

Material Safety Data Sheet

Material Name: TUFCEM® EPOXY RESIN

IDs:

*** Section 1 - Chemical Product and Company Identification ***

Product Trade Name TUFCEM EPOXY RESIN

Manufacturer Information

Ergon Armor (601) 933-3540
Corrosion Engineering
P.O. Box 1639 (800) 424-9300
Jackson, MS 39215-1639

*** Section 2 - Composition / Information on Ingredients ***

CAS #	Component	Percent	OSHA
25068-38-6	Epoxy resin	70-90	Y
2426-08-6	Butyl glycidyl ether	10-30	Y

The substance(s) marked with a "Y" in the OSHA column, are identified as hazardous chemicals according to the criteria of the OSHA Communication Standard (29 CFR 1910.1200)

The components of this product are all on the TSCA inventory list.

Component Related Regulatory Information

This product may be regulated, have exposure limits or other information identified as the following: Glycidol derivatives.

*** Section 3 - Hazards Identification ***

Emergency Overview:

WARNING!
MAY CAUSE EYE AND SKIN IRRITATION.
MAY CAUSE RESPIRATORY TRACT IRRITATION.
PROLONGED EXPOSURE TO HIGH VAPOR CONCENTRATIONS CAN CAUSE CENTRAL NERVOUS SYSTEM DEPRESSION INCLUDING HEADACHE, DIZZINESS, WEAKNESS, CONFUSION, NAUSEA, AND LOSS OF CONSCIOUSNESS.
MAY CAUSE ALLERGIC SKIN REACTION.

Potential Health Effects:

Epoxy resin

Inhalation and skin contact are expected to be the primary routes of occupational exposure to this material. Based on single exposure animal tests, it is considered to be practically non-toxic if swallowed, inhaled or absorbed through the skin and slightly irritating to the eyes and skin. High vapor concentrations are irritating to the eyes and respiratory tract, and may result in central nervous system (CNS) effects such as headache, dizziness, nausea, drowsiness and, in severe exposures, loss of consciousness and death. Prolonged skin contact with very large amounts may cause drowsiness.

Butyl glycidyl ether

Inhalation and skin contact are expected to be the primary routes of occupational exposure to this material. Overexposure to vapors may cause eye and respiratory irritation and typical solvent-type central nervous system

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(CNS) effects such as dizziness, headache, nausea, vomiting and, in severe exposures, loss of consciousness and death. Liquid contact may be moderately irritating to eyes and moderately to severely irritating to skin if contact is prolonged. Studies in animals and human experience have shown that this material can cause allergic contact dermatitis (skin rash) in susceptible individuals. It is also considered, on the basis of single exposure animal tests, to be slightly to moderately toxic after skin contact. Inhalation and skin contact are expected to be the primary routes of occupational exposure to this material. Based on single exposure animal tests, this material is considered to be practically non-toxic if swallowed or inhaled, no more than slightly toxic if absorbed through skin, slightly irritating to eyes and severely irritating to skin. Repeated contact with this material can cause an allergic skin reaction.

*** Section 4 - First Aid Measures ***

Eye Contact:

Immediately flush with plenty of water. Get medical attention if irritation persists.

If On Skin

Immediately flush with plenty of water. Remove contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.

Ingestion:

Induce vomiting as directed by medical personnel. Get medical attention. NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON.

Inhalation:

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

*** Section 5 - Fire Fighting Measures ***

Flash Point: >230 deg F

Method Used: PMCC

**Flammability
Classification:**

**Upper Flammable
Limit (UFL):** N/A

**Lower Flammable
Limit (LFL):** N/A

Fire & Explosion Hazards:

Closed containers of this material may explode when subjected to heat from surrounding fire. Cool exposed containers with water. Avoid breathing fumes from fire exposed material.

Extinguishing Media:

Use water spray, carbon dioxide, foam or dry chemical.

Fire-Fighting Instructions:

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Fire fighters and others who may be exposed to products of combustion should wear full fire fighting turn out gear (full Bunker Gear) and self-contained breathing apparatus (pressure demand NIOSH approved or equivalent). Fire fighting equipment should be thoroughly decontaminated after use.

*** Section 6 - Accidental Release Measures ***

Spill or Leak

Isolate hazard area and deny entry to unnecessary or unprotected personnel. Contain spilled liquid with sand or earth. Clean up spill immediately, observing precautions in the Personal Protection section of MSDS. Avoid runoff into storm sewers and ditches which lead to waterways.

*** Section 7 - Handling and Storage ***

Handling Procedures:

Do not get in eyes, on skin or clothing. Avoid breathing vapor or mist. Keep container closed. Use only with adequate ventilation. Wash thoroughly after handling. Empty container may contain hazardous residues.

Storage Procedures:

Avoid excessive heat. Store out of direct sunlight in a cool, well-ventilated place.

*** Section 8 - Exposure Controls / Personal Protection ***

Component Exposure Limits

Butyl Glycidyl Ether

ACGIH: 25 ppm; 133 mg/m³ (TLV-TWA)

OSHA: 50 ppm; 270 mg/m³ (PEL-TWA)

Engineering Controls:

Investigate engineering techniques to reduce exposures below airborne exposure limits. Provide ventilation if necessary to control exposure levels below airborne exposure limits (see above). If practical, use local mechanical exhaust ventilation at sources of air contamination such as open process equipment. Consult ACGIH ventilation manual or NFPA Standard 91 for design of exhaust systems.

PERSONAL PROTECTIVE EQUIPMENT

As prescribed in the OSHA Standard for Personal Protective Equipment (29 CFR 1910.132), employers must perform a Hazard Assessment of all workplaces to determine the need for, and selection of, proper protective equipment for each task performed.

Eyes/Face Protective Equipment:

Where there is potential for eye contact, wear chemical goggles and have eye flushing equipment available.

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Skin Protection:

Neoprene or Polyvinyl chloride gloves should be worn when handling this material. Wear face shield and chemical resistant clothing such as a rubber apron when splashing may occur. Wash contaminated clothing and clean protective equipment before reuse. Rinse contaminated skin promptly. Wash skin thoroughly after handling.

Respiratory Protection:

Avoid breathing vapor or mist. When airborne exposure limits are exceeded (see above), use NIOSH approved respiratory protection equipment appropriate to the material and/or its components. Consult respirator manufacturer to determine appropriate type equipment for given application. Observe respirator use limitations specified by NIOSH or the manufacturer. For emergency and other conditions where exposure limit may be significantly exceeded, use an approved full face positive-pressure, self-contained breathing apparatus or positive-pressure airline with auxiliary self-contained air supply. Respiratory protection programs must comply with 29 CFR § 1910.134.

* * * Section 9 - Physical & Chemical Properties * * *

Physical State:	Liquid	Appearance:	Clear, straw-colored liquid
Odor:	Mild, sweet odor	Vapor Pressure:	Nil
Vapor Density:	Heavier than air	Boiling Point:	N/E
Melting Point:	N/A	Specific Gravity:	1.11 @ 25/25 Deg C
pH:	N/A	Viscosity:	NE
VOC:	Nil	Solubility Water:	Insoluble

* * * Section 10 - Chemical Stability & Reactivity Information * * *

Chemical Stability:

This material is chemically stable under normal and anticipated storage and handling conditions.

Incompatibility:

Avoid contact with strong acids, strong oxidizers and alkalis which may cause a violent reaction. Contact with amine compounds in uncontrolled conditions results in an exothermic reaction.

Decomposition Products:

Oxides of carbon

Hazardous Polymerization:

Hazardous polymerization is not known to occur.

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*** Section 11 - Toxicological Information ***

Acute Toxicity:

A: General Product Information

No information available for the product.

B: Component Analysis

Epoxy resin

Single exposure (acute) studies indicate that this material is practically non-toxic to rats if swallowed (LD50 4,000-21,000 mg/kg) or rabbits if absorbed through skin (LD50 23,700 mg/kg), no more than slightly toxic in rats if inhaled (LC50 >0.7 mg/l; no deaths at saturated atmosphere), and slightly irritating to rabbit skin and eyes. Human patch testing has shown that this material may produce skin sensitization. Occupational exposure has also been reported to result in allergic contact dermatitis and skin rashes. The health of workers in epoxy resin manufacturing facilities has been evaluated and indicates that pulmonary function was not affected by normal operating concentrations. Skin allergy was observed in guinea pigs following repeated exposures to this material. Subchronic feeding studies with this material in rats have not shown any adverse effects up to concentrations of 3% in the diet. Topical application of this material to the skin of mice has not produced an increase in skin tumors in several studies. Oral administration of this material to pregnant rats and rabbits for the majority of gestation resulted in some maternal toxicity, but no increase in birth defects or toxicity to the fetuses. A single generation reproduction study was conducted by oral administration of this material and did not show adverse effects on fertility, mating or reproductive success nor any adverse effects on the offspring. This material has shown an ability to produce genetic changes in standard bacterial and mammalian cell assays. Increases in chromosomal aberrations have also been observed in mammalian cells in culture. Exposure of whole animals has not resulted in an increase in micronuclei in bone marrow cells or dominant lethal effects. Evaluation of cells from exposed workers has shown chromosomal aberrations in two studies, but a third study did not show this effect.

Butyl glycidyl ether

Single exposure (acute) studies indicate that this material is slightly toxic to mice and rats if swallowed (LD50 1,520 and 2,260 mg/kg, respectively), slightly to moderately toxic to rabbits if absorbed through skin (LD50 788-4,930 mg/kg), practically non-toxic to rats or mice if inhaled (8-hr LC50 670-1030 ppm and 4-hr LC50 >3,500 ppm, respectively), slightly to moderately irritating to rabbit eyes, and moderately to severely irritating to rabbit skin. This material has shown the ability to produce contact allergy-type dermatitis (rashes) and primary irritant effects in controlled skin contact studies with humans. In a four-week inhalation study, rats exposed to 18 ppm of this material showed no adverse effects, but exposures at 98 or 188 ppm produced changes in the nasal and upper respiratory epithelium. Repeated daily inhalation exposure of rats for a longer period (approximately 10 weeks at 38 or 75 ppm) showed no significant effects. At 300 ppm, early deaths (50% mortality), reduced weight gain, and increased kidney and lung weights were observed. No suppression of bone marrow or leukocyte counts was noted in rats given 6 daily injections of this material at 400 mg/kg. Daily oral administration of 450 mg/kg, but not 225 mg/kg, for 2 weeks reduced thymus weights and other measures of an immune system competence. This material has shown an ability to cause genetic changes in standard bacterial assays, assays for chromosomal changes in cultured animal cells and cells from animals exposed to the material. Mixed results have been reported for dominant lethal assays; in one study, fetal loss was increased following exposure of males, and in another study, no effect was observed. Oral administration indicates that this material is rapidly absorbed, metabolized, and excreted in the urine.

Component Carcinogenicity

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None of this product's components are listed by ACGIH, IARC, OSHA, NIOSH, or NTP.

Chronic Toxicity

No information available for the product.

Epidemiology:

No information available for the product.

Neurotoxicity:

No information available for the product.

Mutagenicity:

No information available for the product.

Teratogenicity:

No information available for the product.

*** Section 12 - Ecological Information ***
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Ecotoxicity:

A: General Product Information

No information available for the product.

B: Component Analysis - Ecotoxicity - Aquatic Toxicity

Data on this material and/or its components are summarized below.

Epoxy resin

LC50 Rainbow trout: >1,000 mg/l, Practically Non-toxic

Butyl glycidyl ether

The acute toxicity tests indicate that this material is slightly toxic to fish such as rainbow trout (LC50 65 mg/l). It is slightly to moderately toxic to Daphnia magna (LC50 3.9-55 mg/l) and slightly toxic to algae (EC50 35 mg/l).

Environmental Fate:

Data on this material and/or its components are summarized below.

Epoxy resin

In a closed bottle test, this material was not readily biodegradable with only 2-3% of the Theoretical Oxygen

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Demand (ThOD) being consumed in 28 days and no inhibition of microbial activity.

Butyl glycidyl ether

This material ether was shown to consume 25% of its theoretical oxygen demand within 28 days by the close bottle test, with no inhibition of the test system. The modified Sturm carbon dioxide evolution test showed that 4-12% of the compound was oxidized to carbon dioxide within 28 days. Biodegradation curves indicated that degradation was continuing at the termination of the test.

*** Section 13 - Disposal Considerations ***

US EPA Waste Numbers & Descriptions:

A: General Product Information

Recover, reclaim or recycle when practical.

Disposal via incineration is recommended. Appropriate pretreatment and disposal in an authorized landfill is acceptable. In all cases, dispose of material in accordance with all applicable federal, state, and local laws and regulations. Consult appropriate regulatory officials or your attorney for information on such disposal.

Note: Chemical additions to, processing of, or otherwise altering this material may make this waste management information incomplete, inaccurate, or otherwise inappropriate. Furthermore, state and local waste disposal requirements may be more restrictive or otherwise different from federal laws and regulations.

B: Component Waste Numbers

No EPA Waste Numbers are applicable for this product's components.

*** Section 14 - Transportation Information ***

US DOT Information

Shipping Name: NOT regulated by DOT.

*** Section 15 - Regulatory Information ***

US Federal Regulations

A: General Product Information

This product is considered hazardous under 29 CFR 1910.1200 (Hazard Communication).

B: Component Analysis

None of this products components are listed under SARA Section 302 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65), or CERCLA (40 CFR 302.4).

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SARA 311/312: Acute: Y Chronic: N Fire: N Pressure: N Reactive: N

State Regulations

A: General Product Information

No additional information available.

B: Component Analysis – State

The following components appear on one or more of the following state hazardous substances lists:

Massachusetts Right to Know

This product does contain the following chemical(s), as indicated below, currently on the Massachusetts Right to Know Substance List.

Butyl glycidyl ether

New Jersey Right to Know

This product does contain the following chemical(s), as indicated below, currently on the New Jersey Right-to-Know Substances List.

Butyl glycidyl ether

Pennsylvania Right to Know

This product does contain the following chemical(s), as indicated below, currently on the Pennsylvania Hazardous Substance List.

Butyl glycidyl ether

Other Regulations

A: General Product Information

All components are on the U.S. EPA TSCA Inventory List.

B: Component Analysis – Inventory Component Analysis – Inventory

Component	CAS #	TSCA	DSL	EINECS
Epoxy resin	25068-38-6	Yes	Yes	Yes
Butyl glycidyl ether	2426-08-6	Yes	Yes	Yes

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C: Component Analysis - WHMIS IDL

The following components are identified under the Canadian Hazardous Products Act Ingredient Disclosure List:

Component	CAS #	Disclosure / Classifications
Epoxy resin	25068-38-6	1% / D2B
Butyl Glycidyl Ether	2426-08-6	0.1% / B3, D2B

*** Section 16 - Other Information ***

Key/Legend

EPA = Environmental Protection Agency; TSCA = Toxic Substance Control Act; ACGIH = American Conference of Governmental Industrial Hygienists; IARC = International Agency for Research on Cancer; NIOSH = National Institute for Occupational Safety and Health; NTP = National Toxicology Program; OSHA = Occupational Safety and Health Administration; NFPA = National Fire Protection Association; HMIS = Hazardous Material Identification System; CERCLA = Comprehensive Environmental Response, Compensation and Liability Act; SARA = Superfund Amendments and Reauthorization Act

The information presented herein is believed to be factual as it has been derived from the works and opinions of persons believed to be qualified experts; however, nothing contained in this information is to be taken as a warranty or representation for which Ergon Armor bears legal responsibility. The user should review any recommendations in the specific context of the intended use to determine whether they are appropriate.