ENGINEERING RESIN

Tough 1500

Tough 1500 Resin for Resilient Prototyping

Tough 1500 Resin is the most resilient material in our functional family of Tough and Durable Resins. It produces stiff and pliable parts that bend and spring back quickly under cyclic loading.

- Springy prototypes and assemblies
- Snap fit and press fit connectors
- Polypropylene-like strength

V1 **FLTO1501**

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To the best of our knowledge the information contained herein is accurate. However, Formlabs, Inc. makes no warranty, expressed or implied, regarding the accuracy of these results to be obtained from the use thereof.

Tough 1500 Resin Material Properties Data

	METRIC[1]		IMPERIAL[1]		METHOD
	Green[2]	Post-Cured[3]	Green[2]	Post-Cured[3]	
Mechanical Properties					
Ultimate Tensile Strength	26 MPa	33 MPa	3771 psi	4786 psi	ASTM D 638-14
Tensile Modulus	0.94 GPa	1.5 GPa	136 ksi	218 ksi	ASTM D 638-14
Elongation at Break	69 %	51 %	69 %	51 %	ASTM D 638-14
Flexural Properties					
Flexural Strength	15 MPa	39 MPa	2175 psi	5656 psi	ASTM D 790-15
Flexural Modulus	0.44 GPa	1.4 GPa	58 ksi	203 ksi	ASTM D 790-15
Impact Properties					
Notched IZOD	72 J/m	67 J/m	1.3 ft-lbf/in	1.2 ft-lbf/in	ASTM D256-10
Unnotched IZOD	902 J/m	1387 J/m	17 ft-lbf/in	26 ft-lbf/in	ASTM D4812-11
Thermal Properties					
Heat Deflection Temp. @ 1.8 MPa	34 °C	45 °C	93 °F	113 °F	ASTM D 648-16
Heat Deflection Temp. @ 0.45 MPa	42 °C	52 °C	108 °F	126 °F	ASTM D 648-16
Thermal Expansion	114 µm/m/°C	97 µm/m/°C	63 µin/in/°F	54 µin/in/°F	ASTM E 831-13

[1] Material properties can vary with part geometry, print orientation, print settings, and temperature.

[2] Data was obtained from green parts, printed using Form 2, 100 µm without additional treatments.

[3] Data was obtained from parts printed using Form 2, 100 µm and post-cured with a Form Cure for 60 minutes at 70 C.

Solvent Compatibility

Percent weight gain over 24 hours for a printed and post-cured 1 x 1 x 1 cm cube immersed in respective solvent:

Solvent	24 Hour Weight Gain (%)	Solvent	24 Hour Weight Gain (%)
Acetic Acid, 5 %	0.75	Hydrogen Peroxide (3 %)	0.71
Acetone	19.07	Isooctane	0.02
Isopropyl Alcohol	3.15	Mineral Oil, light	0.05
Bleach, ~5 % NaOCl	0.62	Mineral Oil, heavy	0.09
Butyl Acetate	5.05	Salt Water (3.5 % NaCl)	0.66
Diesel	0.11	Sodium hydroxide (0.025 %, pH = 10)	0.7
Diethyl glycol monomethyl ether	5.25	Water	0.69
Hydrolic Oil	0.17	Xylene	3.22
Skydrol 5	0.46	Strong Acid (HCl Conc)	4.39