

# EPX 81

EPX 81 is our most accurate high strength engineering material. It has a heat deflection temperature of 140C.

<b>Tensile Properties</b> —ASTM D638-Type V, 1mm/min	Metric	U.S.
Tensile Modulus	3140 ± 105 MPa	455 ± 15 ksi
Ultimate Tensile Strength	88 ± 3 MPa	13 ± 0.4 ksi
Elongation-at-Break	5.2 ± 0.7 %	5.2 ± 0.7 %

<b>Flexural Properties</b> —ASTM D790, 0.1mm/mm-min	Metric	U.S.
Flexural Strength	119± 21 MPa	17 ± 3 ksi
Flexural Modulus (chord, 0.5-1% strain)	3250 ± 45 MPa	471 ± 6.5 ksi

<b>Impact Properties</b>	Metric	U.S.
Notched Izod (Machined), ASTM D256	23 ± 5 J/m	0.43 ± 0.09ft-lb/in.
Unnotched Izod, ASTM D4812	291 ± 48 J/m	5.5 ± 0.9 ft-lb/in.

<b>Thermal Properties</b>	Metric	U.S.
Heat Deflection Temperature @ 0.45 MPa/66 psi, ASTM D648	140 °C	284°F
Heat Deflection Temperature @ 1.82 MPa/264 psi ASTM D648	131 °C	268 °F
Coefficient of Thermal Expansion (-60, 60 °C), ASTM E831	65 ppm/°C	36 ppm/°F
(60, 130 °C), ASTM E831	93 ppm/°C	52 ppm/°F
(130, 200 °C), ASTM E831	160 ppm/°C	89 ppm/°F
Heat Capacity, 23°C, ASTM E1269	1.19 J/g-°C	0.284 BTU/lb-°F

<b>Electrical Properties</b>	Metric
Dielectric Strength, ASTM D149	22.4 kV/mm
Dielectric Constant, 1kHz, ASTM D150	3.04
Dissipation Factor, 1kHz, ASTM D150	0.00668
Volume Resistivity, ASTM D257	3.08E + 14 ohm-cm

<b>General Properties</b>	Metric
Hardness, ASTM D2240	90, Shore D
Density (liquid resin)	1.12 g/cm <sup>3</sup>
Density, ASTM D792	1.187 g/cm <sup>3</sup>
Water Absorption, 23°C, 24 hours, ASTM D570	0.16%
Water Absorption, 23°C, long term ASTM D570	0.80%

**NOTES**—Test specimens were produced using Carbon M1 printer and a Type C2 cassette. Print parameters were generated using software v.1.9. Tensile dog bones were 4.0 mm thick. Three-point bending flexural bars were 3.2 mm thick. Notched Izod bars were 3.2 mm thick and unnotched impact bars were 6.3 mm thick. Electrical properties were collected using 2mm thick specimens. Tensile and Flexural data are average ± 1 standard deviation from 16 specimens. Impact data are from 10 specimens. The U.S. value are converted from Metric measurements and are for reference only. All test specimens were printed, cleaned, and post-processed per instructions provided in the Carbon User Manual. Results provided herein are representative of these processes and may vary if these established protocols are not followed.