

# RPU 60

RPU 60 is a tough, abrasion-resistant material that is a good choice for parts that require rigidity, strength, and durability.

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**NOTES**—Test specimens were prepared using Carbon M1 printer and a Type B cassette. Print parameters were generated using software v.0.42.0. Tensile data were generated using printed Type V samples (per ASTM D638). All other test specimens were printed following standard ASTM test geometries. All test specimens were printed, cleaned, and post-processed per instructions provided in the Carbon User Manual. Liquid property measurements were carried out using fully mixed resins. Results provided herein are representative of these processes and may vary if these established protocols are not followed.

## Tensile Properties—ASTM D638

	METRIC	IMPERIAL
Ultimate Tensile Strength	40 - 55 MPa	5800 - 7980 psi
Tensile Strength at Yield	40 - 45 MPa	5800 - 6350 psi
Modulus	1500 - 1700 MPa	217 - 246 ksi
Elongation-at-Break	120 - 140 %	120 - 140 %

## Flexural Properties —ASTM D790

	METRIC	IMPERIAL
Flexural Strength	40 - 45 MPa	5800 - 6350 psi
Flexural Modulus	1400 - 1500 MPa	203 - 218 ksi

## Impact Properties—ASTM D256, ASTM D4812

IMPACT STRENGTH	IMPACT STRENGTH		IMPACT ENERGY	
	METRIC	IMPERIAL	METRIC	IMPERIAL
Machined Izod notch	28 - 30 J/m	0.52 - 0.56 ft-lb/in.	2.7 - 2.9 kJ/m <sup>2</sup>	0.25 - 0.27 ft-lb/in <sup>2</sup>
Izod Unnotched	730 - 810 J/m	13.7 - 15.1 ft-lb/in.	71 - 80 kJ/m <sup>2</sup>	6.5 - 7.2 ft-lb/in <sup>2</sup>

# Carbon Resin

RPU 60 —VERSION 1

TECHNICAL DATA SHEET 4/3/16 V3.2

## Thermal Properties

	METRIC	IMPERIAL
Heat Deflection Temperature @ 0.45 MPa/66 psi (ASTM D648)	58 °C	136 °F
Heat Deflection Temperature @ 1.82 MPa/264 psi (ASTM D648)	49 °C	120 °F
T <sub>g</sub> (DMA, E')	64 °C	147 °F
T <sub>g</sub> (DMA, tan(d))	100 °C	212 °F
Coefficient of Thermal Expansion (ASTM E228)	172 - 182 ppm/°C	

## Liquid Properties

Viscosity (@25°C, cP)	4500 - 6000
Liquid Density (g/mL, @25°C)	1.01 - 1.02

# RPU 70

RPU 70 is a tough, heat resistant material that is a good choice for parts requiring strength, toughness, and moderate heat resistance.

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**NOTES**—Test specimens were prepared using Carbon M1 printer and a Type B cassette. Print parameters were generated using software v.0.3.0. Tensile data were generated using printed Type V samples (per ASTM D638). All other test specimens were printed following standard ASTM test geometries. All test specimens were printed, cleaned, and post-processed per instructions provided in the Carbon User Manual. Liquid property measurements were carried out using fully mixed resins. Results provided herein are representative of these processes and may vary if these established protocols are not followed.

## Tensile Properties—ASTM D638

	METRIC	IMPERIAL
Ultimate Tensile Strength	42 - 47 MPa	6100 - 6800 psi
Tensile Strength at Yield	42 - 47 MPa	6100 - 6800 psi
Modulus	1700 - 2200 MPa	250 - 320 ksi
Elongation-at-Break	90 - 120 %	90 - 120 %

## Flexural Properties —ASTM D790

	METRIC	IMPERIAL
Flexural Strength	55 - 71 MPa	7970 - 10300 psi
Flexural Modulus	1500 - 2200 MPa	220 - 320 ksi

## Impact Properties—ASTM D256, ASTM D4812

IMPACT STRENGTH	IMPACT STRENGTH		IMPACT ENERGY	
	METRIC	IMPERIAL	METRIC	IMPERIAL
Machined Izod notch	21 - 23 J/m	0.39 - 0.43 ft-lb/in.	2.1 - 2.3 kJ/m <sup>2</sup>	1.0 - 1.1 ft-lb/in <sup>2</sup>
Izod Unnotched	500 - 560 J/m	9.4 - 10.4 ft-lb/in.	49 - 55 kJ/m <sup>2</sup>	24 - 26 ft-lb/in <sup>2</sup>

# Carbon Resin

RPU 70 —VERSION 1

TECHNICAL DATA SHEET 4/3/16 V3.2

## Thermal Properties

	METRIC	IMPERIAL
Heat Deflection Temperature @ 0.45 MPa/66 psi (ASTM D648)	70 °C	160 °F
Heat Deflection Temperature @ 1.82 MPa/264 psi (ASTM D648)	55 °C	130 °F
T <sub>g</sub> (DMA, E')	80 °C	176 °F
T <sub>g</sub> (DMA, tan(d))	119 °C	246 °F
Coefficient of Thermal Expansion (ASTM E228)	157 - 167 ppm/°C	

## Liquid Properties

Viscosity (@25°C, cP)	2100 - 2300
Liquid Density (g/mL, @25°C)	1.01 - 1.02

# RPU 80

RPU 80 is a rigid, heat-resistant material that is a good choice for parts requiring strength and durability.

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**NOTES**—Test specimens were prepared using Carbon M1 printer and a Type B cassette. Print parameters were generated using software v.0.42.0. Tensile data were generated using printed Type V samples (per ASTM D638). All other test specimens were printed following standard ASTM test geometries. All test specimens were printed, cleaned, and post-processed per instructions provided in the Carbon User Manual. Liquid property measurements were carried out using fully mixed resins. Results provided herein are representative of these processes and may vary if these established protocols are not followed.

## Tensile Properties—ASTM D638

	METRIC	IMPERIAL
Ultimate Tensile Strength	42 - 47 MPa	6090 - 6800 psi
Tensile Strength at Yield	42 - 47 MPa	6090 - 6800 psi
Modulus	1400 - 2100 MPa	203 - 304 ksi
Elongation-at-Break	45 - 90 %	45 - 90 %

## Flexural Properties —ASTM D790

	METRIC	IMPERIAL
Flexural Strength	58 - 63 MPa	8410 - 9140 psi
Flexural Modulus	1700 - 1900 MPa	247 - 275 ksi

## Impact Properties—ASTM D256, ASTM D4812

IMPACT STRENGTH	IMPACT STRENGTH		IMPACT ENERGY	
	METRIC	IMPERIAL	METRIC	IMPERIAL
Machined Izod notch	11 - 13 J/m	0.21 - 0.24 ft-lb/in.	1.1 - 1.3 kJ/m <sup>2</sup>	0.10 - 0.11 ft-lb/in <sup>2</sup>
Izod Unnotched	180 - 220 J/m	3.4 - 4.1 ft-lb/in.	17 - 22 kJ/m <sup>2</sup>	1.6 - 2.0 ft-lb/in <sup>2</sup>



# Carbon Resin

RPU 80 —VERSION 1

TECHNICAL DATA SHEET 4/3/16 V3.2

## Thermal Properties

	METRIC	IMPERIAL
Heat Deflection Temperature @ 0.45 MPa/66 psi (ASTM D648)	79 °C	174 °F
Heat Deflection Temperature @ 1.82 MPa/264 psi (ASTM D648)	57 °C	134 °F
T <sub>g</sub> (DMA, E')	90 °C	194 °F
T <sub>g</sub> (DMA, tan(d))	125 °C	257 °F
Coefficient of Thermal Expansion (ASTM E228)	151 - 160 ppm/°C	

## Liquid Properties

Viscosity (@25°C, cP)	700 - 800
Liquid Density (g/mL, @25°C)	1.10 - 1.12