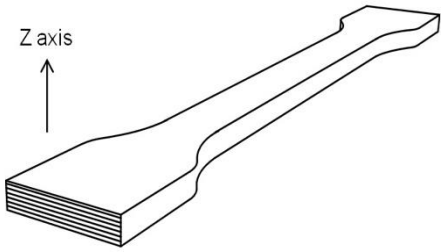
TENSILE TESTING SPECIMEN

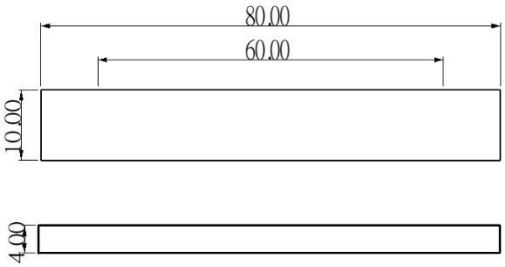
ASTM D638 (ISO 527, GB/T 1040)

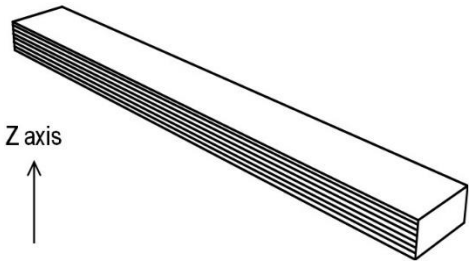




FLEXURAL TESTING SPECIMEN

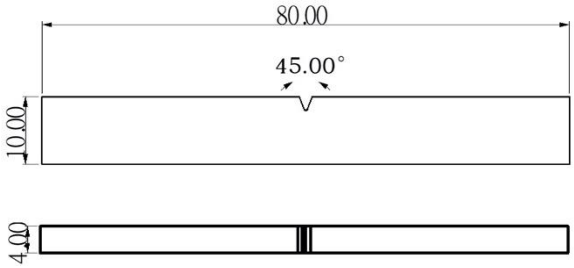
ASTM D638 (ISO 527, GB/T 1040)

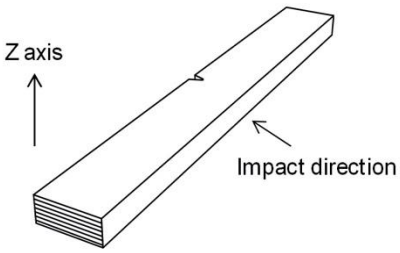




IMPACT TESTING SPECIMEN

ASTM D638 (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.

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.