polymaker

Innovators in 3D printing

Technical Data Sheet

PolyMide™ PA6-GF

www.polymaker.com

V5.1

PolyMide™ PA6-GF

PolyMide™ PA6-GF is a glass fiber reinforced PA6 (Nylon 6) filament. The material exhibits excellent thermal and mechanical properties without sacrificing the layer adhesion.

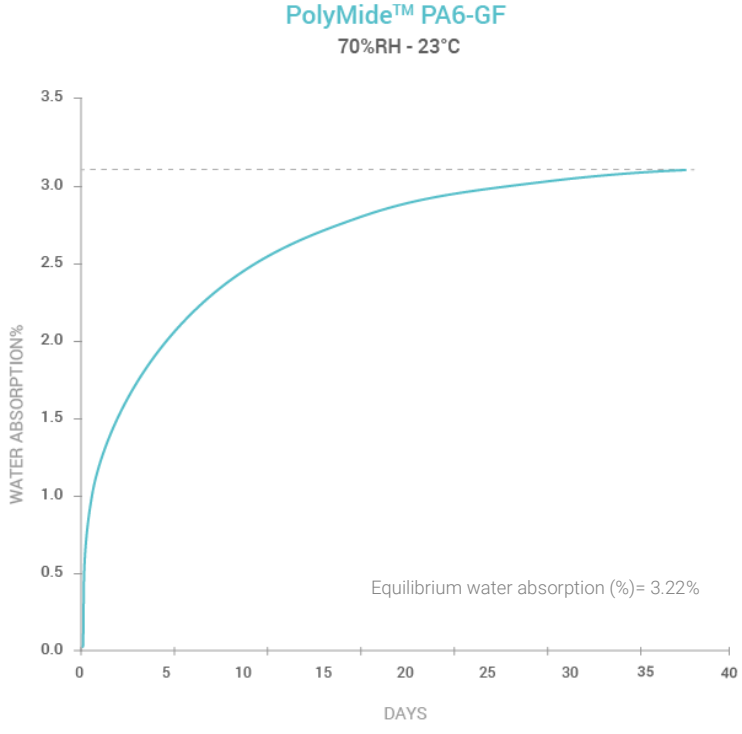
PHYSICAL PROPERTIES

Property	Testing Method	Typical Value
Density	ISO1183, GB/T1033	1.2 g/cm^3 at 23°C
Melt index	300°C, 2.16 kg	15.9 g/10min
Light transmission	N/A	N/A
Flame retardancy	N/A	N/A

CHEMICAL RESISTANCE 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	Resistant

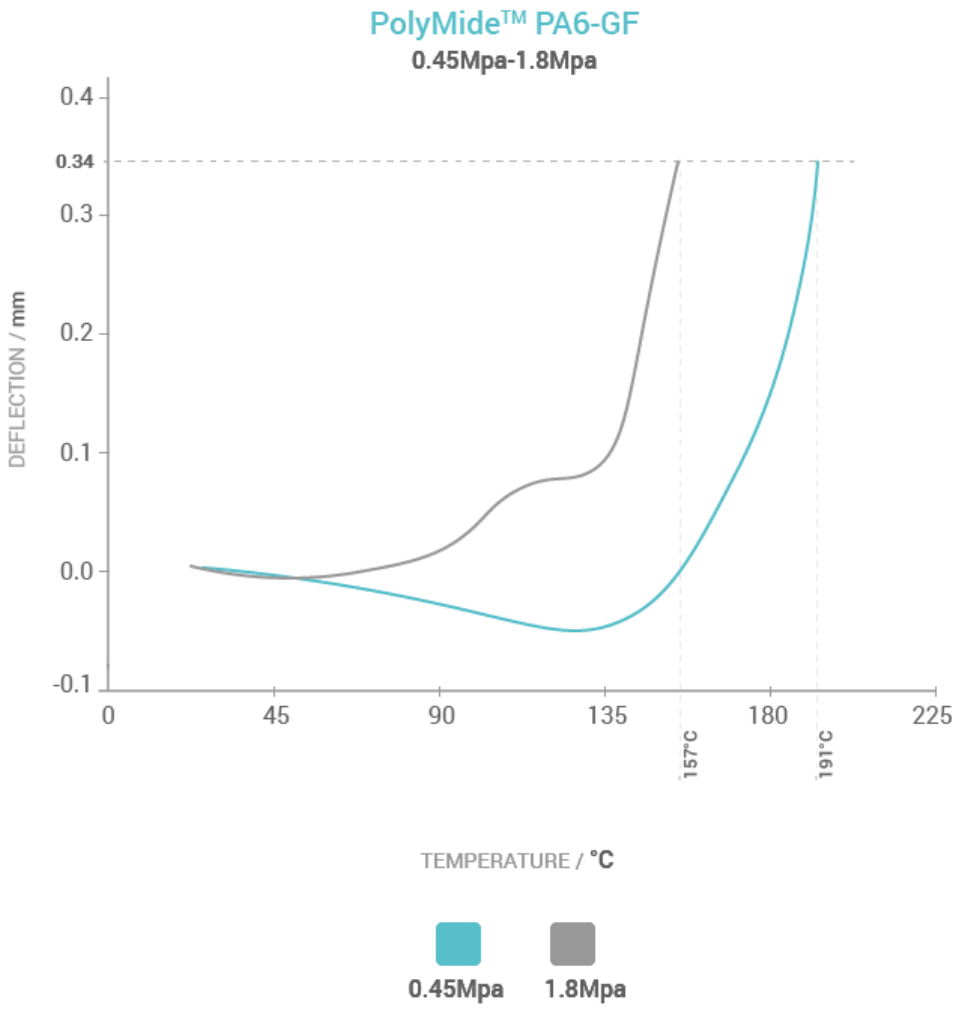
MOISTURE ABSORPTION CURVE



THERMAL PROPERTIES

Property	Testing Method	Typical Value
Glass transition temperature	DSC, 10°C/min	70.4 °C
Melting temperature	DSC, 10°C/min	214.5 °C
Crystallization temperature	DSC, 10°C/min	174.5 °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	157 °C
Heat deflection temperature	ISO 75 0.45MPa	191 °C
Thermal conductivity	N/A	N/A
Heat shrinkage rate	N/A	N/A

HDT CURVE



MECHANICAL PROPERTIES (Dry status)

Property	Testing Method	Typical Value
Young's modulus (X-Y)	ISO 527, GB/T 1040	4431 ± 184 MPa
Young's modulus (Z)		3330 ± 145 MPa
Tensile strength (X-Y)	ISO 527, GB/T 1040	84.5 ± 2.1 MPa
Tensile strength (Z)		61.4 ± 3.9 MPa
Elongation at break (X-Y)	ISO 527, GB/T 1040	3.4 ± 0.3 %
Elongation at break (Z)		2.9 ± 0.7 %
Bending modulus (X-Y)	ISO 178, GB/T 9341	4637 ± 293 MPa
Bending modulus (Z)		N/A
Bending strength (X-Y)	ISO 178, GB/T 9341	136.4 ± 1.6 MPa
Bending strength (Z)		N/A
Charpy impact strength (X-Y)	ISO 179, GB/T 1043	16.5 ± 1.5 kJ/m^2
Charpy impact strength (Z)		N/A

Note:
All specimens were annealed at 80˚C for 6h 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	2053 ± 243 MPa
Young's modulus (Z)		2593 ± 192 MPa
Tensile strength (X-Y)	ISO 527, GB/T 1040	50.8 ± 4.9 MPa
Tensile strength (Z)		44.4 ± 4.7 MPa
Elongation at break (X-Y)	ISO 527, GB/T 1040	19.4 ± 2.2 %
Elongation at break (Z)		2.9 ± 0.8 %
Bending modulus (X-Y)	ISO 178, GB/T 9341	2232 ± 97 MPa
Bending modulus (Z)		N/A
Bending strength (X-Y)	ISO 178, GB/T 9341	65.1 ± 2.2 MPa
Bending strength (Z)		N/A
Charpy impact strength (X-Y)	ISO 179, GB/T 9343	21.2 ± 1.1 kJ/m^2
Charpy impact strength (Z)		N/A

Note:
All specimens were annealed at 80 °C for 6h, and conditioned at 70% relative humidity and ambient temperature for 15 days prior to testing

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	280 – 300 (℃)
Build surface material	BuildTak®, Glass, Blue Tape
Build surface treatment	Glue
Build plate temperature	25 - 50 (˚C)
Cooling fan	OFF
Printing speed	30-60 (mm/s)
Raft separation distance	0.2 (mm)
Retraction distance	3 (mm)
Retraction speed	40 (mm/s)
Environmental temperature	Room temperature - 50 (˚C)
Threshold overhang angle	50 (˚)
Recommended support material	PolyDissolve™ S1

Note:

- Abrasion of the brass nozzle happens frequently when printing PolyMide™ PA6-GF. 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-GF.
- PolyMide™ PA6-GF is sensitive to moisture and should always be stored and used under dry conditions (relative humidity below 20%).
- If PolyMide™ PA6-GF 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 6 hours.
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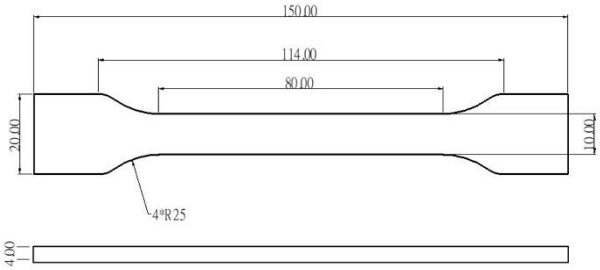
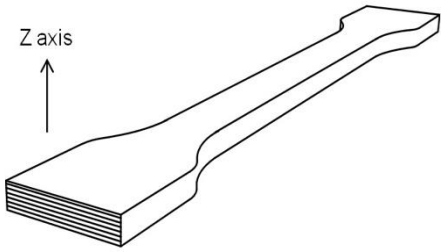
TENSILE TESTING SPECIMEN

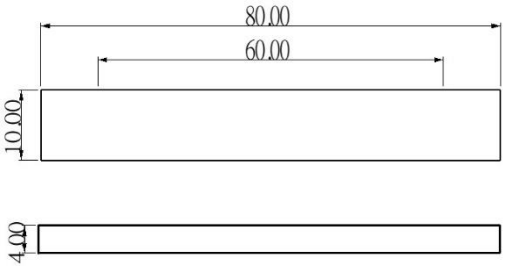
ISO 527, GB/T 1040

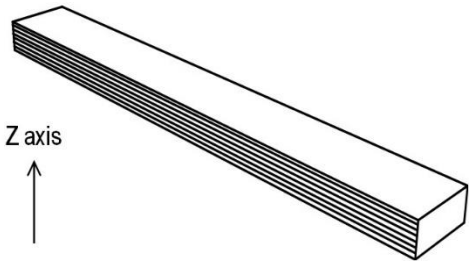




FLEXURAL TESTING SPECIMEN

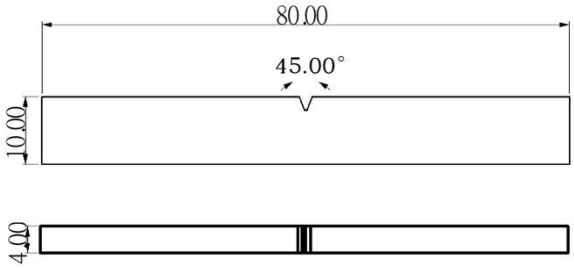
ISO 178, GB/T 9341

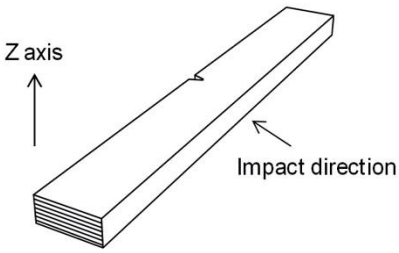




IMPACT TESTING SPECIMEN

ISO 179, GB/T 1043





HOW TO MAKE SPECIMENS

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

Printing temperature	300 °C
Bed temperature	45 °C
Shell	2
Top & bottom layer	4
Infill	100%
Environmental temperature	50 ˚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.