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<h1>Glutaraldehyde</h1>					
Synonyms & Trade Names <b>Glutaric dialdehyde; 1,5-Pentanedial</b>					
CAS No. <b>111-30-8</b>		RTECS No. <b>MA2450000</b> <a href="/niosh-rtecs/MA256250.html">(/niosh-rtecs/MA256250.html)</a>		DOT ID & Guide	
Formula <b>OCH(CH<sub>2</sub>)<sub>3</sub>CHO</b>		Conversion <b>1 ppm = 4.09 mg/m<sup>3</sup></b>		IDLH <b>N.D.</b> See: <a href="/niosh/idlh/intridl4.html">IDLH INDEX (/niosh/idlh/intridl4.html)</a>	
Exposure Limits NIOSH REL : <b>C 0.2 ppm (0.8 mg/m<sup>3</sup>)</b> See <a href="#">Appendix C (nengapdxc.html)</a> (Aldehydes) OSHA PEL † ( <a href="#">nengapdxg.html</a> ) : <b>none</b>			Measurement Methods <b>NIOSH 2532</b> † ( <a href="/niosh/docs/2003-154/pdfs/2532.pdf">/niosh/docs/2003-154/pdfs/2532.pdf</a> ); <b>OSHA 64</b> † ( <a href="http://www.osha.gov/dts/sltc/methods/organic/orgo64/orgo64.html">http://www.osha.gov/dts/sltc/methods/organic/orgo64/orgo64.html</a> ) See: <a href="#">NMAM (/niosh/docs/2003-154/)</a> or <a href="#">OSHA Methods</a> † ( <a href="http://www.osha.gov/dts/sltc/methods/index.html">http://www.osha.gov/dts/sltc/methods/index.html</a> )		
Physical Description <b>Colorless liquid with a pungent odor.</b>					
MW: <b>100.1</b>	BP: <b>212° F</b>	FRZ: <b>7°F</b>	Sol: <b>Miscible</b>	vp: <b>17 mmHg</b>	IP: <b>?</b>
Sp.Gr: <b>1.10</b>	FLP: <b>NA</b>	VEL: <b>NA</b>	LEL: <b>NA</b>		
Noncombustible Liquid					
Incompatibilities & Reactivities <b>Strong oxidizers, strong bases [Note: Alkaline solutions of glutaraldehyde (i.e., activated glutaraldehyde) react with alcohol, ketones, amines, hydrazines &amp; proteins.]</b>					
Exposure Routes <b>inhalation, skin absorption, ingestion, skin and/or eye contact</b>					
Symptoms <b>irritation eyes, skin, respiratory system; dermatitis, sensitization skin; cough, asthma; nausea, vomiting</b>					
Target Organs <b>Eyes, skin, respiratory system</b>					
Personal Protection/Sanitation ( <a href="#">See protection codes (protect.html)</a> ) <b>Skin:</b> Prevent skin contact <b>Eyes:</b> Prevent eye contact <b>Wash skin:</b> When contaminated <b>Remove:</b> When wet or contaminated <b>Change:</b> No recommendation <b>Provide:</b> Eyewash, Quick drench			First Aid ( <a href="#">See procedures (firstaid.html)</a> ) <b>Eye:</b> Irrigate immediately <b>Skin:</b> Water flush immediately <b>Breathing:</b> Respiratory support <b>Swallow:</b> Medical attention immediately		
Respirator Recommendations Not available.  <b>Important additional information about respirator selection (<a href="#">pgintrod.html#mustread</a>)</b>					
See also: <a href="/niosh/npg/pgintrod.html">INTRODUCTION (/niosh/npg/pgintrod.html)</a> See ICSC CARD: <a href="/niosh/ipcsneng/neng0352.html">0352 (/niosh/ipcsneng/neng0352.html)</a>					

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## Glutaraldehyde: An Overview

Quick Tips #174

### Introduction

Glutaraldehyde has a variety of uses and is found in many industries and occupations. It is used primarily as a biocide, but also as a fixative and a therapeutic agent. The main uses of glutaraldehyde are

- As a cold disinfectant in the healthcare industry
- As a hardener in X-ray film processing
- As a biocide in water treatment, in sanitary solutions for aircraft and portable toilets, and in aquaculture
- As a disinfectant in animal housing
- In tanning as a fixative
- As a preservative in industrial oils
- As a therapeutic agent
- In small quantities as a disinfectant for air ducts, as an embalming agent, and as a tissue fixative in electron and light microscopy

Glutaraldehyde ( $C_5H_8O_2$ ) is used mainly as an aqueous solution, ranging in concentration from 50 percent to less than 1 percent. It is a colorless, oily liquid and sometimes has an odor of rotten apples. In a vapor state, glutaraldehyde has a pungent odor, with an odor threshold level of 0.04 ppm.

### Exposure Limits

The National Institute for Occupational Safety and Health (NIOSH) recommended exposure limit (REL) for glutaraldehyde is of 0.2 ppm. An immediately dangerous to life and health (IDLH) concentration has not been determined.

### Effects of Overexposure

Glutaraldehyde use in a variety of industries has led to widespread occupational exposures. Glutaraldehyde is an irritant to the skin, eyes and respiratory system. Exposure symptoms might include burning sensations, dermatitis, headache, coughing, shortness of breath, nausea and vomiting. Target organs are the eyes, skin and respiratory system. Continuous repeated exposure to glutaraldehyde might intensify the skin and respiratory irritant effects. Anyone with a history of skin or eye disorders might be at an increased risk from exposure.

### First Aid

**Eyes:** If glutaraldehyde contacts the eyes, immediately flush the eyes with large amounts of water, occasionally lifting the lower and upper lids. Seek medical attention immediately. Contact lenses should not be worn when working with glutaraldehyde.

**Skin:** If glutaraldehyde contacts the skin, immediately flush the contaminated skin with water for at least 15 minutes. If glutaraldehyde penetrates clothing, immediately remove the clothing and flush the skin with water for at least 15 minutes. Promptly seek medical attention.

**Inhalation:** If large amounts of glutaraldehyde are inhaled, move the exposed person to fresh air at once. If breathing has stopped, immediately begin CPR. Keep the person warm and at rest. Get medical attention as soon as possible.

**Ingestion:** Get medical attention immediately.

### Personal Protective Equipment

Personal protective equipment must be used with engineering and administrative controls to prevent glutaraldehyde exposure.

**Safety goggles** should be considered where concentrated glutaraldehyde is used or where splashing may occur; it is best to use indirect-vent or nonvented goggles, and to avoid goggles with foam padding. Safety glasses with side shields might suffice for the handling of small quantities of dilute glutaraldehyde.

**Protective clothing** should be worn when handling glutaraldehyde. Polyethylene, polyvinyl chloride, Viton™, butyl rubber, natural rubber latex, neoprene and nitrile rubber provide adequate protection from glutaraldehyde solutions and are impervious materials for gloves and aprons.

Although NIOSH has not established an IDLH concentration for glutaraldehyde, and therefore has not issued respirator-selection recommendations, several respirator manufacturers have issued guidelines. North recommends that an airline respirator operated in the pressure-demand mode with a five-minute escape bottle or a self-contained breathing apparatus in pressure-demand mode be used. 3M suggests that a full-face, air-purifying respirator with organic vapor cartridges and a dust/mist prefilter be used for concentrations up to 2 ppm.

For help selecting the right protective clothing to use with glutaraldehyde, call us at 1-800-356-2501

**Air Monitoring**

Personal monitors, passive-gas monitors and vapor meters can help determine workers' exposure to glutaraldehyde.

**Personal monitors** operate on the diffusion principle and require analysis by an outside laboratory to verify exposure levels

**Passive-gas monitors** operate on the diffusion principle and are direct-read monitors. They provide immediate on-site results with easy-to-read color changes

**Vapor meters** quickly measure airborne concentration where glutaraldehyde is used. A given quantity of air is sampled and the concentration is directly displayed

**Commonly Asked Questions**

**Q. What is IDLH?**

**A.** This is the concentration of an airborne contaminant considered to be Immediately Dangerous to Life and Health, as published by NIOSH. "IDLH" is the concentration in the atmosphere that poses an immediate hazard to life or produces immediate, irreversible effects on health.

**Q. Where is exposure to glutaraldehyde most likely?**

**A.** Exposure to glutaraldehyde is most likely in the healthcare industry. It is used in hospitals for cold sterilization of medical supplies and instruments, and also as a disinfectant in urology, endoscopy and dental departments. It is also used as a fixative in X-ray developing solutions.

**Q. Is glutaraldehyde considered a fire hazard?**

**A.** No. Fires may be extinguished with water fog or carbon dioxide, foam or dry-chemical extinguishers. The heat of a fire may produce hazardous decomposition products and vapors.

**Sources**

American Conference of Governmental Industrial Hygienists, "Guide To Occupational Exposure Values -- 1996"

Krister Forsberg and S.Z. Mansdorf, "Quick Selection Guide to Chemical Protective Clothing," Fourth Edition

National Institute of Occupational Safety and Health, "NIOSH Pocket Guide to Chemical Hazards," September 2005

(Rev. 1/2012)

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