

# Vega™

## CARBON FIBER FILLED PEKK MATERIAL

Vega is an ultra high-performance carbon fiber filled PEKK for 3D printing critical aerospace parts on the FX20. Formulated by Markforged engineers and material scientists, it exhibits a smooth matte black surface finish that is excellent for production parts. Vega can be reinforced with continuous fiber to achieve aluminum strength for aerospace components.

High Temperature Carbon Fiber (CF-HT) is a specialized variant of Markforged’s continuous Carbon Fiber designed for use with Vega and ULTEM™ 9085 Filament\*. Capable of yielding aluminum strength parts, it can be precisely laid down in a wide variety of geometries.



Features and benefits

- High heat and FST resistance
- Chemical and solvent resistance
- Low outgassing
- Matte surface finish
- High strength with CF-HT reinforcement

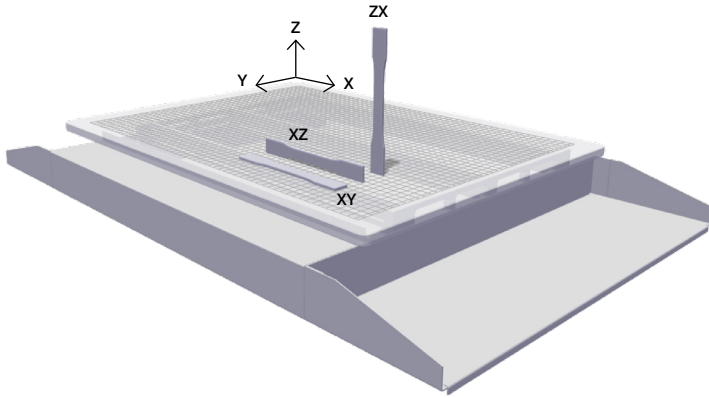
Physical Properties	Unit	Test (ASTM)	Vega XZ Orientation	Test	High Temperature Carbon Fiber (CFR)
Tensile Strength	MPa (ksi)	D638	88 (13)	D3039	760 (110)
Tensile Modulus	GPa (ksi)	D638	5.2 (725)	D3039	57 (8280)
Elongation at Break	%	D638	3	D3039	1.6
Flexural Strength	MPa (ksi)	D790	140 (20)	D790	540 (78.3)
Flexural Modulus	GPa (ksi)	D790	4.7 (681)	D790	50 (7250)
Flexural Extension at Break	%	D790	5.2	D790	1.6
Compressive Strength	MPa	D695	221	D695	300 (43.5)
Compressive Modulus	GPa	D695	4.1	D695	59 (8557)
Notched Izod Impact Resistance	J/m	D256	48	D256	810
Density	g/cm <sup>3</sup>	-	1.27	-	1.2
HDT (1.8 MPa)	deg C (deg F)	D648	157 (315)	-	-
HDT (0.45 MPa)	deg C (Deg F)	D648	164 (327)	-	-

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## Directional Mechanical Properties of Vega

The mechanical properties of 3D printed materials may vary with print orientation. In tension, most parts are strongest when the print orientation and loading direction are parallel, and weakest when the print orientation and loading direction are perpendicular.



Property	Print orientation	Average
Tensile strength (MPa)	XY	65
	XZ	88
	ZX	48
Tensile modulus (GPa)	XY	4.0
	XZ	5.2
	ZX	3.3
Elongation at break (%)	XY	3.9
	XZ	3.0
	ZX	2.5

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