

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

☎ 1-800-340-0772

FAX 1-800-340-0773

E-MAIL: support@mgchemicals.comWEB www.mgchemicals.com

☎ 1-905-331-1396

FAX 1-905-331-2682

E-MAIL: info@mgchemicals.comE-MAIL (Competent Person): 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

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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

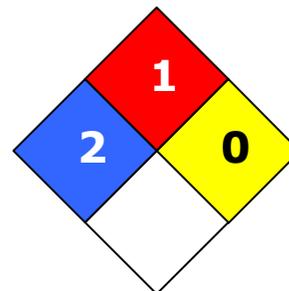
Criteria	Category	Signal Word	Pictograms
Reproductive Toxicity	1	Danger	
Eye Irritation	2A	Warning	
Skin Irritation	2	Warning	
Sensitization	1	Warning	
Environmental Hazard	Chronic Aqua. Tox.	2	
Environmental Hazard	Acute Aqua. Tox.	2	

Other Classifications

HMIS® RATING

HEALTH:	2
FLAMMABILITY:	1
PHYSICAL HAZARD:	0
PERSONAL PROTECTION:	

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

Signal Word	DANGER
Pictograms	Hazard Statements
	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
	Precautionary Statements
Prevention	P280: Wear protective gloves/eye protection. P261: Avoid breathing vapors/dust/fumes. P264: Wash hands thoroughly after handling. P273: Avoid release to the environment.
Response	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
Storage	P405: Store locked up.
Disposal	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**

CAS #	Chemical Name	Wt%
1344-28-1	aluminum oxide (non-fibrous) ^{a)}	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

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Section 4: First Aid Measures

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

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Section 5: Fire Fighting Measures

Auto-ignition Temperature	Not Established	Flash Point ^{a)}	>93 °C [>199 °F]	LFL [LEL] ^{b)} UFL [UEL]	Not Established
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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 aluminum oxides, carbon oxides (CO, CO ₂), nitrogen oxides (NO _x), and some chlorinated compounds.
Fire-Fighter	Wear self-contained breathing apparatus for fire fighting
General Information	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.

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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.

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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 ^{a)}	ACGIH	1 mg/m ³	—
	U.S.A. OSHA PEL	15 mg/m ³	—
	Canada AB	10 mg/m ³	—
	Canada BC	1 mg/m ³	—
	Canada ON	1 mg/m ³	—
	Canada QC	10 mg/m ³	—
Triethylenetetramine	ACGIH	—	—
	U.S.A. (WEEL)	1 ppm	—
	Canada ON ^{a)}	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 ^{a)}	ACGIH	3.5 mg/m ³	—
	U.S.A. OSHA PEL	3.5 mg/m ³	—
	Canada AB	3.5 mg/m ³	—
	Canada BC	3 mg/m ³	—
	Canada ON	3.5 mg/m ³	—
	Canada QC	3.5 mg/m ³	—
1-Methyl-2-pyrrolidone	ACGIH	—	—
	Canada ON	400 mg/m ³	—

Note: Ingredients are listed in descending weight contribution order (from greatest to least). The ACGIH², OSHA, and Canadian provinces exposure limits were consulted. Limits from by RTECS database¹ 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.

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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.

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Section 9: Physical and Chemical Properties

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

Stabilities	Chemically stable at normal temperatures and pressures
Conditions to Avoid	Excessive heat, moisture, and incompatible substances. Do not use in a way that forms a mist or aerosolize the product
Incompatibilities	Strong oxidizing agents, strong acids, strong bases, halogenated hydrocarbons
Polymerization	Will not occur
Decomposition	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

Eyes	Causes severe eye irritation. Also causes eye redness and pain.
Skin	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.
Inhalation	<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>
Ingestion	<i>Not a likely route of exposure. See skin and inhalations symptoms.</i>
Chronic	Prolonged or repeated exposure to the uncured epoxy hardener may cause sensitization (allergies).

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Acute Toxicity (Lethal Exposure Concentrations)

Chemical Name	LD50 oral	LD50 dermal	LC50 inhalation	TCLo inhalation
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 ³ 4 h Rat
carbon black	>15 g/kg Rat	>3 g/kg Rabbit	Not established	1.6 mg/m ³ 7 h Rat
1-methyl-2-pyrrolidone	3914 mg/kg Rat	>2 000 mg/kg Rabbit	Not established	400 mg/m ³ 6 h 4 w (intermit.) Rat

Note: Representative toxicity data from by RTECS database of the Canadian Centre for Occupational Health and Safety (CCOHS)¹ 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

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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.

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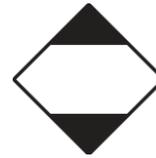
THERMALLY CONDUCTIVE EPOXY**832TC-PART B****Section 14: Transport Information****Ground**

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

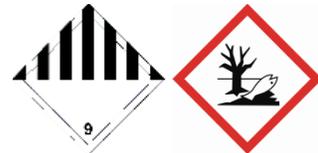
UN number: UN3082

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



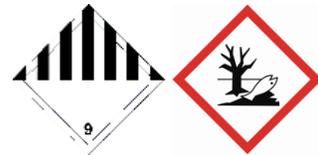
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THERMALLY CONDUCTIVE EPOXY**832TC-PART B****Sea****Refer to IMDG regulations.**

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.

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

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