

# High Temp

## High Temp Resin for Heat Resistance

High Temp Resin offers a heat deflection temperature (HDT) of 238 °C @ 0.45 MPa, the highest among Formlabs resins. Use it to print detailed, precise proto-types with high temperature resistance.

Hot air, gas, and fluid flow

Molds and inserts

Heat resistant mounts, housings, and fixtures



FLHTAM02

**formlabs** 

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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.

# Material Properties Data Metric

METRIC <sup>1</sup>				METHOD
	Green <sup>2</sup>	Post-Cured <sup>3</sup>	Post-Cured + Thermally Post-Cured <sup>4</sup>	
<b>Thermal Properties</b>				
Heat Deflection Temp. @ 1.8 MPa	43.6 °C	99.2 °C	101 °C	ASTM D 648-16
Heat Deflection Temp. @ 0.45 MPa	49.3 °C	142 °C	238 °C	ASTM D 648-16

METRIC <sup>1</sup>				METHOD
	Green <sup>2</sup>	Post-Cured <sup>5</sup>	Post-Cured + Thermally Post-Cured <sup>6</sup>	
<b>Mechanical Properties</b>				
Ultimate Tensile Strength	20.9 MPa	58.3 MPa	51.1 MPa	ASTM D 638-14
Elongation at break	14 %	3.3 %	2.4 %	ASTM D 638-14
Tensile modulus	0.75 GPa	2.75 GPa	2.9 GPa	ASTM D 638-14
Flexural strength at break	24.1 MPa	94.5 MPa	93.8 MPa	ASTM D 790-15
Flexural modulus	0.69 GPa	2.62 GPa	2.62 GPa	ASTM D 790-15
<b>Impact Properties</b>				
Notched IZOD	32.8 J/m	18.2 J/m	24.2 J/m	ASTM D 256-10
<b>Thermal Properties</b>				
Thermal Expansion (0-150 °C)	118.1 (µm/m/°C)	79.6 (µm/m/°C)	74 (µm/m/°C)	ASTM E 831-13

<sup>1</sup>Material properties can vary with part geometry, print orientation, print settings, and temperature.

<sup>2</sup>Data was obtained from green parts, printed using Form 2, 100 µm, High Temp settings, washed for 5 minutes in Form Wash and air dried without post cure.

<sup>3</sup>Data was obtained from parts printed using a Form 2, 100 micron, High Temp settings, and post-cured with Form Cure at 80 °C for 120 minutes.

<sup>4</sup>Data was obtained from parts printed using a Form 2, 100 micron, High Temp settings, and post-cured with Form Cure at 80 °C for 120 minutes plus an additional thermal cure in a lab oven at 160 °C for 180 minutes.

<sup>5</sup>Data was obtained from parts printed using a Form 2, 100 micron, High Temp settings, and post-cured with Form Cure at 60 °C for 60 minutes.

<sup>6</sup>Data was obtained from parts printed using a Form 2, 100 micron, High Temp settings, and post-cured with Form Cure at 60 °C for 60 minutes plus an additional thermal cure in a lab oven at 160 °C for 90 minutes

# Material Properties Data Imperial

IMPERIAL <sup>1</sup>				METHOD
	Green <sup>2</sup>	Post-Cured <sup>3</sup>	Post-Cured + Thermally Post-Cured <sup>4</sup>	
<b>Thermal Properties</b>				
Heat Deflection Temp. @ 1.8 MPa	110.48 °F	210.56 °F	213.8 °F	ASTM D 648-16
Heat Deflection Temp. @ 0.45 MPa	120.74 °F	287.6 °F	460.4 °F	ASTM D 648-16

IMPERIAL <sup>1</sup>				METHOD
	Green <sup>2</sup>	Post-Cured <sup>5</sup>	Post-Cured + Thermally Post-Cured <sup>6</sup>	
<b>Mechanical Properties</b>				
Ultimate Tensile Strength	3031 psi	8456 psi	7411 psi	ASTM D 638-14
Elongation at break	14 %	3.3 %	2.4 %	ASTM D 638-14
Tensile modulus	109 ksi	399 ksi	421 ksi	ASTM D 638-14
Flexural strength at break	3495 psi	13706 psi	13605 psi	ASTM D 790-15
Flexural modulus	100 ksi	400 ksi	400 ksi	ASTM D 790-15
<b>Impact Properties</b>				
Notched IZOD	0.61 ft-lbf/in	0.34 ft-lbf/in	0.45 ft-lbf/in	ASTM D 256-10
<b>Thermal Properties</b>				
Thermal Expansion (0-150 °C)	65.6 µin/in/°F	44.2 µin/in/°F	41.1 µin/in/°F	41.1 uin/in/°F

<sup>1</sup> Material properties can vary with part geometry, print orientation, print settings, and temperature.

<sup>2</sup> Data was obtained from green parts, printed using Form 2, 100 µm, High Temp settings, washed for 5 minutes in Form Wash and air dried without post cure.

<sup>3</sup> Data was obtained from parts printed using a Form 2, 100 micron, High Temp settings, and post-cured with Form Cure at 80 °C for 120 minutes.

<sup>4</sup> Data was obtained from parts printed using a Form 2, 100 micron, High Temp settings, and post-cured with Form Cure at 80 °C for 120 minutes plus an additional thermal cure in a lab oven at 160 °C for 180 minutes.

<sup>5</sup> Data was obtained from parts printed using a Form 2, 100 micron, High Temp settings, and post-cured with Form Cure at 60 °C for 60 minutes.

<sup>6</sup> Data was obtained from parts printed using a Form 2, 100 micron, High Temp settings, and post-cured with Form Cure at 60 °C for 60 minutes plus an additional thermal cure in a lab oven at 160 °C for 90 minutes

## 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 hr weight gain (%)	24 hr size gain (%)	Solvent	24 hr weight gain (%)	24 hr size gain (%)
Acetic Acid, 5 %	< 1	< 1	Hydrogen peroxide (3%)	< 1	< 1
Acetone	< 1	< 1	Isooctane (aka gasoline)	< 1	< 1
Isopropyl Alcohol	< 1	< 1	Mineral oil (light)	< 1	< 1
Bleach ~5% NaOCl	< 1	< 1	Mineral oil (Heavy)	< 1	< 1
Butyl Acetate	< 1	< 1	Salt Water (3.5% NaCl)	< 1	< 1
Diesel Fuel	< 1	< 1	Sodium Hydroxide solution	< 1	< 1
Diethyl glycol Monomethyl Ether	< 1	< 1	Water	< 1	< 1
Hydraulic Oil	< 1	< 1	Xylene	< 1	< 1
Skydrol 5	< 1	< 1	Strong Acid (HCl conc)	1.2	< 1