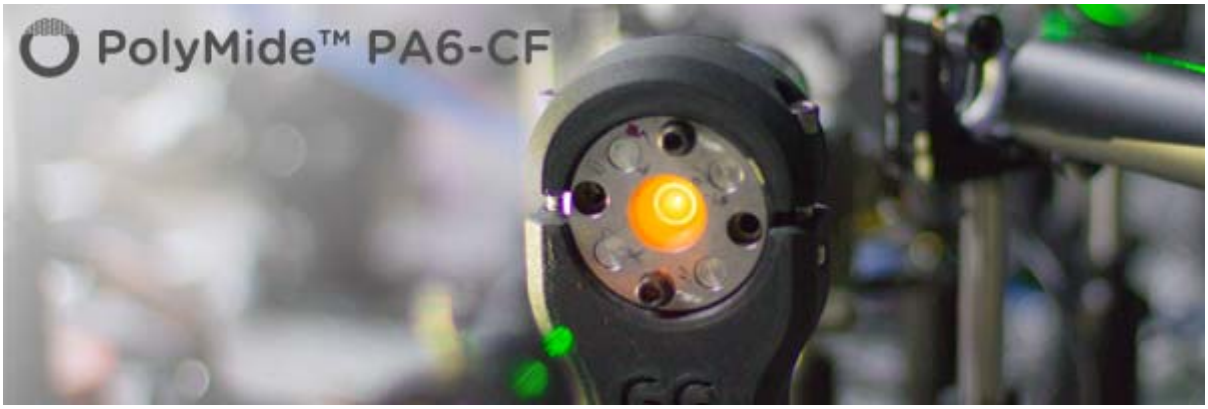

PolyMide™ PA6-CF

PolyMide™ is a family of Nylon/polyamide based filaments. Produced with Polymaker's Warp-Free™ technology, PolyMide™ filaments deliver engineering properties intrinsic to Nylon and ease of printing.

PolyMide™ PA6-CF is a carbon fiber reinforced nylon filament featuring 20% chopped carbon fibers by weight. Within Polymakers range of nylon filaments, PolyMide™ PA6-CF delivers best in class stiffness, strength and heat resistance and superior z axis tensile strength to outperform many other functional 3D printing materials in "dry state". Together with 20% industrial chopped carbon fibers, Polymakers Fiber-Adhesion™ technology optimizes the surface chemistry of the fibers to achieve better dispersion and bonding to the Nylon 6 matrix and delivers an outstanding filament for functional applications.
We highly recommend to use a wear resistant nozzle, to print with the PolyBox™ and to keep it at dry conditions (relative humidity of 15% or less) at all times to maintain the best printing results.

Features:

- **Excellent Stiffness & Strength -** Featuring a tensile modulus up to 7.4 GPA on the XY axis and 4.3 GPA on the Z axis, PolyMide™ PA6-CF is well suited for high performance industrial and engineering applications. PolyMide™ PA6-CF combines extreme stiffness and best-in-class tensile strength. PolyMide™ PA6-CF is an excellent choice for dry applications[1] requiring stiffness and durability such as automotive brackets, jigs, ESD safe fixtures, aerospace, prosthetics and engineering.
- **Excellent Heat Resistance -** Featuring a high heat resistance up to 215°C after annealing[2], PolyMide™ PA6-CF offers excellent heat resistance for demanding applications where heat and stress are critical design factors. This material lends itself perfectly to functioning automotive applications where a combination of heat resistance and mechanical properties are required.
- **Outstanding Layer Adhesion -** Most fiber reinforced materials show a decrease in z-axis layer adhesion when compared with their non-fiber reinforced Nylons, producing a part that is only stronger on the X-Y axis but detrimental to the Z axis. Polymakers new technology in PolyMide™ PA6-CF not only solves this problem but actually increases Z axis tensile strength creating more isotropic parts that are strong in every direction.
- **Warp-Free™ -** PolyMide™ PA6-CF features Polymakers Warp-Free™ technology to deliver a reliable Nylon filament with excellent dimensional stability and near-zero warpage. This is achieved by the fine control of microstructure and crystallization behaviour of Nylon, which enables the material to fully release the internal stress

before solidification. The Warp-Free™ technology in PolyMide™ PA6-CF is designed to work best with minimal bed temperatures.

- **Wear Resistant and Tough -** Parts printed in PolyMide™ PA6-CF display excellent toughness and wear resistant properties.
- **ESD Safe -** PolyMide™ PA6-CF is an ESD safe material making it a suitable candidate for printing electronic jigs and fixtures
- **Improved Printability –** Unlike many other Nylon filaments, PolyMide™ PA6-CF is extremely easy to work with, exhibiting excellent dimensional stability. It is compatible with most filament-based 3D printers with no heated bed or chamber required!
- **Uncompromised Quality -** Polymakers leading quality control process and rigorous in-house testing ensure reliable printing and consistency across spools and batches.

[1] *Most Nylon parts in the real world undergo a process called "Moisture conditioning" which improves toughness and flexibility of the Nylon while reducing tensile strength and stiffness. Unless protected with a moisture barrier, PA6-CF shows a greater change in mechanical properties when subjected to water / high humidity in comparison to long-chain nylon filaments like PA12-CF or PA612-CF. In simple terms PA6-CF will typically offer the best properties in a dry application, but for a wet or high humidity application a longer chain nylon such as PA612 or PA12 may be better.*

[2] *PolyMide™ PA6-CF displays the best mechanical and thermal properties when fully crystallized. The printed part will not reach full crystallization during the printing process, an additional step is required: Annealing. PolyMide™ PA6-CF can be annealed in the oven at 80˚C for 6 hours right after the printing process.*

Specifications:

Print Settings	Mechanical Properties	Thermal Properties	Other
Nozzle Temperature: 280˚C – 300˚C * Printing Speed: 60mm/s Bed Temperature: 25˚C – 50˚C (Do NOT exceed 50 ˚C) Bed Surface: almost any surface with a thin coat of PVA glue Cooling Fan: OFF **Note:** Printing conditions may vary with different printers and nozzle diameters. * We highly recommend to use a wear resistant nozzle	Dry State Young's modulus (X-Y): 7453 ± 656 (MPa) Tensile strength (X-Y): 105.0 ± 5.0 (MPa) Tensile strength (Z): 67.7 ± 4.7 (MPa) Bending strength (X-Y): 169.0 ± 4.7 (MPa) Charpy impact strength (X-Y): 13.34 ± 0.52 (kJ/m2) Moisture Conditioned Young's modulus (X-Y): 5666.07 ± 469 (MPa) Tensile strength (X-Y): 81.7 ± 6.0 (MPa) Tensile strength (Z): 64.4 ± 5.6 (MPa) Bending strength (X-Y): 152.2 ± 15.7 (MPa) Charpy impact strength (X-Y): 32.8 ±1.03 (kJ/m2)	Glass Transition Temperature: 74.2 °C Heat Deflection Temperature (0.45 MPa): 215 ˚C Heat Deflection Temperature (1.8 MPa): 173 ˚C Note: All specimens were annealed prior to testing.	Density: 1.17 g/cm3 Product Manual: Contact Us Technical Data Sheets: Contact us Safety Data Sheets: Contact
Post-Printing Annealing models printed in PolyMide™ PA6-CF allows users to take advantage of the full mechanical and thermal properties of this material. Parts should be annealed shortly after the print completes. Annealing Settings: The annealing process consists of putting the model in an oven at 80 - 100 ˚C for 6 hours.			

What is "Dry" and "Wet" State: *Nylon materials are hygroscopic and printed parts will naturally absorb moisture from the air and become moisture conditioned. Unless your 3D printed parts operate in particularly dry environments or are post processed with a moisture*

barrier, it's generally assumed that all nylon printed parts will end up in their moisture conditioned properties in every-day use.

- *This is a physical reaction which is completely reversible. The water molecules act as a plasticizer inside the nylon and while it decreases tensile strength and stiffness, it increases toughness and impact resistance.*
- *Once the material reaches equilibrium the part has become conditioned and will stop absorbing moisture.PA6 materials reach equilibrium at roughly 2.7% by weight in environments at 50% R.H (Moisture Conditioned State) and reach equilibrium at 9.5% by weight when saturated with water (Wet State).*
- *Dry state data represents the testing results of PolyMide™ PA6-CF after printing and annealing the part. Moisture conditioned state represents the properties of PolyMide™ PA6-CF after annealing and conditioning at 70% relative humidity for 15 days.*

Disclaimer: *The typical values presented in Polymakers data sheet are intended for reference and comparison purposes only. Due to the nature of 3D printing they should not be used for design specifications or quality control purposes.*

Storage: *It is highly recommended to store PolyMide™ PA6-CF in the PolyBox™ to prevent moisture absorption which will lower the quality and the mechanical properties of the print. If the filament has absorbed moisture it can be dried at 80˚C for 8 hours in a convection oven.*