

# Flexible

## Flexible Resin for Ergonomic Features

Use Flexible Resin to produce parts that bend and compress. Flexible is excellent for simulating soft-touch materials and adding ergonomic features to multi-material assemblies.

Handles, grips, and overmolds

Cushioning and damping

Wearables prototyping

Packaging

Stamps



FLFLGR02

formlabs 

**Prepared** 04 . 19 . 2016  
**Rev** 01 04 . 18 . 2017

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 <sup>1</sup> |                         | IMPERIAL <sup>1</sup> |                         | METHOD            |
|--|---------------------|-------------------------|-----------------------|-------------------------|-------------------|
|  | Green               | Post-Cured <sup>2</sup> | Green                 | Post-Cured <sup>2</sup> |                   |
| <b>Mechanical Properties</b>           |                     |                         |                       |                         |                   |
| Ultimate Tensile Strength <sup>3</sup> | 3.3 - 3.4 MPa       | 7.7 - 8.5 MPa           | 483 - 494 psi         | 110 - 1230 psi          | ASTM D 412-06 (A) |
| Elongation at Failure <sup>3</sup>     | 60 %                | 75 - 85 %               | 60 %                  | 75 - 85 %               | ASTM D 412-06 (A) |
| Compression Set <sup>4,5</sup>         | 0.40 %              | 0.40 %                  | 0.40 %                | 0.40 %                  | ASTM D 395-03 (B) |
| Tear Strength                          | 9.5 - 9.6 kN/m      | 13.3 - 14.1 kN/m        | 54 - 55 lbf/in        | 76 - 80 lbf/in          | ASTM D 624-00     |
| Shore Hardness                         | 70 - 75 A           | 80 - 85 A               | 70 - 75 A             | 80 - 85 A               | ASTM 2240         |
| <b>Thermal Properties</b>              |                     |                         |                       |                         |                   |
| Vicat Softening Point <sup>6</sup>     | 231 °C              | 230 °C                  | 448 °F                | 446 °F                  | ASTM D 1525-09    |

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

<sup>2</sup> Data was obtained from parts printed using Form 2, 100 µm, Flexible settings and post-cured with 80.5 mW/cm<sup>2</sup> of 365 nm fluorescent light for 60 minutes.

<sup>3</sup> Tensile testing was performed after 3+ hours at 23 °C, using a Die C dumbbell and 20 in/min cross head speed.

<sup>4</sup> Compression testing was performed at 23 °C after aging at 23 °C for 22 hours.

<sup>5</sup> Tear testing was performed after 3+ hours at 23 °C, using a Die C tear specimen and a 20 in/min cross head speed.

<sup>6</sup> Thermal testing was performed after 40+ hours with a 10 N loading at 50 °C/hour. Cracks formed in samples during testing.

## 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 (%) | Solvent                             | 24 hr weight gain (%) |
|---------------------------------|-----------------------|-------------------------------------|-----------------------|
| Acetic Acid, 5 %                | 1.3                   | Sodium hydroxide (0.025 %, pH = 10) | 1                     |
| Acetone                         | 33                    | Xylene                              | 29                    |
| Isopropyl Alcohol               | 9.8                   |                                     |                       |
| Bleach, ~5 % NaOCl              | 1.1                   |                                     |                       |
| Butyl Acetate                   | 16                    |                                     |                       |
| Diethyl glycol monomethyl ether | 30                    |                                     |                       |
| Hydrogen Peroxide (3 %)         | 1.3                   |                                     |                       |
| Isooctane                       | < 1                   |                                     |                       |
| Salt Water (3.5 % NaCl)         | < 1                   |                                     |                       |