

## Description

The 834ATH *Flame Retardant Epoxy Encapsulating and Potting Compound* is a two-part, economical, electronic-grade, self-extinguishing, flame retardant epoxy that provides excellent physical, chemical, and electrical protection and offers a degree of thermal conductivity.

It protects against static discharges, shocks, vibrations, and mechanical impacts. It is extremely resistant to environmental humidity, salt water, and harsh chemicals. It also helps hide and restrict access to intellectual property, and it much harder to remove than standard epoxy encapsulating compounds.

## Applications & Usages

The 834ATH epoxy is used to pot or encapsulate printed circuit assemblies in a protective block. The cured epoxy improves reliability, operational range, and lengthens the life of electrical and electronic parts.

## Benefits and Features

- **Certified *UL 94V-0*** (File # [E334302](#))
- **Specification Verified as per *UL 746A***
- **Excellent Comparative Tracking Index** (400–599 V, *PLC = 1*)
- **Cost effective**
- **Increased thermal conductivity**
- **Mix ratio 2A:1B** compatible with most dispensing equipment
- **Resistance to water and humidity** allowing submersion if needed
- **Protects electronics from** moisture, corrosion, fungus, thermal shock, and static discharges
- **Free of solvents**



### ENVIRONMENT

- ✓ RoHS
- ✓ REACH compliant

## Curing & Work Schedule

<i>Properties</i>	<i>Value</i>
Working Life <sup>a)</sup>	2 h
Shelf Life	5 y
Full Cure @20 °C [68 °F]	24 h
Full Cure @80 °C [176 °F]	60 min
Full Cure @100 °C [212 °F]	45 min
Storage Temperature of Unmixed Parts	16 to 27 °C [61 to 81 °F]

a) Working life and full cure assumes room temperature and 100g. A 10 °C increase can decrease the pot life by half.

## Service Ranges

<i>Properties</i>	<i>Value</i>
Service Temperature	-30 to +175 °C [-22 to +347 °F]
Max Intermittent Temp. <sup>a)</sup>	-40 to +200 °C [-40 to 392 °F]

b) Maximum short-term exposure temperature toleration limit—not recommended as a sustained or repeated operation condition

## Principal Components

Name	CAS Number
Part A: Epoxide Resin	25068-38-6 + 68609-97-2
Part B: Curing Amide	68410-23-1 + 112-24-3
Aluminum Trihydrate	21645-51-2
1,1-(ethane-1,2-diyl)bis(pentabromobenzene)	84852-53-9
Antimony Trioxide	1309-64-4

## Properties of Cured 834ATH

<i>Physical Properties</i>	<i>Method</i>	<i>Value<sup>a</sup></i>
Color	Visual	Black
Density @25 °C [77 °C]		~1.4 g/cm <sup>3</sup>
Hardness	Shore D	85D
Tensile Elongation	ASTM D 638	6.2%
Tensile Strength	"	28 N/mm <sup>2</sup> [4,100 lb/in <sup>2</sup> ]
Compression Strength	ASTM D 695	99.8 N/mm <sup>2</sup> [14,500 lb/in <sup>2</sup> ]
Tensile Impact	ASTM D 1822	8.4 kJ/m <sup>2</sup> [4.0 ft·lb/in <sup>2</sup> ]
Izod Impact	ASTM D 256	20 J/m
Lap Shear Strength (Al alloy 5052)	ASTM D 1002	14.9 N/mm <sup>2</sup> [2,160 lb/in <sup>2</sup> ]
Flexural Strength	ASTM D 790	51 N/mm <sup>2</sup> [7,400 lb/in <sup>2</sup> ]
Water Absorption (WAB)		0.15%
Linear Dimension Change @after 168 h in water	ASTM D1042	0.0037%
<i>Electric Properties</i>	<i>Method</i>	<i>Value</i>
Breakdown Voltage @1.514 mm	ASTM D 149	33 kV
Dielectric Strength	"	22 kV/mm [550 V/mil]
Breakdown Voltage @3.175 mm [1/8"]	Reference fit <sup>b</sup>	47 kV
Dielectric Strength		15 kV/mm [380 V/mil]
Volume Resistivity @23 °C & 50% RH	ASTM D 257	7 x10 <sup>14</sup> Ω·cm
Volume Resistivity @35 °C & 90% RH	"	2 x10 <sup>14</sup> Ω·cm
Comparative Tracking Index (CTI)	ASTM D 3628	400 V to 599 V Performance Level Class (PCL) = 1
Hot Wire Ignition (HWI)	ASTM D3874	120 s
High Voltage Arc Tracking Rate (HVTR)		121 mm/min
High Voltage Arc Resistance to Ignition (HVAR)		300 s
High Voltage, Low Current, Dry Arc Resistance	ASTM D 495	127 s
High-Current Arc Ignition (HAI)	CSA C22.2	+150 arc

*Note:* Specifications are for epoxy samples cured at 65 °C for 1 hour, with additional curing time at room temperature for optimal results. For most tests, samples were conditioned at 23 °C and 50% RH.

a) N/mm<sup>2</sup> = mPa; lb/in<sup>2</sup> = psi;


b) To allow comparison between products, the Tautscher equation was fitted to five experimental dielectric strengths and interpolated for a standard reference thickness of 1/8" (3.175 mm).

## Properties of Cured 834ATH (*Continued*)

<i>Thermal Properties</i>	<i>Method</i>	<i>Value</i>
Glass Transition Temperature	ASTM D 3481	51 °C [124 °F]
Coefficient of Thermal Expansion		
Below Tg	ASTM E 831	84 ppm/°C
Above Tg	"	178 ppm/°C
Thermal Conductivity @25 °C [77 °C]	ASTM E 1461 92	0.37 W/m·K
Thermal Diffusivity @25 °C [77 °C]	"	2.1 x 10 <sup>-7</sup> m <sup>2</sup> /s
Specific Heat Capacity @25 °C [77 °C]	ASTM E 1269 01	1.2 J/(kg·K)
Heat Deflection Temperature	ASTM D 648	53.7 °C [129 °F]

d) Coefficient of Thermal Expansion (CTE) units are in ppm/°C = in/in/°C × 10<sup>-6</sup> = unit/unit/°C × 10<sup>-6</sup>

## Properties of Uncured 834ATH

<i>Physical Property</i>	<i>Mixture (2A:1B)</i>	
Color	Black	
Viscosity @20 °C [73 °F]	5,900 cP [5.9 Pa·s] <sup>a)</sup>	
Density	1.39 g/mL	
Mix Ratio by weight (A:B)	2.25:1.00	
Mix Ratio by volume (A:B)	2:1	
		
<i>Physical Property</i>	<i>Part A</i>	<i>Part B</i>
Color	Black	Black
Viscosity @24°C [73 °F]	4,600 cP [4.6 Pa·s]	12,900 cP [12.9 Pa·s]
Density	1.40 g/mL	1.26 g/mL
Flash Point	150 °C [302 °F]	185 °C [365 °F]
% solids	~98%	100%
Odor	Mild aromatic	Ammonia like


a) Brookfield viscometer at 50 RPM with spindle LV4



## Compatibility

**Adhesion**—As seen in the substrate adhesion table, the 834ATH epoxy adheres to most materials found on printed circuit assemblies; however, it is not compatible with contaminants like water, oil, and greasy flux residues that may affect adhesion. If contamination is present, clean the printed circuit assembly with electronic cleaner such as MG Chemicals 4050 Safety Wash, 406B Superwash, or 824 Isopropyl Alcohol.

### Substrate Adhesion in Decreasing Order

<i>Physical Properties</i>	<i>Adhesion</i>
Aluminum	<p>Stronger</p>  <p>Weaker</p>
Steel	
Fiberglass	
Wood	
Paper, Fiber	
Glass	
Rubber	
Polycarbonate	
Acrylic	
Polypropylene <sup>a</sup>	

a) Does not bond to polypropylene

## Storage

Store between 16 and 27 °C [60 and 80 °F] in dry area away from sunlight. Prolonged storage or storage at or near freezing temperatures can result in crystallization. If crystallization occurs, reconstitute the component to its original state by temporarily warming it to 50 to 60 °C [122 to 140 °F]. To ensure full homogeneity, stir thoroughly the warm component, reincorporating all settled material. Re-secure container lid and let cool down before use.

## Health and Safety

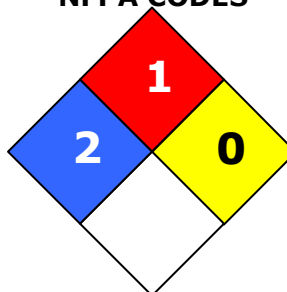
Please see the 834ATH **Material Safety Data Sheet** (MSDS) parts A and B for more details on transportation, storage, handling and other security guidelines.

### Part A

#### HMIS RATING

<b>HEALTH:</b>	<b>2</b>
<b>FLAMMABILITY:</b>	<b>1</b>
<b>PHYSICAL HAZARD:</b>	<b>0</b>
<b>PERSONAL PROTECTION:</b>	

#### NFPA CODES

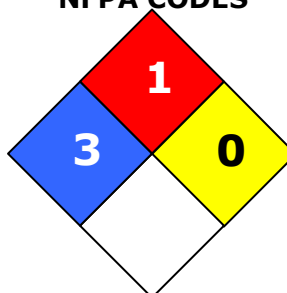


### Part B

#### HMIS RATING

<b>HEALTH:</b>	<b>3</b>
<b>FLAMMABILITY:</b>	<b>1</b>
<b>PHYSICAL HAZARD:</b>	<b>0</b>
<b>PERSONAL PROTECTION:</b>	

#### NFPA CODES



**Health and Safety:** The 834ATH parts can ignite if the liquid is both heated and exposed to flames or sparks.

Wear safety glasses or goggles and disposable polyvinyl chloride, neoprene, or nitrile gloves while handling liquids. Part B in particular causes skin burns and may cause sensitization if exposed over a long period of time. The epoxy is black and will not wash off once cured: wear protective work clothing. Wash hands thoroughly after use or if skin contact occurs. Do not ingest.

Use in well-ventilated area since vapors may cause irritation of the respiratory tract and cause respiratory sensitization in susceptible individuals.

The cured epoxy resin presents no known hazard.

## Application Instructions

Follow the procedure below for best results. If you have little or no experience with the 834ATH epoxy, please follow the long instructions instead. The short instructions provided here are not suitable for first time users.

### To prepare 2:1 (A:B) epoxy mixture

1. Stir and fold the material in the **Part A** container until fully homogenous.
2. With a different stirrer, stir and fold the material in the **Part B** container until fully homogenous.
3. Measure **two** parts by volume (or weight) of pre-stirred **A**, and pour in the mixing container.
4. Measure **one** part by volume (or weight) of pre-stirred **B**, and slowly pour in the mixing container while stirring.
5. Put in a vacuum chamber, bring to 25 Hg/in pressure, and wait for 2 minutes to de-air.  
—OR—  
Let sit for 30 minutes to de-air.
6. If bubbles are present at top, use the mixing paddle to gently break them.
7. Pour mixture into the mold or container containing the components to be encapsulated.

**ATTENTION!** Mixing >500 g [0.4 L] of Part B at a time into A decreases working life and promotes flash cure. Use of epoxy mixing machines with static stirrer recommended for large volumes. Limit size of hand-mixed batches.

### To room temperature cure the 834ATH epoxy

Let stand for 24 hours.

### To heat cure the 834ATH epoxy

Put in oven at 80 °C [176 °F] for 60 minutes.

### **ATTENTION!**

Due to exothermic reaction, heat cure temperatures should be at least 25% below the maximum temperature tolerated by the most fragile PCB component. For larger potting blocks, reduce heat cure temperature by greater margins.



ISO 9001 Registered Quality System.  
Burlington, Ontario, Canada QMI File # 004008

# Flame Retardant Encapsulating & Potting Compound 834ATH Technical Data Sheet

834ATH

## Packaging and Supporting Products

### Product Availability

<i>Cat. No.</i>	<i>Form</i>	<i>Net Volume</i>		<i>Net Weight</i>		<i>Shipping Weight</i>	
<b>834ATH-375ML</b>	Liquid	375 mL	12 fl oz	350 mg	16 oz	0.4 kg	0.9 lb
<b>834ATH-3L</b>	Liquid	3 L	0.8 gal	4.05 kg	7.6 lb	4.5 kg	10 lb
<b>834ATH-60L</b>	Liquid	60 L	16.0 gal	15.32 kg	33.8 lb	16.0 kg	35 lb

### Supporting Products

- 8328 Epoxy and Adhesive Cleaner
- 8329 Epoxy Mold Release (for temperature cures  $\leq 85$  °C)

## Technical Support

Contact us regarding any questions, improvement suggestions, or problems with this product. Application notes, instructions, and FAQs are located at [www.mgchemicals.com](http://www.mgchemicals.com).

Email: [support@mgchemicals.com](mailto:support@mgchemicals.com)

Phone: 1-800-340-0772 Ext. 1030 (Canada, Mexico & USA)

1-905-331-1396 Ext. 1030 (International)

Fax: 1-905-331-2862 or 1-800-340-0773

Mailing address: **Manufacturing & Support**  
1210 Corporate Drive  
Burlington, Ontario, Canada  
L7L 5R6

**Head Office**  
9347-193rd Street  
Surrey, British Columbia, Canada  
V4N 4E7

## Warranty

*M.G. Chemicals Ltd.* warrants this product for 12 months from the date of purchase by the end user. *M.G. Chemicals Ltd.* makes no claims as to shelf life of this product for the warranty. The liability of *M.G. Chemicals Ltd.* whether based on its warranty, contracts, or otherwise shall in no case include incidental or consequential damage.

## Disclaimer

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