

Material Safety Data Sheet

Material Name: FLEXJOINT® HARDENER

IDs:

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

Product Trade Name FLEXJOINT HARDENER

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
112-24-3	Triethylenetetramine	15-30	Yes
141-43-5	Ethanolamine	65-90	Yes

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.

*** Section 3 - Hazards Identification ***

Emergency Overview:

Clear light medium viscosity liquid with slight amine odor
DANGER!

CAUSES EYE AND SKIN BURNS. MAY CAUSE BLINDNESS.

MAY BE HARMFUL IF ABSORBED THROUGH SKIN

MAY CAUSE ALLERGIC RESPIRATORY REACTION.

MAY CAUSE ALLERGIC SKIN REACTION.

MAY BE HARMFUL IF SWALLOWED.

Potential Health Effects:

Ethanolamine

Skin contact and inhalation are expected to be the primary routes of occupational exposure to this material. Direct contact of liquid with eyes or skin may cause severe irritation or corrosive chemical burns. Repeated or prolonged contact may result in absorption of the material and systemic effects, such as liver or kidney injury. Overexposure to vapors and mists has produced eye and respiratory tract irritation, chest pain and coughing. Other symptoms of overexposure reported following chemical spills include headache, nausea, dizziness, and upper extremity numbness. Accidental swallowing of this material may cause burns of the mouth, throat, esophagus and stomach and symptoms of gastrointestinal distress. It is considered, on the basis of single exposure animal tests, to be slightly to moderately toxic by the inhalation route. In studies with animals that have been exposed by inhalation or oral dosing of high amounts, liver and kidney changes have been observed. Due to the potential for this material to cause injury to these organs, workers with liver or kidney disease or diminished function of these organs should have limited exposure to this material.

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Triethylenetetramine

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 slightly toxic if swallowed and moderately toxic if absorbed through skin. Direct contact of liquid is corrosive to skin and eyes. Inhalation of vapor or mist may cause severe irritation to the skin, eyes and upper respiratory tract with effects such as coughing, wheezing, shortness of breath and nausea. If swallowed, this material may cause burns of the nose and throat, abdominal pain, and diarrhea. Repeated or prolonged exposure to this material may cause allergic skin and respiratory reactions. Workers with lung disease or limited respiratory capacity should limit exposure to this material.

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

IF IN EYES, immediately flush with plenty of water for at least 15 minutes. Get medical attention immediately.

IF ON SKIN, immediately wash with soap and plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur. Wash clothing before reuse. Destroy contaminated shoes.

IF SWALLOWED, do NOT induce vomiting. Give water to drink. Get medical attention immediately. NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON.

IF INHALED, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

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

Flash Point: 253 deg F

Method Used: TCC

Flammability
Classification:

Upper Flammable
Limit (UFL): NE

Lower Flammable
Limit (LFL): NE

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:

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.

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*** 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

Ethanolamine (112-24-3)

ACGIH TLV-STEL: 15 mg/m³, 6 ppm
ACGIH TLV-TWA: 7.5 mg/m³, 3 ppm
OSHA PEL-TWA: 6 mg/m³, 3 ppm

Triethylenetetramine (112-24-3)

WEEL TWA: 6 mg/m³ 1 ppm TWA
WEEL-AIHA Skin Designator Y

-Only those components with exposure limits are printed in this section.

-Skin contact limits designated with a "Y" above have skin contact effect. Air sampling alone is insufficient to accurately quantitate exposure. Measures to prevent significant cutaneous absorption may be required.

-ACGIH Sensitizer designator with a value of "Y" above means that exposure to this material may cause allergic reactions.

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

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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.

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:	Yellow-amber liquid
Odor:	Amine	Vapor Pressure:	<2 mg/Hg @ 20 deg C
Vapor Density:	3.5 (air = 1)	Boiling Point:	>400 deg F
Melting Point:	-39 deg C	Specific Gravity:	0.97 @ 25/25 Deg C
pH:	N/A	Viscosity:	NE
VOC:	nil	Solubility Water:	Partly soluble

*** 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, alkalis, oxidizers, copper, copper alloys, chlorinated compounds and epoxy resins (in uncontrolled conditions).

Decomposition Products:

Oxides of carbon and nitrogen.

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Hazardous Polymerization:

Hazardous polymerization is not known to occur.

*** Section 11 - Toxicological Information ***

Acute Toxicity:

A: General Product Information

No information available for the product.

B: Component Analysis –

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

Ethanolamine

Repeated application in controlled skin contact studies with human volunteers has shown this material to be a cumulative skin irritant, but did not show evidence for allergic skin reactions. This material did not produce allergic skin reactions in guinea pigs. Acute inhalation exposure of mice, rats, rabbits and guinea pigs at up to 1250 ppm caused damage to the liver, kidney and lungs. Continuous 24-hour exposure of dogs, guinea pigs and rats to 6 ppm of this material resulted in skin irritation and animals exposed at up to 102 ppm showed inflammation of the lungs, liver and kidney damage, and changes in blood parameters. Repeated skin application of this material in rats at 4 mg/kg/day produced effects in the liver, heart and lung. Subchronic administration of this material in the diet (up to 1280 mg/kg/day) caused damage to liver and kidneys in rats. No birth defects were noted in rats given skin applications of this material during pregnancy, even at levels (225 mg/kg/day) which produced adverse effects in the mothers (decreased weight gain and skin irritation) and delayed development of offspring. Birth defects and embryoletality were observed in rats given this material orally during pregnancy at doses of 50-500 mg/kg/day. No adverse treatment-related effects on reproductive performance were observed in male and female rats given this material at dietary concentrations up to 7500 ppm. This material has generally produced no genetic changes in standard tests using bacterial or animal cells. Single exposure (acute) studies indicate:

Oral - Slightly Toxic to Rats (LD50 1,100 - 3,300 mg/kg)

Dermal - Slightly Toxic to Rats (LD50 2,460 mg/kg)

Inhalation - Moderately Toxic to Guinea Pigs (1-hr LC50 0.58 mg/l)

Inhalation - No More Than Slightly Toxic to Cats and Dogs (7-hr LC50 >2.47 mg/l, no lethalties occurred)

Eye Irritation - Corrosive to Rabbits

Skin Irritation - Corrosive to Rabbits

Triethylenetetramine

Workplace experience indicates that short term overexposure to vapor of this material causes severe irritation to the eyes, nose, throat and respiratory tract, and contact with liquid of this material causes severe eye and skin burns. Repeated or prolonged exposure to this material may cause allergic skin and respiratory reactions including asthma. Human case reports indicate that repeated oral exposure causes digestive tract irritation and skin rashes. Skin allergy was observed in guinea pigs following repeated skin exposure. This material did not increase the incidence of tumors in long term skin application studies in mice. Birth defects were noted in the offspring of rats given this material in the diet during pregnancy, but only at dosages which produced significant adverse effects in the mother. No birth defects were

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noted in the offspring of rats and guinea pigs exposed to this material by skin application during pregnancy, but guinea pigs showed an increase in miscarriages. This material produced genetic changes in standard tests using bacterial and animal cells, but not in tests using whole animals. Single exposure (acute) studies indicate:

Oral - Slightly Toxic to Rats and Mice (LD50 1,600-4,340 mg/kg)

Dermal - Moderately Toxic to Rabbits (LD50 800 mg/kg)

Skin Irritation - Severely Irritating to Rabbits

Eye Irritation - Severely Irritating to Rabbits

Component Carcinogenicity

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.

Ethanolamine

This material is generally non-toxic to fish such as rainbow trout, bluegill, goldfish, and fathead minnow with LC50 values greater than 100 mg/l. It has also been shown to be non-toxic to invertebrates such as Daphnia magna and blue green

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algae with LC50 values of 250 mg/l or 6300 mg/l, respectively. This material has a low octanol/water partition coefficient and would not be expected to bioaccumulate in aquatic species or food chains.

Environmental Fate:

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

Ethanolamine

This material is readily degraded biologically, showing high theoretical utilization in both chemical and biological oxidation demand testing.

*** 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 ***
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US DOT Information

DOT Name: Polyamines, liquid, corrosive, NOS
DOT Technical Name: (Polyethylene Polyamines)
DOT Hazard Class: 8
UN Number: UN2735
DOT Packing Group: PGIII

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*** 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

SARA Title III, Section 313

This product does not contain chemical(s) which are defined as toxic chemicals under and subject to the reporting requirements of, Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 986 and 40 CFR Part 372.

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

SARA 311/312: Acute: Y Chronic: Y 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.

Ethanolamine
Triethylenetetramine

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.

Ethanolamine
Triethylenetetramine

Pennsylvania Right to Know

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

Ethanolamine

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Triethylenetetramine

Other Regulations

A: General Product Information

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

B: Component Analysis – Inventory Component Analysis - Inventory

CAS #	Component	TSCA	DSL	EINECS
141-43-5	Ethanolamine	Yes	Yes	Yes
112-24-3	Triethylenetetramine	Yes	Yes	Yes

C: Component Analysis - WHMIS IDL

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

Component	CAS #	Disclosure / Classifications
Ethanolamine	141-43-5	1% / B3, E
Triethylenetetramine	112-24-3	0.1% / D1B, D2B, E

*** 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.