

EMS CATALOG NO: 16200-16222 &
16400-16411
EMS PRODUCT: Glutaraldehyde 25%
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MATERIAL SAFETY DATA SHEET

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FOR PRODUCT AND SALES INFORMATION

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PRODUCT IDENTIFICATION

PRODUCT NAME: Glutaraldehyde 25%
COMMON NAME: Glutaraldehyde (25% by Weight)
SYNONYM: Glutaral, Glutaric Dialdehyde
CHEMICAL FORMULA: CHCC(=O)CHO
CHEMICAL FAMILY: Aldehydes

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COMPOSITION INFORMATION

COMPONENT	CAS#	AMOUNT
Glutaraldehyde	111-30-8	25%
Water	7732-18-5	<74.5%
Methanol	67-56-1	0.5%

HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

APPEARANCE: Transparent, Colorless
PHYSICAL STATE: Liquid
ODOR: Sharp, Fruity, Medicinal
HAZARDS OF PRODUCT: DANGER!
CORROSIVE
CAUSES IRREVERSIBLE EYE DAMAGE.
CAUSES SKIN BURNS.
MAY BE FATAL IF SWALLOWED.
PROLONGED OR FREQUENTLY REPEATED SKIN CONTACT MAY CAUSE ALLERGIC REACTION IN SOME INDIVIDUALS.
PLASTIC CONTAINER, IF PRESENT, MAY CAUSE STATIC IGNITION HAZARD.

ASPIRATION MAY CAUSE LUNG DAMAGE. CAUSES ASTHMATIC SIGNS AND SYMPTOMS IN HYPER-REACTIVE INDIVIDUALS.

POTENTIAL HEALTH EFFECTS:
Effects of Single Acute Overexposure:

INHALATION:
Vapor is irritating to the respiratory tract, causing stinging sensations in the nose and throat, discharge from the nose, possibly bleeding from the nose, coughing, chest discomfort and tightness, difficulty with breathing, and headache. Heating the solution may result in more severe irritant effects.

EYE CONTACT:
Liquid will cause a severe and persistent conjunctivitis, seen as excess redness and marked swelling of the conjunctiva and profuse discharge. Severe corneal injury may develop, which could permanently impair vision if prompt first-aid and medical

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treatment are not obtained. Vapor will cause stinging sensations in the eye with excess tear production, blinking, and possibly a slight excess redness of the conjunctiva.

SKIN CONTACT:

Brief contact will cause itching with mild to moderate local redness and possibly swelling. Prolonged contact may result in pain, severe redness and swelling, with ulceration, tissue destruction, and possibly bleeding into the inflamed area. Contact with solutions of glutaraldehyde may cause harmless yellow or brownish coloration of the skin.

SKIN ABSORPTION:

Prolonged or widespread contact may result in the absorption of potentially harmful amounts of material.

SWALLOWING

Moderately toxic. May cause moderate to marked irritation and possibly chemical burns of the mouth, throat, esophagus, and stomach. There will be discomfort or pain in the chest and abdomen, nausea, vomiting, diarrhea, dizziness, faintness, drowsiness, thirst, weakness, circulatory shock, collapse and coma. Aspiration into the lungs may occur during ingestion or vomiting, resulting in lung injury.

Chronic, Prolonged or Repeated Overexposure

EFFECTS OF REPEATED OVEREXPOSURE:

Repeated skin contact may cause a cumulative dermatitis.

OTHER EFFECTS OF OVEREXPOSURE:

May cause skin sensitization in a small portion of individuals and present as an allergic contact dermatitis. This usually results from contact with the liquid, but occasionally there may be a reaction to glutaraldehyde vapor. Will cause signs and symptoms of an asthmatic attack in hyper-reactive individuals.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE

Skin contact may aggravate an existing dermatitis. Inhalation of material may aggravate asthma and inflammatory or fibrotic pulmonary disease.

POTENTIAL ENVIRONMENTAL EFFECTS

See Section labeled ECOLOGICAL INFORMATION.

FIRST AID PROCEDURES

INHALATION:

Remove to fresh air. Give artificial respiration if not breathing. If breathing is difficult, oxygen may be given by qualified personnel. Obtain medical attention.

EYE CONTACT:

Immediately flush eyes with water and continue washing for at least 15 minutes. DO NOT remove contact lenses, if worn. Obtain medical attention without delay, preferably from an ophthalmologist.

SKIN CONTACT:

Immediately remove contaminated clothing and shoes. Wash skin with soap and water. Obtain medical attention. Wash clothing before reuse. Discard contaminated leather articles such as shoes and belt.

SWALLOWING

DO NOT INDUCE VOMITING. Do not give anything to drink. Obtain medical attention without delay.

NOTES TO PHYSICIAN:

The hazards of this material are due mainly to its severely irritant properties on skin and mucosal surfaces. Moderately toxic by swallowing. Moderately toxic by absorption across the skin. Due to the severely irritating or corrosive nature of the material, swallowing may lead to ulceration and inflammation of the upper alimentary tract with hemorrhage and fluid loss. Also, perforation of the esophagus or stomach may occur, leading to mediastinitis or peritonitis and the resultant complications. Any material aspirated during vomiting may cause lung injury. Therefore, emesis should not be induced mechanically or pharmacologically. If it is considered necessary to evacuate the stomach contents, this should be done by means least likely to cause aspiration (e.g., gastric lavage after endotracheal intubation).

FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES:

FLASH POINT: Closed Cup: Tag Closed Cup ASTM D 56: None
Open Cup: Tag Closed Cup ASTM D 1310: None
AUTOIGNITION TEMPERATURE: Not currently available.

FLAMMABLE LIMITS IN AIR:

LOWER: Not determined, Aqueous System
UPPER: Not determined, Aqueous System

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EXTINGUISHING MEDIA:

Not-flammable (aqueous solution): After water evaporates, remaining material will burn. Use alcohol-type or all-purpose-type foam, applied by manufacturer's recommended techniques for large fires. Use carbon dioxide or dry chemical media for small fires.

EXTINGUISHING MEDIA TO AVOID:

No information currently available.

SPECIAL FIRE FIGHTING PROCEDURES:

No information currently available.

SPECIAL PROTECTIVE EQUIPMENT FOR FIREFIGHTERS:

Use self-contained breathing apparatus and protective clothing.

UNUSUAL FIRE AND EXPLOSION HAZARDS: None known.

HAZARDOUS COMBUSTION PRODUCTS:

Burning can produce the following products: Carbon monoxide and/or carbon dioxide. Carbon monoxide is highly toxic if inhaled; carbon dioxide in sufficient concentrations can act as an asphyxiant.

ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED:

Very low concentrations (5ppm or less of glutaraldehyde) can be degraded in a biological wastewater treatment system. Thus, small spills can be flushed with large quantities of water. Large quantities or 'slugs' can be harmful to the treatment system. Thus, large spills should be collected for disposal. It may also be possible to decontaminate spilled material by careful application of sodium hydroxide, ammonium or sodium bisulfite. Depending on conditions, considerable heat and fumes can be liberated by the decontamination reaction.

PERSONAL PRECAUTIONS:

Wear suitable protective equipment. See Section labeled PERSONAL PROTECTION.

ENVIRONMENTAL PRECAUTIONS:

Toxic to fish; avoid discharge to natural waters.

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HANDLING AND STORAGE

HANDLING

GENERAL HANDLING

Do not get in eyes, on skin, on clothing. Avoid breathing vapor. Do not swallow. Do not handle or empty in presence of flammable vapor. Wear goggles, protective clothing and gloves. Wash thoroughly with soap and water after handling. Remove contaminated clothing and wash before reuse. Keep container closed. Use with adequate ventilation.

FOR INDUSTRY USE ONLY.

VENTILATION:

General (mechanical) room ventilation is expected to be satisfactory if this material is kept in covered equipment or if the solution is highly diluted. However, if vapors are strong enough to be irritating to the nose (or eyes), the TLV is probably being exceeded and special ventilation may be required.

OTHER PRECAUTIONS:

Must not be used in the form of a spray or aerosol.

STORAGE

No information currently available.

EXPOSURE CONTROLS AND PERSONAL PROTECTION

EXPOSURE LIMITS

COMPONENT	EXPOSURE LIMITS	SKIN	IR STATE
Glutaraldehyde	0.05 ppm CEILING ACGIH		activated and unactivated
	0.2 mg/m ³ CEILING ACGIH		activated and unactivated
	0.2 ppm CEILING OSHA		
	0.8 mg/m ³ CEILING OSHA		
	0.1 ppm CEILING UCC		
Methanol	200 ppm TWA8 ACGIH	Yes	
	262 mg/m ³ TWA8 ACGIH	Yes	
	250 ppm STEL ACGIH	Yes	
	328 mg/m ³ STEL ACGIH	Yes	
	200 PPM TWA8 OSHA	Yes	
	260 mg/m ³ TWA8 OSHA	Yes	
	250 ppm STEL OSHA	Yes	
	325 mg/m ³ STEL OSHA	Yes	

PERSONAL PROTECTION

RESPIRATORY PROTECTION:

Use self-contained breathing apparatus in high vapor concentrations. If self-contained breathing apparatus is not available, a MSHA/NIOSH approved air purifying respirator equipped with an organic vapor cartridge should be used.

VENTILATION:

General (mechanical) room ventilation is expected to be satisfactory if this material is kept in covered equipment or if the solution is highly diluted. However, if vapors are strong enough to be irritating to the nose (or eyes), the TLV is probably being exceeded and special ventilation may be required.

EYE PROTECTION:

Splash proof monogoggles or safety glasses with side shields in conjunction with a face shield.

PROTECTIVE GLOVES:

Polyethylene
Nitrile (NBR)
Butyl

OTHER PROTECTIVE EQUIPMENT:

Chemical apron, Eye bath, Safety shower, Rubber Boots.

ENGINEERING CONTROLS:

No information currently available.

PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE: Liquid.

APPEARANCE: Transparent Colorless.

pH: Not currently available.

SOLUBILITY IN WATER (BY WEIGHT): 20°C 100%

ODOR: Sharp, Fruity, Medicinal.

MOLECULAR WEIGHT: 100.11 g/mol

BOILING POINT (760MMHg): ~100.5°C ~213°F As product.

FREEZING POINT: ~-21°C ~-6°F

SPECIFIC GRAVITY (h₂O = 1): 1.129 20°C/20°C

VAPOR PRESSURE AT 20°C: 0.03 kPa Active Ingredient
0.20mmHg Active Ingredient

VAPOR DENSITY (AIR=1): 1.1

EVAPORATION RATE (BUTYL ACETATE = 1): 1.0

MELTING POINT: Not applicable.

STABILITY AND REACTIVITY

STABILITY/INSTABILITY: Stable.

CONDITIONS TO AVOID:

Avoid high temperature and evaporation of water.

INCOMPATIBLE MATERIALS: Strong alkalis and acids catalyze an aldol-type condensation (exothermic, but not expected to be violent).

HAZARDOUS POLYMERIZATION: Will not occur.

CONDITIONS TO AVOID: Temperatures above 100°C, Although polymerization may occur, it is not hazardous.

INHIBITORS/STABILIZERS: Not applicable.

TOXICOLOGICAL INFORMATION

ACUTE TOXICITY

PERORAL: rat LD50 female 154 (116-206) mg/kg

Major signs: sluggishness, lacrimation, diarrhea, piloerection, perineal encrustation.

Gross pathology: lungs, stomach, intestines discolored.

PERORAL: rat LD50 male 246 (179-339) mg/kg

Major signs: sluggishness, lacrimation, diarrhea, piloerection, perineal encrustation.

Gross pathology: lungs, stomach, intestines discolored

PERCUTANEOUS: rabbit LD50 24 hr occluded 2.54 (1.46-4.41) ml/kg

Major signs: necrosis at application site

Gross pathology: lungs, liver, spleen, kidneys discolored

INHALATION: dynamic generation of vapor Exposure Time 4h 163 ppm rat female

Room temperature

Kill Rate: 0/5

Major Signs: blepharospasm, periorcular wetness, audible respiration

Gross pathology: None.

INHALATION: static generation of substantially saturated vapor

Exposure Time 4h rat female

20°C

Kill Rate: 0/5

Major Signs: blepharospasm

Gross Pathology: None

INHALATION: dynamic generation of vapor Exposure Time 4h 16.3 ppm

rat male

Room temperature

Kill Rate: 0/5

Major Signs: blepharospasm, periorcular wetness, audible

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respiration

Gross Pathology: None.

INHALATION: static generation of substantially saturated vapor

Exposure Time 4h rat male

20°C

Kill Rate: 0/5

Major Signs: blepharospasm

Gross Pathology: None

INHALATION: Aerosol Exposure Time 4h

LC50 0.48 (0.41-0.59) ml/l

Major Signs: heavy or irregular breathing, nasal discharge,
gasping, nasal encrustation

Gross Pathology: lungs discolored.

IRRITATION:

SKIN: rabbit 4 hr covered 2/6 with necrosis

SKIN: rabbit 1 hr occluded minor to severe erythema and edema
with necrosis, scabbing,
desquamation, and alopecia

SKIN: rabbit 3 min occluded minor erythema

EYE: rabbit 0.005 ml severe corneal injury, iritis,
swelling and necrosis of eyelid

EYE: rabbit 0.5ml 5% solution in water severe
corneal injury, iritis, swelling
and necrosis of eyelid.

EYE: rabbit 0.5ml 1% solution in water trace corneal
injury

SENSITIZATION (ANIMAL AND HUMAN STUDIES)

Guinea Pig Maximization Test: intradermal injection of a 0.1% glutaraldehyde solution and topical administration of a 5% solution. Evidence of delayed contact hypersensitivity in 68% of test animals upon challenge.

CHRONIC TOXICITY AND CARCINOGENICITY:

Subchronic drinking water studies in rats, mice and dogs using glutaraldehyde concentrations up to 1000 ppm showed no evidence for any target organ toxicity. In vitro studies for genotoxicity using a variety of assays have given results varying from no activity, through equivocal, to weakly positive; however, in all vivo studies for genotoxicity have been uniformly negative. Several developmental toxicity studies have demonstrated that at maternally nontoxic doses, glutaraldehyde does not produce fetotoxic, embryotoxic or teratogenic effects.

In chronic (2-year) continuous drinking water combined chronic toxicity-oncogenicity study using Fischer 344 rats, there was no evidence for non-oncogenic target organ toxicity. The only possible oncogenicity-related finding was an increase in the incidence of large granular cell lymphocytic leukemia in female, but not male, rats. The pattern of the response suggests that it does not represent direct chemical carcinogenic activity

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but, rather, a modifying influence on the expression of this spontaneous and commonly occurring neoplasm in the Fischer 344 rat.

SIGNIFICANT DATA WITH POSSIBLE RELEVANCE TO HUMANS

Studies in humans have shown that glutaraldehyde is neither phototoxic nor a photosensitizer. Subchronic drinking water studies in rats, mice and dogs using concentrations up to 1000 ppm showed no evidence for any target organ toxicity. In vitro studies for genotoxicity using a variety of assays have given results varying from no activity through equivocal, to weakly positive; however, all in vivo studies for genotoxicity have been uniformly negative. Several developmental toxicity studies have demonstrated that at maternally nontoxic doses, glutaraldehyde does not produce fetotoxic, embryotoxic or teratogenic effects. In a two-generation reproduction study involving continuous exposure of CD rats to glutaraldehyde up to 1000 ppm, in drinking water there were effects on parental body weight and food consumption at 1000 ppm (due to an aversion to the taste), but no adverse effects on reproductive performance. In a chronic 2-year continuous drinking water combined chronic toxicity-oncogenicity study using Fischer 344 rats, there was no evidence for non-oncogenic target organ toxicity. The only possible oncogenicity-related finding was an increase in the incidence of large granular cell lymphocytic leukemia in female, but not male, rats. The pattern of the response suggests that it does not represent direct chemical carcinogenic activity but, rather, a modifying influence on the expression of this spontaneous and commonly occurring neoplasm in the Fischer 344 rat. Repeated applications of aqueous solutions of glutaraldehyde to the rat skin for 20 doses over a 28-day period at 50, 100, or 150 mg/kg/day produced mild local inflammatory effects, but no evidence for target organ or tissue systemic toxicity. An extensive clinical survey has been conducted on nursing staff in 59 endoscopy units (340 currently employed workers and 18 former employees); investigational procedures included detailed questionnaire, sensitization to common allergens, blood for IgE measurements, lung function tests, peak flow diaries, and measurement of workplace glutaraldehyde vapor concentrations. About two-thirds of current employees had ocular, nasal, or lower respiratory tract symptoms, but these were more prevalent for non-work conditions. The only effect correlated with glutaraldehyde exposure was nasal irritation. There was a slight, but not statistically or biologically significant, decrease in FEV1 for those with lower respiratory tract symptoms. There were no indications of asthma and no objective evidence for respiratory sensitization.

ECOLOGICAL INFORMATION

ENVIRONMENTAL FATE

BOD (% OXYGEN CONSUMPTION)

DAY 5	DAY 10	DAY 15	DAY 20	DAY 30
32%	68%		86%	

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ECOTOXICITY

ECOTOXICITY TO MICRO-ORGANISMS: Bacterid/NA LC50 16 h 50 mg/l
ECOTOXICITY TO AQUATIC INVERTEBRATES: Daphnia LC50 48 h 11.5 mg/l
CONFIDENCE LIMITS: 9.4 - 14.2 mg/l
ECOTOXICITY TO FISH: Blue gill LC50 96 h 22 mg/l

FURTHER INFORMATION

THOD (measured) 1.00

DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD:

Atomize into a very hot incinerator fire or mix with a suitable flammable solvent, and incinerate where permitted under appropriate Federal, State and local regulations. High water content may dampen flame. Dispose in accordance with all applicable Federal, State, Provincial, and local environmental regulations. Empty containers should be recycled or disposed of through an approved waste management facility.

DISPOSAL CONSIDERATIONS:

See Section Labeled Waste Disposal Method

Disposal methods identified are for the product as sold. For proper disposal of used material, an assessment must be completed to determine the proper and permissible waste management options permissible under applicable rules, regulations and/or laws governing your location.

TRANSPORT INFORMATION

No information available.

REGULATORY INFORMATION

FEDERAL / NATIONAL

CERCLA (COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT OF 1980 SECTION 103)

The following components of this product are specifically listed as hazardous substances in 40 CFR 302.4 (unlisted hazardous substances are not identified) and are present at levels which could require reporting: NONE

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SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (SARA) TITLE III
SECTIONS 302 AND 304

The following components of this product are listed as extremely hazardous substances in 40 CFR Part 355 and are present at levels which could require reporting and emergency planning.

NONE

SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (SARA) TITLE III
SECTION 313

The following components of this product are listed as toxic chemicals in 40 CFR 372.65 and are present at levels which could require reporting and customer notification under Section 1313 and 40 CFR Part 372.

THIS PRODUCT DOES NOT CONTAIN TOXIC CHEMICALS AT LEVELS WHICH
COULD REQUIRE REPORTING UNDER THE STATUTE.

SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (SARA) TITLE III
SECTIONS 311 AND 312

DELAYED HAZARD: Yes

FIRE HAZARD: No

IMMEDIATE HEALTH HAZARD: Yes

REACTIVE HAZARD: No

SUDDEN RELEASE OF PRESSURE HAZARD: No

TOXIC SUBSTANCES CONTROL ACT (TSCA)

All components of this product are on the TSCA Inventory or are exempt from TSCA Inventory requirements.

STATE / LOCAL

PENNSYLVANIA (WORKER AND COMMUNITY RIGHT-TO-KNOW ACT)

This product is subject to the Worker and Community Right-to-Know Act. The following components of this product are at levels which could require identification in the MSDS.

COMPONENT	CAS#	AMOUNT
Glutaraldehyde	111-30-8	<= 25.0000%

MASSACHUSETTS (HAZARDOUS SUBSTANCES DISCLOSURE BY EMPLOYERS)

The following components of this product appear on the Massachusetts Substance List and are present at levels which could require identification in the MSDS;

COMPONENT	CAS#	AMOUNT
Glutaraldehyde	111-30-8	<= 25.0000%

CALIFORNIA PROPOSITION 65 (SAFE DRINKING WATER AND TOXIC ENFORCEMENT
ACT OF 1986)

This product contains no listed substances known to the State of California to cause cancer, birth defects or other reproductive harm, at levels which would require a warning under the statute.

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CALIFORNIA SCAGMD RULE 443.1 (SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT RULE 443.1 LABELING OF MATERIALS CONTAINING ORGANIC SOLVENTS)

VOC: Not applicable.

This section provides selected regulatory information on this product including its components. This is not intended to include all regulations. It is the responsibility of the user to know and comply with all applicable rules, regulations and laws relating to the product being used.

OTHER INFORMATION

SPECIFIC HAZARD RATING SYSTEM

HMS ratings for this product are: H-3 F-0 S-1

NFPA ratings for this product are: H-2 F-0 S-1

These ratings are part of specific hazard communications program(s) and should be disregarded where individuals are not trained in the use of these hazard rating systems. You should be familiar with the hazard communication applicable to your workplace.

RECOMMENDED USES AND RESTRICTIONS

Must not be used in the form of a spray or aerosol.

FOR INDUSTRY USE ONLY!