

FLAME RETARDANT EPOXY**834FRB-PART A**

Safety Data Sheet

Section 1: Identification

Product Identifier and Other Means of Identification

Product Name: Flame Retardant Epoxy**SDS Code:** 834FRB-Part A**Related Part #** 834FRB-375ML, 834FRB-3L, 834FRB-60L

Recommended Use and Restriction on Use

Use: Resin for use with epoxy hardener**Uses Advised Against:** Not for use as 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**☎** +1-905-331-1396**FAX** +1-800-340-0773**FAX** +1-905-331-2682**E-MAIL** support@mgchemicals.com**E-MAIL** info@mgchemicals.com**WEB** www.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

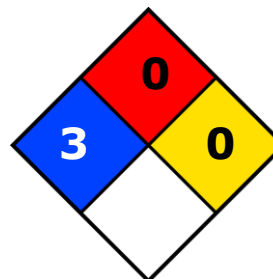
FLAME RETARDANT EPOXY
834FRB-PART A
Section 2: Hazard(s) Identification
Classification of the Chemical Material
GHS Categories

| Criteria | | Category | Signal Word | Pictograms |
|------------------------|--------------------|----------|-------------|-------------|
| Sensitization | Skin sensitizer | 1 | Warning | Exclamation |
| Eye Irritation | | 2 | Warning | Exclamation |
| Acute Toxicity | Dermal | 4 | Warning | Exclamation |
| Carcinogenicity | | 2 | Warning | Health |
| Germ Cell Mutagenicity | Oral | 2 | Warning | Health |
| Environmental Hazard | Acute Aqua. Tox. | 2 | Warning | Environment |
| Environmental Hazard | Chronic Aqua. Tox. | 2 | 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: | 0 |
| 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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FLAME RETARDANT EPOXY
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Label Elements

| Signal Word | WARNING |
|--|--|
| Pictograms | Hazard Statements |
|  | H351: Suspected of causing cancer H341: Suspected of causing genetic defects |
|  | H319: Causes serious eye irritation H315: Causes skin irritation H317: May cause an allergic skin reaction |
|  | H412: Toxic to aquatic life with long lasting effects |
| Prevention | Precautionary Statements |
| P102 | Keep out of reach of children. |
| P201 | Obtain special instructions before use. |
| P202 | Do not handle until all safety precautions have been read and understood. |
| P260 | Avoid breathing fumes/mist/vapors. |
| P280 | Wear protective gloves/eye protection/face 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. |

Continued on the next page

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Continued...

| 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. |
| P304 + P340 | IF INHALED: Remove person to fresh air and keep comfortable for breathing. |
| P308 + P313 | IF exposed or concerned: Get medical advice/attention. |
| 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

None known

Section 3: Composition/Information on Ingredients

| CAS # | Chemical Name | %Weight/Weight |
|--------------|--|-----------------------|
| 28768-32-3 | Oxiranemethanamine, N,N''-(methylenedi-4,1-phenylene)bis[N-(oxiranylmethyl)- | 40-60% |
| 84652-53-9 | 1,1'-(1,2-ethanediyl) bis[2,3,4,5,6-pentabromo-benzene | 10-30% |
| 1309-64-4 | antimony trioxide | 7-13% |
| 68609-97-2 | alkyl glycidyl ether | 3-7% |
| 25068-38-6 | reaction products: bisphenol-A-(epichlorhydrin) and epoxy resin | 3-7% |
| 64741-65-7 | naphtha, petroleum, heavy distillate | 0.1-1% |
| 1333-86-4 | carbon black | 0.1-1% |

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Section 4: First-Aid Measures

| <i>Exposure Condition</i> | <i>GHS Code: Precautionary Statement</i> |
|---------------------------|--|
| IF IN EYES | P305 + P351 + P338, P337 + P313 |
| Immediate Symptoms | <i>redness, severe 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, P362 + P364 |
| Immediate Symptoms | <i>redness, irritation, rash</i> |
| Response | Wash with plenty of water. Take off contaminated clothing and wash it before reuse. If skin irritation or rash occurs: Get medical advice/attention. Wash contaminated clothing before reuse. |
| IF INHALED | P304 + P340, P312, P310, P308 + P313 (unlikely route of exposure due to low volatility) |
| Immediate Symptoms | <i>cough, irritation of the respiratory track</i> |
| Response | 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 |
| Immediate Symptoms | <i>irritation, stomach/abdominal discomfort or pain</i> |
| Response | Rinse mouth. IF exposed or concerned: Get medical advice/attention |

FLAME RETARDANT EPOXY
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Section 5: Fire-Fighting Measures

| | | | | | |
|----------------------------------|---------------|--------------------|----------------------|-------------------------------|---------------|
| Auto-ignition Temperature | Not available | Flash Point | >150 °C [>302 °F] | LFL [LEL]^{a)} | Not available |
| | | | | UFL [UEL]^{b)} | available |

In case of fire P370 + P378

Extinguishing Media Use dry chemical, carbon dioxide, chemical foam, or water spray to extinguish. Use water spray to cool containers.

Specific Hazards Not flammable or combustible, but will burn if involved in a fire. It should self-extinguishes when removed from external flame sources.

Liberates toxic gases at temperature greater than 320 °C [608 °F].

Prevent fire-fighting wash from entering waterway or sewer system.

Combustion Products Produces carbon oxides (CO, CO₂), hydrogen bromide (HBr), bromines, and toxic fumes.

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

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

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

Section 6: Accidental Release Measures

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

Containment Remove all sources of ignition.

Prevent spill from entering drains and waterways. Contain with inert absorbent (such as soil, sand, vermiculite).

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

Disposal Dispose of spill waste according to Section 13.

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Section 7: Handling and Storage
Prevention

Keep out of reach of children.

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. Take off contaminated clothing and wash it before reuse.

Avoid breathing fumes/mist/vapors.

Protect from high heat over 200 °C [392 °F]. Do NOT process in a fashion that causes mist or fumes.

Collect spillage.

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

Handling

Wear protective gloves/eye protection.

Wash hands thoroughly after handling.

Storage

Store locked up.

Section 8: Exposure Controls/Personal Protection
Routes of Entry

Eyes, skin, ingestion

Substances with Occupational Exposure Limit Values

| Chemical Name | Country or Vendor | Long Term Exposure Limits (PEL) | Short Term Exposure Limits (STEL) |
|---------------------------------|-------------------|-------------------------------------|-----------------------------------|
| antimony trioxide ^{a)} | ACGIH | 0.5 mg/m ³ | Not established |
| | U.S.A. OSHA PEL | 0.5 mg/m ³ | Not established |
| | Canada AB | 0.5 mg/m ³ | Not established |
| | Canada BC | 0.5 mg/m ³ | Not established |
| | Canada ON | 0.5 mg/m ³ ^{b)} | Not established |
| | Canada QC | 0.5 mg/m ³ | Not established |

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FLAME RETARDANT EPOXY
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Continued...

| Chemical Name | Country or Vendor | Long Term Exposure Limits (PEL) | Short Term Exposure Limits (STEL) |
|--------------------------------------|--------------------------|--|--|
| 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 |
| naphtha, petroleum, heavy distillate | ACGIH | 100 ppm (525 mg/m ³) | Not established |
| | U.S.A. OSHA PEL | 500 ppm (2900 mg/m ³) | Not established |
| | Canada AB | 572 mg/m ³ | Not established |
| | Canada BC | 290 mg/m ³ | 580 mg/m ³ |
| | Canada ON | 100 ppm | Not established |
| | Canada QC | 525 mg/m ³ | 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 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 for 15 min and long term permissible exposure limits (PEL) for 8 h.

a) Respirable airborne particles

Engineering Controls
Ventilation

Keep airborne concentrations below exposure limits provided in the table below.

Because carbon black and the antimony trioxide are bound to the liquid mixture; the airborne hazard is present only if the conditions of use result in aerosolization or misting.

Personal Protective Equipment
Eye protection

Wear appropriate protective eyeglasses or chemical safety goggles.

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

Skin Protection

Wear appropriate protective clothing to prevent skin contact.

RECOMMENDATION: Use butyl rubber, neoprene, or other chemically resistant gloves.

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Respiratory Protection 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 MSDS, and that the respirator is fitted to the employee by a professional. Ensure vapor cartridges are stored in sealed plastic bags when not being used.

General Hygiene Considerations

Wash hands with water and soap after use.

Section 9: Physical and Chemical Properties

| | | | |
|----------------------------------|----------------------|---|--|
| Physical State | Liquid | Lower Flammability Limit | Not applicable |
| Appearance | Black | Upper Flammability Limit | Not applicable |
| Odor | Mildly aromatic | Vapor Pressure @25 °C | Not available |
| Odor Threshold | Not available | Vapor Density | Not available |
| pH | Not available | Specific Gravity @25 °C | 1.39 |
| Freezing/Melting Point | >150 °C [>302 °F] | Solubility in Water | Partially water soluble |
| Boiling Point | Not available | Partition Coefficient | Not available |
| Flash Point | Not available | Auto-ignition Temperature^{a)} | >465 °C [>392 °F] |
| Evaporation Rate | Slow | Decomposition Temperature | Not available |
| Flammability (solid, gas) | Not available | Viscosity @25 °C | 1 600 cP [1 150 mm ² /s] |

a) Supplier value for the component with the lowest know auto-ignition

FLAME RETARDANT EPOXY**834FRB-PART A****Section 10: Stability and Reactivity**

| | |
|----------------------------|---|
| Reactivity | Reacts with amines |
| Chemical Stability | Chemically stable at normal temperatures and pressures |
| Conditions to Avoid | Temperatures over 320 °C [608 °F] and incompatible substances |
| Incompatibilities | Strong oxidizing agents, strong acids, strong bases |
| Polymerization | Will not occur |
| Decomposition | Will not decompose under normal conditions. For thermal decomposition, see combustion products in Section 5 |

Section 11: Toxicological Information**Routes of Exposure**

Eyes, ingestion, and skin

Symptoms Summary

| | |
|-------------------|---|
| Eyes | May cause redness, severe eye irritation, and pain. |
| Skin | May cause serious skin irritation and skin sensitization. |
| Inhalation | Inhalation of vapors, fumes, or mist may cause irritation to the upper respiratory tract. |
| Ingestion | Single dose oral toxicity is low. |
| Chronic | <p>Prolonged and repeated exposure may cause dermatitis, defatting of the skin, and skin sensitization reactions.</p> <p>Long term exposure to carbon black or antimony trioxide dust or mist may cause cancer.</p> <p>Prolonged ingestion of the antimony trioxide component may cause gastrointestinal upset, ulcers, blood effects, liver effects, and neurological effects.</p> |

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FLAME RETARDANT EPOXY
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Lethal Exposure Concentrations

| Chemical Name | LD50 oral | LD50 dermal | LC50 inhalation | TCLo inhalation |
|--|--------------------------------|-----------------------------------|---------------------------------|-------------------------------|
| Oxiranemethanamine, N,N''-(methylenedi-4,1-phenylene)bis[N-(oxiranylmethyl)- | Not available | Not available | Not available | Not available |
| 1,1'-(1,2-ethanediyl) bis[2,3,4,5,6-pentabromo-benzene | >5 000 mg/kg Rat ^{a)} | >2 000 mg/kg Rabbit ^{a)} | Not available | Not available |
| antimony trioxide | >34 600 mg/kg Rat | >2 000 mg/kg Rabbit | Not available | Not available |
| alkyl glycidyl ether | 19 200 mg/kg Rat | 4 500 mg/kg Rat | Not available | Not available |
| reaction products: bisphenol-A-(epichlorhydrin) and epoxy resin | 11 400 mg/kg Rat | 100 pph 7 h Rabbit ^{b)} | Not available | Not available |
| naphtha, petroleum, heavy alkylate | 34 600 mg/kg Rat ^{a)} | 15 400 mg/kg Rabbit ^{a)} | >3 684 ppm 4h Rat ^{a)} | Not available |
| carbon black | >15 g/kg Rat | >3 g/kg Rabbit | N/E | 1.6 mg/m ³ 7 h Rat |

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

a) Data from supplier SDS

b) Lowest published lethal toxic dose. LD50 is not available.

Other Toxicological Effects
Skin corrosion/irritation

Skin irritant

Serious eye damage/irritation

Severe eye irritant.

Respiratory and skin sensitization (allergic reactions)

The epoxy resin components (CAS# 28768-32-3, 68609-97-2, and 25068-38-6) may cause skin sensitization in humans

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FLAME RETARDANT EPOXY**834FRB-PART A****Carcinogenicity**
(risk of cancer)

The carbon black and antimony trioxide are possibly carcinogenic by airborne routes of exposures.

ANTIMONY TRIOXIDE [1309-64-4] (See Note A)

IARC Group 2B: Possibly carcinogenic to humans. This finding is based on a long term dust inhalation study for female rats.

ACGIH A2: Suspected human carcinogen causing lung cancer

NTP: Not listed

CARBON BLACK [1333-86-4] (See Note A)

IARC Group 2B: Possibly carcinogenic to humans. This finding is based long term on dust inhalations studies on rats.

ACGIH A4: Not classified as a human carcinogen

NTP: Not listed

Mutagenicity
(risk of heritable genetic effects)

Contains over 50% of the CAS # 28768-32-3 substance, which is suspected of being a mutagen.

Reproductive Toxicity
(risk to sex functions)

No data available

Teratogenicity
(risk of fetus malformation)

No data available

STOT-single exposure

No data available

STOT-repeated exposure

Not data available

Aspiration hazard

Data does not give rise to classification. Viscosity at 40 °C is >>20.5 mm²/s and <2% aspiration toxicant contributions.

Note A: Carbon black and antimony trioxide are not considered volatile in the liquid part or in the final product; therefore, the inhalation hazard applies to intentional aerosolization, misting, or to possible dust from grinding and cutting of the final cured epoxy product.

FLAME RETARDANT EPOXY**834FRB-PART A****Section 12: Ecological Information**

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

The epoxy resins (CAS# 28768-32-3, 68609-97-2, and 25068-38-6) have a LC50 for aquatic organisms 1 mg/L to 10 mg/L.

Antimony trioxide (CAS#1309-64-4) has a LC50 of 833 mg/L for flathead minnow (*pimpehales promelas*) 96 h.

Acute Ecotoxicity

Category 2

GHS Code: Hazard Statement

H402: Harmful to aquatic life

Chronic Ecotoxicity

Category 3

GHS Code: Hazard Statement

H411: Toxic to aquatic life with long lasting effects

Avoid release to the environment. Collect spillage

Persistence and Biodegradability

Not available

Bioaccumulative Potential

Not available

Mobility in Soil

Not available

Other Effects

Not available

Section 13: Disposal Considerations

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

FLAME RETARDANT EPOXY
834FRB-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 liters and under

Limited Quantity


Sizes greater than 5 liters

UN number: UN3082

Shipping Name:

 ENVIRONMENTALLY HAZARDOUS
 SUBSTANCE, LIQUID, N.O.S.

 (Reaction product: bisphenol-A-
 (epichlorhydrin))

Class: 9

Packing Group: III

Marine Pollutant: Yes

Air

Refer to ICAO-IATA Dangerous Goods Regulations.

Sizes 5 liters and under

Limited Quantity


Sizes greater than 5 liters

UN number: UN3082

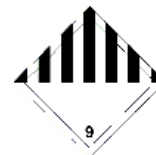
Shipping Name:

 ENVIRONMENTALLY HAZARDOUS
 SUBSTANCE, LIQUID, N.O.S.

 (Reaction product: bisphenol-A-
 (epichlorhydrin))


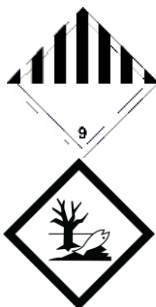
Class: 9

Packing Group: III

Marine Pollutant: Yes

Excepted Quantity E2 ≤30 mL

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FLAME RETARDANT EPOXY
834FRB-PART A
Sea

| Refer to IMDG regulations. | |
|---|--|
| Sizes 5 liters and under Limited Quantity | Sizes greater than 5 liters UN number: UN3082 Shipping Name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Reaction product: bisphenol-A- (epichlorhydrin)) Class: 9 Packing Group: III Marine Pollutant: Yes |
|  |  |

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

Section 15: Regulatory Information
Canada
WHMIS Classification


D2A – Very Toxic (Carcinogen IARC class 2B; Mutagen)

D2B – Toxic Other (Skin and Eye Irritant; 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.

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FLAME RETARDANT EPOXY**834FRB-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 contain an "antimony compound", which is listed as hazardous air pollutants.

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

This product contains antimony trioxide (CAS# 1309-64-4; reportable quantity = 1000 lb), 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 (CAS# 1333-86-4; airborne, unbound particles of respirable size), which is listed as a carcinogen.

This product contains antimony trioxide (CAS# 1309-64-4) is listed as a carcinogen.

Europe**RoHS**

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

WEEE

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

Section 16: Other Information

| | |
|----------------------------|---|
| MSDS Prepared by | Michel Hachey |
| Date of Revision | 04 December 2014 |
| Supersedes | 10 November 2014 |
| Reason for Changes: | Corrected wrong transport symbol in section 14. |

Continued on the next page

FLAME RETARDANT EPOXY**834FRB-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 |
| NOELR | No observable effect loading ratio |
| GHS | Globally Harmonized System of Classification of Labeling of Chemicals |
| LC50 | Lethal Concentration 50% |
| LCLo | Lowest published lethal concentration |
| LD50 | Lethal Dose 50% |
| PEL | Permissible Exposure Limit |
| 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*
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.



Registered Quality System **ISO 9001:2008**

QMI File #004008

Burlington, Ontario, Canada

FLAME RETARDANT EPOXY

834FRB-PART B

Safety Data Sheet

Section 1: Identification

Product Identifier and Other Means of Identification

Product Name: Flame Retardant Epoxy

SDS Code: 834FRB-Part B

Related Part #: 834FRB-375ML, 834FRB-3L, 834FRB-60L

Recommended Use and Restriction on Use

Use: Hardener for use with epoxy resin

Uses Advised Against: Not for use as 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

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

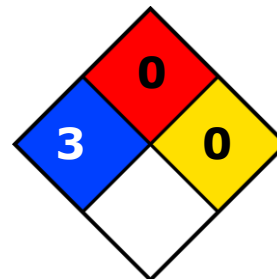
FLAME RETARDANT EPOXY
834FRB-PART B
Section 2: Hazard(s) Identification
Classification of the Chemical Material
GHS Categories

| Criteria | | Category | Signal Word | Pictograms |
|----------------------|-------------------|----------|-------------|-------------|
| Serious Eye Damage | | 1 | Danger | Corrosion |
| Skin Corrosion | | 1B | Danger | Corrosion |
| Sensitization | Skin sensitizer | 1 | Warning | Exclamation |
| Acute Toxicity | Dermal | 4 | Warning | Exclamation |
| Carcinogenicity | | 2 | Warning | Health |
| Environmental Hazard | Acute Aqu. Tox. | 2 | Warning | Environment |
| Environmental Hazard | Chronic Aqu. Tox. | 2 | 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: | 0 |
| 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)

Continued on the next page

FLAME RETARDANT EPOXY
834FRB-PART B
Label Elements

| Signal Word | DANGER |
|---|---|
| Pictograms | Hazard Statements |
|  | H314: Causes severe skin burns and eye damage |
|  | H351: Suspected of causing cancer |
|  | H312: Harmful in contact with skin H317: May cause an allergic skin reaction |
|  | H412: Toxic to aquatic life with long lasting effects |
| Prevention | Precautionary Statements |
| P102 | Keep out of reach of children. |
| P201 | Obtain special instructions before use. |
| P202 | Do not handle until all safety precautions have been read and understood. |
| P260 | Do not breathe dust/mist/vapors. |
| P280 | Wear protective gloves/eye protection/face 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. |

Continued on the next page

FLAME RETARDANT EPOXY
834FRB-PART B

| 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. |
| P310 | Immediately call a POISON CENTER/doctor |
| P303 + P361 + P353 | IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower]. |
| P363 | Wash contaminated clothing before reuse. |
| P333 + P313 | If skin irritation or rash occurs: Get medical advice/attention. |
| P272 | Contaminated clothing should not be allowed out of the workplace. |
| 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/ |
| P308 + P313 | IF exposed or concerned: Get medical advice/attention. |
| 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

None known

Section 3: Composition/Information on Ingredients

| CAS # | Chemical Name | %Weight/Weight |
|--------------|--|-----------------------|
| 68410-23-1 | dimer fatty acid (C18)poly amido amine resin | 63-70% |
| 84652-53-9 | 1,1'-(1,2-ethanediyl) bis[2,3,4,5,6-pentabromo-benzene | 10-30% |
| 112-24-3 | triethylenetetramine | 10-30% |
| 1309-64-4 | antimony trioxide | 7-13% |
| 108-65-6 | 2-methoxy-1-methylethyl acetate | 0.5-1.5% |
| 8052-41-3 | Stoddard solvent; Low boiling point naphtha | 0.1-1% |
| 64741-65-7 | naphtha, petroleum, heavy distillate | 0.1-1% |
| 1333-86-4 | carbon black | 0.1-1% |

FLAME RETARDANT EPOXY
834FRB-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 at least 20 minutes. 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, P363, P313 +P313 |
| Immediate Symptoms | <i>redness, irritation, rash, pain, burns, blistering</i> |
| Response | Wash with plenty of water/shower. Take off immediately all contaminated clothing. 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, P312, P310, P308 + P313 (unlikely route of exposure due to low volatility) |
| Immediate Symptoms | <i>cough, irritation of the respiratory track, burning sensation</i> |
| Response | 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 |
| Immediate Symptoms | <i>burns to mouth, throat, stomach, abdominal pain, nausea, vomiting, diarrhea</i> |
| Response | Rinse mouth. Do not induce vomiting. Immediately call a POISON CENTRE/doctor. |

FLAME RETARDANT EPOXY
834FRB-PART B
Section 5: Fire-Fighting Measures

| | | | | | |
|----------------------------------|---------------|--------------------|----------------------|-------------------------------|---------------|
| Auto-ignition Temperature | Not available | Flash Point | >122 °C [>256 °F] | LFL [LEL]^{a)} | Not available |
| | | | | UFL [UEL] | |

In case of fire P370 + P378

Extinguishing Media Use dry chemical, carbon dioxide, chemical foam, or water spray to extinguish. Use water spray to cool containers.

Specific Hazards Not flammable or combustible, but will burn if involved in a fire. It should self-extinguishes when removed from external flame sources.

Liberates toxic gases at temperature greater than 320 °C [608 °F].

Prevent fire-fighting wash from entering waterway or sewer system.

Combustion Products Produces carbon oxides (CO, CO₂), hydrogen bromide (HBr), bromines, and toxic fumes.

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

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

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

Section 6: Accidental Release Measures

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

Containment Remove all sources of ignition.

Prevent spill from entering drains and waterways. Contain with inert absorbent (such as soil, sand, vermiculite).

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

Disposal Dispose of spill waste according to Section 13.

FLAME RETARDANT EPOXY
834FRB-PART B
Section 7: Handling and Storage
Prevention

Keep out of reach of children.

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. Take off contaminated clothing and wash it before reuse.

Do not breathe dust/fumes/mist/vapors.

Protect from high heat over 200 °C [392 °F]. Do NOT process in a fashion that causes mist or fumes.

Collect spillage.

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

Handling

Wear protective gloves/eye protection.

Wash hands thoroughly after handling.

Storage

Keep container tightly closed.

Section 8: Exposure Controls/Personal Protection
Routes of Entry

Eyes, skin, ingestion

Substances with Occupational Exposure Limit Values

| Chemical Name | Country or Vendor | Long Term Exposure Limits (PEL) | Short Term Exposure Limits (STEL) |
|---------------------------------|--|---|---|
| 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) Not established | Not established Not established Not established Not established Not established Not established Not established |
| antimony trioxide ^{a)} | ACGIH U.S.A. OSHA PEL Canada AB Canada BC Canada ON Canada QC | 0.5 mg/m ³ 0.5 mg/m ³ 0.5 mg/m ³ 0.5 mg/m ³ (Carcinogen) 0.5 mg/m ³ ^{b)} 0.5 mg/m ³ | Not established Not established Not established Not established Not established Not established |

FLAME RETARDANT EPOXY
834FRB-PART B
Continued...

| Chemical Name | Country or Vendor | Long Term Exposure Limits (PEL) | Short Term Exposure Limits (STEL) |
|------------------------------|--|---|--|
| 1-methoxy-2-propanol acetate | ACGIH U.S.A. OSHA PEL Canada BC Canada ON | Not established Not established 50 ppm 50 ppm | Not established Not established 75 ppm 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 |
| Stoddard solvent | ACGIH U.S.A. OSHA PEL Canada AB Canada BC Canada ON Canada QC | 100 ppm (525 mg/m ³) 500 ppm (2900 mg/m ³) 572 mg/m ³ 290 mg/m ³ 100 ppm 525 mg/m ³ | Not established Not established Not established 580 mg/m ³ 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 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 for 15 min and long term permissible exposure limits (PEL) for 8 h.

a) Respirable airborne particles

b) Exposure should be controlled to levels as low as possible.

Engineering Controls

Ventilation

General ventilation is adequate for normal use; keep airborne exposure as low as possible.

Personal Protective Equipment

Eye protection

Wear appropriate protective eyeglasses or chemical safety goggles.

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

Skin Protection

Wear appropriate protective clothing to prevent skin contact.

RECOMMENDATION: Use butyl rubber, neoprene, or other chemically resistant gloves.

Continued on the next page

FLAME RETARDANT EPOXY
834FRB-PART B

Respiratory Protection 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 MSDS, and that the respirator is fitted to the employee by a professional. Ensure vapor cartridges are stored in sealed plastic bags when not being used.

General Hygiene Considerations

Wash hands with water and soap after use.

Section 9: Physical and Chemical Properties

| | | | |
|----------------------------------|-----------------|--|--|
| Physical State | Liquid | Lower Flammability Limit | Not available |
| Appearance | Black | Upper Flammability Limit | Not available |
| Odor | Ammoniacal-like | Vapor Pressure @25 °C ^{a)} | Not available |
| Odor Threshold | Not available | Vapor Density | Not available |
| pH | Not available | Specific Gravity @25 °C | 1.16 |
| Freezing/Melting Point | Not available | Solubility in Water | Practically insoluble |
| Boiling Point | Not available | Partition Coefficient | Not available |
| Flash Point | Not available | Auto-ignition Temperature | Not available |
| Evaporation Rate | Slow | Decomposition Temperature | Not available |
| Flammability (solid, gas) | Not available | Viscosity @25 °C | 3 600 cP [3 100 mm ² /s] |

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

FLAME RETARDANT EPOXY**834FRB-PART B****Section 10: Stability and Reactivity**

| | |
|----------------------------|---|
| Reactivity | Reacts with amines |
| Chemical Stability | Chemically stable at normal temperatures and pressures |
| Conditions to Avoid | Temperatures over 320 °C [608 °F] and incompatible substances |
| Incompatibilities | Strong oxidizing agents, strong acids, strong bases, and amines |
| Polymerization | Will not occur |
| Decomposition | Will not decompose under normal conditions. For thermal decomposition, see combustion products in Section 5 |

Section 11: Toxicological Information**Routes of Exposure**

Eyes, ingestion, and skin

Symptoms Summary

| | |
|-------------------|---|
| Eyes | May cause chemical burns or severe eye irritation, redness, and pain. |
| Skin | May cause chemical burns and serious skin irritation. May cause skin sensitization. Triethylenetetramine can be absorbed through skin. |
| Inhalation | Hot triethylenetetramine vapors may result in respiratory tract irritation and itching of the face with erythema and edema. May cause nose, throat and lung irritation. Inhalation of vapors, dust, or mist may cause irritation to the upper respiratory tract. |
| Ingestion | Single dose oral toxicity is low. It may cause burns or severe irritation to the digestive tract. |
| Chronic | <p>Prolonged and repeated exposure may cause dermatitis, defatting of the skin, and skin sensitization reactions.</p> <p>Long term exposure to carbon black or antimony trioxide dust or mist may cause cancer.</p> <p>Prolonged ingestion of the antimony trioxide component may cause gastrointestinal upset, ulcers, blood effects, liver effects, and neurological effects.</p> |

Continued on the next page

FLAME RETARDANT EPOXY
834FRB-PART B
Lethal Exposure Concentrations

| Chemical Name | LD50 oral | LD50 dermal | LC50 inhalation | TCLo inhalation |
|---|-----------------------------------|--------------------------------------|------------------------------------|------------------------------------|
| fatty acids, C18-unsatd., dimers,... (CAS# 68410-23-1) | >5 000 mg/kg a) | >5 000 mg/kg a) | Not established | Not established |
| 1,1'-(1,2-ethanediyl) bis[2,3,4,5,6-pentabromo-benzene | >5 000 mg/kg Rat ^{a)} | >2 000 mg/kg Rabbit ^{a)} | Not available | Not available |
| triethylenetetramine | 2 500 mg/kg Rat | 805 g/kg Rabbit | Not established | Not established |
| antimony trioxide | >34 600 mg/kg Rat | >2 000 mg/kg Rabbit | Not available | Not available |
| 2-methoxy-1-methylethyl acetate | 8 532 mg/kg Rat | >5 g/kg Rabbit | Not available | 1 105 mg/m ³ 4 h Rat |
| naphtha, petroleum, heavy alkylate | 34 600 mg/kg Rat ^{a)} | 15 400 mg/kg Rabbit ^{a)} | >3 684 ppm 4h Rat ^{a)} | Not available |
| carbon black | >15 g/kg Rat | >3 g/kg Rabbit | N/E | 1.6 mg/m ³ 7 h Rat |

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

Other Toxicological Effects
Skin corrosion/irritation

Triethylenetetramine (CAS# 112-24-3) can cause skin burns.

Serious eye damage/irritation

Triethylenetetramine (CAS# 112-24-3) can cause severe eye damage.

Respiratory and skin sensitization (allergic reactions)

The epoxy hardener components (CAS# 68410-23-1, and 112-24-3) may cause skin sensitization in humans

Continued on the next page

FLAME RETARDANT EPOXY**834FRB-PART B****Carcinogenicity**
(risk of cancer)**ANTIMONY TRIOXIDE [1309-64-4]** (See Note A)

IARC Group 2B: Possibly carcinogenic to humans. This finding is based on a long term dust inhalation study for female rats.

ACGIH A2: Suspected human carcinogen causing lung cancer

NTP: Not listed

CARBON BLACK [1333-86-4] (See Note A)

IARC Group 2B: Possibly carcinogenic to humans. This finding is based long term on dust inhalations studies on rats.

ACGIH A4: Not classified as a human carcinogen

NTP: Not listed

Mutagenicity
(risk of heritable genetic effects)

Data does not give rise to classification. Antimony trioxide damages human DNA at 0.12 ng/L 1 y

Reproductive Toxicity
(risk to sex functions)

No data available

Teratogenicity
(risk of fetus malformation)

No data available

STOT-single exposure

No data available

STOT-repeated exposure

Not data available

Aspiration hazard

Viscosity at 40 °C is >>20.5 mm²/s, thus not classified as aspiration hazard.

Note A: Carbon black and antimony trioxide are not considered volatile in the liquid part or in the final product; therefore, the inhalation hazard applies to intentional aerosolization, misting, or to possible dust from grinding and cutting of the final cured epoxy product.

FLAME RETARDANT EPOXY**834FRB-PART B****Section 12: Ecological Information**

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

The fatty acids, C18-unsatd., dimers, reaction products with polyethylenepolyamines (CAS# 68410-23-1) was classified as a chronic category 2 environmental toxicant (supplier reports LC50 range of 1–10 mg/L for fish; EC0 bacterial >10 and ≤100 mg/L; not readily biodegradable).

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

Antimony trioxide (CAS#1309-64-4) has a LC50 of 833 mg/L for flathead minnow (pimpehales promelas) 96 h.

Acute Ecotoxicity

Category 2

GHS Code: Hazard Statement

H401: Toxic to aquatic life

Chronic Ecotoxicity

Category 2

GHS Code: Hazard Statement

H412: Harmful to aquatic life with long lasting effects

P273: Avoid release to the environment

P391: Collect spillage

Persistence and Biodegradability

Not available

Bioaccumulative Potential

Not available

Mobility in Soil

Not available

Other Effects

Not available

Section 13: Disposal Considerations

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

FLAME RETARDANT EPOXY
834FRB-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 1 liter and under

Limited Quantity


Sizes greater than 1 liter

UN number: UN2259

Shipping Name:

 TRIETHYLENETETRAMINE SOLUTION,
 N.O.S. (containing dimer fatty acid
 (C18)poly amido amine resin)

Class: 8

Packing Group: II

Marine Pollutant: Yes

Air

Refer to ICAO-IATA Dangerous Goods Regulations.

Sizes 0.5 liter and under

Limited Quantity


Sizes greater than 0.5 liters up to 1 L

UN number: UN2259

Shipping Name:

 TRIETHYLENETETRAMINE SOLUTION,
 N.O.S. (containing dimer fatty acid
 (C18)poly amido amine resin)

Class: 8

Packing Group: II

Marine Pollutant: Yes

Excepted Quantity E2 ≤30 mL

Continued on the next page

FLAME RETARDANT EPOXY
834FRB-PART B
Sea
Refer to IMDG regulations.

Sizes 1 liter and under

Limited Quantity


Sizes greater than 1 liter

UN number: UN2259

Shipping Name:

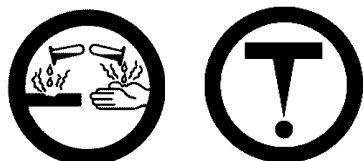
 TRIETHYLENETETRAMINE SOLUTION,
 N.O.S. (containing dimer fatty acid
 (C18)poly amido amine resin)

Class: 8

Packing Group: II

Marine Pollutant: Yes


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

Section 15: Regulatory Information
Canada
WHMIS Classification


E – Corrosive (Chemical burns);

D1B – Toxic (Skin Absorption);

D2A – Very Toxic (Carcinogen IARC class 2B)

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.

Continued on the next page

FLAME RETARDANT EPOXY**834FRB-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 contain an "antimony compound", which is listed as hazardous air pollutants.

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

This product contains antimony trioxide (CAS# 1309-64-4; reportable quantity = 1000 lb), 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 (CAS# 1333-86-4; airborne, unbound particles of respirable size), which is listed as a carcinogen.

This product contains antimony trioxide (CAS# 1309-64-4) is listed as a carcinogen.

Europe**RoHS**

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

WEEE

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

Section 16: Other Information

MSDS Prepared by Michel Hachey

Date of Revision 24 July 2014

Supersedes 11 June 2012

Reason for Changes: Change HCS 2012 format and revision of transport Section 14.

Continued on the next page

FLAME RETARDANT EPOXY**834FRB-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 |
| NOELR | No observable effect loading ratio |
| GHS | Globally Harmonized System of Classification of Labeling of Chemicals |
| LC50 | Lethal Concentration 50% |
| LCLo | Lowest published lethal concentration |
| LD50 | Lethal Dose 50% |
| PEL | Permissible Exposure Limit |
| 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*
1210 Corporate Drive
Burlington, Ontario, Canada
L7L 5R6

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

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