

THERMALLY CONDUCTIVE EPOXY

**832TC-PART A**

# Safety Data Sheet

## Section 1: Product and Company Identification

### Product Identifier and Other Means of Identification

**Product Name:** Thermally Conductive Epoxy: Encapsulating and Potting Compound**SDS Code:** 832TC-Part A**Related Part #:** 832TC-450ML, 832TC-2L, 832TC-8L, 832TC-40L

### Recommended Use and Restriction on Use

**Use:** Thermally conductive epoxy resin for use with hardeners to pot devices or encapsulate components**Uses Advised Against:** Not applicable

### Details of Manufacturer or Importer

#### Manufacturer

MG Chemicals  
1210 Corporate Drive  
Burlington, Ontario L7L 5R6  
CANADA

MG Chemicals (Head Office)  
9347-193 Street  
Surrey, British Columbia V4N 4E7  
CANADA

☎ 1-800-340-0772

FAX 1-800-340-0773

E-MAIL: [support@mgchemicals.com](mailto:support@mgchemicals.com)WEB [www.mgchemicals.com](http://www.mgchemicals.com)

☎ 1-905-331-1396

FAX 1-905-331-2682

E-MAIL: [info@mgchemicals.com](mailto:info@mgchemicals.com)E-MAIL (Competent Person): [sds@mgchemicals.com](mailto:sds@mgchemicals.com)

### Emergency Phone Number

**For hazardous material incidents ONLY**—leaks, spills, fires, exposures or accidents  
USA or CANADA: Call CHEMTREC ☎: **1-800-424-9300****For emergencies involving dangerous goods;** Collect 24/7CANADA: Call CANUTEC ☎: **1-613-996-6666** or **\*666** on cellular phones

**THERMALLY CONDUCTIVE EPOXY**

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**Section 2: Hazards Identification**

**Classification of Hazardous Chemical**

**WHMIS Classification**



D2A – Very Toxic (Reproductive toxicant; Carcinogenicity IARC: 2B), D2B – Toxic Material (Skin/Eye Irritation; Skin Sensitization in Humans)

**GHS Categories**

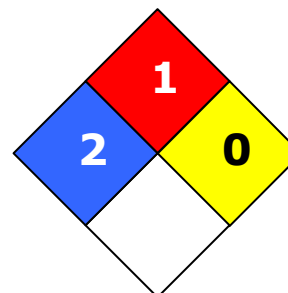
Criteria		Category	Signal Word	Pictograms
Reproductive Toxicity		1	Danger	Health
Eye Irritation		2A	Warning	Exclamation
Skin Irritation		2	Warning	Exclamation
Sensitization	Skin Sensitizer	1	Warning	Exclamation
Environmental Hazard	Chronic Aqua. Tox.	2	Warning	Environmental
Environmental Hazard	Acute Aqua. Tox.	2	—	Environmental

**Other Classifications**

**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® 704 CODES**



*Approximate HMIS and NFPA Risk Ratings Legend:*




0 (Low or none); 1 (Slight); 2 (Moderate); 3 (Serious); 4 (Severe)

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**Label Elements**

<b>Signal Word</b>	<b>DANGER</b>
<b>Pictograms</b>	<b>Hazard Statements</b>
	H360: May damage fertility or the unborn child
	H319: Causes serious eye irritation H317: May cause allergic skin reaction H315: Causes skin irritation
	H411: Toxic to aquatic life with long lasting effects
<b>Prevention</b>	<b>Precautionary Statements</b>
P102	Keep out of reach of children.
P201 + P202	Obtain special instructions before use. Do not handle until all safety precautions have been understood.
P261	Avoid breathing dust/vapors/spray/mist.
P264	Wash thoroughly after handling.
P280	Wear protective gloves/eye protection.
<b>Response</b>	<b>Precautionary Statements</b>
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P302 + P352 + P362 + P364	IF ON SKIN: Wash with plenty of water. Take off contaminated clothing and wash it before reuse.
P337 + P313	If rash occurs or skin or eye irritation persists: Get medical advice/attention.
P308 + P313	If exposed or concerned: Get medical advice/attention.
<b>Storage</b>	<b>Precautionary Statements</b>
P405	Store locked up.

*Continued on the next page*

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<b>Disposal</b>	<b>Precautionary Statements</b>
P391	Collect spillage.  P501: Dispose of contents/container in accordance to local/regional/national/international regulations.

**Other Hazards**

Not applicable

**Section 3: Hazardous Ingredients**

<b>CAS #</b>	<b>Chemical Name</b>	<b>Wt%</b>
28064-14-4	phenyl glycidyl ether/ formaldehyde copolymer	45-55%
1344-28-1	aluminum oxide	45-55%
64741-65-7	naphtha, petroleum, heavy alkylate	0.5-1.5%
1333-86-4	carbon black	0.1-0.5%
872-50-4	1-methyl-2-pyrrolidone	0.1-0.2%

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**Section 4: First Aid Measures**

<i>Exposure Condition</i>	<i>GHS Code: Precautionary Statement</i>
<b>IF IN EYES</b>	P305
<b>Symptoms</b>	Immediate: <i>irritation, redness, pain</i>
<b>Response</b>	P351: Rinse cautiously with water for several minutes. P338: Remove contact lenses, if present and easy to do. Continue rinsing.
<b>If eye irritation persists</b>	P313: Get medical attention.
<b>IF ON SKIN</b>	P302
<b>Symptoms</b>	Immediate: <i>irritation, redness, dry skin;</i> Delayed: <i>rash</i>
<b>Response</b>	P352: Wash with plenty of water. P362+ P364 + P272: Take off contaminated clothing and wash it before reuse. Contaminated work clothing should not be allowed out of the workplace.
<b>If skin irritation/rash occurs, or concerned</b>	P313: Get medical advice/attention.
<b>IF INHALED</b>	P304 ( <i>Not a likely route of exposure under normal use</i> )
<b>Symptoms</b>	Immediate: <i>cough, respiratory system irritation</i>
<b>Response</b>	P340: Remove person to fresh air (out of the contaminated zone) and keep comfortable for breathing.
<b>If exposed or concerned</b>	P313: Get medical advice/attention.
<b>IF SWALLOWED</b>	P301 ( <i>Not a likely route of exposure under normal use</i> )
<b>Symptoms</b>	Immediate: <i>irritation, nausea, vomiting</i>
<b>Response</b>	P330: Rinse mouth. P331: Do NOT induce vomiting.
<b>If exposed or concerned</b>	P313: Get medical advice/attention.

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**Section 5: Fire Fighting Measures**

<b>Auto-ignition Temperature</b>	Not Established	<b>Flash Point</b> <sup>a)</sup>	>190 °C [>374 °F]	<b>LFL [LEL]</b> <sup>b)</sup>	Not Established
				<b>UFL [UEL]</b>	Established

**In case of fire** P370

**Response** P378: Use dry chemical, carbon dioxide, or chemical foam to extinguish. Use water spray to cool containers.

**Combustion Products** Produces CO, CO<sub>2</sub>, aluminum oxides, nitrogen oxides (NO<sub>x</sub>), and phenolic molecules.

**Fire-Fighter** Wear self-contained breathing apparatus for fire fighting.

**General Information** Do not use halocarbon extinguishers.  
Prevent fire-fighting wash from entering waterway or sewer system.

a) Supplier value for the component with the lowest know flash point

b) LFL = Lower Flammability [or Explosion] Limit (in volume %);  
UFL = Upper Flammability [or Explosion] Limit (in volume %)

**Section 6: Accidental Release Measures**

**Personal Protection:** See Section 8. Avoid breathing the mist/vapors.

**Containment** Remove all sources of ignition.

**Cleaning** Collect liquid in a sealable, solvent-resistant container. Sprinkle inert absorbent compound onto spill, then sweep into the container. Wipe up further residue with paper towel wetted with alcohol (or other suitable organic solvent) and place dirty towels in container. Wash spill area with soap and water to remove the last traces of residue.

**RECOMMENDATION:** Use a plastic container.

**Disposal** Dispose of spill waste according to Section 13.

**THERMALLY CONDUCTIVE EPOXY****832TC-PART A****Section 7: Handling and Storage**

- Prevention** P201 + P202: Obtain special instructions before use. Do not handle until all safety precautions have been understood.
- P261 + P271 + P284: Avoid breathing fume/vapors. Use only outdoors or in well ventilated area. In cases of inadequate ventilation wear respiratory protection.
- P262: Do not get in eye, on skin, or on clothing.
- P261: Avoid breathing dust/vapors/spray/mist.
- P270: Do not eat, drink, or smoke when using this product.
- RECOMMENDATION:** Protect from high heat. Do NOT process in a fashion that causes mist or fumes.
- Handling** P280: Wear protective gloves/clothing/eye protection.
- RECOMMENDATION:** Wear neoprene, butyl rubber, nitrile or other impervious gloves with breakthrough time greater than intended use period.
- P264: Wash hands thoroughly after handling.
- P391: Collect spillage.
- Storage** P405: Store locked up.
- RECOMMENDATION:** Keep in a dry and clean area, away from incompatible substances.

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**Section 8: Exposure Controls/Personal Protection**

**Routes of Entry**

Eyes, ingestion, inhalation, and skin

**Substances with Occupational Exposure Limit Values**

Chemical Name	Country	Long Term Exposure Limits (PEL)	Short Term Exposure Limits (STEL)
Alumina <sup>a)</sup>	ACGIH	1 mg/m <sup>3</sup>	—
	U.S.A. OSHA PEL	15 mg/m <sup>3</sup>	—
	Canada AB	10 mg/m <sup>3</sup>	—
	Canada BC	1 mg/m <sup>3</sup>	—
	Canada ON	1 mg/m <sup>3</sup>	—
	Canada QC	10 mg/m <sup>3</sup>	—
Carbon black <sup>a)</sup>	ACGIH	3.5 mg/m <sup>3</sup>	—
	U.S.A. OSHA PEL	3.5 mg/m <sup>3</sup>	—
	Canada AB	3.5 mg/m <sup>3</sup>	—
	Canada BC	3 mg/m <sup>3</sup>	—
	Canada ON	3.5 mg/m <sup>3</sup>	—
	Canada QC	3.5 mg/m <sup>3</sup>	—
1-Methyl-2-pyrrolidone	ACGIH	—	—
	Canada ON	400 mg/m <sup>3</sup>	—

*Note:* Ingredients are listed in descending weight contribution order (from greatest to least). The ACGIH<sup>2</sup>, OSHA, and Canadian provinces exposure limits were consulted. Limits from by RTECS database<sup>1</sup> of the Canadian Centre for Occupational Health and Safety (CCOHS) a data from suppliers' SDS were also consulted. Short term exposure limits (STEL) are usually for 15 min and long term permissible exposure limits (PEL) for 8 h.

a) Respirable airborne particles

**Engineering Controls**

**Ventilation**

Keep airborne concentrations below exposure limits. Because carbon black is bound to the liquid mixture; the airborne hazard is present only if the conditions of use could result in aerosolization or misting.

**RECOMMENDATION:** If the product is heated at high temperatures or worker is allergic, consider using a full mask with organic vapor cartridges.

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**THERMALLY CONDUCTIVE EPOXY****832TC-PART A****Personal Protective Equipment****Eye protection**

Wear appropriate protective eyeglasses or chemical safety goggles.

**RECOMMENDATION:** Use safety glasses with lateral protection (side shields).

**Skin Protection**

Wear appropriate protective clothing to prevent skin contact.

**RECOMMENDATION:** Use of protective gloves in butyl rubber, latex, neoprene, or other chemically resistant gloves.

**Respiratory Protection**

If exposed to vapors, wear respirator such as a half-mask respirator.

**RECOMMENDATION:** Consult your local safety supply store to ensure your respirator has filter cartridges appropriate for the ingredients listed in section 3 of this MSDS, and that the respirator is fitted to the employee by a professional. Ensure vapor cartridges are stored in sealed plastic bags when not being used.

**General Hygiene Considerations**

Wash hands thoroughly with water and soap after handling.

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**Section 9: Physical and Chemical Properties**

<b>Physical State</b>	Liquid	<b>Appearance</b>	Black
<b>Odor</b>	Mild aromatic	<b>Odor Threshold</b>	Not established
<b>pH</b>	Not available	<b>Specific Gravity</b>	1.749
<b>Solubility in Water</b>	Insoluble	<b>Freezing/Melting Point</b>	Not available
<b>Flash Point <sup>a)</sup></b>	>122 °C [>252 °F]	<b>Vapor Pressure @ 20 °C</b>	Not available
<b>Boiling Point</b>	Not available	<b>Evaporation Rate</b>	Not available
<b>Lower Flammability Limit</b>	Not available	<b>Upper Flammability Limit</b>	Not available
<b>Auto-ignition Temperature</b>	Not available	<b>Decomposition Temperature</b>	Not available
<b>Viscosity @25 °C</b>	15 000 cSt	<b>Vapor Density</b>	>1 (Air = 1)
<b>Partition Coefficient</b>	Not established		

a) The closed cup flash point for component with the lowest reported value.

**Section 10: Stability and Reactivity**

<b>Stabilities</b>	Chemically stable at normal temperatures and pressures
<b>Conditions to Avoid</b>	Excessive heat, and incompatible substances. Do not use in a way that forms a mist or aerosolize the product
<b>Incompatibilities</b>	Strong oxidizing agents, strong bases, strong acids, halogenated hydrocarbons
<b>Polymerization</b>	Will not occur
<b>Decomposition</b>	Will not decompose under normal conditions. For thermal decomposition, see combustion products in Section 5

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**Section 11: Toxicological Information**

**Routes of Exposure**

Eyes, ingestion, inhalation, and skin

**Symptoms Summary**

- Eyes** Causes serious eye irritation. May also cause eye redness or pain.
- Skin** May cause mild to moderate skin irritation and allergic skin reactions.
- Inhalation** *Not a likely route of exposure due to low volatility.* Inhalation of vapors or mist may cause irritation to the nose, throat and lung (upper respiratory tract).
- Ingestion** *Not a likely route of exposure.* No acute toxicity effect known. See skin and inhalation symptoms.
- Chronic** Prolonged or repeated exposure to the uncured epoxy resins used may cause dermatitis and sensitization.

**Acute Toxicity (Lethal Exposure Concentrations)**

Chemical Name	LD50 oral	LD50 dermal	LC50 inhalation	TCLo inhalation
phenyl glycidyl ether/ formaldehyde copolymer	4 000 mg/kg Rabbit <sup>a)</sup>	Not available	6 000 mg/kg Rabbit <sup>a)</sup>	Not available
aluminum oxide	Not established	Not established	Not established	Not established
carbon black	>15 g/kg Rat	>3 g/kg Rabbit	Not available	1.6 mg/m <sup>3</sup> 7 h Rat
1-methyl-2-pyrrolidone	3 914 mg/kg Rat	>2 000 mg/kg Rabbit	Not established	400 mg/m <sup>3</sup> 6 h 4 w (intermit.) Rat

*Note:* Representative toxicity data from by RTECS database of the Canadian Centre for Occupational Health and Safety (CCOHS)<sup>1</sup> data from supplier MSDS were also consulted.

a) Supplier MSDS

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<b>Skin corrosion/irritation</b>	Skin irritant
<b>Serious eye damage/irritation</b>	Causes serious eye irritation.
<b>Sensitization</b> (allergic reactions)	The epoxy resin components (CAS# 28064-14-4) may cause skin sensitization in humans
<b>Carcinogenicity</b> (risk of cancer)	<p>The carbon black [1333-86-4] is possibly carcinogenic by airborne routes of exposures. Because the carbon black is bound in a high viscosity epoxy liquid mixture, it is not expected to be available as an airborne hazard (dust, mist, or spray) under normal use.</p> <p>Carbon Black [1333-86-4]</p> <p>IARC Group 2B: Possibly carcinogenic to humans ACGIH A4: Not classified as a human carcinogen CA Prop 65: Listed as a carcinogen NTP: Not listed</p>
<b>Mutagenicity</b> (risk of heritable genetic effects)	No data available
<b>Reproductive Toxicity</b> (risk to sex functions)	Insufficient data for classification
<b>Teratogenicity</b> (risk of fetus malformation)	<p>In Europe, intension for inclusion have been declared for 1-methyl-2-pyrrolidone in the Substance of Very High Concern as a reproductive toxicant.</p> <p>1-methyl-2-pyrrolidone (CAS# 872-50-4)</p> <p>CA Prop 65: Listed as a reproductive toxicant ACGIH: Not listed</p>
<b>STOT-single exposure</b>	No data available
<b>STOT-repeated exposure</b>	No data available
<b>Aspiration hazard</b>	Viscosity at 40 °C is >>20.5 mm <sup>2</sup> /s, thus not classified as aspiration hazard.

**THERMALLY CONDUCTIVE EPOXY****832TC-PART A****Section 12: Ecological Information**

The ecotoxicity of the mixture was estimated by the calculation method using the summation of classified ingredients. The IMDG Code criteria and the raw-material MSDS along with supporting data for the classification of registered substances from the European Chemical Agency database (<http://echa.europa.eu>) were used.

In Europe, similar epoxy resins with CAS# 28064-14-4 are generally classified as category 2 marine pollutant due to LC50 96 h of >1 mg/L but ≤10 mg/L. Chronic toxic effects have been suggested.

**Acute Ecotoxicity**

Category 2

*GHS Code: Hazard Statement*

H401: Toxic to aquatic life

P273: Avoid release to the environment

P391: Collect spillage

**Chronic Ecotoxicity**

Category 3

*GHS Code: Hazard Statement*

H411: Toxic to aquatic life with long lasting effects

P273: Avoid release to the environment

P391: Collect spillage

**Biodegradability**

The content is not readily biodegradable.

**Section 13: Disposal Information**

P501: Dispose of contents in accordance with all local, regional, national, and international regulations.

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**THERMALLY CONDUCTIVE EPOXY****832TC-PART A****Section 14: Transport Information****Ground**

**Refer to TDG regulations** (Canadian Transportation of Dangerous Goods regulations); **USA CFR 49 Regulations** (Parts 100 to 185). **ADR** (European Agreement Concerning the International Carriage of Dangerous Goods by Road, and **ADN** (Agreement Concerning the International Carriage of Dangerous Goods by Inland Waterways).

## Sizes 5 liter and under

**Limited Quantity**

**Note:** The 832TC-450ML, 832TC-2L and 832TC-8L are composed of separate containers which meet this inner packaging limit.



## All sizes greater than 5 liter

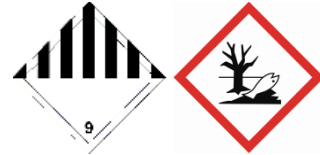
**UN number:** UN3082

**Shipping Name:** ENVIRONMENTALLY HAZARDOUS SUBSTANCE, N.O.S. (Reaction product: bisphenol-F-(epichlorhydrin))

**Class:** 9

**Packing Group:** III

**Marine Pollutant:** Yes

**Air**

**Refer to ICAO-IATA Dangerous Goods Regulations.**

## All sizes

**UN number:** UN3082

**Shipping Name:** ENVIRONMENTALLY HAZARDOUS SUBSTANCE, N.O.S. (Reaction product: bisphenol-f-(epichlorhydrin))

**Class:** 9

**Packing Group:** III

**Marine Pollutant:** Yes

**Pkg Inst:** 964. ERG Code: 9L



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**THERMALLY CONDUCTIVE EPOXY****832TC-PART A****Sea****Refer to IMDG regulations.**

Sizes 5 liter and under

**Limited Quantity**

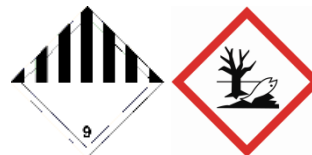
**Note:** The 832TC-450ML, 832TC-2L and 832TC-8L are composed of separate containers which meet this inner packaging limit.



All sizes greater than 5 liter

**UN number:** UN3082

**Shipping Name:** ENVIRONMENTALLY HAZARDOUS SUBSTANCE, N.O.S. (Reaction product: bisphenol-F-(epichlorhydrin))

**Class:** 9**Packing Group:** III**Marine Pollutant:** Yes**EmS#:** F-A, S-F**Stowage and Segregation:** Category A

*Note:* Component supplier SDS transportation sections and labeling were consulted. All involved staff of shipper must be appropriately trained before involvement with the transport of this product, or work under direct supervision of a trained person.

**Section 15: Regulatory Information****Canada****Domestic Substance List (DSL) / Non-Domestic Substance Lists (NDSL)**

All hazardous ingredients are listed on the DSL/NDSL.

**Industry and Science Canada**

MG Labels products intended for the workplace to conform to WHMIS labeling regulations. Product identification, net quantity declaration, minimum printing type size heights, and packaging of this product are in compliance.

**Health Canada**

Products produced by MG Chemicals intended for retail display conform to the Canadian Consumer Labeling Regulations.

**THERMALLY CONDUCTIVE EPOXY****832TC-PART A****USA****CAA** (Clean Air Act, USA)

This product does not contain any class 1 ozone depleting substances.

This product does not contain any class 2 ozone depleting substances.

This product does not contain substances that are listed as hazardous air pollutants.

**EPCRA** (Emergency Planning and Right to Know Act, USA, 40 CFR 372.45)

This product does not contain substance subject to the reporting requirements of section 313 Title III of the SARA of 1986 and 40 CFR part 372.

**TSCA** (Toxic Substances Control Act of 1976, USA)

All substances are TSCA listed.

**California Proposition 65** (Chemicals known to cause cancer or reproductive toxicity, Sept 2, 2011 revision, USA).

This product contains carbon black (CAS# 1333-86-4; airborne, unbound particles of respirable size), which is listed as a carcinogen.

This product contains 1-methyl-2-pyrrolidone (CAS# 872-50-4) is listed as a developmental reproductive toxicant.

**Europe****REACH**

This product contains 1-methyl-2-pyrrolidone (CAS# 872-50-4), for which an intension of inclusion as a Substance of Very High Concern (SVHC) currently exists due to reproductive toxicity concerns.

**RoHS**

This product does not contain any lead, cadmium, mercury, hexavalent chromium, PBB's, or PBDE's, and complies with European RoHS regulations.

**WEEE**

This product is not a piece of electrical or electronics equipment, and is therefore not governed by this regulation.

**Section 16: Other Information**

**MSDS Prepared by** Michel Hachey

**Date of Issue** 14 January 2014

**Supersedes** 18 July 2013

**Reason for Changes:** Correct CAS# for aluminum oxide

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**THERMALLY CONDUCTIVE EPOXY****832TC-PART A****Reference**

- 1) All toxicological data were checked against the RTECS (Registry of Toxic Effects of Chemical Substances®)
- 2) ACGIH 2011 TLVs and BEIs: Based on the documentation of the threshold limit values for chemical substances and physical agents & biological exposure indices, American Conference of Governmental of Industrial Hygienist Cincinnati, OH (2011).

**Abbreviations**

ACGIH American Conference of Governmental Industrial Hygienists  
GHS: Globally Harmonized System of Classification of Labeling of Chemicals  
LC50 Lethal Concentration 50%  
LCLo Lowest published lethal concentration  
LD50 Lethal Dose 50%  
N/A Not Applicable  
N/E Not Estimated  
PEL Permissible Exposure Limit  
STEL Short-Term Exposure Limit  
TCLo Lowest published toxic concentration  
TWA Time Weighted Average  
VOC Volatile Organic Content  
WEEL Workplace Environmental Exposure Levels

**Technical Queries** 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)

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

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

**Disclaimer** This material safety data sheet is provided as an information resource only. *M.G. Chemicals, Ltd.* believes the information contained herein is accurate and compiled from reliable sources. It is the responsibility of the user to query and verify any information seeming suspect where doubt on the validity may exist. The buyer assumes all responsibility of using and handling the product in accordance with local, regional, national, and international regulations.

THERMALLY CONDUCTIVE EPOXY

**832TC-PART B**

# Safety Data Sheet

## Section 1: Product and Company Identification

### Product Identifier and Other Means of Identification

**Product Name:** Thermally Conductive Epoxy: Encapsulating and Potting Compound**SDS Code:** 832TC-Part B**Related Part #:** 832TC-450ML, 832TC-2L, 832TC-8L, 832TC-40L

### Recommended Use and Restriction on Use

**Use:** Thermally conductive epoxy hardener for use with resins to pot devices or encapsulate components**Uses Advised Against:** Not available

### Details of Manufacturer or Importer

#### Manufacturer

MG Chemicals  
1210 Corporate Drive  
Burlington, Ontario L7L 5R6  
CANADA

MG Chemicals (Head Office)  
9347-193 Street  
Surrey, British Columbia V4N 4E7  
CANADA

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☎ 1-905-331-1396

FAX 1-905-331-2682

E-MAIL: [info@mgchemicals.com](mailto:info@mgchemicals.com)E-MAIL (Competent Person): [sds@mgchemicals.com](mailto:sds@mgchemicals.com)

### Emergency Phone Number

**For hazardous material incidents ONLY**—leaks, spills, fires, exposures or accidents  
USA or CANADA: Call CHEMTREC ☎: **1-800-424-9300****For emergencies involving dangerous goods;** Collect 24/7  
CANADA: Call CANUTEC ☎: **1-613-996-6666** or **\*666** on cellular phones

**THERMALLY CONDUCTIVE EPOXY**

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**Section 2: Hazards Identification**




**Classification of Hazardous Chemical**

**WHMIS Classification**



E – Corrosive; D1B Immediately Toxic (Skin Absorption); D2A – Very Toxic (Reproductive toxicant; Carcinogenicity IARC: 2B), D2B – Toxic Material (Skin Sensitization in Humans)

**GHS Categories**

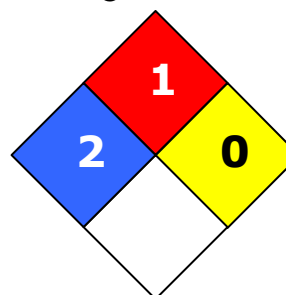
Criteria	Category	Signal Word	Pictograms
Reproductive Toxicity	1	Danger	
Eye Irritation	2A	Warning	
Skin Irritation	2	Warning	
Sensitization	1	Warning	
Environmental Hazard	Chronic Aqua. Tox.	2	
Environmental Hazard	Acute Aqua. Tox.	2	

**Other Classifications**

**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® 704 CODES**



*Approximate HMIS and NFPA Risk Ratings Legend:*




0 (Low or none); 1 (Slight); 2 (Moderate); 3 (Serious); 4 (Severe)

*Continued on the next page*

**THERMALLY CONDUCTIVE EPOXY**

**832TC-PART B**

**Label Elements**

<b>Signal Word</b>	<b>DANGER</b>
<b>Pictograms</b>	<b>Hazard Statements</b>
	H360: May damage fertility or the unborn child
	H319: Causes serious eye irritation H317: May cause allergic skin reaction H315: Causes skin irritation
	H411: Toxic to aquatic life with long lasting effects
	<b>Precautionary Statements</b>
<b>Prevention</b>	P280: Wear protective gloves/eye protection. P261: Avoid breathing vapors/dust/fumes. P264: Wash hands thoroughly after handling. P273: Avoid release to the environment.
<b>Response</b>	P305 + P351 + P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. P302 + P352 + P361 + P364: IF ON SKIN: Wash with plenty of water. Take off immediately all contaminated clothing and wash before reuse. P337 + P313: If eye or skin irritation persists or rash occurs: Get medical advice/attention P362 + P364: Take off contaminated clothing and wash it before reuse
<b>Storage</b>	P405: Store locked up.
<b>Disposal</b>	P391: Collect spillage. P501: Dispose of contents/container in accordance to local/regional/national/international regulations.

**Other Hazards**

Not applicable

**THERMALLY CONDUCTIVE EPOXY****832TC-PART B****Section 3: Hazardous Ingredients**

<b>CAS #</b>	<b>Chemical Name</b>	<b>Wt%</b>
1344-28-1	aluminum oxide (non-fibrous) <sup>a)</sup>	45-55%
68071-65-8	Fatty acids, C18-unstad., dimers, polymers with tall-oil fatty acids, tetraethylenepentamine and triethylenetetramine	25-35%
100-51-6	benzyl alcohol	7-13%
112-24-3	triethylenetetramine	1.5-2.2%
64741-65-7	Naphtha, petroleum, heavy alkylate	0.5-1.5%
108-65-6	2-methoxy-1-methylethyl acetate	0.5-1.5%
1333-86-4	carbon black	0.5-1%
872-50-4	1-methyl-2-pyrrolidone	0.1-0.2%

a) non-hazardous under OSHA-GHS and WHMIS

**THERMALLY CONDUCTIVE EPOXY**

**832TC-PART B**

**Section 4: First Aid Measures**

<i>Exposure Condition</i>	<i>GHS Code: Precautionary Statement</i>
<b>IF IN EYES</b>	P305
<b>Symptoms</b>	Immediate: <i>severe irritation, redness, pain</i>
<b>Response</b>	P351: Rinse cautiously with water for several minutes. P338: Remove contact lenses, if present and easy to do. Continue rinsing.
<b>If eye irritation persists</b>	P313: Get medical advice/attention
<b>IF ON SKIN</b>	P302
<b>Symptoms</b>	Immediate: <i>irritation, redness, dry skin;</i> Delayed: <i>rash</i>
<b>Response</b>	P352: Wash with plenty of water. P362 + P364 + P272: Take off contaminated clothing and wash before reuse. Contaminated work clothing should not be allowed out of the workplace.
<b>If skin irritation or rash occurs, or concerned</b>	P313: Get medical advice/attention
<b>IF INHALED</b>	P304 ( <i>Not a likely route of exposure under normal use</i> )
<b>Symptoms</b>	Immediate: <i>respiratory system irritation, cough</i>
<b>Response</b>	P340: Remove person to fresh air (out of the contaminated zone) and keep comfortable for breathing.
<b>If feeling unwell</b>	P312: Call a POISON CENTRE/doctor
<b>IF SWALLOWED</b>	P301 ( <i>Not a likely route of exposure under normal use</i> )
<b>Symptoms</b>	Immediate: <i>Abdominal pain, irritation, nausea, vomiting, diarrhea</i>
<b>Response</b>	P330: Rinse mouth. P331: Do NOT induce vomiting.
<b>If feeling unwell</b>	P312: Call a POISON CENTRE/doctor

**THERMALLY CONDUCTIVE EPOXY**

**832TC-PART B**

**Section 5: Fire Fighting Measures**

<b>Auto-ignition Temperature</b>	Not Established	<b>Flash Point</b> <sup>a)</sup>	>93 °C [>199 °F]	<b>LFL [LEL]</b> <sup>b)</sup> <b>UFL [UEL]</b>	Not Established
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<b>In case of fire</b>	P370
<b>Response</b>	P378: Use dry chemical, carbon dioxide, or chemical foam to extinguish. Use water spray to cool containers.
<b>Combustion Products</b>	Produces aluminum oxides, carbon oxides (CO, CO <sub>2</sub> ), nitrogen oxides (NO <sub>x</sub> ), and some chlorinated compounds.
<b>Fire-Fighter</b>	Wear self-contained breathing apparatus for fire fighting
<b>General Information</b>	Prevent fire-fighting wash from entering waterway or sewer system.

*Note:* The GHS codes and the GHS precaution statements are used. The format is *GHS Codes: Statements.*

a) Supplier value for the component with the lowest know flash point

b) LFL = Lower Flammability [or Explosion] Limit (in volume %);  
UFL = Upper Flammability [or Explosion] Limit (in volume %)

**Section 6: Accidental Release Measures**

**Personal Protection:** See Section 8. Avoid breathing the mist/vapors.

**Containment** Remove all sources of ignition.

**Cleaning** Collect liquid in a sealable, solvent-resistant container. Sprinkle inert absorbent compound onto spill, then sweep into the container. Wipe up further residue with paper towel wetted with alcohol (or other suitable organic solvent) and place dirty towels in container. Wash spill area with soap and water to remove the last traces of residue.

**RECOMMENDATION:** Use a plastic container.

**Disposal** Dispose of spill waste according to Section 13.

**THERMALLY CONDUCTIVE EPOXY****832TC-PART B****Section 7: Handling and Storage**

**Prevention** P261: Avoid breathing vapors/dust/fumes.

P270: Do not eat, drink, or smoke when using this product.

**RECOMMENDATION:** Protect from high heat. Do NOT process in a fashion that causes mist or fumes.

**Handling** P280: Wear protective gloves/clothing/eye protection.

**RECOMMENDATION:** Wear neoprene, butyl rubber, nitrile or other impervious gloves with breakthrough time greater than intended use period.

P264: Wash hands thoroughly after handling.

**Storage** P403 + P233+ P235: Keep Container tightly closed. Store in a well-ventilated area. Keep cool.

**RECOMMENDATION:** Keep in a dry and clean area, away from incompatible substances.



**THERMALLY CONDUCTIVE EPOXY**
**832TC-PART B**
**Section 8: Exposure Controls/Personal Protection**
**Routes of Entry**

Eyes, ingestion, inhalation, and skin

**Substances with Occupational Exposure Limit Values**

Chemical Name	Country	Long Term Exposure Limits (PEL)	Short Term Exposure Limits (STEL)
Alumina <sup>a)</sup>	ACGIH	1 mg/m <sup>3</sup>	—
	U.S.A. OSHA PEL	15 mg/m <sup>3</sup>	—
	Canada AB	10 mg/m <sup>3</sup>	—
	Canada BC	1 mg/m <sup>3</sup>	—
	Canada ON	1 mg/m <sup>3</sup>	—
	Canada QC	10 mg/m <sup>3</sup>	—
Triethylenetetramine	ACGIH	—	—
	U.S.A. (WEEL)	1 ppm	—
	Canada ON <sup>a)</sup>	0.5 ppm	—
2-methoxy-1-methylethyl acetate	ACGIH	—	—
	U.S.A. (WEEL)	100 ppm	—
	Canada BC Canada ON	50 ppm 50 ppm	75 ppm —
Carbon black <sup>a)</sup>	ACGIH	3.5 mg/m <sup>3</sup>	—
	U.S.A. OSHA PEL	3.5 mg/m <sup>3</sup>	—
	Canada AB	3.5 mg/m <sup>3</sup>	—
	Canada BC	3 mg/m <sup>3</sup>	—
	Canada ON	3.5 mg/m <sup>3</sup>	—
	Canada QC	3.5 mg/m <sup>3</sup>	—
1-Methyl-2-pyrrolidone	ACGIH	—	—
	Canada ON	400 mg/m <sup>3</sup>	—

*Note:* Ingredients are listed in descending weight contribution order (from greatest to least). The ACGIH<sup>2</sup>, OSHA, and Canadian provinces exposure limits were consulted. Limits from by RTECS database<sup>1</sup> of the Canadian Centre for Occupational Health and Safety (CCOHS) a data from suppliers' SDS were also consulted. Short term exposure limits (STEL) are for 15 min and long term permissible exposure limits (PEL) for 8 h.

a) Skin—can be absorbed through the skin.

*Continued on the next page*

**THERMALLY CONDUCTIVE EPOXY****832TC-PART B****Engineering Controls****Ventilation**

Keep airborne concentrations below exposure limits. Because carbon black is bound to the liquid mixture; the airborne hazard is present only if the conditions of use could result in aerosolization or misting.

**RECOMMENDATION:** If the product is heated at high temperatures or worker is allergic, consider using a full mask with organic vapor cartridges.

**Personal Protective Equipment****Eye protection**

Wear appropriate protective eyeglasses or chemical safety goggles.

**RECOMMENDATION:** Use safety glasses with lateral protection (side shields).

**Skin Protection**

Wear appropriate protective clothing to prevent skin contact.

**RECOMMENDATION:** Use of protective gloves in butyl rubber, latex, neoprene, or other chemically resistant gloves.

**Respiratory Protection**

If exposed to vapors, wear respirator such as a half-mask respirator.

**RECOMMENDATION:** Consult your local safety supply store to ensure your respirator has filter cartridges appropriate for the ingredients listed in section 3 of this MSDS, and that the respirator is fitted to the employee by a professional. Ensure vapor cartridges are stored in sealed plastic bags when not being used.

**General Hygiene Considerations**

Wash hands thoroughly with water and soap after handling.

**THERMALLY CONDUCTIVE EPOXY**

**832TC-PART B**

**Section 9: Physical and Chemical Properties**

<b>Physical State</b>	Liquid	<b>Appearance</b>	Black
<b>Odor</b>	Slight aromatic	<b>Odor Threshold</b>	Not established
<b>pH</b>	Not available	<b>Specific Gravity</b>	1.75
<b>Solubility in Water</b>	Insoluble	<b>Freezing/Melting Point</b>	Not available
<b>Flash Point</b> <sup>a)</sup>	>93 °C [>199 °F]	<b>Vapor Pressure</b> <sup>b)</sup> <b>@ 20 °C</b>	<0.1 kPa [<1 mmHg]
<b>Boiling Point</b>	Not available	<b>Evaporation Rate</b>	Not available
<b>Lower Flammability Limit</b>	Not available	<b>Upper Flammability Limit</b>	Not available
<b>Auto-ignition Temperature</b>	Not available	<b>Decomposition Temperature</b>	Not available
<b>Viscosity @25 °C</b>	9 400 cSt	<b>Vapor Density</b>	>1 (Air = 1)
<b>Partition Coefficient</b>	Not available		

a) The closed cup flash point for component with the lowest reported value.

b) Based on supplier value of main hardener system

**Section 10: Stability and Reactivity**

<b>Stabilities</b>	Chemically stable at normal temperatures and pressures
<b>Conditions to Avoid</b>	Excessive heat, moisture, and incompatible substances. Do not use in a way that forms a mist or aerosolize the product
<b>Incompatibilities</b>	Strong oxidizing agents, strong acids, strong bases, halogenated hydrocarbons
<b>Polymerization</b>	Will not occur
<b>Decomposition</b>	Will not decompose under normal conditions. For thermal decomposition, see combustion products in Section 5

**THERMALLY CONDUCTIVE EPOXY****832TC-PART B****Section 11: Toxicological Information****Routes of Exposure**

Eyes, ingestion, inhalation, and skin

**Symptoms Summary**

<b>Eyes</b>	Causes severe eye irritation. Also causes eye redness and pain.
<b>Skin</b>	May cause moderate skin irritation. May cause rash due to allergic skin reactions. Triethylenetetramine and 1-methyl-2-pyrrolidone can be absorbed through skin leading to toxic effects.
<b>Inhalation</b>	<p>Inhalation of vapors or mist may cause irritation to the nose, throat and lung (upper respiratory tract).</p> <p>When heated, hot triethylenetetramine vapors may also result in itching of the face with skin redness (erythema) and swelling (edema).</p>
<b>Ingestion</b>	<i>Not a likely route of exposure. See skin and inhalations symptoms.</i>
<b>Chronic</b>	Prolonged or repeated exposure to the uncured epoxy hardener may cause sensitization (allergies).

**THERMALLY CONDUCTIVE EPOXY**
**832TC-PART B**
**Acute Toxicity (Lethal Exposure Concentrations)**

<b>Chemical Name</b>	<b>LD50 oral</b>	<b>LD50 dermal</b>	<b>LC50 inhalation</b>	<b>TCLo inhalation</b>
aluminum oxide	Not established	Not established	Not established	Not established
fatty acids, C18-unsatd., dimers, ... (CAS# 68071-65-8)	Not established	Not established	Not established	Not established
benzyl alcohol	1 230 mg/kg Rat	2 000 mg/kg Rabbit	Not established	Not established
triethylenetetramine	2 500 mg/kg Rat	805 mg/kg Rabbit	Not established	Not established
naphtha, petroleum, heavy alkylate	Not established	Not established	Not established	Not established
2-methoxy-1-methylethyl acetate	8 532 mg/kg Rat	>5 g/kg Rabbit	Not established	1 105 mg/m <sup>3</sup> 4 h Rat
carbon black	>15 g/kg Rat	>3 g/kg Rabbit	Not established	1.6 mg/m <sup>3</sup> 7 h Rat
1-methyl-2-pyrrolidone	3914 mg/kg Rat	>2 000 mg/kg Rabbit	Not established	400 mg/m <sup>3</sup> 6 h 4 w (intermit.) Rat

Note: Representative toxicity data from by RTECS database of the Canadian Centre for Occupational Health and Safety (CCOHS)<sup>1</sup> data from supplier MSDS were also consulted.

a) Supplier MSDS

**Skin corrosion/irritation** Triethylenetetramine (CAS# 112-24-3) can cause skin burns.

**Serious eye damage/irritation** Triethylenetetramine (CAS# 112-24-3) can cause severe eye damage.

**Sensitization**  
(allergic reactions) The epoxy hardener components (CAS# 68071-65-8 and 112-24-3) may cause skin sensitization in humans

*Continued on the next page*

**THERMALLY CONDUCTIVE EPOXY****832TC-PART B****Carcinogenicity**

(risk of cancer)

Carbon black [1333-86-4] is possibly carcinogenic by airborne routes of exposures. Because the carbon black is bound in a high viscosity epoxy liquid mixture, it is not expected to be available as an airborne hazard (dust, mist, or spray) under normal use.

Carbon Black [1333-86-4]

IARC Group 2B: Possibly carcinogenic to humans

ACGIH A4: Not classified as a human carcinogen

CA Prop 65: Listed as a carcinogen

NTP: Not listed

**Mutagenicity**

(risk of heritable genetic effects)

No data available

**Reproductive Toxicity**

(risk to sex functions)

Insufficient data for classification

**Teratogenicity** (risk of fetus malformation)

In Europe, intension for inclusion have been declared for 1-methyl-2-pyrrolidone in the Substance of Very High Concern as a reproductive toxicant.

1-methyl-2-pyrrolidone (CAS# 872-50-4)

CA Prop 65: Listed as a reproductive toxicant

ACGIH: Not listed

**STOT-single exposure**

No data available

**STOT-repeated exposure**

No data available

**Aspiration hazard**

Viscosity at 40 °C is  $\gg 20.5 \text{ mm}^2/\text{s}$ , thus not classified as aspiration hazard.

**THERMALLY CONDUCTIVE EPOXY****832TC-PART B****Section 12: Ecological Information**

The ecotoxicity of the mixture was estimated by the calculation method using the summation of classified ingredients. The IMDG Code criteria and the raw-material MSDS along with supporting data for the classification of registered substances from the European Chemical Agency database (<http://echa.europa.eu>) were used.

The fatty acids, C18-unsatd., dimers, oligomeric reaction products with tall-oil fatty acids, tetraethylenepentamine and triethylenetetramine (CAS# 68071-65-8) was classified as an acute category 2 environmental toxicant due to supplier report of moderate toxicity to aquatic organism (LC50 range of 1–10 mg/L).

Literature for the Triethylenetetramine (CAS # 112-24-3) suggest low aquatic toxicity (LC50, IC50, and EC50 values of >100 mg/L for fish and between 10 and 100 for algae).

**Acute Ecotoxicity**

Category 2

*GHS Code: Hazard Statement*

H401: Toxic to aquatic life

P273: Avoid release to the environment

P391: Collect spillage

**Chronic Ecotoxicity**

Category 3

*GHS Code: Hazard Statement*

H412: Harmful to aquatic life with long lasting effects

P273: Avoid release to the environment

P391: Collect spillage

**Biodegradability**

The content is not readily biodegradable.

**Section 13: Disposal Information**

P501: Dispose of contents in accordance with all local, regional, national, and international regulations.

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**THERMALLY CONDUCTIVE EPOXY****832TC-PART B****Section 14: Transport Information****Ground**

**Refer to TDG regulations** (Canadian Transportation of Dangerous Goods regulations); **USA CFR 49 Regulations** (Parts 100 to 185). **ADR** (European Agreement Concerning the International Carriage of Dangerous Goods by Road, and **ADN** (Agreement Concerning the International Carriage of Dangerous Goods by Inland Waterways).

Sizes 5 liter and under

**Limited Quantity**

**Note:** The 832TC-450ML, 832TC-4L and 832TC-8L are composed of separate containers which meet this inner packaging limit.



All sizes greater than 5 liter

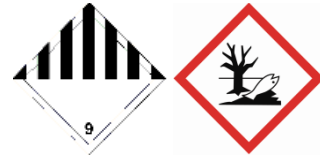
**UN number:** UN3082

**Shipping Name:** ENVIRONMENTALLY HAZARDOUS SUBSTANCE, N.O.S. (Reaction product: tall oil/triethylenetetramine/tetraethylenepentamine)

**Class:** 9

**Packing Group:** III

Marine Pollutant: Yes

**Air**

**Refer to ICAO-IATA Dangerous Goods Regulations.**

All sizes

**UN number:** UN3082

**Shipping Name:** ENVIRONMENTALLY HAZARDOUS SUBSTANCE, N.O.S. (Reaction product: tall oil/triethylenetetramine/tetraethylenepentamine)

**Class:** 9

**Packing Group:** III

**Marine Pollutant:** Yes

**Pkg Inst:** 964. ERG Code: 9L



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**THERMALLY CONDUCTIVE EPOXY****832TC-PART B****Sea**

Refer to IMDG regulations.

Sizes 5 liter and under

**Limited Quantity**

**Note:** The 832TC-450ML, 832TC-2L and 832TC-8L are composed of separate containers which meet this inner packaging limit.



All sizes greater than 5 liter

**UN number:** UN3082

**Shipping Name:** ENVIRONMENTALLY HAZARDOUS SUBSTANCE, N.O.S. (Reaction product: tall oil/triethylenetetramine/tetraethylenepentamine)

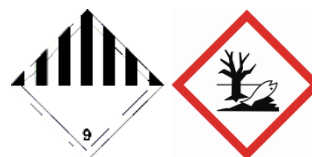
**Class:** 9

**Packing Group:** III

**Marine Pollutant:** Yes

**EmS#:** F-A, S-F

**Stowage and Segregation:** Category A



*Note:* Component supplier SDS transportation sections and labeling were consulted. All involved staff of shipper must be appropriately trained before involvement with the transport of this product, or work under direct supervision of a trained person.

**Section 15: Regulatory Information****Canada****Domestic Substance List (DSL) / Non-Domestic Substance Lists (NDSL)**

All hazardous ingredients are listed on the DSL/NDSL.

**Industry and Science Canada**

MG Labels products intended for the workplace to conform to WHMIS labeling regulations. Product identification, net quantity declaration, minimum printing type size heights, and packaging of this product are in compliance.

**Health Canada**

Products produced by MG Chemicals intended for retail display conform to the Canadian Consumer Labeling Regulations.

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**THERMALLY CONDUCTIVE EPOXY****832TC-PART B****USA****CAA** (Clean Air Act, USA)

This product does not contain any class 1 ozone depleting substances.

This product does not contain any class 2 ozone depleting substances.

This product does not contain substances that are listed as hazardous air pollutants.

**EPCRA** (Emergency Planning and Right to Know Act, USA, 40 CFR 372.45)

This product does not contain substance subject to the reporting requirements of section 313 Title III of the SARA of 1986 and 40 CFR part 372.

**TSCA** (Toxic Substances Control Act of 1976, USA)

All substances are TSCA listed.

**California Proposition 65** (Chemicals known to cause cancer or reproductive toxicity, Sept 2, 2011 revision, USA).

This product contains carbon black (CAS# 1333-86-4; airborne, unbound particles of respirable size), which is listed as a carcinogen.

This product contains 1-methyl-2-pyrrolidone (CAS# 872-50-4) is listed as a developmental reproductive toxicant.

**Europe****REACH**

This product contains 1-methyl-2-pyrrolidone (CAS# 872-50-4), for which an intension of inclusion as a Substance of Very High Concern (SVHC) currently exists due to reproductive toxicity concerns.

**RoHS**

This product does not contain any lead, cadmium, mercury, hexavalent chromium, PBB's, or PBDE's, and complies with European RoHS regulations.

**WEEE**

This product is not a piece of electrical or electronics equipment, and is therefore not governed by this regulation.

**THERMALLY CONDUCTIVE EPOXY****832TC-PART B****Section 16: Other Information**

**MSDS Prepared by** Michel Hachey  
**Date of Issue** 18 July 2013  
**Supersedes** 27 January 2011  
**Reason for Changes:** Change to GHS format

**Reference**

- 1) All toxicological data were checked against the RTECS (Registry of Toxic Effects of Chemical Substances®)
- 2) ACGIH 2011 TLVs and BEIs: Based on the documentation of the threshold limit values for chemical substances and physical agents & biological exposure indices, American Conference of Governmental of Industrial Hygienist Cincinnati, OH (2011).

**Abbreviations**

ACGIH American Conference of Governmental Industrial Hygienists  
GHS: Globally Harmonized System of Classification of Labeling of Chemicals  
LC50 Lethal Concentration 50%  
LCLo Lowest published lethal concentration  
LD50 Lethal Dose 50%  
N/A Not Applicable  
N/E Not Estimated  
PEL Permissible Exposure Limit  
STEL Short-Term Exposure Limit  
TCLo Lowest published toxic concentration  
TWA Time Weighted Average  
VOC Volatile Organic Content  
WEEL Workplace Environmental Exposure Levels

**Technical Queries** 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).

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**THERMALLY CONDUCTIVE EPOXY****832TC-PART B**

**Disclaimer** This material safety data sheet is provided as an information resource only. *M.G. Chemicals, Ltd.* believes the information contained herein is accurate and compiled from reliable sources. It is the responsibility of the user to query and verify any information seeming suspect where doubt on the validity may exist. The buyer assumes all responsibility of using and handling the product in accordance with local, regional, national, and international regulations.