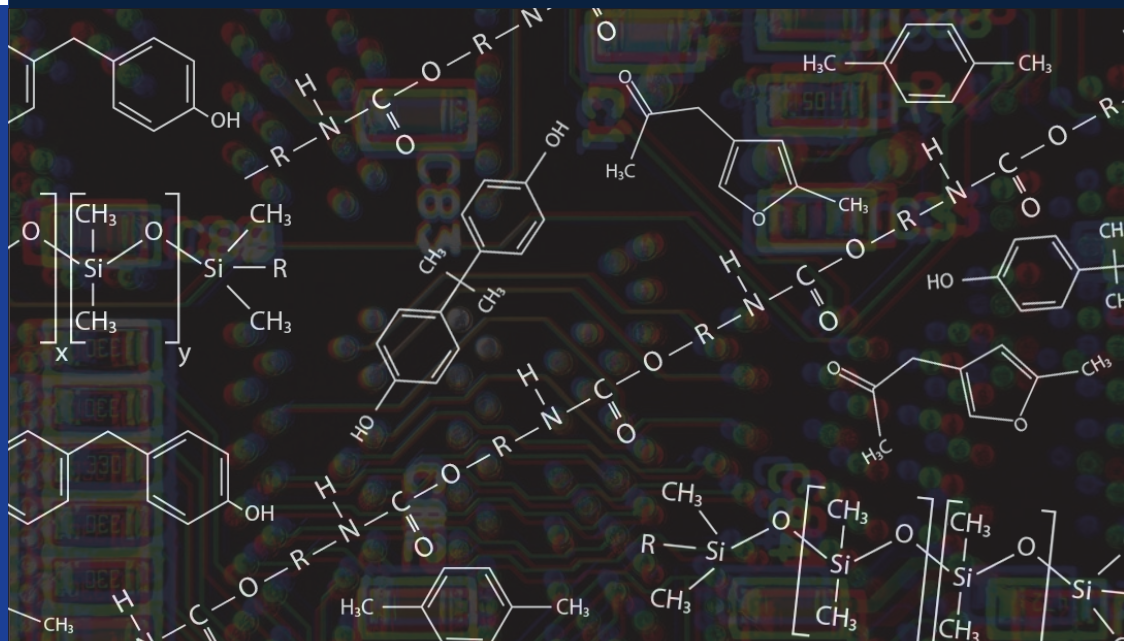


ONE COMPANY... MANY SOLUTIONS

# EPOXY POTTING & ENCAPSULATING COMPOUNDS

AUTOMOTIVE  
AEROSPACE  
TRANSPORT  
MARINE  
MEDICAL  
TELECOMMUNICATIONS  
CONSUMER ELECTRONICS  
UTILITIES





## WHAT IS MG CHEMICALS?

MG Chemicals is a manufacturer and wholesaler of chemical products for the electronics industry. Our chemical products include dusters and circuit coolers, electronic cleaners, flux removers, contact cleaners, protective coatings, epoxies, adhesives, RTV silicones, lubricants, EMI/RFI shielding coatings, thermal management products, prototyping supplies, solders and more. We also distribute related non-chemical products such as wipes, swabs, brushes, desoldering braids, copper-clad boards and 3D printing filaments.

## MG SERVICE

MG Chemicals understands that setting up production involves multiple challenges. Our service team has years of experience in production and equipment use, and understands the various technical issues you may encounter during planning, pilot studies and production runs. To overcome these challenges, we offer the following professional services.

MG Chemicals can

- Provide advice on equipment and materials
- Assist with setup and troubleshooting
- Review your proposed application processes
- Suggest ways of optimizing and customizing processes to best meet your needs
- Offer training on the proper use of our products

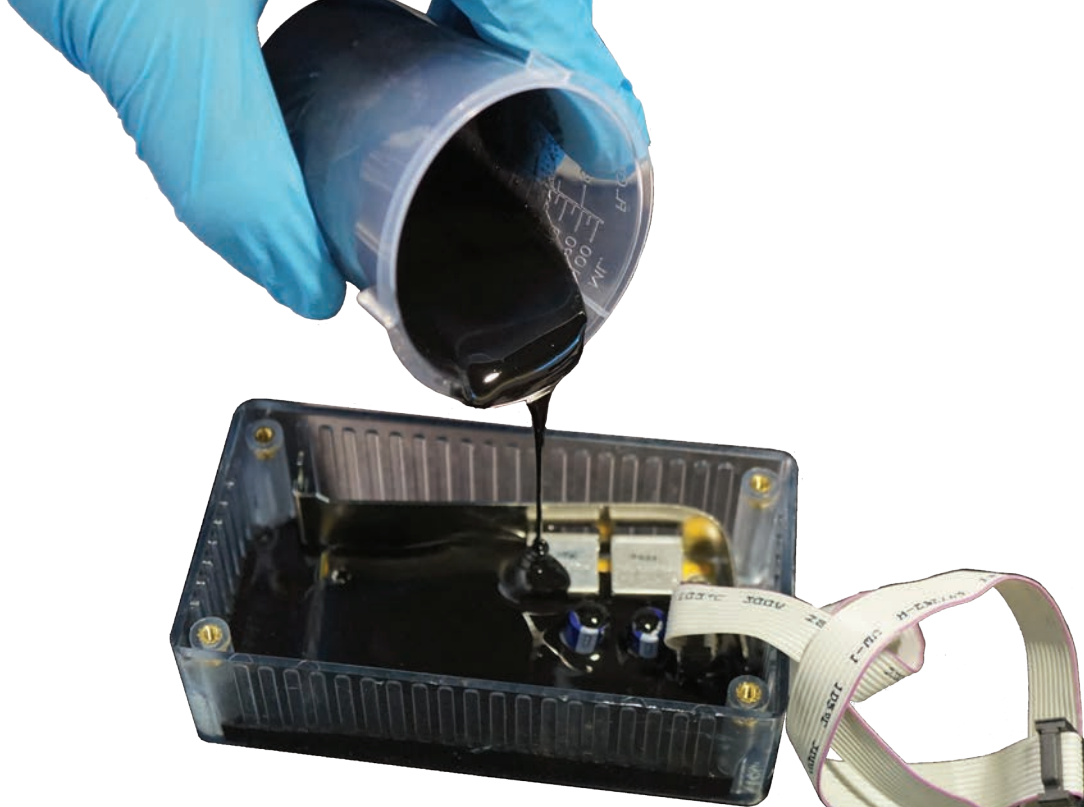
Quality Assurance

Since 1955, MG Chemicals has provided the North American electronics industry with a full line of high performance chemicals and accessories. The MG Chemicals manufacturing facility operates under the ISO 9001 Quality System Standard. All products undergo MG Chemicals' design process, including the testing and analysis of each product to maximize performance, user safety, environmental safeguards and market desirability.

Customer Care

Customer care is what separates MG Chemicals from the rest. Our commitment to all of these principles focuses on getting you the quality product and support you deserve.





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# INTRODUCTION TO EPOXY POTTING AND ENCAPSULATING COMPOUNDS

## Epoxy Potting and Encapsulating Compounds

Potting compounds are designed to provide a high level of protection to printed circuit boards and electronic devices by embedding them in a thick, durable polymer. Epoxies are used when extreme operating conditions require optimum protection. They offer different physical and chemical properties from other alternatives, and these properties are listed below.

**Physical Protection** – These compounds hold components firmly in place, preventing damage from vibration, mechanical shocks, abrasion, bending, tension, compression and torsion.

**Environmental Protection** - They are non-porous, providing complete protection from humidity and water, allowing for direct submersion in salt water, and granting complete protection from dust, soil, corrosion and fungus. They also are extremely chemically resistant and can resist most fuels, oils, alcohols, mild solvents, and strong acids.

**Electrical Protection** - Epoxies have inherent insulative properties that result in a high volume resistivity and dielectric strength. These features allow epoxies to provide protection from static discharge, electrical shocks and arcing, and also allow tighter spacing between components.

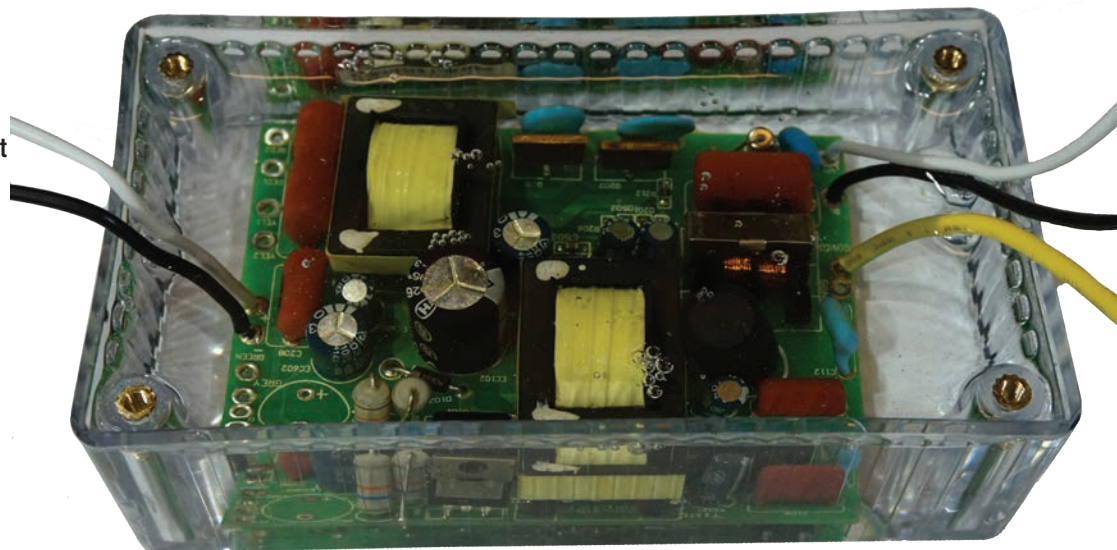
**Thermal Protection** – They provide a high level of resistance to thermal cycling and thermal shock, which is an important requirement for many customers who are looking to protect their electronics from temperature swings.

**Technology Protection** – Black systems block visual inspection and are very difficult to remove without destroying the underlying device, making it more difficult for competitors to reverse engineer.

The three main chemistries in thermosetting, potting and encapsulation compounds are epoxies, silicones and polyurethanes. Epoxies provide a set of benefits not seen with the other chemistries, some of which are listed below:

### BENEFITS & FEATURES

- Cost effective
- Easy to use
- Extended shelf life
- Room temperature shipping and storage
- Room temperature cures are the norm
- Curing can usually be accelerated with heat
- Low VOC's
- Isocyanate-free
- Chemical resistance
- Primerless adhesion to many substrates
- More rigid
- Excellent moisture resistance
- Excellent durability
- Excellent bond strength
- Multifunctional protection



All of our epoxy compounds share certain characteristics; however, the characteristics of each of our products vary to meet the specific needs of the different applications they are intended to serve. Here are some of the ways the characteristics of our compounds vary:

**UL Ratings** – In the epoxy potting compound line, this comprises the UL 94 flammability rating and the UL 746A certification for electrical and mechanical properties. Some industries, such as aerospace and defense, require UL listings to even consider using a product. All compounds in our 834 series are either in the process of being certified or are already UL certified to UL 94V-0.

**Thermal Conductivity** – Certain applications involve a lot of heat generation at the board level, requiring thermal management considerations. As polymers are generally thermally insulative on their own, formulating specifically for thermal conductivity is important. Our thermally conductive compounds address the issue of thermal management by transferring the heat from the electronics through the potting compound, thus increasing life span and reliability as well as reducing the overall temperature of components.

**Hard or Flexible** – We offer epoxy potting compounds that are either hard (70-90 Shore D) or flexible (80-90 Shore A). Certain applications require hard compounds; however, hard compounds can introduce stresses that affect sensitive components in situations where a lot of thermal cycling occurs. Flexible epoxies provide a low-stress option in sensitive applications where traditional hard options cannot be used but the core chemical properties of an epoxy are still desired.

**Optical Clarity** – Most potting compounds are pigmented black to prevent visual inspection and maximize radiative cooling. However, we offer products that are clear to allow visual inspection: 832C, which is translucent amber, and 832WC, which is water-clear for maximum optical transmission.

**Mix Ratios** – MG Chemical formulates epoxies with convenient 1:1 or 2:1 mix ratios for easy processing. In some of our specialty products, we utilize mix ratios that are 4:1 or 5:1 to achieve certain desirable properties.

**Viscosity** – Viscosity is the measurement of a product's resistance to flow, and is usually measured in centipoise (cP). The viscosity is important for an application and should be considered during the design stage. Our products vary from low viscosity (less than 1000 cP, thin) to high viscosity (greater than 18000 cP). Products that contain a lot of filler are usually thick, while some compounds can be extremely thin.

**Working Time** – Our epoxies have various working times, depending on the specific resin and hardener being used. Epoxies cure exothermically, and the reaction is accelerated through heat, meaning that a curing epoxy is self-accelerating. Depending on application needs, a low exotherm epoxy may be desired when working with larger quantities, and higher exotherm options may be desired for throughput when working with small quantities. We measure and list our working times using 100 g batches of epoxy.

**Cure Schedule** – Most epoxies can be cured at room temperature; however, optimal properties are achieved when using an elevated temperature. Generally, we try to provide multiple cure schedules, and the most commonly used cure temperatures are 25 °C, 65 °C, and 80 °C. Typically, increasing temperature will decrease cure time. Each system has a limit as to how high it can be heated without impairing the qualities of the cured product.



## 832B - Black, 2:1

A general epoxy potting and encapsulating compound that is extremely tough and durable.

### BENEFITS & FEATURES

- 2:1 volume mix ratio
- Very high tensile strength
- Very strong compressive strength
- Strong flexural strength

| Cat. Number | Packaging | Net Volume |            | Net Weight |         |
|-------------|-----------|------------|------------|------------|---------|
| 832B-375ML  | Kit       | 375 mL     | 12.6 fl oz | 403 g      | 0.89 lb |
| 832B-3L     | Kit       | 2.55 L     | 0.68 gal   | 2.74 kg    | 6.04 lb |
| 832B-12L    | Kit       | 10.8 L     | 2.88 gal   | 11.6 kg    | 25.6 lb |
| 832B-60L    | Kit       | 60 L       | 16 gal     | 64.5 kg    | 142 lb  |

## 832C - Translucent

A general epoxy potting and encapsulating compound that is a translucent amber color.

### BENEFITS & FEATURES

- 2:1 volume mix ratio
- Amber color allows for visual inspection
- Very high tensile strength
- Very strong compressive strength
- Very high electrical resistivity

| Cat. Number | Packaging      | Net Volume |            | Net Weight |         |
|-------------|----------------|------------|------------|------------|---------|
| 832C-375ML  | Kit            | 375 mL     | 12.7 fl oz | 402 g      | 12.9 oz |
| 832C-450ML  | Dual cartridge | 450 mL     | 25.3 fl oz | 483 g      | 15.5 oz |
| 832C-3L     | Kit            | 2.55 L     | 5.39 pt    | 2.73 kg    | 6.0 lb  |
| 832C-60L    | Kit            | 60 L       | 16 gal     | 64.3 kg    | 142 lb  |

## 832HD - Black, 1:1

A general epoxy potting and encapsulating compound with a 1:1 volume mix ratio.

### BENEFITS & FEATURES

- Very high lap shear strength

| Cat. Number | Packaging       | Net Volume |            | Net Weight |         |
|-------------|-----------------|------------|------------|------------|---------|
| 832HD-25ML  | Dual syringe*   | 25 mL      | 0.8 fl oz  | 26.2 g     | 0.92 oz |
| 832HD-50ML  | Dual cartridge* | 50 mL      | 1.6 fl oz  | 52.5 g     | 1.85 oz |
| 832HD-400ML | Dual cartridge  | 400 mL     | 13.5 fl oz | 420 g      | 14.8 oz |
| 832HD-7.4L  | Kit             | 7.4 L      | 1.9 gal    | 7.77 kg    | 17.1 lb |
| 832HD-40L   | Kit             | 40 L       | 10 gal     | 42 gal     | 92 lb   |

## 832WC - Water Clear

An optically clear compound for encapsulating LED's, fiber optics, or any potting or adhesive application requiring optimal clarity

### BENEFITS & FEATURES

- 2:1 volume mix ratio
- Optically clear
- Minimal yellowing over time

| Cat. Number | Packaging | Net Volume |            | Net Weight |         |
|-------------|-----------|------------|------------|------------|---------|
| 832WC-375ML | Kit       | 375 mL     | 12.6 fl oz | 401 g      | 14.1 oz |
| 832WC-3L    | Kit       | 2.7 L      | 2.85 qt    | 2.89 kg    | 6.37 lb |
| 832WC-12L   | Kit       | 10.8 L     | 2.88 gal   | 11.5 kg    | 25.5 lb |
| 832WC-60L   | Kit       | 60 L       | 16 gal     | 64.2 kg    | 141 lb  |

## 832FX - Flexible

For use in stress-sensitive or low temperature applications.

### BENEFITS & FEATURES

- 1:1 volume mix ratio
- Soft, 88 Shore A hardness
- Low mixed viscosity of 700 cP
- Low Tg of 8.8 °C

| Cat. Number | Packaging | Net Volume |            | Net Weight |         |
|-------------|-----------|------------|------------|------------|---------|
| 832FX-450ML | Kit       | 450 mL     | 15.2 fl oz | 475 g      | 1.05 lb |
| 832FX-1.7L  | Kit       | 1.7 L      | 57 fl oz   | 1.8 kg     | 3.9 lb  |
| 832FX-7.4L  | Kit       | 7.4 L      | 1.9 gal    | 7.82 kg    | 17.2 lb |
| 832FX-40L   | Kit       | 40 L       | 10 gal     | 42.2 kg    | 93.2 lb |

## 832TC - Thermally Conductive

For use when potting heat generating components.

### BENEFITS & FEATURES

- 1:1 volume mix ratio
- Good thermal conductivity
- Good lap shear strength
- Low exotherm
- Long working time of 2 hours

| Cat. Number | Packaging | Net Volume |            | Net Weight |         |
|-------------|-----------|------------|------------|------------|---------|
| 832TC-450ML | Kit       | 450 mL     | 15.2 fl oz | 752 g      | 1.66 lb |
| 832TC-2L    | Kit       | 1.7 L      | 0.45 gal   | 2.84 kg    | 6.26 lb |
| 832TC-8L    | Kit       | 7.2 L      | 1.92 gal   | 12.0 kg    | 26.5 lb |
| 832TC-40L   | Kit       | 40 L       | 10.7 gal   | 66.8 kg    | 147 lb  |

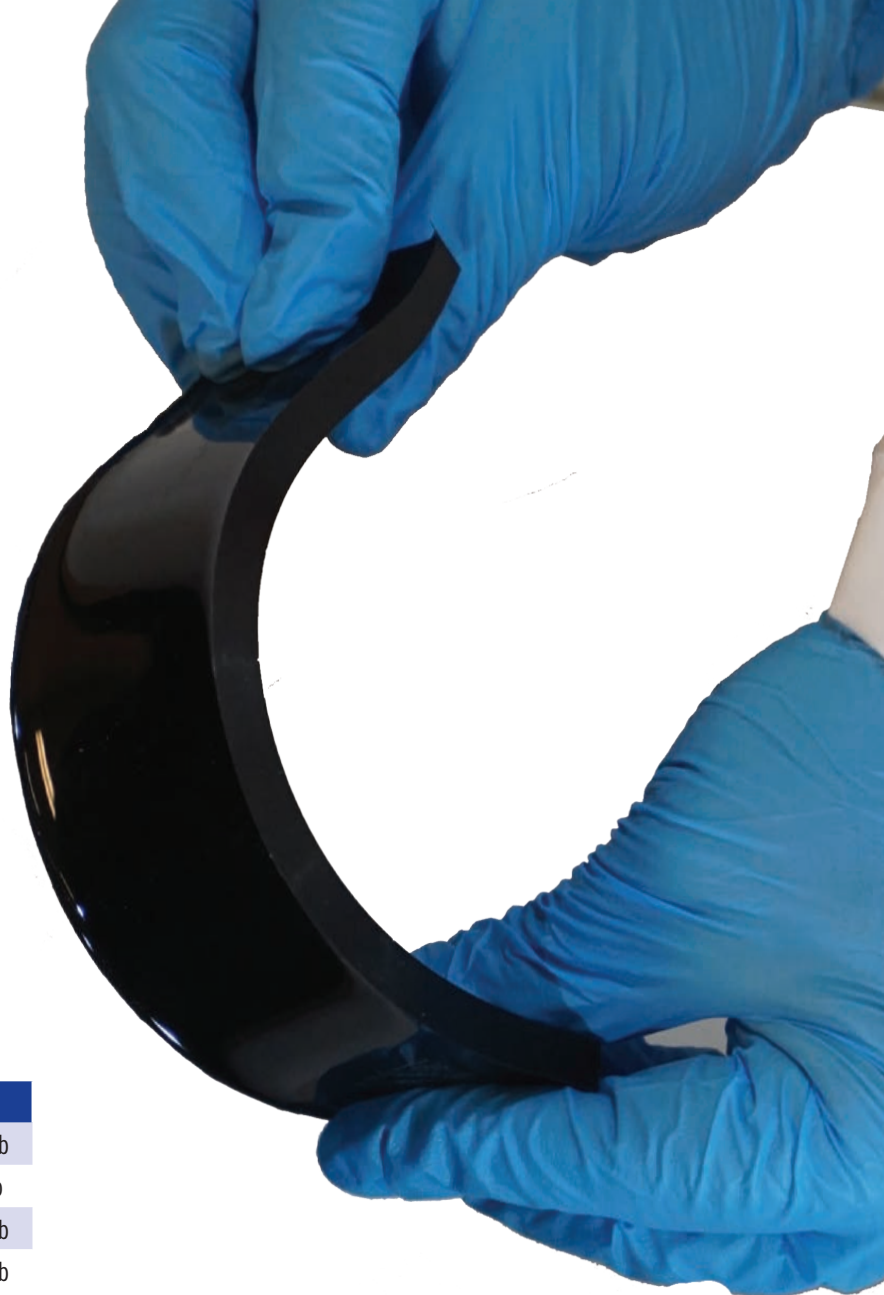
## 832HT - High Temperature

For use in high temperature applications, or applications requiring strong chemical resistance or physical strength.

### BENEFITS & FEATURES

- 2:1 weight mix ratio
- High tensile strength
- Very high dielectric strength
- Strong compressive strength
- Strong flexural strength
- Good lap shear strength
- Excellent chemical resistance
- High Tg of 89 °C

| Cat. Number | Packaging | Net Volume |            | Net Weight |         |
|-------------|-----------|------------|------------|------------|---------|
| 832HT-375ML | Kit       | 340 mL     | 11.5 fl oz | 377 g      | 12.1 oz |
| 832HT-3L    | Kit       | 2.3 L      | 2.43 qt    | 2.55 kg    | 5.62 lb |



| Uncured Properties      | 832B     | 832C     | 832HD    | 832TC     | 832HT     | 832FX  | 832WC    |
|-------------------------|----------|----------|----------|-----------|-----------|--------|----------|
| Mix Ratio by Vol. (A:B) | 2:1      | 2:1      | 1:1      | 1:1       | 1.7:1     | 1:1    | 2:1      |
| Viscosity Mixture       | 3 300 cP | 2 700 cP | 4 100 cP | 18 000 cP | 21 900 cP | 700 cP | 979 cP   |
| Part A                  | 2 200 cP | 1 900 cP | 5 900 cP | 36 000 cP | 46 400 cP | 800 cP | 2 860 cP |
| Part B                  | 5 800 cP | 5 800 cP | 2 300 cP | 14 000 cP | 6 600 cP  | 165 cP | 340 cP   |
| Working Time @22 °C     | 1 h      | 1 h      | 45 min   | 2 h       | 1 h       | 2.5 h  | 1 h      |
| Full Cure @22 °C        | 24 h     | 24 h     | 24 h     | 96 h      | 24 h      | 48 h   | 72 h     |
| Full Cure @65 °C        | 1 h      | 1 h      | 2 h      | 2 h       | 1 h       | 2 h    | TBD      |

| Cured Properties | 832B      | 832C        | 832HD     | 832TC     | 832HT     | 832FX     | 832WC           |
|------------------|-----------|-------------|-----------|-----------|-----------|-----------|-----------------|
| Color            | Black     | Translucent | Black     | Black     | Black     | Black     | Optically clear |
| Density          | 1.11 g/mL | 1.12 g/mL   | 1.07 g/mL | 1.83 g/mL | 1.10 g/mL | 1.08 g/mL | 1.06 g/mL       |
| Hardness         | 80D       | 84D         | 80D       | 82D       | 87D       | 88A       | 82D             |

| Mechanical Properties               | 832B                   | 832C                  | 832HD                | 832TC                 | 832HT                 | 832FX                 | 832WC                 |
|-------------------------------------|------------------------|-----------------------|----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Tensile Strength                    | 57 N/mm <sup>2</sup>   | 56 N/mm <sup>2</sup>  | 32 N/mm <sup>2</sup> | 18 N/mm <sup>2</sup>  | 48 N/mm <sup>2</sup>  | 9.6 N/mm <sup>2</sup> | 10 N/mm <sup>2</sup>  |
| Elongation                          | 3.3%                   | 6.4%                  | TBD                  | 1.9%                  | TBD                   | 160%                  | TBD                   |
| Compressive Strength                | 155 N/mm <sup>2</sup>  | 182 N/mm <sup>2</sup> | 75 N/mm <sup>2</sup> | 29 N/mm <sup>2</sup>  | 130 N/mm <sup>2</sup> | TBD                   | 157 N/mm <sup>2</sup> |
| Flexural Strength                   | 114 N/mm <sup>2</sup>  | 38 N/mm <sup>2</sup>  | TBD                  | 37 N/mm <sup>2</sup>  | 101 N/mm <sup>2</sup> | TBD                   | TBD                   |
| Lap Shear Strength, Stainless steel | 4.2 N/mm <sup>2</sup>  | 4.4 N/mm <sup>2</sup> | 21 N/mm <sup>2</sup> | 13 N/mm <sup>2</sup>  | 15 N/mm <sup>2</sup>  | TBD                   | 3.3 N/mm <sup>2</sup> |
| Izod Impact                         | 0.93 kJ/m <sup>2</sup> | 1.5 kJ/m <sup>2</sup> | TBD                  | 1.7 kJ/m <sup>2</sup> | TBD                   | TBD                   | TBD                   |

| Electrical Properties         | 832B                        | 832C                        | 832HD                       | 832TC                       | 832HT                     | 832FX                       | 832WC                       |
|-------------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|---------------------------|-----------------------------|-----------------------------|
| Volume Resistivity            | 5.3 x 10 <sup>12</sup> Ω·cm | 1.2 x 10 <sup>16</sup> Ω·cm | 1.4 x 10 <sup>13</sup> Ω·cm | 2.6 x 10 <sup>15</sup> Ω·cm | 1 x 10 <sup>13</sup> Ω·cm | 5.8 x 10 <sup>12</sup> Ω·cm | 1.6 x 10 <sup>17</sup> Ω·cm |
| Surface Resistivity           | TBD                         | 5.5 x 10 <sup>15</sup> Ω    | TBD                         | 3.2 x 10 <sup>15</sup> Ω    | TBD                       | TBD                         | TBD                         |
| Dielectric Strength @1/8"     | 442 V/mil                   | 406 V/mil                   | 365/mil                     | 370 V/mil                   | >430 V/mil                | 343 V/mil                   | 394 V/mil                   |
| Breakdown Voltage @1/8"       | 55.3 kV                     | 50.7 kV                     | 45.7 kV                     | 46.2 kV                     | >54 kV                    | 42.8 kV                     | 49 kV                       |
| Dielectric Constant @1 MHz    | 2.77                        | TBD                         | 2.53                        | 4.41                        | 2.83                      | 3.06                        | 3.23                        |
| Dielectric Dissipation @1 MHz | 0.017                       | TBD                         | 0.041                       | 0.011                       | 0.014                     | 0.050                       | 0.028                       |

| Thermal Properties                       | 832B          | 832C          | 832HD         | 832TC         | 832HT         | 832FX         | 832WC         |
|--|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Thermal Conductivity @25 °C              | 0.26 W/(m·K)  | 0.28 W/(m·K)  | 0.27 W/(m·K)  | 0.68 W/(m·K)  | 0.27 W/(m·K)  | 0.26 W/(m·K)  | TBD           |
| Specific Heat Capacity @25 °C            | 2.2 J/(g·K)   | 2.1 J/(g·K)   | 2.0 J/(g·K)   | TBD           | 1.6 J/(g·K)   | 2.7 J/(g·K)   | TBD           |
| Heat Deflection Temp.                    | 47 °C         | 44 °C         | TBD           | 35 °C         | 54 °C         | TBD           | TBD           |
| Glass Transition Temp. (T <sub>g</sub> ) | 49 °C         | 35 °C         | 41 °C         | 25 °C         | 89 °C         | 8.8 °C        | 33 °C         |
| CTE prior T <sub>g</sub>                 | 79 ppm/°C     | 77 ppm/°C     | 73 ppm/°C     | 66 ppm/°C     | 86 ppm/°C     | 114 ppm/°C    | 80 ppm/°C     |
| CTE after T <sub>g</sub>                 | 196 ppm/°C    | 195 ppm/°C    | 207 ppm/°C    | 167 ppm/°C    | 152 ppm/°C    | 218 ppm/°C    | 192 ppm/°C    |
| Constant Service Temp.                   | -40 to 140 °C | -40 to 140 °C | -40 to 150 °C | -30 to 175 °C | -40 to 225 °C | -40 to 140 °C | -40 to 140 °C |
| Maximum Intermittent Temp.               | 175 °C        | 175 °C        | 175 °C        | 200 °C        | 250 °C        | 150 °C        | 155 °C        |

TBD=To be determined

## Available Packaging (cartridges)

For kits packaging see pages 10 & 11



25 mL Dual Cartridge



50 mL Dual Cartridge



8MT-25



8DG-50-1-1



8MT-50

Dispensing tools  
(Sold separately)



450 mL Dual Cartridge



8DG-450-2-1



8MT-450

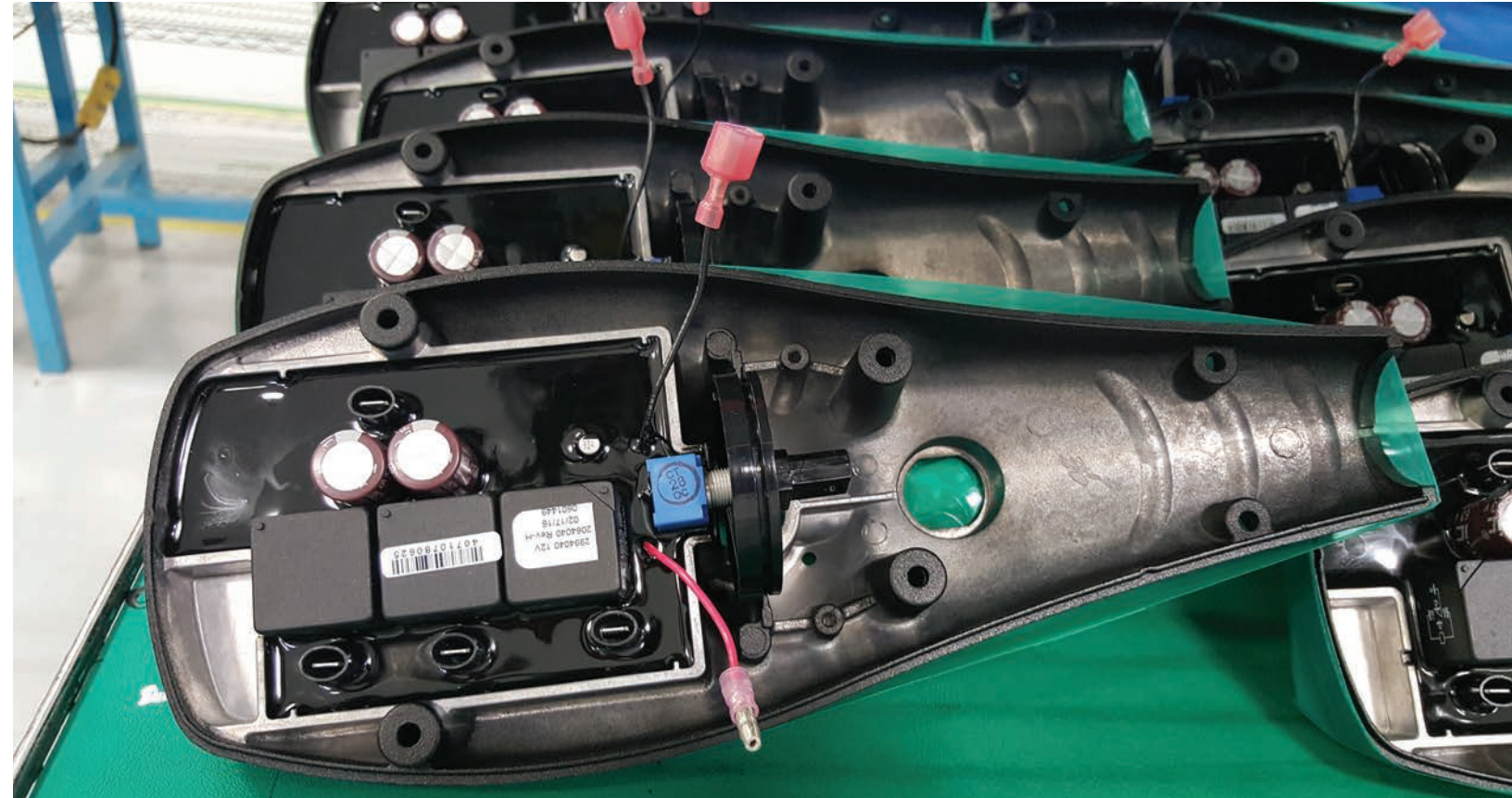
Dispensing tools  
(Sold separately)



# 834 Series – Compounds meeting the UL 746A Standard

All compounds in the 834 series are designed to meet the UL746A Standard for polymeric materials.

The UL 746A Standard provides data regarding the physical, electrical, flammability, thermal, and other properties of the materials, and is intended to furnish guidance to the material manufacturers, molders, end-product manufacturers, safety engineers, and other interested parties.



## 834B - Balanced Formula

A good standard potting compound. Suitable for most applications.

### BENEFITS & FEATURES

- 2:1 volume mix ratio
- High thermal conductivity
- Halogen free

## 834FRB - Low Viscosity

Flame retardant but not thermally conductive. The lack of thermal fillers allows better flow and physical strength.

### BENEFITS & FEATURES

- 2:1 volume mix ratio
- Very high lap shear strength
- Very flowable
- Excellent CTI (>600 V, PLC=0)
- Low thermal conductivity

| Cat. Number | Packaging | Net Volume |            | Net Weight |         |
|-------------|-----------|------------|------------|------------|---------|
| 834B-375ML  | Kit       | 375 mL     | 12.6 fl oz | 597 g      | 1.31 lb |
| 834B-2.7L   | Kit       | 2.7 L      | 2.85 qt    | 4.3 kg     | 9.48 lb |
| 834B-10.8L  | Kit       | 10.8 L     | 2.85 gal   | 17.2 kg    | 37.9 lb |
| 834B-60L    | Kit       | 60 L       | 15.8 gal   | 95.6 kg    | 210 lb  |

| Cat. Number  | Packaging | Net Volume |            | Net Weight |         |
|--------------|-----------|------------|------------|------------|---------|
| 834FRB-375ML | Kit       | 375 mL     | 12.6 fl oz | 475 g      | 1.05 lb |
| 834FRB-3L    | Kit       | 3 L        | 3.17 qt    | 3.81 kg    | 8.39 lb |
| 8324FRB-60L  | Kit       | 60 L       | 16 gal     | 76.1 kg    | 167 lb  |

## 834ATH - Economical

Pigmented with aluminum trihydrate (ATH), providing a cost-effective solution with some thermal conductivity.

### BENEFITS & FEATURES

- 2:1 volume mix ratio
- Thermally conductive
- Cost Effective
- Good compressive strength
- Good lap shear strength
- Low impact resistance

| Cat. Number  | Packaging | Net Volume |            | Net Weight |         |
|--------------|-----------|------------|------------|------------|---------|
| 834ATH-375ML | Kit       | 375 mL     | 12.6 fl oz | 516 g      | 1.13 lb |
| 834ATH-3L    | Kit       | 2.55 L     | 2.69 qt    | 3.5 kg     | 7.73 lb |
| 834ATH-60L   | Kit       | 60 L       | 16 gal     | 82.5 kg    | 182 lb  |

## 834HTC - High Thermal Conductivity

Use when high thermal conductivity is essential.

### BENEFITS & FEATURES

- 5:1 volume mix ratio
- High thermal conductivity of 1.0 W/m.K
- Halogen free



| Cat. Number  | Packaging | Net Volume |          | Net Weight |         |
|--------------|-----------|------------|----------|------------|---------|
| 834THC-900ML | Kit       | 900 mL     | 1.9 pt   | 1.53 kg    | 3.38 lb |
| 834THC-4.25L | Kit       | 4.25 L     | 1.13 gal | 7.25 kg    | 15.9 lb |

## 834FX - Flexible

For use in stress-sensitive or low temperature applications.

### BENEFITS & FEATURES

- 1:1 volume mix ratio
- Good thermal conductivity: 0.61 W/m.K
- Soft, 88 Shore A Hardness
- Low Tg of 0.7 °C.
- Halogen free
- Low constant service temperature limit
- Long working time of 2.5 hours
- Low exotherm



| Cat. Number | Packaging | Net Volume |            | Net Weight |         |
|-------------|-----------|------------|------------|------------|---------|
| 834FX-450ML | Kit       | 450 mL     | 15.2 fl oz | 728 g      | 1.6 lb  |
| 834FX-1.7L  | Kit       | 1.7 L      | 1.79 qt    | 2.75 kg    | 6.06 lb |
| 834FX-7.4L  | Kit       | 7.4 L      | 1.92 gal   | 11.6 kg    | 25.6 lb |
| 834FX-40L   | Kit       | 40 L       | 10.6 gal   | 64.8 kg    | 142 lb  |

## Available Packaging (kits)



375mL Kit



900mL Kit



1.7L Kit



3L Kit



4.25L Kit

| Uncured Properties      | 834B      | 834FRB   | 834FX     | 834HTC    | 834ATH     |
|-------------------------|-----------|----------|-----------|-----------|------------|
| Mix Ratio by Vol. (A:B) | 2:1       | 2:1      | 1:1       | 5:1       | 2:1        |
| Viscosity Mixture       | 16 200 cP | 2 600 cP | 10 800 cP | 10 500 cP | 5 900 cP   |
| Part A                  | 27 500 cP | 1 900 cP | 4 560 cP  | 55 900 cP | 4 600 cP   |
| Part B                  | 2 100 cP  | 4 800 cP | 4 670 cP  | 24 cP     | 12 900 cP  |
| Working Time @22 °C     | 1 h       | 1 h      | 2.5 h     | 1.5 h     | 2 h        |
| Full Cure @22 °C        | 48 h      | 24 h     | 48 h      | 24 h      | 24 h       |
| Full Cure @65 °C        | 3 h       | 1 h      | 3 h       | 2 h       | 1 h @80 °C |

| Cured Properties                               | 834B                        | 834FRB                      | 834FX                       | 834HTC                      | 834ATH                    |
|--|-----------------------------|-----------------------------|-----------------------------|-----------------------------|---------------------------|
| Color  | Black                       | Black                       | Black                       | Black                       | Black                     |
| Density  | 1.59 g/mL                   | 1.39 g/mL                   | 1.64 g/mL                   | 1.69 g/mL                   | 1.40 g/mL                 |
| Hardness                                       | 85D                         | 83D                         | 88A                         | 91D                         | 85D                       |
| UL 94V-0 Certification File #                  | Meets                       | E334302                     | Meets                       | Meets                       | E334302                   |
| Halogen Free                                   | No                          | No                          | Yes                         | Yes                         | No                        |
| Mechanical Properties                          |                             |                             |                             |                             |                           |
| Tensile Strength                               | 17 N/mm <sup>2</sup>        | 23 N/mm <sup>2</sup>        | 5.3 N/mm <sup>2</sup>       | 22 N/mm <sup>2</sup>        | 28 N/mm <sup>2</sup>      |
| Compressive Strength                           | 74 N/mm <sup>2</sup>        | 140 N/mm <sup>2</sup>       | 14 N/mm <sup>2</sup>        | 123 N/mm <sup>2</sup>       | 100 N/mm <sup>2</sup>     |
| Flexural Strength                              | TBD                         | 65 N/mm <sup>2</sup>        | TBD                         | TBD                         | 51 N/mm <sup>2</sup>      |
| Lap Shear Strength, Stainless steel            | 8.2 N/mm <sup>2</sup>       | 24 N/mm <sup>2</sup>        | 3.7 N/mm <sup>2</sup>       | 6.7 N/mm <sup>2</sup>       | 15 N/mm <sup>2</sup> , Al |
| Izod Impact                                    | TBD                         | 2.39 kJ/m <sup>2</sup>      | TBD                         | N/A                         | 0.02 kJ/m <sup>2</sup>    |
| Electrical Properties                          |                             |                             |                             |                             |                           |
| Volume Resistivity                             | 2.1 x 10 <sup>12</sup> Ω·cm | 1.4 x 10 <sup>15</sup> Ω·cm | 7.5 x 10 <sup>11</sup> Ω·cm | 3.0 x 10 <sup>13</sup> Ω·cm | 7 x 10 <sup>14</sup> Ω·cm |
| Dielectric Strength @1/8"                      | 376 V/mil                   | 344 V/mil                   | 330 V/mil                   | 345 V/mil                   | 380 V/mil                 |
| Breakdown Voltage @1/8"                        | 47 kV                       | 43.0 kV                     | 41.4 kV                     | 43.1 kV                     | 47 kV                     |
| Dielectric Constant @1 MHz                     | 3.10                        | 2.80                        | 4.50                        | 3.91                        | 3.07                      |
| Dielectric Dissipation @1 MHz                  | 0.010                       | 0.011                       | 0.044                       | 0.019                       | 0.016                     |
| Thermal Properties                             |                             |                             |                             |                             |                           |
| Thermal Conductivity @25 °C                    | 0.79 W/(m·K)                | 0.28 W/(m·K)                | 0.61 W/(m·K)                | 0.94 W/(m·K)                | 0.37 W/(m·K)              |
| Specific Heat Capacity @25 °C                  | 1.5 J/(g·K)                 | TBD                         | 1.4 J/(g·K)                 | 1.3 J/(g·K)                 | 1.2 J/(g·K)               |
| Heat Deflection Temperature                    | TBD                         | TBD                         | TBD                         | TBD                         | 54 °C                     |
| Glass Transition Temperature (T <sub>g</sub> ) | 56 °C                       | 39 °C                       | 0.7 °C                      | 52 °C                       | 51 °C                     |
| CTE prior T <sub>g</sub>                       | 74 ppm/°C                   | 50 ppm/°C                   | 71 ppm/°C                   | 34 ppm/°C                   | 84 ppm/°C                 |
| CTE after T <sub>g</sub>                       | 107 ppm/°C                  | 178 ppm/°C                  | 137 ppm/°C                  | 116 ppm/°C                  | 178 ppm/°C                |
| Constant Service Temperature                   | -40 to 175 °C               | -40 to 175 °C               | -50 to 150 °C               | -50 to 150 °C               | -40 to 175 °C             |
| Maximum Intermittent Temperature               | 200 °C                      | 200 °C                      | 165 °C                      | 165 °C                      | 200 °C                    |

TBD=To be determined

## Available Packaging (kits)



7.4L Kit

10.8L Kit

40L Kit

60L Kit



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