



MATERIAL SAFETY DATA SHEET

PRODUCT

NALCO 2838 LIQUID

Emergency Telephone Number
Medical (800) 462-5378 (24 hours) (800) I-M-ALERT

SECTION 01 CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

TRADE NAME: NALCO 2838 LIQUID
DESCRIPTION: An aqueous solution of glutaraldehyde

NFPA 704M/HMIS RATING: 3/3 HEALTH 1/1 FLAMMABILITY 0/0 REACTIVITY 0 OTHER
0=Insignificant 1=Slight 2=Moderate 3=High 4=Extreme

SECTION 02 COMPOSITION AND INFORMATION ON INGREDIENTS

Our hazard evaluation has identified the following chemical ingredient(s) as hazardous under OSHA's Hazard Communication Rule, 29 CFR 1910.1200. Consult Section 15 for the nature of the hazard(s).

INGREDIENT(S)	CAS #	APPROX.%
Glutaraldehyde	111-30-8	15

SECTION 03 HAZARD IDENTIFICATION

EMERGENCY OVERVIEW:

DANGER! CORROSIVE. Causes irreversible eye damage. Causes skin irritation. Harmful if inhaled or swallowed. May cause skin sensitization. Do not get in eyes, on skin, on clothing. Avoid breathing vapor. Do not swallow. Wear goggles, protective clothing and protective gloves. Wash thoroughly with soap and water after handling. Remove contaminated clothing and wash before reuse.

Empty containers may contain residual product. Do not reuse container unless properly reconditioned.

PRIMARY ROUTE(S) OF EXPOSURE: Eye, Skin, Inhalation

EYE CONTACT: Corrosive to the eyes with possible permanent damage depending on the length of exposure and on the first aid action given.

SKIN CONTACT: Can cause moderate to severe skin irritation. Depending on the length of exposure and on the first aid action given, prolonged contact may be corrosive to skin. Can cause allergic contact dermatitis in susceptible individuals. Can be harmful if absorbed.

INGESTION: Can be harmful or fatal.

INHALATION: Can cause severe respiratory tract irritation.

SYMPTOMS OF EXPOSURE: A review of available data does not identify any symptoms from exposure not previously mentioned.

AGGRAVATION OF EXISTING CONDITIONS: A review of available data does not



MATERIAL SAFETY DATA SHEET

PRODUCT

NALCO 2838 LIQUID

Emergency Telephone Number
Medical (800) 462-5378 (24 hours) (800) I-M-ALERT

identify any worsening of existing conditions.

SECTION 04 FIRST AID INFORMATION

EYES: Immediately flush for at least 15 minutes while holding eyelids open. Call a physician at once.
SKIN: Immediately flush with water for at least 15 minutes. For a large splash, flood body under a shower. Call a physician at once.
INGESTION: Do not induce vomiting. Do not give anything to drink. Seek medical advice with urgency.
INHALATION: Remove to fresh air. Treat symptoms. Call a physician.

NOTE TO PHYSICIAN: Based on the individual reactions of the patient, the physician's judgment should be used to control symptoms and clinical condition.

CAUTION: If unconscious, having trouble breathing or in convulsions, do not induce vomiting or give water.

NOTE TO PHYSICIAN: Probable mucosal damage may contraindicate the use of gastric lavage. Measures against circulatory shock, respiratory depression and convulsions may be needed.

SECTION 05 FIRE FIGHTING MEASURES

FLASH POINT: None (TCC) ASTM D-56

EXTINGUISHING MEDIA: This product would not be expected to burn unless all the water is boiled away. The remaining organics may be ignitable. Use water to cool containers exposed to fire.

SECTION 06 ACCIDENTAL RELEASE MEASURES

IN CASE OF TRANSPORTATION ACCIDENTS, CALL THE FOLLOWING 24-HOUR TELEPHONE NUMBER (800) I-M-ALERT or (800) 462-5378.

SPILL CONTROL AND RECOVERY:

Small liquid spills: Contain with absorbent material, such as clay, soil or any commercially available absorbent. Shovel reclaimed liquid and absorbent into recovery or salvage drums for disposal. Refer to CERCLA in Section 15.

Large liquid spills: Dike to prevent further movement and reclaim into recovery or salvage drums or tank truck for disposal. Refer to CERCLA in Section 15.

For large indoor spills, evacuate employees and ventilate area. Those responsible for control and recovery should wear the protective equipment



MATERIAL SAFETY DATA SHEET

PRODUCT

NALCO 2838 LIQUID

Emergency Telephone Number
Medical (800) 462-5378 (24 hours) (800) I-M-ALERT

specified in Section 8.

This product is toxic to fish. It should not be directly discharged into lakes, ponds, streams, waterways, or public water supplies.

SECTION 07 HANDLING AND STORAGE

Storage : Keep container closed when not in use.

SECTION 08 EXPOSURE CONTROLS AND PERSONAL PROTECTION

RESPIRATORY PROTECTION: Respiratory protection is not normally needed since the volatility and toxicity are low. If significant mists are generated, use either a chemical cartridge respirator with a dust/mist prefilter or supplied air.

For large spills, entry into large tanks, vessels or enclosed small spaces with inadequate ventilation, a positive pressure, self-contained breathing apparatus is recommended.

VENTILATION: General ventilation is recommended. Additionally, local exhaust ventilation is recommended where vapors, or mists may be released.

PROTECTIVE EQUIPMENT: Wear impermeable gloves, boots, apron and a face shield with chemical splash goggles. Examples of impermeable gloves available on the market are neoprene, nitrile, PVC, natural rubber, viton and butyl (compatibility studies have not been performed). A full slicker suit is recommended if gross exposure is possible.

The availability of an eye wash fountain and safety shower is recommended.

If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse.

HUMAN EXPOSURE CHARACTERIZATION: Based on Nalco's recommended product application and our recommended personal protective equipment, the potential human exposure is: LOW.

SECTION 09 PHYSICAL AND CHEMICAL PROPERTIES

COLOR: Colorless	FORM: Liquid	ODOR: Characteristic aldehyde
DENSITY:	8.7 lbs/gal.	
SOLUBILITY IN WATER:	Completely	
SPECIFIC GRAVITY:	1.04 @ 68 Degrees F	ASTM D-1298
pH (NEAT) =	3.1-4.5	ASTM E-70
FREEZE POINT:	20.3 Degrees F/-6.5 Degrees C	ASTM D-1177
BOILING POINT:	213 Degrees F @ 760 mm Hg	ASTM D-86



MATERIAL SAFETY DATA SHEET

PRODUCT

NALCO 2838 LIQUID

Emergency Telephone Number
Medical (800) 462-5378 (24 hours) (800) I-M-ALERT

FLASH POINT: None (TCC) ASTM D-56
VAPOR PRESSURE: 16 mm Hg @ 68 Degrees C ASTM D-323

NOTE: These physical properties are typical values for this product.

SECTION 10 STABILITY AND REACTIVITY

INCOMPATIBILITY: Avoid contamination with strong acids and bases. Contact with these may cause a heat-generating reaction which is not expected to be violent.

STORAGE: Avoid storage at temperatures above 100 Degrees C.

THERMAL DECOMPOSITION PRODUCTS: In the event of combustion CO, CO2 may be formed. Do not breathe smoke or fumes. Wear suitable protective equipment.

SECTION 11 TOXICOLOGICAL INFORMATION

TOXICITY STUDIES: Acute toxicity studies have been conducted on various concentrations of glutaraldehyde. The results are shown below. (A.I. refers to active ingredient basis.)

ACUTE ORAL TOXICITY (ALBINO RATS):

LD50 for 50% solution = 1.3 ml/kg (733 mg/kg A.I.)
LD50 for 45% solution = 1.2 ml/kg (605 mg/kg A.I.)
LD50 for 25% solution = 1.54-1.87 ml/kg (409-497 mg/kg A.I.)
LD50 for 10% solution = 1.07-1.62 ml/kg (111-168 mg/kg A.I.)

ACUTE DERMAL TOXICITY (ALBINO RABBITS):

LD50 for 50% solution = 1.59-2.54 ml/kg (897-1432 mg/kg A.I.)
LD50 for 45% solution = 2.00-2.71 ml/kg (1004-1360 mg/kg A.I.)
LD50 for 25% solution = 8.0-12.80 ml/kg (2128-3045 mg/kg A.I.)

COMMENTS: A major determinant of the acute percutaneous toxicity of glutaraldehyde solution is concentration. Cumulative toxicity is also possible by repeated dermal contact with 25-50% solution of glutaraldehyde.

PRIMARY SKIN IRRITATION TEST (ALBINO RABBITS): At 10% or greater, glutaraldehyde solutions may cause moderate to severe irritation, with possible necrosis after prolonged contact.

DOT CORROSIVITY TEST: Aqueous solutions up to, and including, 45% do not produce corrosive lesions when tested under DOT conditions, but at 50% two of six animals developed local necrosis in 4 hours or less.

SKIN SENSITIZATION: At levels of 0.2% and lower no sensitization occurred in human studies. Higher levels produced allergic contact dermatitis. Cross reaction with formaldehyde or from lower concentrations of glutaraldehyde does



MATERIAL SAFETY DATA SHEET

PRODUCT

NALCO 2838 LIQUID

Emergency Telephone Number

Medical (800) 462-5378 (24 hours) (800) I-M-ALERT

not occur.

PRIMARY EYE IRRITATION TEST (ALBINO RABBITS): Severely irritating
COMMENTS: At levels of 0.2% and below of glutaraldehyde no eye irritation was noted. Levels above 0.2% of glutaraldehyde produced moderate to severe irritation and corneal injury.

ACUTE INHALATION TOXICITY (ALBINO RATS): LC = Greater than 2.5 L/minute (saturated vapor for 6-8 hours produced irritant effects, but resulted in no deaths.)

COMMENTS: Examination of all sacrificed animals at the end of the study showed no abnormalities.

OTHER TOXICITY RESULTS: Laboratory studies have shown that glutaraldehyde is not teratogenic, and several studies have shown the material not to be a mutagen.

Doses of 25 and 50 mg/kg given by gavage to pregnant rats produced decreases in maternal body weight. There were no other indications of maternal toxicity nor were there evidence of fetotoxicity or external, visceral or skeletal abnormalities. Mice (CD-1 strain) given 100 mg/kg by gavage showed fetotoxicity as evidenced by decreased body weight. At lower doses, there was no evidence of fetotoxicity or skeletal abnormalities. No evidence of teratogenic effects were noted in either species.

Mutagenicity in vitro tests of Chinese hamster ovary, sister chromatid exchange and unscheduled DNA synthesis did not produce dose-related responses. Oral doses of 30 and 60 mg/kg to mice showed no effect in the dominant lethal assay. In all five strains of Salmonella, with and without metabolic activation by S 9 liver homogenate, no mutagenic response was noted.

Glutaraldehyde incorporated into the diet of rats up to 1.6 g/kg for seven days resulted in no deaths. An eleven week drinking water study of glutaraldehyde at up to 0.5% showed no effect.

Preliminary histopathological findings in the 24-month sacrifice of a combined oncogenicity/chronic study in Fischer 344 rats given glutaraldehyde in drinking water showed an increase in the incidence of the spontaneously occurring large granular cell lymphocytic leukemia (LGL) at all dosages (50, 250, 1000 ppm) compared with the controls only for the female rats. Male rats had the same incidence as controls at all levels of exposures. The significance of this observation to humans remains to be determined.

HUMAN HAZARD CHARACTERIZATION: Based on our hazard characterization, the potential human hazard is: HIGH.



MATERIAL SAFETY DATA SHEET

PRODUCT

NALCO 2838 LIQUID

Emergency Telephone Number
Medical (800) 462-5378 (24 hours) (800) I-M-ALERT

SECTION 12 ECOLOGICAL INFORMATION

BIOCHEMICAL OXYGEN DEMAND (5-day BOD): 0

CHEMICAL OXYGEN DEMAND (COD): 349,000 mg/L

AQUATIC DATA: Aquatic toxicity studies have been performed on various concentrations of glutaraldehyde solutions with results as follows.

Bluegill sunfish:

96-hour static acute LC50 for 25% solution = 37.6 ppm
96-hour NOEL for 25% solution = 10 ppm

Rainbow trout:

96-hour static acute LC50 for 25% solution = 42.1 ppm
96-hour NOEL for 25% solution = 32 ppm

Daphnia magna:

48-hour static acute LC50 for 25% solution = 16.9 ppm
48-hour NOEL for 25% solution = 5 ppm

Data for 25% solutions using other species:

48-hour static acute LC50 in Oyster larvae = 2.1 ppm
96-hour static acute LC50 in Green crabs = 465 ppm
96-hour static acute LC50 in Grass shrimp = 41 ppm

AVIAN DATA: Wildlife toxicity studies have been performed on 25 and 50% solutions of glutaraldehyde with results as follows.

8-day dietary LC50 to Bobwhite Quail = 10,000 ppm
8-day dietary LC50 to Mallard Duck = 10,000 ppm
Acute oral LD50 to Mallard Duck = 933 mg/kg for 50% solution
Acute oral LD50 to Mallard Duck = 1631 mg/kg for 25% solution

DEGRADATION: In the standard BOD test, glutaraldehyde was degraded at greater than 50% in less than 5 days.

AQUATIC DATA: Results below are based on the active ingredient.

96 hour static acute LC50 to sewage microorganisms = 34 ppm

96 hour no observed effect concentration is 10 ppm based on no mortality or abnormal effects.

If released into the environment, see CERCLA in Section 15.

ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION: Based on our Hazard



MATERIAL SAFETY DATA SHEET

PRODUCT

NALCO 2838 LIQUID

Emergency Telephone Number
Medical (800) 462-5378 (24 hours) (800) I-M-ALERT

Characterization, the potential environmental hazard is: MODERATE.
Based on Nalco's recommended product application and the product's characteristics, the potential environmental exposure is: LOW.

SECTION 13 DISPOSAL CONSIDERATIONS

DISPOSAL: If this product becomes a waste, it does not meet the criteria of a hazardous waste as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR 261, since it does not have the characteristics of Subpart C, nor is it listed under Subpart D.

As a non-hazardous liquid waste, it should be solidified with stabilizing agents (such as sand, fly ash, or cement) so that no free liquid remains before disposal to an industrial waste landfill. A non-hazardous liquid waste can also be incinerated in accordance with local, state and federal regulations.

SECTION 14 TRANSPORTATION INFORMATION

PROPER SHIPPING NAME/HAZARD CLASS MAY VARY BY PACKAGING, PROPERTIES, AND MODE OF TRANSPORTATION. TYPICAL PROPER SHIPPING NAMES FOR THIS PRODUCT ARE:

ALL TRANSPORTATION MODES : PRODUCT IS NOT REGULATED
(UNLESS SPECIFIED BELOW) DURING TRANSPORTATION

AIR TRANSPORTATION : OTHER REGULATED SUBSTANCES

MARINE TRANSPORTATION : PRODUCT IS NOT REGULATED
(IMDG/IMO) DURING TRANSPORTATION

UN/ID NO : NONE

HAZARD CLASS - PRIMARY : 0 - NOT REQUIRED

PACKING GROUP : N/A

IMDG PAGE NO : NONE

IATA PACKING INSTRUCTION : CARGO: 906

IATA CARGO AIRCRAFT LIMIT : NO LIMIT (MAX NET QUANTITY PER PACKAGE)

FLASH POINT : NONE

TECHNICAL NAME(S) : GLUTARALDEHYDE

RQ LBS (PER PACKAGE) : NONE

RQ COMPONENT(S) : NONE

SECTION 15 REGULATORY INFORMATION

The following regulations apply to this product.

FEDERAL REGULATIONS:



MATERIAL SAFETY DATA SHEET

PRODUCT

NALCO 2838 LIQUID

Emergency Telephone Number

Medical (800) 462-5378 (24 hours) (800) I-M-ALERT

OSHA'S HAZARD COMMUNICATION RULE, 29 CFR 1910.1200:

Based on our hazard evaluation, the following ingredient in this product is hazardous and the reason is shown below.

Glutaraldehyde - Corrosive

Glutaraldehyde = Ceiling 0.05 ppm, 0.2 mg/m³ ACGIH/TLV

Glutaraldehyde = Ceiling 0.2 ppm, 0.8 mg/m³ OSHA/PEL

CERCLA/SUPERFUND, 40 CFR 117, 302:

Notification of spills of this product is not required.

SARA/SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986

(TITLE III) - SECTIONS 302, 311, 312 AND 313:

SECTION 302 - EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355):

This product does not contain ingredients listed in Appendix A and B as an Extremely Hazardous Substance.

SECTIONS 311 and 312 - MATERIAL SAFETY DATA SHEET REQUIREMENTS (40 CFR 370):

Our hazard evaluation has found this product to be hazardous. The product should be reported under the following EPA hazard categories:

- XX Immediate (acute) health hazard
- XX Delayed (chronic) health hazard
- Fire hazard
- Sudden release of pressure hazard
- Reactive hazard

Under SARA 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are: 500 pounds or the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

SECTION 313 - LIST OF TOXIC CHEMICALS (40 CFR 372):

This product does not contain ingredients on the List of Toxic Chemicals.

TOXIC SUBSTANCES CONTROL ACT (TSCA):

The active ingredient is regulated under FIFRA and exempted under TSCA. All the inerts are on the Inventory List.

FEDERAL INSECTICIDE, FUNGICIDE AND RODENTICIDE ACT (FIFRA), 7 USC 135:

EPA Reg. No. 10352-23-1706. This product is registered for use as a microorganism control chemical. In all cases follow instructions on the product label.



MATERIAL SAFETY DATA SHEET

PRODUCT

NALCO 2838 LIQUID

Emergency Telephone Number
Medical (800) 462-5378 (24 hours) (800) I-M-ALERT

RESOURCE CONSERVATION AND RECOVERY ACT (RCRA), 40 CFR 261 SUBPART C & D:
Consult Section 13 for RCRA classification.

FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15
(formerly Sec. 307), 40 CFR 116 (formerly Sec. 311):
None of the ingredients are specifically listed.

CLEAN AIR ACT, Sec. 111 (40 CFR 60), Sec. 112 (40 CFR 61, 1990 Amendments),
Sec. 611 (40 CFR 82, CLASS I and II Ozone depleting substances):
This product does not contain ingredients covered by the Clean Air Act.

STATE REGULATIONS:

CALIFORNIA PROPOSITION 65:
This product does not contain any chemicals which require warning under
California Proposition 65.

MICHIGAN CRITICAL MATERIALS:
This product does not contain ingredients listed on the Michigan Critical
Materials Register.

STATE RIGHT TO KNOW LAWS:
Regulated in those states using the TLV for glutaraldehyde as a criteria for
listing.

INTERNATIONAL REGULATIONS:

This product is a registered biocide and is exempt from WHMIS under The House
of Commons of Canada Bill C-70.

SECTION 16 OTHER INFORMATION

Nalco internal number FUCC042993

Laboratory studies, using an odor test panel, indicated glutaraldehyde vapors
in air may be 'irritating' to humans at about 0.3 ppm in air; the TLV has
been established as 0.2 ppm ceiling. Thus, if vapors are concentrated enough
to be irritating, the TLV is probably being exceeded.

SECTION 17 RISK CHARACTERIZATION

Due to our commitment to Product Stewardship, we have evaluated the human
and environmental hazards and exposures of this product. Based on our
recommended use of this product, we have characterized the product's general
risk. This information should provide assistance for your own risk
management practices. We have evaluated our product's risk as follows:

* The human risk is: LOW.



MATERIAL SAFETY DATA SHEET

PRODUCT

NALCO 2838 LIQUID

Emergency Telephone Number
Medical (800) 462-5378 (24 hours) (800) I-M-ALERT

* The environmental risk is: LOW.

Any use inconsistent with Nalco's recommendations may affect our risk characterization. Our sales representative will assist you to determine if your product application is consistent with our recommendations. Together we can implement an appropriate risk management process.

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information.

SECTION 18 REFERENCES

Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, American Conference of Governmental Industrial Hygienists, OH.

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (CD-ROM version), Micromedex, Inc., Englewood, CO.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (CD-ROM version), Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

Title 29 Code of Federal Regulations, Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA).

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, Ohio (CD-ROM version), Micromedex, Inc., Englewood, CO.

Shepard's Catalog of Teratogenic Agents (CD-ROM version), Micromedex, Inc., Englewood, CO.

Suspect Chemicals Sourcebook (a guide to industrial chemicals covered under major regulatory and advisory programs), Roytech Publications



MATERIAL SAFETY DATA SHEET

PRODUCT

NALCO 2838 LIQUID

Emergency Telephone Number

Medical (800) 462-5378 (24 hours) (800) I-M-ALERT

(a Division of Ariel Corporation), Bethesda, MD.

The Teratogen Information System, University of Washington, Seattle,
Washington (CD-ROM version), Micromedex, Inc., Englewood, CO.

PREPARED BY: William S. Utley, PhD., DABT, Manager, Product Safety
DATE CHANGED: 03/06/1998 DATE PRINTED: 03/28/1999