



Material Safety Data Sheet

The Dow Chemical Company

Product Name: GLUTARALDEHYDE 50% FCC

Issue Date: 07/17/2013

Print Date: 18 Jul 2013

The Dow Chemical Company encourages and expects you to read and understand the entire (M)SDS, as there is important information throughout the document. We expect you to follow the precautions identified in this document unless your use conditions would necessitate other appropriate methods or actions.

1. Product and Company Identification

Product Name

GLUTARALDEHYDE 50% FCC

COMPANY IDENTIFICATION

The Dow Chemical Company
2030 Willard H. Dow Center
Midland, MI 48674
United States

Customer Information Number:

800-258-2436

SDSQuestion@dow.com

EMERGENCY TELEPHONE NUMBER

24-Hour Emergency Contact:

989-636-4400

Local Emergency Contact:

989-636-4400

2. Hazards Identification

Emergency Overview

Color: Clear

Physical State: Liquid.

Odor: Fruity

Hazards of product:

DANGER! Keep out of reach of children. Causes severe eye burns. Causes skin burns. May cause allergic skin reaction. Harmful if inhaled; heated material produces harmful vapors. Causes respiratory tract irritation. Harmful if swallowed. May be harmful if absorbed through skin. Aspiration hazard. Can enter lungs and cause damage. Evacuate area. Keep upwind of spill. Highly toxic to fish and/or other aquatic organisms.

OSHA Hazard Communication Standard

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

Potential Health Effects

Eye Contact: May cause severe irritation with corneal injury which may result in permanent impairment of vision, even blindness. Chemical burns may occur. Vapor may cause eye irritation experienced as mild discomfort and redness.

Skin Contact: Brief contact may cause skin burns. Symptoms may include pain, severe local redness and tissue damage.

Skin Absorption: Prolonged or widespread skin contact may result in absorption of potentially harmful amounts.

Skin Sensitization: Skin contact may cause an allergic skin reaction in a small proportion of individuals. Has caused allergic skin reactions when tested in guinea pigs. Has demonstrated the potential for contact allergy in mice.

Inhalation: Vapor may cause severe irritation of the upper respiratory tract (nose and throat). Vapor from heated material may cause serious adverse effects, even death. Case reports and medical surveys link asthma and respiratory irritation to glutaraldehyde exposure, primarily in medical personnel. Asthma-like symptoms may occur in people prone to respiratory disorders or other allergies. Asthma-like symptoms may include coughing, difficult breathing and a feeling of tightness in the chest. Occasionally, breathing difficulties may be life threatening.

Respiratory Sensitization: May cause allergic respiratory response in a small proportion of individuals.

Ingestion: Moderate toxicity if swallowed. Swallowing may result in irritation or burns of the mouth, throat, and gastrointestinal tract. Swallowing may result in gastrointestinal irritation or ulceration. Excessive exposure may cause: Headache. Dizziness. Anesthetic effects. Drowsiness. Unconsciousness. Other central nervous system effects.

Aspiration hazard: Aspiration into the lungs may occur during ingestion or vomiting, causing tissue damage or lung injury.

Effects of Repeated Exposure: Repeated skin contact may result in absorption of amounts which could cause death. May cause nausea and vomiting.

Birth Defects/Developmental Effects: Has been toxic to the fetus in laboratory animals at doses toxic to the mother.

3. Composition Information

Component	CAS #	Amount
Glutaraldehyde	111-30-8	50.0 %
Water	7732-18-5	<= 50.0 %

4. First-aid measures**Description of first aid measures**

General advice: First Aid responders should pay attention to self-protection and use the recommended protective clothing (chemical resistant gloves, splash protection). If potential for exposure exists refer to Section 8 for specific personal protective equipment.

Inhalation: Move person to fresh air. If person is not breathing, call an emergency responder or ambulance, then give artificial respiration; if by mouth to mouth use rescuer protection (pocket mask etc). Call a poison control center or doctor for treatment advice. If breathing is difficult, oxygen should be administered by qualified personnel.

Skin Contact: Take off contaminated clothing. Wash skin with soap and plenty of water for 15-20 minutes. Call a poison control center or doctor for treatment advice. Wash clothing before reuse. Shoes and other leather items which cannot be decontaminated should be disposed of properly. Suitable emergency safety shower facility should be immediately available.

Eye Contact: Wash immediately and continuously with flowing water for at least 30 minutes. Remove contact lenses after the first 5 minutes and continue washing. Obtain prompt medical consultation, preferably from an ophthalmologist. Suitable emergency eye wash facility should be immediately available.

Ingestion: If the person is fully alert and cooperative, have the person rinse mouth with plenty of water. In cases of ingestion have the person drink 4 to 10 ounces (120-300 mL) of water. Do not induce vomiting. Do not attempt mouth rinse if the person has respiratory distress, altered mental status, or nausea and vomiting. Call a physician and/or transport to emergency facility immediately. See "Indication of immediate medical attention and special treatment needed".

Most important symptoms and effects, both acute and delayed

Aside from the information found under Description of first aid measures (above) and Indication of immediate medical attention and special treatment needed (below), no additional symptoms and effects are anticipated.

Indication of immediate medical attention and special treatment needed

Maintain adequate ventilation and oxygenation of the patient. May cause respiratory sensitization or asthma-like symptoms. Bronchodilators, expectorants and antitussives may be of help. Glutaraldehyde may transiently worsen reversible airways obstruction including asthma or reactive airways disease. Treat bronchospasm with inhaled beta2 agonist and oral or parenteral corticosteroids. Chemical eye burns may require extended irrigation. Obtain prompt consultation, preferably from an ophthalmologist. If burn is present, treat as any thermal burn, after decontamination. Due to irritant properties, swallowing may result in burns/ulceration of mouth, stomach and lower gastrointestinal tract with subsequent stricture. Aspiration of vomitus may cause lung injury. Suggest endotracheal/esophageal control if lavage is done. Probable mucosal damage may contraindicate the use of gastric lavage. No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient. Have the Safety Data Sheet, and if available, the product container or label with you when calling a poison control center or doctor, or going for treatment.

Excessive exposure may aggravate preexisting asthma and other respiratory disorders (e.g. emphysema, bronchitis, reactive airways dysfunction syndrome).

5. Fire Fighting Measures

Suitable extinguishing media

To extinguish combustible residues of this product use water fog, carbon dioxide, dry chemical or foam.

Special hazards arising from the substance or mixture

Hazardous Combustion Products: Under fire conditions some components of this product may decompose. The smoke may contain unidentified toxic and/or irritating compounds. Combustion products may include and are not limited to: Carbon monoxide. Carbon dioxide.

Unusual Fire and Explosion Hazards: This material will not burn until the water has evaporated. Residue can burn.

Advice for firefighters

Fire Fighting Procedures: Keep people away. Isolate fire and deny unnecessary entry. To extinguish combustible residues of this product use water fog, carbon dioxide, dry chemical or foam. Contain fire water run-off if possible. Fire water run-off, if not contained, may cause environmental damage. Review the "Accidental Release Measures" and the "Ecological Information" sections of this (M)SDS.

Special Protective Equipment for Firefighters: Wear positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing (includes fire fighting helmet, coat, trousers, boots, and gloves). Avoid contact with this material during fire fighting operations. If contact is likely, change to full chemical resistant fire fighting clothing with self-contained breathing apparatus. If this is not available, wear full chemical resistant clothing with self-contained breathing apparatus and fight fire from a remote location. For protective equipment in post-fire or non-fire clean-up situations, refer to the relevant sections.

6. Accidental Release Measures

Personal precautions, protective equipment and emergency procedures: Evacuate area. Keep upwind of spill. Ventilate area of leak or spill. Only trained and properly protected personnel must be involved in clean-up operations. Refer to Section 7, Handling, for additional precautionary measures. Use appropriate safety equipment. For additional information, refer to Section 8, Exposure Controls and Personal Protection.

Environmental precautions: Spills or discharge to natural waterways is likely to kill aquatic organisms. Prevent from entering into soil, ditches, sewers, waterways and/or groundwater. See Section 12, Ecological Information.

Methods and materials for containment and cleaning up: Avoid making contact with spilled material, glutaraldehyde will be absorbed by most shoes. Always wear the correct protective equipment, consisting of splashproof monogoggles, or both safety glasses with side shields and a wraparound full-face shield, appropriate gloves and protective clothing. A self-contained breathing apparatus or respirator and absorbents may be necessary, depending on the size of the spill and the adequacy of ventilation. Small spills: Wear the correct protective equipment and cover the liquid with absorbent material. Collect and seal the material and the dirt that has absorbed the spilled material in polyethylene bags and place in a drum for transit to an approved disposal site. Rinse away the remaining spilled material with water to reduce odor, and discharge the rinsate into a municipal or industrial sewer. Large spills: In case of nasal and respiratory irritation, vacate the room immediately. Personnel cleaning up should be trained and equipped with a self-contained breathing apparatus, or an officially approved or certified full-face respirator equipped with an organic vapor cartridge, gloves, and clothing impervious to glutaraldehyde, including rubber boots or shoe protection. Deactivate with sodium bisulfite (2-3 parts (by weight) per part of active substance glutaraldehyde), collect the neutralized liquid and place in a drum for transit to an approved disposal site.

7. Handling and Storage

Handling

General Handling: Keep out of reach of children. Do not get in eyes, on skin, on clothing. Do not swallow. Avoid prolonged or repeated contact with skin. Avoid breathing vapor. Keep container closed. Use with adequate ventilation. Wear goggles, protective clothing and butyl or nitrile gloves. Wash thoroughly with soap and water after handling. Remove contaminated clothing and wash before reuse. See Section 8, EXPOSURE CONTROLS AND PERSONAL PROTECTION.

Other Precautions: Do not spray or aerosolize the undiluted form of the product. Full personal protective equipment (including skin covering and full-face SCBA respirator) is required for dilutions or mixtures of the product used in a spray application.

Storage

Do not store in: Aluminum. Carbon steel. Copper. Mild steel. Iron. Please refer to Dow publication: GLUTARALDEHYDE. Safe Handling and Storage Guide; Form No. 253-01338.

Shelf life: Use within 12 Months

8. Exposure Controls / Personal Protection

Exposure Limits

Component	List	Type	Value
Glutaraldehyde	ACGIH	Ceiling	0.05 ppm SEN

A "SEN" notation following the exposure guideline refers to the potential to produce sensitization, as confirmed by human or animal data.

Personal Protection

Eye/Face Protection: Use chemical goggles. If exposure causes eye discomfort, use a full-face respirator. Use a full-face respirator when material is heated or when aerosols/mists are generated. Eye wash fountain should be located in immediate work area.

Skin Protection: Use protective clothing chemically resistant to this material. Selection of specific items such as face shield, boots, apron, or full body suit will depend on the task. Safety shower should be located in immediate work area. Use chemical protective clothing resistant to this material, when there is any possibility of skin contact. Remove contaminated clothing immediately, wash skin area with soap and water, and launder clothing before reuse or dispose of properly. Items which cannot be decontaminated, such as shoes, belts and watchbands, should be removed and disposed of properly.

Hand protection: Use gloves chemically resistant to this material. Examples of preferred glove barrier materials include: Butyl rubber. Examples of acceptable glove barrier materials include: Nitrile/butadiene rubber ("nitrile" or "NBR"). NOTICE: The selection of a specific glove for a particular application and duration of use in a workplace should also take into account all relevant workplace factors such as, but not limited to: Other chemicals which may be handled, physical requirements (cut/puncture protection, dexterity, thermal protection), potential body reactions to glove materials, as well as the instructions/specifications provided by the glove supplier.

Respiratory Protection: Atmospheric levels should be maintained below the exposure guideline. When respiratory protection is required for certain operations, use an approved air-purifying respirator. This product is a respiratory irritant. If discomfort is experienced ventilation is not adequate and an approved full face air-purifying respirator is recommended. If vapors are strong enough to be irritating to the nose, or eyes, the OEL is probably being exceeded. Special ventilation or respiratory protection may be required. For operations such as spraying and other conditions such as emergencies where the exposure guideline may be greatly exceeded, use an approved positive-pressure self-contained breathing apparatus. For emergency response or for situations where the atmospheric level is unknown, use an approved positive-pressure self-contained breathing apparatus or positive-pressure air line with auxiliary self-contained air supply. The following should be effective types of air-purifying respirators: Full-face Organic vapor cartridge with a particulate pre-filter.

Ingestion: Avoid ingestion of even very small amounts; do not consume or store food or tobacco in the work area; wash hands and face before smoking or eating.

Engineering Controls

Ventilation: Use engineering controls to maintain airborne level below exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, use only with adequate ventilation. Local exhaust ventilation may be necessary for some operations.

9. Physical and Chemical Properties

Appearance

Physical State

Liquid.

Color

Clear

Odor

Fruity

Odor Threshold

< 1 ppb *Literature*

pH

3.1 - 4.5 *ASTM E70*

Melting Point

Not applicable to liquids

Freezing Point

-18 °C (0 °F) *OECD 102*

Boiling Point (760 mmHg)

100.7 °C (213.3 °F) *OECD 103*.

Flash Point - Closed Cup

ASTM D56 (none)

Evaporation Rate (Butyl Acetate = 1)

1.0 *Literature*

Flammability (solid, gas)

Not applicable to liquids

Flammable Limits In Air

Lower: No test data available

Upper: No test data available

Vapor Pressure

0.3 mmHg @ 20 °C *OECD 104* Active ingredient

Vapor Density (air = 1)

1.1

Specific Gravity (H₂O = 1)

1.129 *OECD 109*

Solubility in water (by weight)

100 % @ 20 °C *Calculated*

Partition coefficient, n-octanol/water (log Pow)	-0.333 <i>Measured</i>
Autoignition Temperature	No test data available
Decomposition Temperature	No test data available
Dynamic Viscosity	15.4 cps <i>Literature</i> (Brookfield Viscosity - @ 100 rpm, #0 spindle)
Kinematic Viscosity	20.2 mm ² /s @ 20 °C <i>Literature</i>
Explosive properties	no data available
Oxidizing properties	No
Molecular Weight	No test data available
Saturated Vapor Concentration	No test data available
Henry's Law Constant (H)	3.3E-08 atm*m ³ /mole; 25 °C <i>Measured</i>

10. Stability and Reactivity

Reactivity

No dangerous reaction known under conditions of normal use.

Chemical stability

Thermally stable at typical use temperatures.

Possibility of hazardous reactions

Polymerization will not occur.

Conditions to Avoid: Active ingredient decomposes at elevated temperatures.

Incompatible Materials: Avoid contact with: Amines. Ammonia. Strong acids. Strong bases. Strong oxidizers. Avoid contact with metals such as: Aluminum. Carbon steel. Copper. Iron. Mild steel.

Hazardous decomposition products

Decomposition products depend upon temperature, air supply and the presence of other materials.

11. Toxicological Information

Acute Toxicity

Ingestion

As product: LD50, rat, male and female 200 mg/kg

Dermal

As product: LD50, rabbit, male 1,749 mg/kg

Inhalation

As product: The LC50 has not been determined.

Eye damage/eye irritation

May cause severe irritation with corneal injury which may result in permanent impairment of vision, even blindness. Chemical burns may occur. Vapor may cause eye irritation experienced as mild discomfort and redness.

Skin corrosion/irritation

Brief contact may cause skin burns. Symptoms may include pain, severe local redness and tissue damage.

Sensitization

Skin

Skin contact may cause an allergic skin reaction in a small proportion of individuals. Has caused allergic skin reactions when tested in guinea pigs. Has demonstrated the potential for contact allergy in mice.

Respiratory

May cause allergic respiratory response in a small proportion of individuals.

Repeated Dose Toxicity

Repeated skin contact may result in absorption of amounts which could cause death. May cause nausea and vomiting.

Chronic Toxicity and Carcinogenicity

In a NTP chronic 2-year inhalation study on glutaraldehyde, no carcinogenicity was seen in rats or in mice. An increase in large granular lymphocytes in Fischer rats dosed with glutaraldehyde for two years was random or a secondary carcinogenic effect due to a modifying influence on the occurrence of this common neoplasm in this rat strain.

Developmental Toxicity

Has been toxic to the fetus in laboratory animals at doses toxic to the mother. Did not cause birth defects in laboratory animals.

Reproductive Toxicity

In animal studies, did not interfere with reproduction.

Genetic Toxicology

In vitro genetic toxicity studies were negative in some cases and positive in other cases. Animal genetic toxicity studies were predominantly negative.

12. Ecological Information

Toxicity

Material is highly toxic to aquatic organisms on an acute basis (LC50/EC50 between 0.1 and 1 mg/L in the most sensitive species tested). Material is moderately toxic to birds on an acute basis (LD50 between 51 and 500 mg/kg). Material is practically non-toxic to birds on a dietary basis (LC50 > 5000 ppm).

Fish Acute & Prolonged Toxicity

LC50, Pimephales promelas (fathead minnow), 96 h: 10.8 mg/l

Aquatic Invertebrate Acute Toxicity

LC50, Daphnia magna (Water flea), 48 h, immobilization: 0.69 mg/l

Aquatic Plant Toxicity

ErC50, Pseudokirchneriella subcapitata (green algae), Growth rate inhibition, 72 h: 2.64 mg/l

Toxicity to Micro-organisms

EC50, OECD 209 Test; activated sludge: > 50 mg/l

EC50; Bacteria, 16 h: 17 - 25 mg/l

Aquatic Invertebrates Chronic Toxicity Value

water flea Daphnia magna, flow-through test, 21 d, number of offspring, NOEC, NOEC: 0.24 mg/l

Toxicity to Above Ground Organisms

oral LD50, Anas platyrhynchos (Mallard duck): 408 - 466 mg/kg

dietary LC50, Colinus virginianus (Bobwhite quail): > 5,000 ppm

dietary LC50, Anas platyrhynchos (Mallard duck): > 5,000 ppm

Persistence and Degradability

Material is readily biodegradable. Passes OECD test(s) for ready biodegradability.

OECD Biodegradation Tests:

Biodegradation	Exposure Time	Method	10 Day Window
83 %	28 d	OECD 301A Test	pass
73 %	28 d	OECD 306 Test	Not applicable

Indirect Photodegradation with OH Radicals

Rate Constant	Atmospheric Half-life	Method
4.69E-11 cm ³ /s	2.74 h	Estimated.

Biological oxygen demand (BOD):

BOD 5	BOD 10	BOD 20	BOD 28
28 %	57 - 63 %	72 - 74 %	

Theoretical Oxygen Demand: 1.92 mg/mg

Bioaccumulative potential**Bioaccumulation:** Bioconcentration potential is low ($BCF < 100$ or $\text{Log Pow} < 3$).**Partition coefficient, n-octanol/water (log Pow):** -0.333 Measured**Mobility in soil****Mobility in soil:** Potential for mobility in soil is high (K_{oc} between 50 and 150)., Given its very low Henry's constant, volatilization from natural bodies of water or moist soil is not expected to be an important fate process.**Partition coefficient, soil organic carbon/water (K_{oc}):** 120 - 500 Estimated.**Henry's Law Constant (H):** $3.3E-08 \text{ atm}\cdot\text{m}^3/\text{mole}$; 25 °C Measured**13. Disposal Considerations**

DO NOT DUMP INTO ANY SEWERS, ON THE GROUND, OR INTO ANY BODY OF WATER. All disposal practices must be in compliance with all Federal, State/Provincial and local laws and regulations. Regulations may vary in different locations. Waste characterizations and compliance with applicable laws are the responsibility solely of the waste generator. AS YOUR SUPPLIER, WE HAVE NO CONTROL OVER THE MANAGEMENT PRACTICES OR MANUFACTURING PROCESSES OF PARTIES HANDLING OR USING THIS MATERIAL. THE INFORMATION PRESENTED HERE PERTAINS ONLY TO THE PRODUCT AS SHIPPED IN ITS INTENDED CONDITION AS DESCRIBED IN MSDS SECTION: Composition Information. FOR UNUSED & UNCONTAMINATED PRODUCT, the preferred options include sending to a licensed, permitted: Incinerator or other thermal destruction device.

14. Transport Information**DOT Non-Bulk****Proper Shipping Name:** CORROSIVE LIQUID, TOXIC, N.O.S.**Technical Name:** GLUTARALDEHYDE**Hazard Class:** 8 (6.1) **ID Number:** UN2922 **Packing Group:** PG II**DOT Bulk****Proper Shipping Name:** CORROSIVE LIQUID, TOXIC, N.O.S.**Technical Name:** GLUTARALDEHYDE**Hazard Class:** 8 (6.1) **ID Number:** UN2922 **Packing Group:** PG II

This information is not intended to convey all specific regulatory or operational requirements/information relating to this product. Additional transportation system information can be obtained through an authorized sales or customer service representative. It is the responsibility of the transporting organization to follow all applicable laws, regulations and rules relating to the transportation of the material.

15. Regulatory Information**OSHA Hazard Communication Standard**

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Community Right-to-Know Act of 1986) Sections 311 and 312

Immediate (Acute) Health Hazard	Yes
Delayed (Chronic) Health Hazard	No
Fire Hazard	No
Reactive Hazard	No
Sudden Release of Pressure Hazard	No

Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Community Right-to-Know Act of 1986) Section 313

To the best of our knowledge, this product does not contain chemicals at levels which require reporting under this statute.

Pennsylvania (Worker and Community Right-To-Know Act): Pennsylvania Hazardous Substances List and/or Pennsylvania Environmental Hazardous Substance List:

The following product components are cited in the Pennsylvania Hazardous Substance List and/or the Pennsylvania Environmental Substance List, and are present at levels which require reporting.

Component	CAS #	Amount
Glutaraldehyde	111-30-8	<= 50.0 %

Pennsylvania (Worker and Community Right-To-Know Act): Pennsylvania Special Hazardous Substances List:

To the best of our knowledge, this product does not contain chemicals at levels which require reporting under this statute.

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.

US. Toxic Substances Control Act

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

16. Other Information

Product Literature

Additional information on this product may be obtained by calling your sales or customer service contact.

Hazard Rating System

NFPA	Health	Fire	Reactivity
	3	1	0

Recommended Uses and Restrictions

Identified uses

Personal care applications. Cosmetics.

Revision

Identification Number: 2026 / 1001 / Issue Date 07/17/2013 / Version: 8.0

Most recent revision(s) are noted by the bold, double bars in left-hand margin throughout this document.

Legend

N/A	Not available
W/W	Weight/Weight
OEL	Occupational Exposure Limit
STEL	Short Term Exposure Limit

TWA	Time Weighted Average
ACGIH	American Conference of Governmental Industrial Hygienists, Inc.
DOW IHG	Dow Industrial Hygiene Guideline
WEEL	Workplace Environmental Exposure Level
HAZ_DES	Hazard Designation
Action Level	A value set by OSHA that is lower than the PEL which will trigger the need for activities such as exposure monitoring and medical surveillance if exceeded.

The Dow Chemical Company urges each customer or recipient of this (M)SDS to study it carefully and consult appropriate expertise, as necessary or appropriate, to become aware of and understand the data contained in this (M)SDS and any hazards associated with the product. The information herein is provided in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied, is given. Regulatory requirements are subject to change and may differ between various locations. It is the buyer's/user's responsibility to ensure that his activities comply with all federal, state, provincial or local laws. The information presented here pertains only to the product as shipped. Since conditions for use of the product are not under the control of the manufacturer, it is the buyer's/user's duty to determine the conditions necessary for the safe use of this product. Due to the proliferation of sources for information such as manufacturer-specific (M)SDSs, we are not and cannot be responsible for (M)SDSs obtained from any source other than ourselves. If you have obtained an (M)SDS from another source or if you are not sure that the (M)SDS you have is current, please contact us for the most current version.