# 8820

## High Temperature Rigid Urethane

8820 is a black, tough, high temperature, two-part polyurethane potting compound. It has a low mixed viscosity and properties similar to epoxy compounds, but with exceptional low temperature stability. As well, it adheres strongly to a wide variety of substrates, including metals, composites, glass, ceramics, and many plastics.

8820 offers exceptional physical protection, a high continuous operating temperature, and superior protection from acids, bases, and many organic solvents.


## Features & Benefits

2:1 mix ratio

15 minute working time

48 hour cure at room temperature

Constant service temperature of -50 to 150 °C

Low exotherm

Excellent dielectric properties

## Cure Instructions

Allow to cure at room temperature for 48 hours, or cure in an oven at one of these time/temperature options:

| | | |
|---|---|---|
| Temperature | 65 °C | 80 °C |
| Time | 2 h | 1.5 h |

Moisture contamination can create large bubbles and a lumpy appearance. For consistent curing results, ensure that part A is dry before use and the mixture is kept dry during cure. If moisture contamination of part A is suspected, follow the steps below:

1. Pre-heat part A at 65 °C for 2 hours. Mix the heated resin with the appropriate amount of hardener (do not allow the resin to cool as this may create condensation that wets the resin).
2. Mix the 2 components together and cure in an enclosure that has a constant stream of nitrogen gas flowing through to keep the environment dry.

## Available Packaging

| Part # | Packaging | Net Vol. | Net Wt. |
|---|---|---|---|
| 8820-2.55L | 3 Can kit | 2.55 L | 3 kg |
| 8820-60L | 3 Pail kit | 60 L | 70.6 kg |

## Storage and Handling

Store between 16 and 27 ˚C in a dry area, away from sunlight (see SDS). Minimize the time that the container is kept opened and purge with nitrogen before closing if the material is not used up at once.

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## Liquid Properties

| | | |
|---|---|---|
| Chemistry | Polyurethane | — |
| Density | 1.2 g/mL (Mixed)<br>1.2 g/mL (A)<br>1.2 g/mL (B) | ASTM D1475 |
| Viscosity @ 25 ˚C | 3 820 cP (Mixed)<br>10 700 cP (A)<br>250 cP (B) | Brookfield Engineering labs Inc.<br>IPCTM-65- Method 2.4.24.4 |
| Mix Ratio | 2:1 (Volume)<br>1.85:1 (Weight) | — |
| Working Time [a] | 15 min | — |
| Shrinkage | 5.7% | Calculated |
| Shelf Life | 2 y | — |

[a]Based on 100 g sample. Varies by volume and geometry.

## Cured Properties

| | | |
|---|---|---|
| Flame Retardancy | No | — |
| Color | Black | — |
| Density | 1.2 g/mL | Hydrostatic Weighing |
| Service Temperature Range | -50–150 ˚C | — |
| Intermittent Temperature | 175 ˚C | — |
| Thermal Conductivity @ 25 ˚C<br>Specfic Heat Capacity @ 25 ˚C<br>Thermal Diffusivity @ 25 ˚C | 0.3 W/(m·K)<br>1.4 J/(g·K)<br>0.2 $mm^2/s$ | ASTM E1461 |
| Glass Transition Temperature ($T_g$) | 44 ˚C | ASTM E1545 |
| Coefficient of Thermal Expansion (CTE) | 94 ppm/˚C (Prior $T_g$)<br>195 ppm/˚C (After $T_g$) | ASTM E831 |
| Hardness | 73 D | ASTM D2240 |
| Tensile Strength | 38 $N/mm^2$ | ASTM D638 |
| Compressive Strength | 295 $N/mm^2$ | ASTM D695 |

## Cured Properties Continued

| | | |
|---|---|---|
| Lap Shear | 13 N/mm$^2$ (Stainless Steel)<br>12 N/mm$^2$ (Aluminum)<br>3.7 N/mm$^2$ (ABS)<br>4.9 N/mm$^2$ (PC) | ASTM D1002 |
| Resistivity | 1.4 x $10^{13}$ Ω·cm | ASTM D257 |
| Breakdown Voltage @ 3.175 mm<br>Dielectric Strength @ 3.175 mm | 47 300 V<br>480 V/mil | ASTM D149 |
| Dielectric Constant @ 1 MHz<br>Dissipation Factor @ 1 MHz | 3.1<br>0.1 | ASTM D150 |
| Chemical Absorption<br>Weight Gain, 30 days @ 25 °C | 1 % (IPA)<br>12 % (Toluene)<br>0.7 % (Sulphuric Acid 3%)<br>0.5 % (Acetic Acid)<br>0.3 % (10% NaOH)<br>0.3 % (10% NaCl)<br>0.4 % (Water)<br>0 % (Transmission Oil)<br>0 % (Transformer Oil)<br>0.4 % (Gasoline) | — |
| Weight Loss @ 155 °C (600 hrs) | 39.8 % | – |
| Water Absorption [b] @ 1 week<br>@ 2 weeks<br>@ 4 weeks | 0.1% (water), 0.05% (10% salt water)<br>0.4% (water), 0.2% (10% salt water)<br>0.7% (water), 0.5% (10% salt water) | — |

[a] Sample size: 12.8 mm width, 12.5 mm thickness, and 4.8 g. Cured 1 hour @ 65 ˚C.

## Application Instructions

Read the product SDS and Application Guide for more detailed instructions before using this product.

## Recommended Preparation

Clean the substrate with 824 99.9% Isopropyl Alcohol, so the surface is free of oils, dust, and other residues.

## Mixing

1. (Optional) Pre-heat part A to improve surface quality.
2. Scrape settled material free from the bottom and sides of the part A container; stir the contents until homogenous.
3. Measure 2 parts by volume of the pre-stirred part A, and pour into the mixing container. Ensure all contents are transferred by scraping the container.
4. Measure 1 part by volume of the part B, and pour into the mixing container. Ensure all contents are transferred by scraping the container
5. Thoroughly mix parts A and B together.
6. (Optional) Put in a vacuum chamber at 25 inHg.
7. Pour the mixture into a container holding the components to be protected.
8. Blanket both parts with nitrogen if the material is not used up to prevent moisture.
9. Close the part A and B containers tightly between uses.

Mixing >500 g at a time decreases working time and can lead to a flash cure. Limit the size of hand-mixed batches. For large production volumes, contact MG Chemicals Technical Support for assistance.