

# High Temp Resin

## HEAT-RESISTANT ENGINEERING RESIN

High Temp is a rigid engineering photopolymer for detailed parts exposed to elevated temperatures. With the full published thermal cure, it reaches a heat-deflection temperature of 238 °C at 0.45 MPa. It is suited to heat-resistant prototypes, fixtures, flow-path components, and short-run tooling where geometry, cure state, loading, and service duration are carefully validated.

## Design Advantages

- Published HDT up to 238 °C at 0.45 MPa after the full thermal cure
- Post-cured tensile strength up to 58 MPa and flexural strength up to 97 MPa
- Rigid response with a published tensile modulus of 2.8 GPa after post-curing
- Suitable for hot-air, gas, and fluid-flow prototypes, heat-resistant fixtures, molds, and inserts

## Material Specifications

| ITEM              | PUBLISHED VALUE                         |
|-------------------|-----------------------------------------|
| Material family   | Heat-resistant engineering photopolymer |
| Tensile strength  | 58 MPa, 60 °C post-cure                 |
| Tensile modulus   | 2.8 GPa, both published post-cures      |
| Flexural strength | 97 MPa, full thermal cure               |
| HDT at 1.8 MPa    | 101 °C, full thermal cure               |
| HDT at 0.45 MPa   | 238 °C, full thermal cure               |

## Application Fit

- Heat-resistant mounts, housings, fixtures, and test components
- Hot-air, gas, and fluid-flow prototypes
- Molds, inserts, thermoforming aids, and short-run tooling
- Detailed components evaluated under controlled elevated-temperature exposure

## Mechanical Properties

| PROPERTY                   | GREEN    | 60 °C CURE | FULL THERMAL CURE | METHOD       |
|----------------------------|----------|------------|-------------------|--------------|
| Ultimate tensile strength  | 21 MPa   | 58 MPa     | 49 MPa            | ASTM D638-14 |
| Tensile modulus            | 0.75 GPa | 2.8 GPa    | 2.8 GPa           | ASTM D638-14 |
| Elongation at break        | 14%      | 3.3%       | 2.3%              | ASTM D638-14 |
| Flexural strength at break | 24 MPa   | 95 MPa     | 97 MPa            | ASTM D790-15 |
| Flexural modulus           | 0.7 GPa  | 2.6 GPa    | 2.8 GPa           | ASTM D790-15 |
| Notched Izod               | 33 J/m   | 18 J/m     | 17 J/m            | ASTM D256-10 |

## Thermal Properties

| PROPERTY                         | GREEN       | 60 °C CURE | FULL THERMAL CURE | METHOD       |
|----------------------------------|-------------|------------|-------------------|--------------|
| HDT at 1.8 MPa                   | 44 °C       | 78 °C      | 101 °C            | ASTM D648-16 |
| HDT at 0.45 MPa                  | 49 °C       | 120 °C     | 238 °C            | ASTM D648-16 |
| Coefficient of thermal expansion | 118 µm/m/°C | 80 µm/m/°C | 75 µm/m/°C        | ASTM E831-13 |

## Published Cure Conditions

| DATA COLUMN       | PUBLISHED CONDITION                              |
|-------------------|--------------------------------------------------|
| Green             | Washed and air-dried; no post-cure               |
| 60 °C cure        | 60 minutes at 60 °C                              |
| Full thermal cure | 120 minutes at 80 °C, then 180 minutes at 160 °C |

## Design Interpretation

The cure schedule materially changes performance. The full thermal cure maximizes heat resistance but reduces tensile strength, elongation, and impact resistance relative to the 60 °C cure. Select the cure state against the actual combination of temperature, load, impact, dimensional tolerance, and exposure time—not HDT alone.

## Solvent Compatibility

| FLUID                                | 24 H SIZE GAIN | 24 H WEIGHT GAIN |
|--------------------------------------|----------------|------------------|
| Acetic acid, 5%                      | <1%            | <1%              |
| Acetone                              | <1%            | 2%               |
| Bleach, about 5% NaOCl               | <1%            | <1%              |
| Butyl acetate                        | <1%            | <1%              |
| Diesel fuel                          | <1%            | <1%              |
| Diethylene glycol monomethyl ether   | <1%            | 1%               |
| Hydraulic oil                        | <1%            | <1%              |
| Hydrogen peroxide, 3%                | <1%            | <1%              |
| Isooctane, gasoline analogue         | <1%            | <1%              |
| Isopropyl alcohol                    | <1%            | <1%              |
| Mineral oil, light                   | <1%            | <1%              |
| Mineral oil, heavy                   | <1%            | <1%              |
| Salt water, 3.5% NaCl                | <1%            | <1%              |
| Skydrol 5                            | <1%            | 1.1%             |
| Sodium hydroxide, 0.025%, pH 10      | <1%            | <1%              |
| Concentrated hydrochloric acid       | 1.2%           | <1%              |
| Tripropylene glycol monomethyl ether | <1%            | <1%              |
| Water                                | <1%            | <1%              |
| Xylene                               | <1%            | <1%              |

## Processing Basis

Published specimens were produced at 100  $\mu\text{m}$  layers, washed for 5 minutes, and evaluated either green, after a 60-minute cure at 60 °C, or after a full thermal cure of 120 minutes at 80 °C followed by 180 minutes at 160 °C. These conditions describe the source data and are not universal production requirements.

## Design and Qualification Notes

HDT is a short-term deflection measurement under a specified load and is not a continuous-use temperature rating. Evaluate creep, thermal cycling, aging, dimensional change, fluid pressure, and retained mechanical performance for the intended duty cycle. Solvent results report 24-hour size and mass change only; they do not establish long-term chemical compatibility.

## Published Data and Qualification

Values are based on published specimen data and are provided for design reference and material comparison. Lucent Additive has not independently generated every published value. Properties can vary with geometry, orientation, process settings, post-curing, temperature, and service environment. Validate the finished component under intended mechanical, chemical, and thermal conditions.

## Start an Application Review

Send Lucent Additive your CAD model, quantity, peak and continuous temperatures, load case, duty cycle, fluid exposure, dimensional requirements, and target schedule. Our team can review material fit, cure strategy, production approach, and validation needs before quoting.

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