

# FPU 50

*Limited Availability*

FPU 50 is an impact, abrasion and fatigue resistant semi-rigid material that is a good choice for parts that must withstand repetitive stresses such as living hinges or friction fits.

<b>Tensile Properties</b> —ASTM D638-Type V, 10 mm/min	Metric	U.S.
Tensile Modulus	860 ± 110 MPa	125 ± 16 ksi
Ultimate Tensile Strength	29 ± 1 MPa	4.2 ± 0.2 ksi
Tensile Strength at Yield	20 ± 1 MPa	2.9 ± 0.2 ksi
Elongation at Yield	7 ± 1 %	7 ± 1 %
Elongation at Break	280 ± 15 %	280 ± 15 %

<b>Flexural Properties</b> —ASTM D790, 0.1 mm/mm-min	Metric	U.S.
Flexural Stress at 5% Strain, no yielding	32 ± 1 MPa	4.6 ± 0.2 ksi
Flexural Modulus (chord, 0.5-1% strain)	831 ± 36 MPa	121 ± 5 ksi

<b>Impact Properties</b>	Metric	U.S.
Notched Izod (machined), 23°C, ASTM D256	40 ± 5 J/m	0.75 ± 0.09 ft-lb/in
Notched Izod (machined), -30°C, ASTM D256	30 ± 6 J/m	0.56 ± 0.11 ft-lb/in
Gardner Impact, 23°C, ASTM D5420	5.1 J	3.8 ft-lb

<b>Thermal Properties</b>	Metric	U.S.
Heat Deflection Temperature @ 0.45 MPa/66 psi, ASTM D648	78 °C	172 °F
Heat Deflection Temperature @ 1.82 MPa/264 psi, ASTM D648	52 °C	126 °F
Coefficient of Thermal Expansion (-40, 40°C), ASTM E832	129 μm/m-°C	72 x 10 <sup>-6</sup> in/in-°F
Heat Capacity, 23°C, ASTM E1269	1.48J/g-°C	0.353 BTU/lb-°F
Thermal Conductivity, ASTM C518	0.138 W/m-K	0.0799 BTU/hr-ft-°F

<b>Electrical Properties</b>	Metric
Dielectric Strength, ASTM D149	13.0 kV/mm
Dielectric Constant, 1kHz, ASTM D150	3.21
Dissipation Factor, 1kHz, ASTM D150	0.0131
Volume Resistivity, ASTM D257	1.87 x 10 <sup>13</sup> ohm-cm

<b>General Properties</b>	Metric
Hardness, ASTM D2240	71, Shore D
Density, ASTM D792	1.053 g/cm <sup>3</sup>
Water Absorption, 23 °C, 24 hours, ASTM D570	0.42%
Water Absorption, 23 °C, long term, ASTM D570	0.75%

**NOTES**—Test specimens were prepared using a Carbon M1 printer and a Type C cassette. Print parameters were generated using software v1.7.0-209.44, v1.8.0-228.28 and v1.8.0-228.64. All test specimens were printed, cleaned, and post-processed per instructions provided in the Carbon User Manual. Tensile and Flexural data are average ± 1 standard deviation from 16 specimens; Notched Izod impact data are from 10 specimens. Results provided herein are representative of these processes and may vary if these established protocols are not followed.