

MEDIUM CURE THERMALLY CONDUCTIVE ADHESIVE, FLOWABLE 8329TFM-PART A

Safety Data Sheet

Section 1: Identification

Product Identifier and Other Means of Identification

Product Name: Medium Cure Thermally Conductive Adhesive, Flowable**SDS Code:** 8329TFM-Part A**Related Part #** 8329TFM-25ML, 8329TFM-50ML

Recommended Use and Restriction on Use

Use: Thermally conductive adhesive resin**Uses Advised Against:** Not for use as a spray coating

Details of Manufacturer or Importer

ManufacturerMG 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 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

MEDIUM CURE THERMALLY CONDUCTIVE ADHESIVE, FLOWABLE 8329TFM-PART A

Section 2: Hazard(s) Identification



Classification of Hazardous Chemical

GHS Categories

Criteria		Category	Signal Word	Pictograms
Sensitization	Skin	1	Warning	Exclamation
Eye Irritation		2	Warning	Exclamation
Skin Irritation		2	Warning	Exclamation
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	WARNING
Pictograms	Hazard Statements
	H317: May cause an allergic skin reaction H319: Causes serious eye irritation H315: Causes skin irritation
	H410: Very toxic to aquatic life with long lasting effects

Section continued on the next page

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Continued...

Prevention	Precautionary Statements
P102	Keep out of reach of children.
P261	Avoid breathing fumes/vapors.
P280	Wear protective gloves/protective clothing/eye protection.
P264	Wash hands and exposed skin thoroughly after handling.
P272	Contaminated work clothing should not be allowed out of the workplace.
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 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.
Disposal	Precautionary Statements
P501	Dispose of contents/container in accordance to local/regional/international regulations.

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

MEDIUM CURE THERMALLY CONDUCTIVE ADHESIVE, FLOWABLE 8329TFM-PART A

Section 3: Composition/Information on Ingredients

CAS #	Chemical Name	%(weight)
1344-28-1	aluminum oxide	40%
28064-14-4	phenol, polymer with formaldehyde, glycidyl ether	26%
1314-13-2	zinc oxide	25%
68609-97-2	alkyl glycidyl ether	4%
25068-38-6	bisphenol-A epoxy resin (reaction product)	2%
1333-86-4	carbon black	0.6%

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, serious irritation, pain</i>
Response	Rinse cautiously with water for at least 20 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 Response	<i>redness, irritation, dry skin, allergic contact dermatitis</i> Wash with plenty water. If skin irritation or rash occurs: Get medical advice/attention. Take off contaminated clothing and wash it before reuse.
IF INHALED	P304 + P340
Immediate Symptoms	<i>cough, irritation of the respiratory track, sore throat</i>
Response	Remove person to fresh air and keep comfortable for breathing.
IF SWALLOWED	P301 + P330 + P331
Immediate Symptoms	<i>irritation, abdominal pain, diarrhea, nausea, vomiting</i>
Response	Rinse mouth. Do NOT induce vomiting.

MEDIUM CURE THERMALLY CONDUCTIVE ADHESIVE, FLOWABLE 8329TFM-PART A**Section 5: Fire-Fighting Measures**

Extinguishing Media	In case of fire: Use dry chemical, carbon dioxide, chemical foam, or water spray to extinguish.
Specific Hazards	Not flammable or combustible, but burns if involved in a fire. Produces irritating smoke of unknown toxicity in fires. 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. Prevent fire-fighting wash from entering waterway or sewer system.
Combustion Products	Produces carbon oxides (CO,CO ₂), nitrogen oxides, 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	See personal protection recommendations in Section 8.
Precautions for Response	Avoid breathing the fumes/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/vapors. Contaminated work clothing should not be allowed out of the workplace.

Avoid release to the environment.

Handling

Wear protective gloves/eye protection. Wash hands and exposed skin thoroughly after handling. Take off contaminated clothing and wash it before reuse.

Collect spillage.

Section 8: Exposure Controls/Personal Protection

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
	Canada QC	2 mg/m ³	10 mg/m ³
fumes dust	Canada QC	2 mg/m ³	10 mg/m ³
	Canada QC	10 mg/m ³	Not established
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

Note: Ingredients are listed in descending weight contribution order (from greatest to least). The ACGIH¹, OSHA (Table Z-1), and Canadian provinces exposure limits were consulted. Limits from the RTECS² database and 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) Respirable airborne particles.

Section continued on the next page

MEDIUM CURE THERMALLY CONDUCTIVE ADHESIVE, FLOWABLE 8329TFM-PART A**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, 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 nitrile, latex, neoprene or other chemically resistant gloves.

Respiratory Protection

For over-exposures up to 10 x OEL of vapors, 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 handling.

MEDIUM CURE THERMALLY CONDUCTIVE ADHESIVE, FLOWABLE 8329TFM-PART A
Section 9: Physical and Chemical Properties

Physical State	Liquid	Lower Flammability Limit	Not available
Appearance	Black	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	2.23
Freezing/Melting Point	Not available	Solubility in Water	Insoluble
Boiling Point ^{a)}	>207 °C [>404 °F]	Partition Coefficient	Not available
Flash Point ^{b)}	149 °C [300 °F]	Auto-ignition Temperature	Not available
Evaporation Rate	Not available	Decomposition Temperature	Not available
Flammability (solid, gas)	Not available	Viscosity @40 °C	>20.5 mm ² /s

a) Values for the component with the lowest reported boiling point.

b) The closed cup flash point values are based on the alkyl glycidyl ether 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 oxides, 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 THERMALLY CONDUCTIVE ADHESIVE, FLOWABLE 8329TFM-PART A**Section 11: Toxicological Information****Routes of Exposure**

Eye contact, Skin contact, Inhalation, and Ingestion

Symptoms Summary

Eyes	May cause redness, serious irritation, or pain.
Skin	Causes skin redness, irritation, dry skin, or allergic contact dermatitis.
Inhalation	May cause cough and respiratory irritation, or sore throat.
Ingestion	May cause irritation, abdominal pain, diarrhea, nausea, or vomiting.
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
phenol, polymer with formaldehyde, glycidyl ether	>2 000 mg/kg	>2 000 mg/kg	Not established
zinc oxide	7 950 mg/kg Mouse	Not established	2 500 mg/m ³ Mouse
alkyl glycidyl ether	19 200 mg/kg Rat	4 500 mg/kg Rat	Not available
bisphenol-A epoxy resin (reaction product)	11 400 mg/kg Rat	Not available	Not available
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.

a) Supplier MSDS

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MEDIUM CURE THERMALLY CONDUCTIVE ADHESIVE, FLOWABLE 8329TFM-PART A**Other Toxicological Effects****Skin corrosion/irritation**

Phenol, polymer with formaldehyde, glycidyl ether; alkyl glycidyl ether; and bisphenol-A are known skin irritants.

Serious eye damage/irritation

Phenol, polymer with formaldehyde, glycidyl ether and bisphenol-A causes serious eye irritation.

Sensitization
(allergic reactions)

May cause skin sensitization based on animal studies due to 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)

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)

Based on available data, the classification criteria are not met.

STOT-single exposure

Based on available data, the classification criteria are not met.

STOT-repeated exposure

Based on available data, the classification criteria are not met.

Aspiration hazard

There are no category 1 components, and the kinematic viscosity is $>20.5 \text{ mm}^2/\text{s}$ at $40 \text{ }^\circ\text{C}$.

MEDIUM CURE THERMALLY CONDUCTIVE ADHESIVE, FLOWABLE 8329TFM-PART A**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 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, alkyl glycidyl ether, and carbon black are not classified as environmental hazard according to GHS criteria.

Acute Ecotoxicity

Available toxicity data does not meet classification thresholds.

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 THERMALLY CONDUCTIVE ADHESIVE, FLOWABLE 8329TFM-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.**

<p>Sizes under 450 L</p> <p>NOT REGULATED in TDG per Special Provisions 99</p>	<p><i>FOR REFERENCE ONLY</i></p> <p>UN number: UN3082 Shipping Name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (zinc oxide; phenol, polymer with formaldehyde, glycidyl ether) Class: 9 Packing Group: III Marine Pollutant: Yes</p>
<p>Sizes 5 L and under</p> <p>NOT REGULATED in 49 CFR per exception 171.4 (c)(2)</p>	

Special Provision 99 (2): These Regulations, except for Part 1 (Coming into Force, Repeal, Interpretation, General Provisions and Special Cases) and Part 2 (Classification), do not apply to the handling, offering for transport or transporting of less than 450 kg of UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S., or less than 450 L of UN3082, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S., on a road vehicle or a railway vehicle. The dangerous goods must be contained in one or more small means of containment designed, constructed, filled, closed, secured and maintained so that under normal conditions of transport, including handling, there will be no accidental release of the dangerous goods that could endanger public safety.

Air

Refer to ICAO-IATA regulations.

<p>Sizes 5 L and under: Cat. No. 8329TFM-25ML, 8329TFM-50ML</p>	
<p>NOT REGULATED On air waybill, write: "Not Restricted, as per Special Provisions A197"</p>	

Special Provision A197: These substances when transported in single or combination packagings containing net quantity per single or inner packaging of less than 5 L or less for liquids or having a net mass of 5 kg or less for solids, are not subject to any other provisions of these Regulations provided the packagings meet the general provisions 5.0.2.4.1, 5.0.2.6.1.1 and 5.0.2.8.

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MEDIUM CURE THERMALLY CONDUCTIVE ADHESIVE, FLOWABLE 8329TFM-PART A**Sea****Refer to IMDG regulations.**

Sizes 5 L and under: Cat. No. 8329TFM-25ML, 8329TFM-50ML

NOT REGULATED
per 2.10.2.7

2.10.2.7: Marine pollutants packaged in single or combination packagings containing a net quantity per single or inner packaging of 5 L or less for liquids or having a net mass per single or inner packaging of 5 kg or less for solids are not subject to any other provision of this Code relevant to marine pollutants provided the packagings meet the general provisions of 4.1.1.1, 4.1.1.2 and 4.1.1.4 to 4.1.1.8. In the case of marine pollutants also meeting the criteria for inclusion in another hazard class, all provisions of this Code relevant to any additional hazards continue to apply.

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.

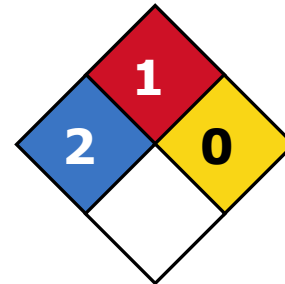
Hazardous Products Act (R.S.C., 1985, c. H-3)

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

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MEDIUM CURE THERMALLY CONDUCTIVE ADHESIVE, FLOWABLE 8329TFM-PART A**USA****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)

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, 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, 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.

MEDIUM CURE THERMALLY CONDUCTIVE ADHESIVE, FLOWABLE 8329TFM-PART A**Section 16: Other Information**

SDS Prepared by	Michel Hachey
Date of Review	09 May 2017
Supersedes	10 November 2016
Reason for Changes:	Product name revision

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

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Quality System Certified to ISO 9001:2008

SAI Global File #004008
Burlington, Ontario, Canada

MEDIUM CURE THERMALLY CONDUCTIVE ADHESIVE, FLOWABLE 8329TFM-PART A

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*
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.

MEDIUM CURE THERMALLY CONDUCTIVE ADHESIVE, FLOWABLE 8329TFM-PART B

Safety Data Sheet

Section 1: Identification

Product Identifier and Other Means of Identification

Product Name: Medium Cure Thermally Conductive Adhesive, Flowable**SDS Code:** 8329TFM-Part B**Related Part #** 8329TFM-25ML, 8329TFM-50ML

Recommended Use and Restriction on Use

Use: Thermally conductive adhesive hardener**Uses Advised Against:** Not for use as a spray coating

Details of Manufacturer or Importer

ManufacturerMG 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 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, FLOWABLE 8329TFM-PART B
Section 2: Hazard(s) Identification
Classification of Hazardous Chemical
GHS Categories

Criteria	Category	Signal Word	Pictograms
Skin Corrosion	1	Danger	Corrosion
Eye Corrosion	1	Danger	Corrosion
Reproductive Toxicity	2	Warning	Health
Specific Target Organ Toxicity Repeated Exposure	2	Warning	Health
Sensitization Skin	1	Warning	Exclamation
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
	H361: Suspected of damaging fertility or the unborn child H373: May cause damage to organs through prolonged or repeated exposure
	H317: May cause an allergic skin reaction

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MEDIUM CURE THERMALLY CONDUCTIVE ADHESIVE, FLOWABLE 8329TFM-PART B
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 and exposed skin 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	For all routes of exposure: Immediately call a POISON CENTER/doctor.
P308 + P313	IF exposed or concerned: Get medical advice/attention.
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 + P352	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Wash skin with plenty of 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.

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MEDIUM CURE THERMALLY CONDUCTIVE ADHESIVE, FLOWABLE 8329TFM-PART B
Continued...

Disposal	Precautionary Statements
P501	Dispose of contents/container in accordance to local/regional/international regulations.

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	aluminum oxide	40%
1314-13-2	zinc oxide	25%
25154-52-3	nonylphenol	12%
1761-71-3	4,4'-methylenebis(cyclohexylamine)	3%
112-24-3	triethylenetetramine	1%
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, burns, pain</i>
Response	Rinse cautiously with water for at least 30 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/doctor.

Section continued on the next page

MEDIUM CURE THERMALLY CONDUCTIVE ADHESIVE, FLOWABLE 8329TFM-PART B
Continued...

IF ON SKIN (or hair)	P303 + P361 + P352, P310, P333 + P313, P363
Immediate Symptoms	<i>redness, allergic contact dermatitis, burns</i>
Response	Take off immediately all contaminated clothing. Wash skin with plenty of water [or shower]. Immediately call a POISON CENTER/doctor. If skin irritation or rash occurs: Get medical advice/attention. Wash contaminated clothing before reuse.
IF INHALED	P304 + P340, P310, P308 + P313
Immediate Symptoms	<i>cough, irritation of the respiratory track</i>
Response	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/doctor. IF exposed or concerned: Get medical advice/attention.
IF SWALLOWED	P301 + P330 + P331, P310, P308 + P313
Immediate Symptoms	<i>burns to mouth and throat, abdominal pain</i>
Response	Rinse mouth. Do NOT induce vomiting. Immediately call a POISON CENTER/doctor. IF exposed or concerned: Get medical advice/attention.

Section 5: Fire-Fighting Measures

Extinguishing Media	In case of fire: Use dry chemical, carbon dioxide, chemical foam, or water spray to extinguish.
Specific Hazards	Not flammable or combustible, but burns if involved in a fire. Produces irritating smoke of unknown toxicity in fires. 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. 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.

MEDIUM CURE THERMALLY CONDUCTIVE ADHESIVE, FLOWABLE 8329TFM-PART B**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.

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. Avoid release to the environment.
Handling	Wear protective gloves/protective clothing/eye protection. Take off contaminated clothing and wash it before reuse. Wash hands and exposed skin thoroughly after handling. Collect spillage.
Storage	Store locked up.

MEDIUM CURE THERMALLY CONDUCTIVE ADHESIVE, FLOWABLE 8329TFM-PART B
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: Ingredients are listed in descending weight contribution order (from greatest to least). The ACGIH¹, OSHA, 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.

Section continued on the next page

MEDIUM CURE THERMALLY CONDUCTIVE ADHESIVE, FLOWABLE 8329TFM-PART B**Engineering Controls****Ventilation**

Keep airborne concentrations below the occupational exposure limits (OEL).

Note that the aluminum oxide, zinc oxide, and carbon black powders 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 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 handling.

MEDIUM CURE THERMALLY CONDUCTIVE ADHESIVE, FLOWABLE 8329TFM-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	2.18
Freezing/Melting Point	Not available	Solubility in Water	Insoluble
Boiling Point	>145 °C [>293 °F]	Partition Coefficient	Not available
Flash Point ^{a)}	150 °C [302 °F]	Auto-ignition Temperature	Not available
Evaporation Rate	Not available	Decomposition Temperature	Not available
Flammability (solid, gas)	Not available	Viscosity @25 °C	>20.5 mm ² /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 THERMALLY CONDUCTIVE ADHESIVE, FLOWABLE 8329TFM-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 redness or pain.
Skin	May cause redness, allergic contact dermatitis, and chemical burns. Triethylenetetramine can be absorbed through skin leading to toxic effects.
Inhalation	Inhalation of vapors or mist may cause cough and irritation of the nose, throat, and lungs (upper respiratory tract).
Ingestion	May cause severe irritation and abdominal pain. It is corrosive to the mouth, throat, esophagus, and stomach. (See inhalation symptoms.)
Chronic	Prolonged and repeated exposure to uncured epoxy hardener 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 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
carbon black	>15.4 g/kg Rat	>3 g/kg Rabbit	Not established

Note: Representative toxicity data from RTECS database² and data from supplier (M)SDS were also consulted.

a) Supplier MSDS

Section continued on the next page

MEDIUM CURE THERMALLY CONDUCTIVE ADHESIVE, FLOWABLE 8329TFM-PART B**Other Toxicological Effects**

Skin corrosion/irritation	Nonylphenol and triethylenetetramine causes severe skin burns.
Serious eye damage/irritation	Nonylphenol 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.
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	There are no category 1 components, and the kinematic viscosity is >20.5 mm ² /s at 40 °C.

MEDIUM CURE THERMALLY CONDUCTIVE ADHESIVE, FLOWABLE 8329TFM-PART B**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.

The 4,4'-methylenebis (cyclohexylamine) is classified as a chronic category 2 environmental toxicant.

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 and carbon black are not classified as environmental hazard according to GHS criteria.

Acute Ecotoxicity

Available toxicity data does not meet classification thresholds.

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, FLOWABLE 8329TFM-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 L and under

Limited Quantity



Sizes greater than 1 L

UN number: UN2735

Shipping Name: AMINES, LIQUID,
 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 mL and under

Excepted Quantity

Document as class E2

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



Sizes 0.5 L and under

Limited Quantity

UN number: UN2735

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

Class: 8

Packing Group: II

Marine Pollutant: Yes



Section continued on the next page

MEDIUM CURE THERMALLY CONDUCTIVE ADHESIVE, FLOWABLE 8329TFM-PART B
Sea
Refer to IMDG regulations.

Sizes 5 L and under

Limited Quantity


Sizes greater than 1 L

UN number: UN2735

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

Class: 8

Packing Group: II

Marine Pollutant: Yes


Sizes 30 mL and under

Excepted Quantity

Document as class E2

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.

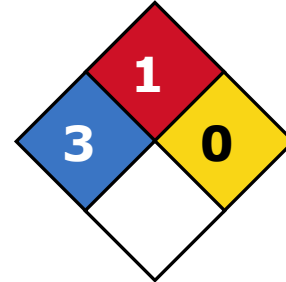
Hazardous Products Act (R.S.C., 1985, c. H-3)

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

Section continued on the next page

MEDIUM CURE THERMALLY CONDUCTIVE ADHESIVE, FLOWABLE 8329TFM-PART B**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)

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, 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.

MEDIUM CURE THERMALLY CONDUCTIVE ADHESIVE, FLOWABLE 8329TFM-PART B**Section 16: Other Information**

SDS Prepared by	Michel Hachey
Date of Revision	09 May 2017
Supersedes	10 November 2016
Reason for Changes:	Product name revision

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

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Registered Quality System **ISO 9001:2008**

QMI File #004008

Burlington, Ontario, Canada

MEDIUM CURE THERMALLY CONDUCTIVE ADHESIVE, FLOWABLE 8329TFM-PART B

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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