

FDM Nylon 12CF

FDM Nylon 12CF™ is a carbon-filled thermoplastic with excellent structural characteristics. The material is comprised of a blend of Nylon 12 resin and chopped carbon fiber, at a loading of 35% by weight. This combination produces one of the strongest thermoplastics in the FDM® material portfolio. It has the highest flexural strength of any FDM thermoplastic, resulting in the highest stiffness-to-weight ratio.

Appropriate uses include strong but lightweight tooling applications and functional prototypes in the aerospace, automotive, industrial and recreational manufacturing industries. FDM Nylon 12CF is available on the Fortus 380mc Carbon Fiber Edition, Fortus 450mc™ and Stratasys F900™ 3D Printers and is compatible with SR-110™ support material.

Mechanical Properties	Test Method	XZ Axis	ZX Axis
Tensile Strength, Yield (Type 1, 0.125", 0.2"/min)	ASTM D638	63 MPa (9,190 psi)	29 MPa (4,170 psi)
Tensile Strength, Ultimate (Type 1, 0.125", 0.2"/min)	ASTM D638	76 MPa (10,960 psi)	34 MPa (4,990 psi)
Tensile Modulus (Type 1, 0.125", 0.2"/min)	ASTM D638	7.6 GPa (1,100 ksi)	2.3 GPa (330 ksi)
Tensile Elongation at Break (Type 1, 0.125", 0.2"/min)	ASTM D638	1.9%	1.2%
Tensile Elongation at Yield (Type 1, 0.125", 0.2"/min)	ASTM D638	0.9%	1.1%
Flexural Strength (Method 1, 0.05"/min)	ASTM D790	142 MPa (20,660 psi)	58 MPa (8,430 psi)
Flexural Modulus (Method 1, 0.05"/min)	ASTM D790	10.3 GPa (1,500 ksi)	2.07 GPa (300 ksi)
Flexural Strain at Break (Method 1, 0.05"/min)	ASTM D790	3%	3%
IZOD Impact, notched (Method A, 23 °C)	ASTM D256	85 J/m (1.6 ft-lb/in)	21 J/m (0.4 ft-lb/in)
IZOD Impact, un-notched (Method A, 23 °C)	ASTM D256	307 J/m (5.8 ft-lb/in)	85 J/m (1.6 ft-lb/in)
Compression Strength, Ultimate (Method 1, 0.050 in./min)	ASTM D695-15	67 MPa (9,670 psi)	92 MPa (13,310 psi)
Compression Modulus (Method 1, 0.050 in./min)	ASTM D695-15	2.7 GPa (387 ksi)	2.2 MPa (314 ksi)
Thermal Properties	Test Method	Value	
Heat Deflection (HDT) @ 264 psi	ASTM D648	143 °C (289 °F)	
Glass Transition Temperature (Tg)	ASTM D7426-08	41 °C (105 °F)	
Coefficient of Thermal Expansion (flow) at 104 °F (40 °C)	ASTM E831	25 µm/(m·°C) (14 µin/(in·°F))	
Coefficient of Thermal Expansion (flow) at 212 °F (100 °C)	ASTM E831	27 µm/(m·°C) (15 µin/(in·°F))	
Coefficient of Thermal Expansion (xflow) at 104 °F (40 °C)	ASTM E831	150 µm/(m·°C) (83 µin/(in·°F))	
Coefficient of Thermal Expansion (xflow) at 212 °F (100 °C)	ASTM E831	300 µm/(m·°C) (167 µin/(in·°F))	

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Electrical Properties	Test Method	Value
Volume Resistivity	ASTM D257	$1.4 \times 10^5 - 1.01 \times 10^6 \Omega\text{-cm}$
Surface Resistivity	ASTM D257	$3.3 \times 10^4 - 6.9 \times 10^5 \Omega/\text{sq}$

Other	Test Method	Value
Specific Gravity	ASTM D792	1.15

System Availability	Layer Thickness Capability	Support Structure	Available Colors
Fortus 450mc	0.010"	Soluble	■ Black
Stratasys F900	0.010"	Soluble	■ Black
Fortus 380mc Carbon Fiber Edition	0.010"	Soluble	■ Black

The information presented are typical values intended for reference and comparison purposes only. They should not be used for design specifications or quality control purposes. End-use material performance can be impacted (+/-) by, but not limited to, part design, end-use conditions, test conditions, etc. Actual values will vary with build conditions. Tested parts were built on a Fortus 450mc @ 0.010" (0.254 mm) slice. Product specifications are subject to change without notice.