

Safety Data Sheet

Section 1: Identification

Product Identifier and Other Means of Identification

Product Name: Medium Cure Thermally Conductive Adhesive

SDS Code: 8329TCM-Part B

Related Part # 8329TCM-6ML, 8329TCM-50ML, 8329TCM-200ML

Recommended Use and Restriction on Use

Use: Thermally conductive adhesive for bonding and thermal management


Uses Advised Against: Not for use as a spray coating

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

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 +1-905-331-1396

FAX +1-905-331-2682

E-MAIL info@mgchemicals.com

E-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

MEDIUM CURE THERMALLY CONDUCTIVE ADHESIVE
8329TCM-PART B
Section 2: Hazard(s) Identification
Classification of the Chemical Material
GHS Categories

Criteria		Category	Signal Word	Pictograms
Serious Eye Damage		1	Danger	Corrosion
Skin Corrosion		1B	Danger	Corrosion
Sensitization	Skin	1	Warning	Exclamation
Specific target organ toxicity	Repeated Exposure	2	Warning	Health
Reproductive Toxicity		2	Warning	Health
Hazardous to the Aquatic Environment	Chronic	1	Warning	Environment


Note: The degree of severity is ranked within each hazard class from 1 (Highest Severity) to up to 5 (Lowest Severity), which is opposite to HMIS and NFPA conventions. Severity category rankings do not allow comparisons between classes.

Label Elements

Signal Word	DANGER
Pictograms	Hazard Statements
	H314: Causes severe skin burns and eye damage
	H317: May cause an allergic skin reaction
	H373: May cause damage to organs (liver, muscles) through prolonged or repeated exposure H361: Suspected of damaging fertility or the unborn child

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Continued ...

Pictograms	Hazard Statements
	H410: Very toxic to aquatic life with long lasting effects
Prevention	Precautionary Statements
P102	Keep out of reach of children.
P260	Do not breathe fumes/vapors.
P201 + P202	Obtain special instructions before use. Do not handle until all safety precautions have been read and understood.
P280	Wear protective gloves/protective clothing/eye protection.
P264	Wash hands thoroughly after handling.
P272	Contaminated work clothing should not be allowed out of the workplace.
P273	Avoid release to the environment.
Response	Precautionary Statements
P310	Immediately call a POISON CENTER/doctor.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].
P333 + P313	If skin irritation or rash occurs: Get medical advice/attention.
P363	Wash contaminated clothing before reuse.
P301 + P330 + P331	IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P304 + P340	IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P391	Collect spillage.
Storage	Precautionary Statements
P405	Store locked up.
Disposal	Precautionary Statements
P501	Dispose of contents/container in accordance to local/regional/international regulations.

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MEDIUM CURE THERMALLY CONDUCTIVE ADHESIVE
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Hazards Not Otherwise Classified

Other Criteria	Hazard Statements/Precautionary Statement	Signal Word	Pictograms
Metal fume fever	When the product is exposed to very high heat such as welding or when mechanically aerosolized, this may cause harmful zinc oxide and aluminum oxide fumes.	None	None

Section 3: Composition/Information on Ingredients

CAS #	Chemical Name	%(weight)
1344-28-1	aluminium oxide	35-45%
1314-13-2	zinc oxide	30-40%
25154-52-3	nonylphenol	10%
1761-71-3	4,4'-methylenebis(cyclohexylamine)	2%
112-24-3	triethylenetetramine	0.5%
1333-86-4	carbon black	0.4%

Section 4: First-Aid Measures

<i>Exposure Condition</i>	<i>GHS Code: Precautionary Statement</i>
IF IN EYES	P305 + P351 + P338, P310
Immediate Symptoms	<i>redness, severe irritation, pain, burns</i>
Response	Rinse cautiously with water for 30 minutes or more. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/doctor.
IF ON SKIN (or hair)	P303 + P361 + P533, P310, P333 + P313, P363
Immediate or Delayed Symptoms	<i>redness, irritation, rash (allergic contact dermatitis), pain, chemical burns, blistering</i>
Response	Take off immediately all contaminated clothing. Wash with plenty of water [shower]. Immediately call a POISON CENTRE/doctor. If skin irritation or rash occurs: Get medical advice/attention. Wash contaminated clothing before reuse.

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IF INHALED	P304 + P340, P310
Immediate Symptoms	<i>cough, irritation of the respiratory track, burning sensation</i>
Delayed Symptoms	<i>asthma, difficulty breathing</i>
Response	Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/doctor.
IF SWALLOWED	P301 + P330 + P331, P310
Immediate Symptoms	<i>Irritation, abdominal pain, nausea, vomiting, burns to the digestive tract</i>
Response	Rinse mouth. Do not induce vomiting. Immediately call a POISON CENTER/doctor.

Advice to Physicians

In case of exposure to nitrogen oxides (NO_x) combustion products or triethylenetetramine vapors during a fire, the symptoms may be delayed. For significant exposures, the exposed person should be kept under medical surveillance for 48 hours.

Section 5: Fire-Fighting Measures

Extinguishing Media	Use dry chemical, carbon dioxide, or chemical foam to extinguish. Use water spray to cool containers.
Specific Hazards	Not flammable or combustible, but burns if involved in a fire. Produces irritating and toxic fumes in fires or in contact with hot surfaces. Inhalation of zinc oxide and aluminum oxide fumes may cause metal fever and irritate the respiratory tract. The flu-like symptoms of metal fever may be delayed, occurring 4 to 12 hours after exposure. Toxic for aquatic environment: Prevent fire-fighting wash from entering waterway or sewer system.
Combustion Products	Produces carbon oxides (CO, CO ₂), nitrogen oxides (NO _x), boron oxides, and toxic metal fumes.
Fire-Fighter	Wear self-contained breathing apparatus and full fire-fighting turn-out gear.

Section 6: Accidental Release Measures

Personal Protection	Use personal protection recommended in Section 8.
Precautions for Response	Do not breathe the fumes/vapors.
Environmental Precautions	Avoid releasing to the environment. Prevent spill from entering drains and waterways. Do not flush to sewer.
Containment Methods	Contain with inert absorbent (such as soil, sand, vermiculite).
Cleaning Methods	Collect liquid in a sealable container. Sprinkle inert absorbent compound onto spill, then sweep into the container. Wipe residue with a paper towel wetted with a suitable organic solvent such as alcohol or ethyl lactate, and place dirty towels in container. Wash spill area with soap and water to remove the last traces of residue.
Disposal Methods	Dispose spill waste according to Section 13.

Section 7: Handling and Storage

Prevention	Keep out of reach of children. Do not breathe fumes/vapors. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Contaminated work clothing should not be allowed out of the workplace. Do not eat, drink, or smoke when using this product. Avoid release to the environment.
Handling	Wear protective gloves/protective clothing/eye protection/face protection. Take off contaminated clothing and wash it before reuse. Wash hands thoroughly after handling. Collect spillage.
Storage	Store locked up.

MEDIUM CURE THERMALLY CONDUCTIVE ADHESIVE
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Section 8: Exposure Controls/Personal Protection
Substances with Occupational Exposure Limit Values

Chemical Name	Country or Vendor	Long Term Exposure Limits (PEL)	Short Term Exposure Limits (STEL)
aluminum metal and insoluble compounds ^{a)}	ACGIH U.S.A. OSHA PEL Canada AB Canada BC Canada ON Canada QC	1 mg/m ³ 15 mg/m ³ 10 mg/m ³ 1 mg/m ³ 1 mg/m ³ 10 mg/m ³	Not established Not established Not established Not established Not established Not established
zinc oxide (dust/mist)	ACGIH U.S.A. OSHA PEL Canada AB Canada BC Canada ON Canada QC	2 mg/m ³ 2 mg/m ³ 2 mg/m ³ 2 mg/m ³ 2 mg/m ³	Not established 10 mg/m ³ 10 mg/m ³ 10 mg/m ³ 10 mg/m ³ 10 mg/m ³
triethylenetetramine	ACGIH U.S.A. OSHA PEL U.S.A (WEEL) Canada AB Canada BC Canada ON Canada QC	Not established Not established 1 ppm Not established Not established 0.5 mg/m ³ (Skin) ^{a)} Not established	Not established Not established Not established Not established Not established Not established Not established
carbon black ^{a)}	ACGIH U.S.A. OSHA PEL Canada AB Canada BC Canada ON Canada QC	3.5 mg/m ³ 3.5 mg/m ³ 3.5 mg/m ³ 3 mg/m ³ 3.5 mg/m ³ 3.5 mg/m ³	Not established Not established Not established Not established Not established Not established

Note: The ACGIH¹, OSHA (Table Z-1), and Canadian provinces exposure limits were consulted. Limits from the RTECS database² and 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) As respirable airborne particles.

Engineering Controls
Ventilation

Keep airborne concentrations below exposure limits. Please note that the aluminum oxide, zinc oxide, and carbon black are inextricably bound to the adhesive mixture; therefore, they are not available as airborne hazard under normal or foreseeable condition of use.

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MEDIUM CURE THERMALLY CONDUCTIVE ADHESIVE**8329TCM-PART B****Personal Protective Equipment****Eye protection**

Wear appropriate protective eyeglasses or chemical safety goggles.

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

Skin Protection

For likely contacts, use of protective butyl rubber, neoprene, or other chemically resistant gloves.

For incidental contacts, use nitrile or other chemically resistant gloves.

Respiratory Protection

For over-exposures up to 10 x OEL of mist/vapors/spray, wear respirator such as a half-mask respirator with organic vapor cartridges.

Above 10 x OEL, use a positive-pressure, air-supplied respirator or a self-contained breathing apparatus.

If the product is heated or worker has a known allergic reaction, consider using a full mask with organic vapor cartridge or with an independent air supply.

RECOMMENDATION: Consult your local safety supply store to ensure that your respirator has a NIOSH (U.S.) approved filter cartridges appropriate for the ingredients listed in Section 3. The respirator should be 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 use.

MEDIUM CURE THERMALLY CONDUCTIVE ADHESIVE
8329TCM-PART B
Section 9: Physical and Chemical Properties

Physical State	Solid	Lower Flammability Limit	Not available
Appearance	Dark grey	Upper Flammability Limit	Not available
Odor	Amine-like	Vapor Pressure @20 °C	Not available
Odor Threshold	Not available	Vapor Density	Not available
pH	Not available	Specific Gravity @25 °C	2.38
Freezing/Melting Point	Not available	Solubility in Water	Insoluble
Boiling Point	Not available	Partition Coefficient	Not available
Flash Point ^{a)}	222 °C [432 °F]	Auto-ignition Temperature	Not available
Evaporation Rate	Not available	Decomposition Temperature	Not available
Flammability (solid, gas)	Not available	Viscosity @25 °C	6 000 000 cP [6 000 Pa·s]

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

Section 10: Stability and Reactivity

Reactivity	Reacts exothermically with ketones, halogenated hydrocarbons, cyanides, nitriles, and epoxides. May attack metals such as aluminum, zinc, copper, and their alloys.
Chemical Stability	Chemically stable at normal temperatures and pressures
Conditions to Avoid	Avoid excessive heat and incompatible substances. Do not use in a way that forms a mist or aerosolizes the product.
Incompatibilities	Strong oxidizing agents, strong acids
Polymerization	Will not occur
Decomposition	For thermal decomposition, see combustion products in Section 5.

Section 11: Toxicological Information

Routes of Exposure

Eye Contact, Skin contact, Inhalation, and Ingestion

Symptoms Summary

Eyes	May cause chemical burns. Also can cause eye irritation, redness or pain.
Skin	May cause redness, serious skin irritation, allergic contact dermatitis, and chemical burns. Triethylenetetramine can be absorbed through skin leading to toxic effects. When heated, hot triethylenetetramine vapors may also result in itching of the face with skin redness (erythema) and swelling (edema).
Inhalation	Inhalation of vapors or mist may cause irritation to the nose, throat and lung (upper respiratory tract).
Ingestion	May cause severe irritation or corrosive burns to the mouth, throat, esophagus, and stomach. May cause allergic reactions. (See inhalation symptoms.)
Chronic	Prolonged and repeated exposure to uncured epoxy hardener may lead to skin sensitization.

Lethal Exposure Concentrations

Chemical Name	LD50 oral	LD50 dermal	LC50 inhalation
aluminum oxide	Not established	Not established	Not established
zinc oxide	7 950 mg/kg Rat	Not established	2 500 mg/m ³ Mouse
nonylphenol	589 mg/kg Rat	2 140 mg/kg Rabbit	Not established
4,4'-methylenebis (cyclohexylamine)	Not established	Not established	400 mg/m ³ mouse
triethylenetetramine	2 500 mg/kg Rat	805 g/kg Rabbit	Not established

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Continued ...

Chemical Name	LD50 oral	LD50 dermal	LC50 inhalation
carbon black	>15.4 g/kg Rat	>3 g/kg Rabbit	Not established

Note: Toxicity data from the RTECS² and ECHA databases were consulted. The data from supplier (M)SDS were also consulted.

Other Toxicological Effects

Skin corrosion/irritation Nonylphenol, 4,4'-Methylenebis(cyclohexylamine), and triethylenetetramine causes severe skin burns.

Serious eye damage/irritation Triethylenetetramine causes severe eye damage.

Respiratory and skin sensitization (allergic reactions) 4,4'-Methylenebis(cyclohexylamine) and triethylenetetramine may cause skin sensitization according to animal studies.

Carcinogenicity (risk of cancer) The carbon black [1333-86-4] is possibly carcinogenic by airborne routes of exposures under WHMIS.
Because the carbon black is bound in the epoxy liquid mixture, it is not 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 (airborne, as unbound particles of respirable size)

NTP: Not listed

Mutagenicity (risk of heritable genetic effects) Based on available data, the classification criteria are not met.

Reproductive Toxicity (risk to sex functions) Based on available data, the classification criteria are not met.

Teratogenicity (risk of fetus malformation) Nonylphenol is suspected of being a human reproductive toxicant. It is listed as a category 2 reproductive toxicant in the EU CLP harmonized list.

STOT-single exposure Based on available data, the classification criteria are not met.

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MEDIUM CURE THERMALLY CONDUCTIVE ADHESIVE**8329TCM-PART B****STOT-repeated exposure**

4,4'-Methylenebis(cyclohexylamine) is suspected of causing muscle disorder and liver damage in workers based on rat studies.

Aspiration hazard

There are no category 1 components, and the kinematic viscosity is >20.5 mm²/s at 40 °C.

Section 12: Ecological Information

Ecological classifications are based on the IMDG/GHS criteria in conjunction with ecotoxicological data from our suppliers, the European Chemical Agency database (<http://echa.europa.eu>), and other reliable sources.

Contains zinc oxide which is an acute and chronic category 1 solid (non-biodegradable, minimal LC50 of 0.042 mg/L) that is very toxic to the aquatic environment.

Nonylphenol is classified as a category 1 chronic aquatic toxicant (minimal LC50 0.128 mg/L).

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

Based on available data, aluminum oxide, boron nitride, and carbon black are not classified as environmental hazard according to GHS criteria.

Acute Ecotoxicity

Category 1

Very toxic to aquatic life

Chronic Ecotoxicity

Category 1

Very toxic to aquatic life with long lasting effects

Avoid release to the environment. Collect spillage.

Biodegradability

Not readily biodegradable

Bioaccumulation

Not available

Other Effects

Not available

MEDIUM CURE THERMALLY CONDUCTIVE ADHESIVE
8329TCM-PART B
Section 13: Disposal Considerations

Dispose of contents in accordance with all local, provincial, state, and federal regulations.

Section 14: Transport Information
Ground

Refer to TDG regulations (Canadian Transportation of Dangerous Goods regulations);
USA DOT 49 CFR (Parts 100 to 185) **Regulations.**

Sizes 1 kg and under

Part B of 8329TCM-6ML, 8329TCM-50ML, and 8329TCM-500ML kits

Limited Quantity



Sizes greater than 1 kg

For Reference Only

UN number: UN3259

Shipping Name: AMINES, SOLID, CORROSIVE, n.o.s. ((nonylphenol; 4,4'-(Methylenebis(cyclohexylamine)))

Class: 8

Packing Group: II

Marine Pollutant: Yes


Air

Refer to ICAO-IATA Dangerous Goods Regulations.

Sizes 30 g and under

Part B of 8329TCM-6ML kit

Excepted Quantity

Document as class E2

Refer to Package Mark 2.6.7.1 in **IATA** for further instruction



Sizes 0.5 kg and under ^{a)}

Part B of 8329TCM-50ML and 8329TCM-500ML kits

Limited Quantity

Max Net QTY/Pkg = 5 kg



a) Inner packaging net quantity per S.P. Y844. Total net quantity per package is 5.0 kg.

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MEDIUM CURE THERMALLY CONDUCTIVE ADHESIVE
8329TCM-PART B
Sea
Refer to IMDG regulations.

Sizes 30 g and under

Part B of 8329TCM-6ML kit
Excepted Quantity

Document as class E2


 Sizes 1 kg and under ^{a)}
Part B of 8329TCM-50ML and 8329TCM-500ML kits
Limited Quantity

Max Net QTY/Pkg = 400 kg



Note: Shipper must be appropriately trained and certified before involvement with the transport of dangerous goods.

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

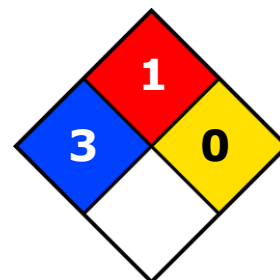
All hazardous ingredients are listed on the DSL/NDSL.

Hazardous Products Act (R.S.C., 1985, c. H-3)

The safety data sheet and label comply with the Hazardous Product Act and WHMIS 2015.

USA
Other Classifications
HMIS® RATING

HEALTH:	* 3
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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MEDIUM CURE THERMALLY CONDUCTIVE ADHESIVE**8329TCM-PART B****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 contains aluminum oxide (CAS# 1344-28-1), which is 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, but it is bound and exposures during normal conditions of uses are below the Safe Harbor Threshold.

Europe**RoHS** (Restriction of Hazardous Substances Directive)

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

WEEE (Waste Electrical and Electronic Equipment Directive)

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

Section 16: Other Information

SDS Prepared by	Michel Hachey
Date of Revision	26 Jun 2017
Supersedes	09 May 2017
Reason for Changes:	Clarification provided in transport section 14

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MEDIUM CURE THERMALLY CONDUCTIVE ADHESIVE**8329TCM-PART B****Reference**

- 1) ACGIH 2013 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 (2013).
- 2) All toxicological data were checked against the RTECS (Registry of Toxic Effects of Chemical Substances®)

Abbreviations

ACGIH	American Conference of Governmental Industrial Hygienists (USA)
EC50	Half maximal effective concentration
EL50	Half maximal effective loading
IARC	International Agency for Research on Cancer
NOELR	No observable effect loading ratio
NTP	National Toxicology Program
GHS	Globally Harmonized System of Classification of Labeling of Chemicals
LC50	Lethal Concentration 50%
LCLo	Lowest published lethal concentration
LD50	Lethal Dose 50%
OEL	Occupational Exposure Limit
PEL	Permissible Exposure Limit
SDS	Safety Data Sheet
STEL	Short-Term Exposure Limit
TCLo	Lowest published toxic concentration
TWA	Time Weighted Average
VOC	Volatile Organic Content

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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