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	ASTM D792 (ISO 1183, GB/T 1033)	1.2 (g/cm3 at 21.5˚C)
Glass transition temperature	DSC, 10 °C/min	75 (°C)
Melt index	300 °C, 2.16 kg	15.9 (g/10 min)
Melting temperature	DSC, 10 °C/min	215 (˚C)
Crystallization temperature	DSC, 10 °C/min	174 (˚C)
Heat Deflection Temperature	ISO 75 1.8 MPa	157 (˚C)
Heat Deflection Temperature	ISO 75 0.45 MPa	191 (˚C)

Tested with 3D printed specimen of 100% infill

Mechanical Properties (Dry State)

Property	Testing method	Typical value
Young's modulus (X-Y)	ASTM D638 (ISO 527, GB/T 1040)	4431 ± 184 (MPa)
Young's modulus (Z)	ASTM D638 (ISO 527, GB/T 1040)	3330 ± 145 (MPa)
Tensile strength (X-Y)	ASTM D638 (ISO 527, GB/T 1040)	84.5 ± 2.1 (MPa)
Tensile strength (Z)	ASTM D638 (ISO 527, GB/T 1040)	61.4 ± 3.9 (MPa)
Elongation at break (X-Y)	ASTM D638 (ISO 527, GB/T 1040)	3.4 ± 0.3 (%)
Elongation at break (Z)	ASTM D638 (ISO 527, GB/T 1040)	2.9 ± 0.7 (%)
Bending modulus (X-Y)	ASTMD790 (ISO 178, GB/T 9341)	4637 ± 293 (MPa)
Bending strength (X-Y)	ASTMD790 (ISO 178, GB/T 9341)	136.4 ± 1.6 (MPa)
Charpy impact strength (X-Y)	ASTM D256 (ISO 179, GB/T 1043)	16.5 ± 0.5 (kJ/m^2)

All testing specimens were printed under the following conditions:
Nozzle temperature = 300 °C, printing speed = 45 mm/s, shell: 0.8mm, infill: 100%
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)	ASTM D638 (ISO 527, GB/T 1040)	2050.3 ± 243.6 (MPa)
Young's modulus (Z)	ASTM D638 (ISO 527, GB/T 1040)	2593 ± 192 (MPa)
Tensile strength (X-Y)	ASTM D638 (ISO 527, GB/T 1040)	50.8 ± 4.9 (MPa)
Tensile strength (Z)	ASTM D638 (ISO 527, GB/T 1040)	44.4 ± 4.7 (MPa)
Elongation at break (X-Y)	ASTM D638 (ISO 527, GB/T 1040)	19.4 ± 2.2 (%)
Elongation at break (Z)	ASTM D638 (ISO 527, GB/T 1040)	2.9 ± 0.8 (%)
Bending modulus (X-Y)	ASTMD790 (ISO 178, GB/T 9341)	2232 ± 97 (MPa)
Bending strength (X-Y)	ASTMD790 (ISO 178, GB/T 9341)	65.1 ± 2.2 (MPa)
Charpy impact strength (X-Y)	ASTM D256 (ISO 179, GB/T 1043)	21.2 ± 1.1 (kJ/m^2)

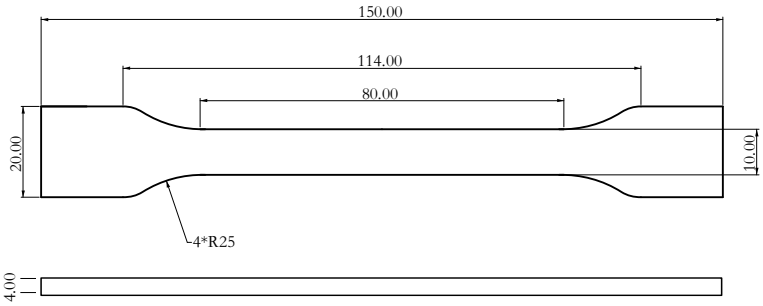
All specimens were annealed at 80 °C for 24h, and conditioned at 70% RH/23 °C and ambient temperature for 15 days prior to testing

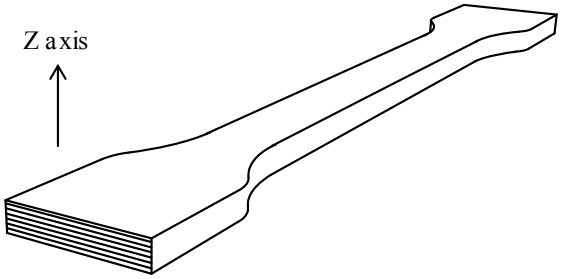
Recommended printing conditions

Parameter	
Nozzle temperature	280 - 300 (˚C)
Build Surface material	Glass, Garolite, Magigoo PA
Build surface treatment	Applying PVA glue to the build surface
Build plate temperature	25 - 50 (˚C)
Cooling fan	Turned off
Printing speed	60 (mm/s)
Raft separation distance	0.1 - 0.2 (mm)
Retraction distance	3 - 6 (mm)
Retraction speed	40 - 60 (mm/s)
Recommended environmental temperature	25 - 50 (˚C)
Threshold overhang angle	45 (˚)
Recommended support material	PolyDissolve™ S1

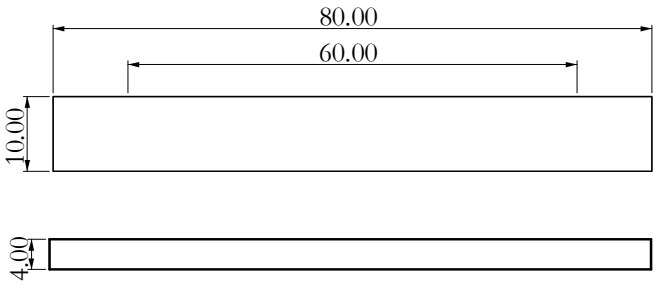
Based on 0.4 mm nozzle and Simplify 3D v.3.1. Printing conditions may vary with different nozzle diameters

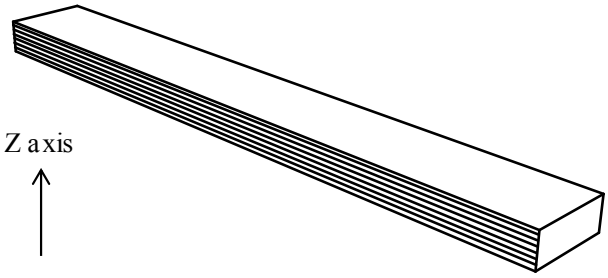
• Abrasion of the brass nozzle happens quite often when printing PolyMide™ PA6-GF. Normally, the life of a brass nozzle would be approximately 9h. A wear-resistance nozzle, such as hardened steel and ruby nozzle, is highly recommended to be used with PolyMide™ PA6-GF.
• PolyMide™ PA6-GF is sensitive 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 1 - 3 hours.



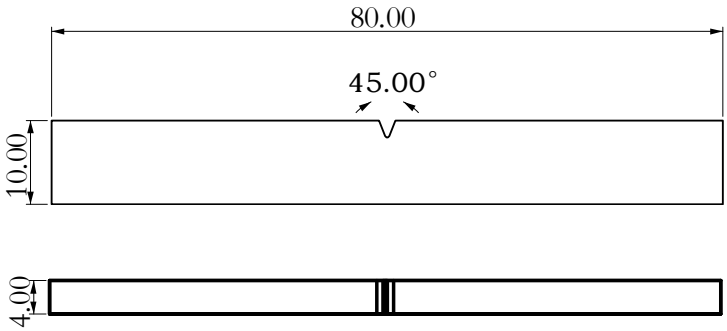


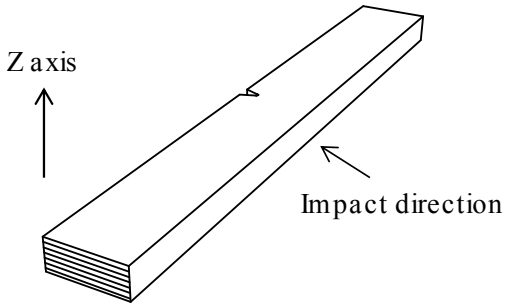
Tensile testing specimen; ASTM D638 (ISO 527, GB/T 1040)





Flexural testing specimen; ASTMD790 (ISO 178, GB/T 9341)





Impact testing specimen; ASTM D256 (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.

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