

PPS-CF

CARBON-FIBER-REINFORCED PPS FOR EXTREME SERVICE ENVIRONMENTS

PPS-CF is a carbon-fiber-reinforced polyphenylene sulfide engineered for high stiffness, dimensional stability, chemical resistance, and exceptional thermal performance. It is suited to specialized functional components operating in corrosive, high-temperature, or flame-exposure environments.

Design Advantages

- High stiffness and dimensional stability for precision structural components
- Exceptional heat-deflection and softening temperatures for extreme service
- Very low water absorption for stable performance in humid environments
- Broad resistance to acids, alkalis, solvents, oils, and greases

Material Specifications

ITEM	PUBLISHED VALUE
Material family	Polyphenylene sulfide with carbon fiber
Filament diameter	1.75 +/- 0.05 mm
Published density	1.26 g/cm ³
Vicat softening temperature	268 C
Heat deflection temperature	235 C at 1.8 MPa; 264 C at 0.45 MPa
Water solubility	Insoluble

Recommended Processing Window

SETTING	RECOMMENDED RANGE
Drying before printing	Forced-air drying oven at 100 to 140 C for 8 to 12 h
Printing and storage humidity	Below 20% RH; sealed with desiccant
Nozzle temperature	310 to 340 C
Build surface	Smooth or textured PEI surface with suitable adhesive
Bed temperature	100 to 120 C
Cooling fan	0 to 40%
Printing speed	Below 100 mm/s
Chamber temperature	60 to 90 C

Physical and Thermal Properties

PROPERTY	TEST METHOD	PUBLISHED VALUE
Density	ISO 1183	1.26 g/cm ³
Melt index	320 C at 2.16 kg	11.48 +/- 1.23 g/10 min
Melting temperature	DSC at 10 C/min	284 C
Glass transition temperature	DSC at 10 C/min	100 C
Crystallization temperature	DSC at 10 C/min	214 C
Vicat softening temperature	ISO 306 and GB/T 1633	268 C
Heat deflection at 1.8 MPa	ISO 75	235 C
Heat deflection at 0.45 MPa	ISO 75	264 C
Saturated water absorption	25 C and 55% RH	0.05%

Mechanical Properties

PROPERTY	TEST METHOD	PUBLISHED VALUE
Young's modulus X Y	ISO 527 and GB/T 1040	8,230 +/- 270 MPa
Young's modulus Z	ISO 527 and GB/T 1040	2,850 +/- 160 MPa
Tensile strength X Y	ISO 527 and GB/T 1040	87 +/- 5 MPa
Tensile strength Z	ISO 527 and GB/T 1040	24 +/- 3 MPa
Elongation at break X Y	ISO 527 and GB/T 1040	1.2 +/- 0.4%
Elongation at break Z	ISO 527 and GB/T 1040	0.7 +/- 0.3%
Flexural modulus X Y	ISO 178 and GB/T 9341	7,160 +/- 280 MPa
Flexural modulus Z	ISO 178 and GB/T 9341	2,460 +/- 190 MPa
Flexural strength X Y	ISO 178 and GB/T 9341	142 +/- 5 MPa
Flexural strength Z	ISO 178 and GB/T 9341	36 +/- 4 MPa
Impact strength X Y	ISO 179 and GB/T 1043	27.8 +/- 2.3 kJ/m ² ; notched 6.2 +/- 1.6 kJ/m ²
Impact strength Z	ISO 179 and GB/T 1043	2.8 +/- 0.4 kJ/m ²

Representative values from standardized printed specimens. Actual part performance depends on geometry, orientation, wall thickness, moisture condition, processing parameters, and service environment.

Chemical and Handling Characteristics

CHARACTERISTIC	PUBLISHED INFORMATION
Composition	Polyphenylene sulfide with carbon fiber
Chemical stability	Stable under normal storage and handling conditions
Water solubility	Insoluble
Acid and alkali resistance	Resistant
Organic solvent resistance	Resistant
Oil and grease resistance	Resistant
Flammability	Flame-retardant; self-extinguishing when removed from flame
Thermal decomposition products	Hydrocarbons, water, carbon oxides, sulfur dioxide, and sulfides

Representative Specimen Conditions

PARAMETER	SOURCE CONDITION
Nozzle temperature	320 C
Bed temperature	110 C
Printing speed	60 mm/s
Chamber temperature	60 C
Pre-test conditioning	Specimens were not annealed before testing

Design and Validation Considerations

- Design for anisotropy: published strength, elongation, and impact performance are lower in the Z direction than in X/Y.
- Use X/Y-oriented load paths where maximum strength, ductility, and impact performance are important.
- Dry and store material below 20% RH with desiccant; moisture can affect extrusion quality and finished-part performance.
- Higher chamber and nozzle temperatures can improve properties, especially in Z; validate the selected process window.
- Annealing at 180 to 220 C for 6 to 12 h may change properties and can reduce toughness or cause deformation; validate the specific geometry and process.
- Confirm chemical compatibility, sustained-temperature behavior, creep, flammability, and safety-critical loads in the intended service environment.

Published Data and Qualification

The values in this sheet are based on standardized specimen testing documented by the material source and are provided for design reference and material comparison. Lucent Additive has not independently generated every published value. Final-part performance can differ because of geometry, orientation, processing, moisture conditioning, and service environment. This document does not create a material warranty or replace qualification of the customer's finished component.

Start an Application Review

Send Lucent Additive your CAD model, quantity, load conditions, operating temperature, inspection needs, chemical exposure, and target schedule. Our team can review material fit, build orientation, production strategy, and validation needs before quoting.

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