

## PA 4535 CF Filament

PA 4535 CF is among the strongest PA6 co-polymer carbon fiber filaments available on the market, delivering increased strength and stiffness.

Typical applications for PA 4535 CF are aluminum replacement parts, housings that require tight printing dimensional tolerances, clips, brackets, retainers, covers, in addition to jigs, fixtures, and tooling.

### ADVANTAGES

PA 4535 CF has the highest carbon fiber loading available in the industry, providing 40% improvement in tensile strength, impact strength, Z strength and elongation at break, with the added benefit of being ESD safe.

Additionally, the combination of carbon fiber in the already extremely low-warp nylon results in extraordinarily flat prints.

### STORAGE AND USE

PPA 4535 CF is highly hygroscopic, meaning it will quickly absorb and retain moisture from the atmosphere, affecting visual quality and mechanical properties. For best results, print and store filament in a dry environment. If necessary, dry filament in an oven at up to 75 °C (165 °F) for 6 – 12 hours.

Due to its high stiffness, material feeding may be challenging near the end of the spool or when the filament is very dry. Pre-heating the filament or allowing the filament to absorb a small amount of moisture from the atmosphere will make it more workable.



## PROPERTIES

### MECHANICAL PROPERTIES - DRY AS PRINTED<sup>1</sup>

	Test Condition	Typical Value	Method
Tensile Modulus (MPa)	XY coupons, Ambient	10600	ASTM D638, Type I
Tensile Elongation at Break (%)	XY coupons, Ambient	2.9	ASTM D638, Type I
Ultimate Tensile Strength (MPa)	XY coupons, Ambient	88.0	ASTM D638, Type I
Flexural Modulus (MPa)	XY coupons, Ambient	5420	ASTM D790
Flexural Strength (MPa)	XY coupons, Ambient	118	ASTM D790
Flexural Strain (%)	XY coupons, Ambient	4.3	ASTM D790
Izod Impact, Notched (J/m)	XY coupons, Ambient	125	ASTM D256
Izod Impact, Un-notched (J/m)	XY coupons, Ambient	525	ASTM D256

<sup>1</sup>Testing conducted on bars printed at 270°C and tested at <0.20 wt% moisture. Typical values are for reference only.

### MECHANICAL PROPERTIES - MOISTURE CONDITIONED<sup>2</sup>

	Test Condition	Typical Value	Method
Tensile Modulus (MPa)	XY coupons, Ambient	485	ASTM D638, Type I
Tensile Elongation at Break (%)	XY coupons, Ambient	7.7	ASTM D638, Type I
Ultimate Tensile Strength (MPa)	XY coupons, Ambient	55.6	ASTM D638, Type I
Flexural Modulus (MPa)	XY coupons, Ambient	2380	ASTM D790
Flexural Strength (MPa)	XY coupons, Ambient	62	ASTM D790
Flexural Strain (%)	XY coupons, Ambient	>5%	ASTM D790
Izod Impact, Notched (J/m)	XY coupons, Ambient	193	ASTM D256
Izod Impact, Un-notched (J/m)	XY coupons, Ambient	653	ASTM D256

<sup>2</sup>Testing conducted on bars printed at 270°C and conditioned for 14 days at 23°C and 50% RH. Typical values are for reference only.

**THERMAL PROPERTIES**

	Test Condition	Typical Value	Method
Heat Deflection Temperature (°C)	0.455 Mpa	162	DMA
Heat Deflection Temperature (°C)	1.82 Mpa	91	DMA
Melt Temperature, Peak (°C)	20°C/min ramp	190	DSC

<sup>1</sup>Testing conducted on bars printed in XY orientation at 250°C and tested dry. Typical values are for reference only.

**OTHER PHYSICAL PROPERTIES**

	Test Condition	Typical Value	Method
Density (g/cm <sup>3</sup> )	Ambient	1.26	ASTM D792

**DIMENSIONAL PROPERTIES**

	Test Condition	Typical Value	Method
Diameter: Mean, Indiv. Axis (mm)	In-line, 100% inspection	1.75±0.05 2.85±0.05	Laser Micrometer

**Disclaimer:** The information in this technical data sheet, including material properties, are obtained from testing representative samples under carefully controlled conditions and are provided for reference only. Material properties may be impacted by storage, handling, processing equipment/parameters, and product design, among other factors. The information is not a substitute for user testing to determine fitness for any specific use and the user is responsible for ensuring safe and lawful use of the product.

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