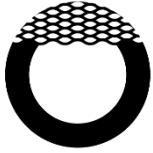


## *Technical Data Sheet*

# *PolyMide™ PA612-CF*

[www.polymaker.com](http://www.polymaker.com)

V5.3



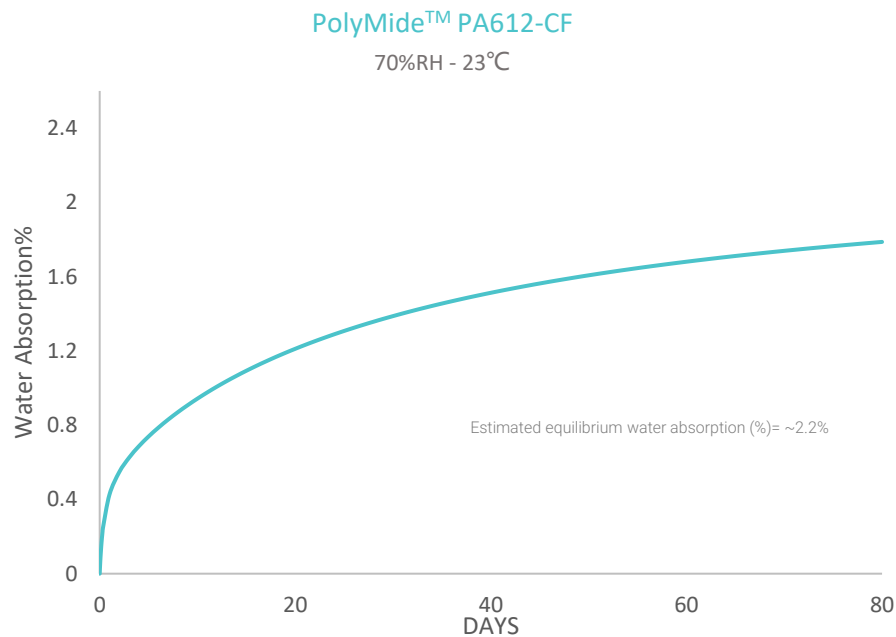
## **PolyMide™ PA612-CF**

PolyMide™ PA612-CF is a carbon fiber reinforced long chain copolyimide filament. Thanks to its chemical structure, this product has lower moisture sensitivity compared to PA6/66 and PA6-based materials, and better mechanical properties than PA12-based materials. In addition, the carbon fiber reinforcement and Warp-free™ technology enhance the size stability of the prints produced with this material.

### **PHYSICAL PROPERTIES**

Property	Testing Method	Typical Value
Density	ISO1183, GB/T1033	1.03 g/cm <sup>3</sup> at 23°C
Melt index	260°C, 2.16 kg	9.91 g/10min

### **MOISTURE ABSORPTION CURVE**



**Note:**

PolyMide™ PA612-CF absorbs moisture slowly over time. The estimated equilibrium water absorption is around 2.2%.

## THERMAL PROPERTIES

Property	Testing Method	Typical Value
Glass transition temperature	DSC, 10°C/min	N/A
Melting temperature	DSC, 10°C/min	210 °C
Crystallization temperature	DSC, 10°C/min	180 °C
Decomposition temperature	TGA, 20°C/min	N/A
Vicat softening temperature	ISO 306, GB/T 1633	N/A
Heat deflection temperature	ISO 75 1.8MPa	114 °C
Heat deflection temperature	ISO 75 0.45MPa	175 °C
Thermal conductivity	N/A	N/A
Heat shrinkage rate	N/A	N/A

## MECHANICAL PROPERTIES (Dry status)

Property	Testing Method	Typical Value
Young's modulus (X-Y)	ISO 527, GB/T 1040	4735.7 ± 87.8 MPa
Young's modulus (Z)		2085.8 ± 91.7 MPa
Tensile strength (X-Y)	ISO 527, GB/T 1040	86.0 ± 0.9 MPa
Tensile strength (Z)		29.9 ± 2.1 MPa
Elongation at break (X-Y)	ISO 527, GB/T 1040	2.8 ± 0.1 %
Elongation at break (Z)		1.7 ± 0.1 %
Bending modulus (X-Y)	ISO 178, GB/T 9341	4331.2 ± 90.0 MPa
Bending modulus (Z)		NA
Bending strength (X-Y)	ISO 178, GB/T 9341	125.1 ± 2.6 MPa
Bending strength (Z)		NA
Charpy impact strength (X-Y)	ISO 179, GB/T 1043	6.8 ± 0.3 kJ/m <sup>2</sup>
Charpy impact strength (Z)		NA

### Note:

1. All specimens were annealed at 80°C for 24h and dried for 48h prior to testing
2. All specimens were printed on Raise 3D E2-CF and sliced on IdeaMaker, the printing settings are shown below. All data here is only for reference purposes, the mechanical properties of printed parts are depending on printers, printing settings and the thermal history of each printed layer.

## **MECHANICAL PROPERTIES (Wet Statu)**

Property	Testing Method	Typical Value
Young's modulus (X-Y)	ISO 527, GB/T 1040	3513.4 ± 144.2 MPa
Young's modulus (Z)		2019.8 ± 93.6 MPa
Tensile strength (X-Y)	ISO 527, GB/T 1040	57.5 ± 0.8 MPa
Tensile strength (Z)		26.5 ± 1.3 MPa
Elongation at break (X-Y)	ISO 527, GB/T 1040	4.6 ± 0.2 %
Elongation at break (Z)		1.9 ± 0.6 %
Bending modulus (X-Y)	ISO 178, GB/T 934	3045.4 ± 85.2 MPa
Bending modulus (Z)		NA
Bending strength (X-Y)	ISO 178, GB/T 934	89.8 ± 1.4 MPa
Bending strength (Z)		NA
Charpy impact strength (X-Y)	ISO 179, GB/T 1043	8.0 ± 0.9 kJ/m <sup>2</sup>
Charpy impact strength (Z)		NA

### Note:

1. All specimens were annealed at 80 °C for 24h, and immersed in ambient temperature water for 3 days prior to testing.
2. All specimens were printed on Raise 3D E2-CF and sliced on IdeaMaker, the printing settings are shown below. All data here is only for reference purposes, the mechanical properties of printed parts are depending on printers, printing settings and the thermal history of each printed layer.

## **RECOMMENDED PRINTING CONDITIONS**

\* Based on 0.4 mm nozzle may vary with different nozzle diameters

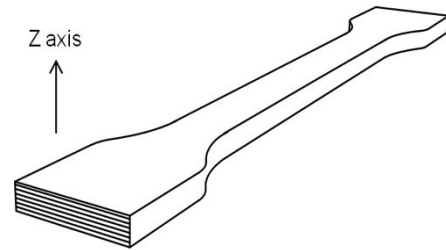
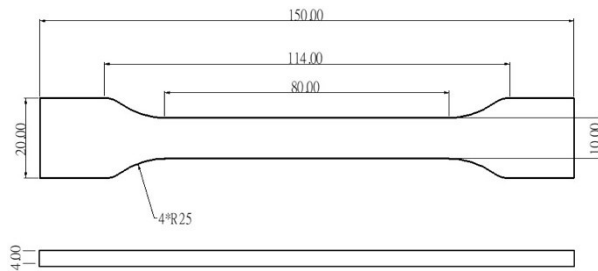
Parameter	
Nozzle temperature	250 – 300 (°C)
Build surface treatment	PVP Glue
Build plate temperature	25 - 50 (°C)
Cooling fan	OFF
Printing speed	30-60 (mm/s)
Raft separation distance	0.1-0.2 (mm)
Retraction distance (Direct Drive)	3 (mm)
Retraction speed (Direct Drive)	40 (mm/s)
Retraction distance (Indirect Drive)	6 (mm)
Retraction speed (Indirect Drive)	60 (mm/s)
Environmental temperature	Room temperature
Threshold overhang angle	60 (°)
Recommended support material	PolySupport For PA12

**Note:**

- Abrasion of the brass nozzle happens frequently when printing PolyMide™ PA612-CF. Normally, the life of a brass nozzle would be approximately 9h. A wear-resistance nozzle, such as hardened metal coated brass nozzle, for example, nickel coated brass nozzle, metal hardened steel and ruby nozzle, is highly recommended to be used with PolyMide™ PA612-CF.
- If printing PolyMide™ PA612-CF on a general desktop 3d printer at 250-260°C, it is highly recommended to use a hardened metal-coated brass nozzle, for example, a nickel-coated brass nozzle.
- If PolyMide™ PA612-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°C for 6 hours.

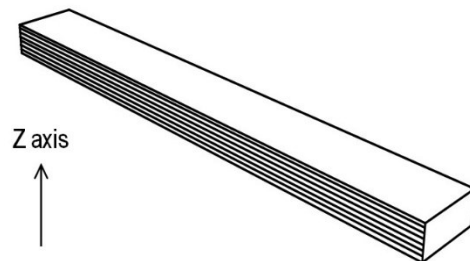
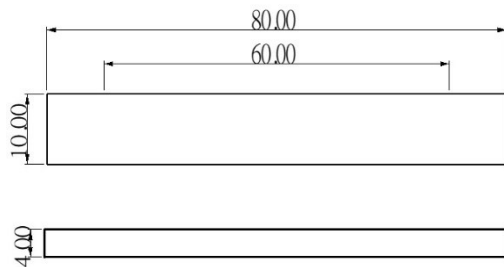
## TENSILE TESTING SPECIMEN

ISO 527, GB/T 1040



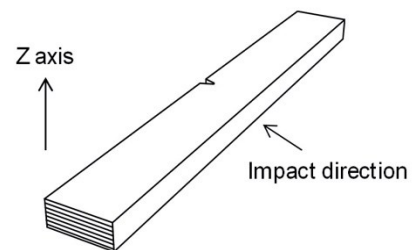
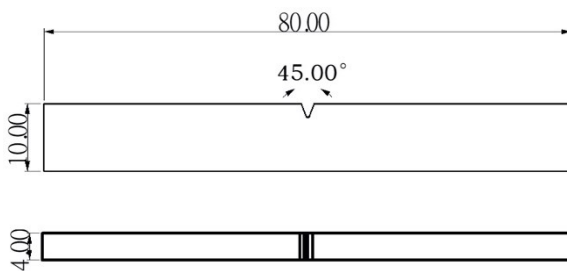
## FLEXURAL TESTING SPECIMEN

ISO 178, GB/T 9341



## IMPACT TESTING SPECIMEN

ISO 179, GB/T 1043



## HOW TO MAKE SPECIMENS

Printing temperature	290 °C
Bed temperature	50 °C
Shell	2
Top & bottom layer	3
Infill	100%
Environmental temperature	50 °C temperature
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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