

MEDIUM CURE, THERMAL CONDUCTIVE ADHESIVE 8329TCM-PART A

Safety Data Sheet

Section 1: Identification

Product Identifier and Other Means of Identification

Product Name: Medium Cure, Thermal Conductive Adhesive

SDS Code: 8329TCM-Part A

Related Part # 8329TCM-6ML, 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

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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, THERMAL CONDUCTIVE ADHESIVE 8329TCM-PART A

Section 2: Hazard(s) Identification

Classification of Hazardous Chemical

GHS Categories

Criteria		Category	Signal Word	Pictograms
Sensitization	Skin sensitizer	1	Warning	Exclamation
Eye Irritation		2	Warning	Exclamation
Skin Irritation		2	Warning	Exclamation
Environmental Hazard	Chronic Aqua. Tox.	1	Warning	Environment

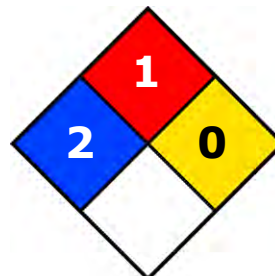
Note: The degree of severity is ranked within each hazard class from 1 (Highest Severity) to up to 5 (Lowest Severity), which is opposite to HMIS and NFPA conventions. Severity category rankings do not allow comparisons between classes.

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)

Section continued on the next page

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Label Elements

Signal Word	WARNING
Pictograms	Hazard Statements
	H319: Causes serious eye irritation H315: Causes skin irritation H317: May cause an allergic skin reaction
	H410: Very toxic to aquatic life with long lasting effects
Prevention	Precautionary Statements
P102	Keep out of reach of children.
P261	Avoid breathing fumes/mist/vapors.
P280	Wear protective gloves/eye protection/face protection.
P272	Contaminated work clothing should not be allowed out of the workplace.
P264	Wash hands thoroughly after handling.
P273	Avoid release to the environment.
Response	Precautionary Statements
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337 + P313	If eye irritation persists: Get medical advice/attention.
P302 + P352	IF ON SKIN: Wash with plenty of water.
P333 + P313	If skin irritation or rash occurs: Get medical advice/attention.
P362 + P364	Take off contaminated clothing and wash it before reuse.
P391	Collect spillage.
Storage	Precautionary Statements
<i>none</i>	<i>none</i>
Disposal	Precautionary Statements
P501	Dispose of contents/container in accordance to local/regional/international regulations.

Section continued on the next page

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Hazards Not Otherwise Classified

Other Criteria	Hazard Statements/Precautionary Statement	Signal Word	Pictograms
Defats skin	Repeated exposure may cause skin dryness or cracking.	None	None
Metal fumes fever	When exposed to extreme heat, this product may produce 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	10-30%
25068-38-6	bisphenol-A epoxy resin (reaction product)	17%
28064-14-4	epoxy phenol novalac resin	5%
17557-23-2	neopentyl glycol diglycidyl ether	3%
1333-86-4	carbon black	0.7%
68609-97-2	alkyl glycidyl ether	0.5%

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Section 4: First-Aid Measures

<i>Exposure Condition</i>	<i>GHS Code/Symptoms/Precautionary Statements</i>
IF IN EYES	P305 + P351 + P338, P337 + P313
Immediate Symptoms	<i>redness, irritation, pain</i>
Response	Rinse cautiously with water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention.
IF ON SKIN	P302 + P352, P333 + P313, P362 + P364
Immediate or Delayed Symptoms	<i>redness, irritation, dry skin, allergic contact dermatitis</i>
Response	Wash with plenty of water. If skin irritation or rash occurs: Get medical advice/attention. Take off contaminated clothing and wash it before reuse.
IF INHALED	P304 + P340, P312, P308 + P313
Immediate Symptoms	<i>cough, irritation of the respiratory track</i>
Response	Remove person to fresh air and keep comfortable for breathing. IF exposed or concerned: Get medical advice/attention.
IF SWALLOWED	P301 + P330, P331
Immediate Symptoms	<i>Irritation</i>
Response	Rinse mouth. Do NOT induce vomiting.

MEDIUM CURE, THERMAL CONDUCTIVE ADHESIVE 8329TCM-PART A**Section 5: Fire-Fighting Measures**

In case of fire	P370 + P378
Extinguishing Media	Use dry chemical, carbon dioxide, chemical foam, or water spray to extinguish.
Specific Hazards	<p>Not flammable or combustible, but burns if involved in a fire. Produces irritating smoke of unknown toxicity in fires.</p> <p>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.</p> <p>Prevent fire-fighting wash from entering waterway or sewer system.</p>
Combustion Products	Produces carbon oxides (CO, CO ₂), nitrogen oxides, boron oxides, and 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	See personal protection recommendations in Section 8.
Precautions for Response	Avoid breathing the fumes/mist/vapors. Remove or keep away all sources of extreme heat or open flames.
Environmental Precautions	Avoid releasing to the environment. Prevent spill from entering drains and waterways.
Containment Methods	Contain with inert and non-flammable absorbent (such as soil, sand, vermiculite).
Cleaning Methods	Collect liquid in a sealable, chemical-resistant container. Sprinkle inert absorbent compound onto spill, then sweep into the container. Wash residue with a paper towel wetted with alcohol, ethyl lactate, or another suitable organic solvent; and place dirty towels in container. Use soap and water to remove the last traces of residue.
Disposal Methods	Dispose of spill waste according to Section 13.

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Section 7: Handling and Storage

- Prevention** Keep out of reach of children.
 Avoid breathing fumes/mist/vapors or contact with skin or eyes.
 Avoid release to the environment.
- Handling** Wear protective gloves/clothing/eye protection.
 Contaminated work clothing should not be allowed out of the workplace.
 Wash hands thoroughly after handling.
 Collect spillage.
- Storage** Store container tightly closed.

Section 8: Exposure Controls/Personal Protection
Routes of Entry

Skin contact, Inhalation, and Eye contact

Substances with Occupational Exposure Limit Values

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

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Note: The ACGIH¹, OSHA, and Canadian provinces exposure limits were consulted. Limits from by RTECS database² 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 the occupational exposure limits (OEL).

Because the zinc oxide, aluminum oxide, and carbon black are inextricably bound to the adhesive mixture; therefore they are not available as airborne hazards under normal use. Ensure adequate ventilation if the product is mechanically misted or aerosolized.

Personal Protective Equipment**Eye protection**

Wear appropriate protective eyeglasses or chemical safety goggles.

Recommendation: Ensure that glasses have side shields for lateral protection.

Skin Protection

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

For incidental contacts, use latex, neoprene 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 your respirator has filter cartridges appropriate for the ingredients listed in section 3 of this SDS, and that the respirator is fitted to the employee by a professional.

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	Lower Flammability Limit	Not available
Appearance	Dark grey	Upper Flammability Limit	Not available
Odor	Slight	Vapor Pressure @20 °C	Not available
Odor Threshold	Not available	Vapor Density	Not available
pH	Not available	Specific Gravity @25 °C	2.48
Freezing/Melting Point	Not available	Solubility in Water	Insoluble
Boiling Point	Not available	Partition Coefficient	Not available
Flash Point ^{a)}	>149°C [>300 °F]	Auto-ignition Temperature	Not available
Evaporation Rate	Not available	Decomposition Temperature	Not available
Flammability (solid, gas)	Not available	Viscosity @25 °C	1 300 000 cP [1 300 Pa·s]

a) The closed cup flash point values are based on the epoxy phenol novolac resin component.

Section 10: Stability and Reactivity

Reactivity	Reacts exothermically with amines.
Chemical Stability	Chemically stable at normal temperatures and pressures
Conditions to Avoid	Avoid ignition sources, open flames, and incompatible substances. Do not use in away that forms mist or aerosolizes the product.
Incompatibilities	Avoid strong oxidizing agents, strong acids, strong bases, ammonia, ethylene oxide, flax oils, and halogenated compounds.
Polymerization	Will not occur
Decomposition	Will not decompose under normal conditions. For thermal decomposition, see combustion products in Section 5.

MEDIUM CURE, THERMAL CONDUCTIVE ADHESIVE 8329TCM-PART A
Section 11: Toxicological Information
Routes of Exposure

Skin contact, Inhalation, and Eye contact

Symptoms Summary

Eyes	May cause redness, severe irritation, or pain.
Skin	May cause skin redness, irritation, dry skin, or allergic contact dermatitis.
Inhalation	May cause cough and respiratory irritation.
Ingestion	No acute oral toxicity effects known (see inhalation symptoms).
Chronic	Prolonged and repeated exposure may lead to skin sensitization.

Acute Toxicity (Lethal Exposure Concentrations)

Chemical Name	LD50 oral	LD50 dermal	LC50 inhalation
aluminum oxide	>5 000 mg/kg Rat ^{a)}	Not established	Not established
zinc oxide	7 950 mg/kg Mouse	Not established	2 500 mg/m ³ Mouse
bisphenol-A epoxy resin (reaction product)	11 400 mg/kg Rat	Not available	Not available
epoxy phenol novolac resin	Not established	Not established	Not established
neopentyl glycol diglycidyl ether	2 000 mg/kg Rat ^{a)}	2 150 mg/kg Rabbit ^{a)}	Not established
carbon black	>15.4 g/kg Rat	>3 g/kg Rabbit	Not established
alkyl glycidyl ether	19 200 mg/kg Rat	4 500 mg/kg Rat	Not available

Note: Toxicity data from the RTECS database accessed through the Canadian Centre for Occupational Health and Safety (CCOHS)² were consulted. The data from supplier (M)SDS were also consulted.

a) Supplier MSDS

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MEDIUM CURE, THERMAL CONDUCTIVE ADHESIVE 8329TCM-PART A**Other Toxicological Effects****Skin corrosion/irritation**

Moderate skin irritant.

Serious eye damage/irritation

Causes serious eye irritation. Contains mechanically abrasive particles.

Sensitization
(allergic reactions)

Skin sensitizer based on animal studies on the epoxy components

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 and emergency conditions.

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)

Not classifiable due to lack of data.

Reproductive Toxicity
(risk to sex functions)

Not classifiable due to lack of data.

Teratogenicity (risk of fetus malformation)

Not classifiable due to lack of data.

STOT-single exposure

Not classifiable due to lack of data.

STOT-repeated exposure

Not classifiable due to lack of data.

Aspiration hazardBased on available data, the classification criteria are not met. There is no category 1 components, and the kinematic viscosity is $>20.5 \text{ mm}^2/\text{s}$ at $40 \text{ }^\circ\text{C}$.

MEDIUM CURE, THERMAL CONDUCTIVE ADHESIVE 8329TCM-PART A**Section 12: Ecological Information**

The IMDG Code criteria, the raw-material safety data sheets, and supporting data from the European Chemical Agency database (<http://echa.europa.eu>) were used to support the classification.

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 aquatic life.

In Europe, similar epoxy resin mixtures with CAS# 28064-14-4 and CAS# 25068-38-6 are generally classified as chronic category 2 marine pollutant due to LC50 96 h of >1 mg/L but ≤10 mg/L.

Based on available data, aluminum oxide, neopentyl glycol diglycidyl ether, carbon black and alkyl glycidyl ether 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

Section 13: Disposal Information

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

MEDIUM CURE, THERMAL CONDUCTIVE ADHESIVE 8329TCM-PART A

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 5 kg and under

Limited Quantity



Sizes greater than 5 kg

UN number: UN3077

Shipping Name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.
(Zinc oxide; reaction products of bisphenol-A and epoxy resin number average molecular weight ≤700; epoxy phenol novolac resin)

Class: 9

Packing Group: III

Marine Pollutant: Yes



Air

Refer to ICAO-IATA Dangerous Goods Regulations.

Sizes 30 g and under

Excepted Quantity

Document as class **E1**

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



Sizes greater than 30 g up to 30 kg

Limited Quantity

UN number: UN3077

Shipping Name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.
(Zinc oxide; reaction products of bisphenol-A and epoxy resin number average molecular weight ≤700; epoxy phenol novolac resin)

Class: 9

Packing Group: III

Marine Pollutant: Yes



Section continued on the next page

MEDIUM CURE, THERMAL CONDUCTIVE ADHESIVE 8329TCM-PART A

Sea

Refer to IMDG regulations.

Sizes 5 kg and under

Limited Quantity



Sizes greater than 5 kg

UN number: UN3077

Shipping Name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.
(Zinc oxide; reaction products of bisphenol-A and epoxy resin number average molecular weight ≤ 700 ; epoxy phenol novolac resin)

Class: 9

Packing Group: III

Marine Pollutant: Yes



Sizes 30 g and under

Excepted Quantity

Document as class **E1**

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

Section 15: Regulatory Information

Canada

WHMIS 1988 Classification



D2B – Toxic Other (Skin Sensitizer, Eye and Skin Irritant)

Domestic Substance List (DSL) / Non-Domestic Substance Lists (NDSL)

All hazardous ingredients are listed on the DSL.

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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MEDIUM CURE, THERMAL CONDUCTIVE ADHESIVE 8329TCM-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 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, June 06, 2014 revision, USA).

This product contains carbon black, which is listed as a carcinogenic substances when airborne, as unbound particles of respirable size.

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

This product does not contain any lead, cadmium, mercury, hexavalent chromium, PBB's, or PBDE's, 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 Review 01 June 2015

Supersedes 14 January 2013

Reason for Changes: Changes to better meet HCS 2012 and WHMIS 2.0 requirements. Small formulation change due to raw material supplier composition declaration.

Section continued on the next page

MEDIUM CURE, THERMAL CONDUCTIVE ADHESIVE 8329TCM-PART A**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.

Email: support@mgchemicals.com

Mailing Addresses *Manufacturing & Support*
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Surrey, British Columbia, Canada
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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.

MEDIUM CURE, THERMAL CONDUCTIVE ADHESIVE 8329TCM-PART B

Safety Data Sheet

Section 1: Identification**Product Identifier and Other Means of Identification****Product Name:** Medium Cure, Thermal Conductive Adhesive**SDS Code:** 8329TCM-Part B**Related Part #** 8329TCM-6ML, 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
CANADAMG 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**WEB** www.mgchemicals.com**☎** +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 accidentsUSA 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

MEDIUM CURE, THERMAL 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 sensitizer	1	Warning	Exclamation
Specific target organ toxicity	Repeated Exposure	2	Warning	Health
Reproductive Toxicity		2	Warning	Health
Environmental Hazard	Chronic Aqua. Tox.	1	Warning	Environment

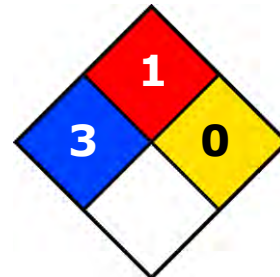
Note: The degree of severity is ranked within each hazard class from 1 (Highest Severity) to up to 5 (Lowest Severity), which is opposite to HMIS and NFPA conventions. Severity category rankings do not allow comparisons between classes.

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, THERMAL CONDUCTIVE ADHESIVE 8329TCM-PART B
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
	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/mist/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.

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MEDIUM CURE, THERMAL CONDUCTIVE ADHESIVE 8329TCM-PART B

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Response	Precautionary Statements
P305 + P351 + P338, P310	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/doctor.
P303 + P361 + P353, P310	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower]. Immediately call a POISON CENTER/doctor.
P333 + P313 P363	If skin irritation or rash occurs: Get medical advice/attention. Wash contaminated clothing before reuse.
P301 + P330 + P331, P310	IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. Immediately call a POISON CENTER/doctor.
P304 + P340, P310	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/doctor.
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.

Hazards Not Otherwise Classified

Not available

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%

MEDIUM CURE, THERMAL CONDUCTIVE ADHESIVE 8329TCM-PART B
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 + P353, 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.
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 (NOx) 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.

MEDIUM CURE, THERMAL CONDUCTIVE ADHESIVE 8329TCM-PART B**Section 5: Fire-Fighting Measures**

In case of fire	P370 + P378
Extinguishing Media	Use dry chemical, carbon dioxide, or chemical foam to extinguish. Use water spray to cool containers.
Specific Hazards	<p>Not flammable or combustible, but burns if involved in a fire. Produces irritating and toxic fumes in fires or in contact with hot surfaces.</p> <p>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.</p> <p>Toxic for aquatic environment: Prevent fire-fighting wash from entering waterway or sewer system.</p>
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/mist/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.

MEDIUM CURE, THERMAL CONDUCTIVE ADHESIVE 8329TCM-PART B**Section 7: Handling and Storage****Prevention**

Keep out of reach of children.

Do not breathe fumes/mist/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.

Section 8: Exposure Controls/Personal Protection**Routes of Entry**

Eye Contact, Skin Contact, Inhalation, Ingestion

Section continued on the next page

MEDIUM CURE, THERMAL CONDUCTIVE ADHESIVE 8329TCM-PART B
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 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, and Canadian provinces exposure limits were consulted. Limits from by RTECS database² 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) As respirable airborne particles.

Section continued on the next page

MEDIUM CURE, THERMAL CONDUCTIVE ADHESIVE 8329TCM-PART B**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.

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 your respirator has a NIOSH (U.S.) approved filter cartridges appropriate for the ingredients listed in section 3 of this SDS, 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 with water and soap after use.

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

Physical State	Liquid	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 aerosolize the product.
Incompatibilities	Strong oxidizing agents, strong acids
Polymerization	Will not occur
Decomposition	For thermal decomposition, see combustion products in Section 5.

MEDIUM CURE, THERMAL CONDUCTIVE ADHESIVE 8329TCM-PART B

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	Not established	2 500 mg/m ³
nonylphenol	589 mg/kg	2 140 mg/kg	Mouse
boron nitride	50 000 mg/kg	Rabbit	established
4,4'-methylenebis (cyclohexylamine)	Not established	Rabbit	Not established
triethylenetetramine	2 500 mg/kg	805 g/kg	400 mg/m ³
carbon black	Rat	Rabbit	mouse
	>15.4 g/kg	>3 g/kg	Not established
	Rat	Rabbit	established

Note: Representative toxicity data from by RTECS database² of the Canadian Centre for Occupational Health and Safety (CCOHS) data from supplier (M)SDS were also consulted.
a) Supplier MSDS

Section continued on the next page

MEDIUM CURE, THERMAL CONDUCTIVE ADHESIVE 8329TCM-PART B**Other Toxicological Effects**

Skin corrosion/irritation	Nonylphenol, 4,4'-Methylenebis(cyclohexylamine), and triethylenetetramine causes severe skin burns.
Serious eye damage/irritation	Nonylphenol, 4,4'-Methylenebis(cyclohexylamine), and 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)	<p>The carbon black [1333-86-4] is possibly carcinogenic by airborne routes of exposures under WHMIS.</p> <p>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.</p> <p>Carbon Black [1333-86-4]</p> <p>IARC Group 2B: Possibly carcinogenic to humans</p> <p>ACGIH A4: Not classified as a human carcinogen</p> <p>CA Prop 65: Listed as a carcinogen (airborne, as unbound particles of respirable size)</p> <p>NTP: Not listed</p>
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.
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.
STOT-repeated exposure	4,4'-Methylenebis(cyclohexylamine) is suspected of causing muscle disorder and liver damage in workers based on rat studies.
Aspiration hazard	Based on available data, the classification criteria are not met. There is no category 1 components, and the kinematic viscosity is >20.5 mm ² /s at 40 °C.

MEDIUM CURE, THERMAL CONDUCTIVE ADHESIVE 8329TCM-PART B**Section 12: Ecological Information**

The IMDG Code criteria and the raw-material (M)SDS along with supporting data for the classification of registered substances from the European Chemical Agency database (<http://echa.europa.eu>) were used.

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

Section 13: Disposal Considerations

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

MEDIUM CURE, THERMAL CONDUCTIVE ADHESIVE 8329TCM-PART B
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 5 kg and under

Limited Quantity


Sizes greater than 5 kg

UN number: UN3259

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

Class: 8

Packing Group: III

Marine Pollutant: Yes

Air

Refer to ICAO-IATA Dangerous Goods Regulations.

Sizes 30 g and under

Excepted Quantity

 Document as class **E1**

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


Sizes greater than 30 g up to 5 kg

Limited Quantity
UN number: UN3259

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

Class: 8

Packing Group: III

Marine Pollutant: Yes

Section continued on the next page

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

Sizes 5 kg and under

Limited Quantity


Sizes greater than 5 kg

UN number: UN3259

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

Class: 8

Packing Group: III

Marine Pollutant: Yes


Sizes 30 g and under

Excepted Quantity

 Document as class **E1**

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

Section 15: Regulatory Information
Canada
WHMIS 1988 Classification


E – Corrosive (Chemical burns); D1B – Toxic (Skin Absorption);
D2B – Toxic Other (Skin Sensitizer)

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.

Section continued on the next page

MEDIUM CURE, THERMAL CONDUCTIVE ADHESIVE 8329TCM-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 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, which is listed as a carcinogenic substances when airborne, as unbound particles of respirable size.

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

This product does not contain any lead, cadmium, mercury, hexavalent chromium, PBB's, or PBDE's, 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	01 June 2015
Supersedes	14 January 2013

Reason for Changes: Changes to better meet HCS 2012 and WHMIS 2015 requirements.

Section continued on the next page

MEDIUM CURE, THERMAL 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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