

Glutaraldehyde Policy

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1. Purpose. The purpose of the glutaraldehyde policy is to establish procedures/guidelines to protect the health and safety of all employees of the Virginia Commonwealth University (VCU) community who may be occupationally exposed to glutaraldehyde.

2. Scope. This glutaraldehyde policy applies to all Virginia Commonwealth University employees or Virginia Commonwealth University Health System (VCUHS) employees in those work areas where there is potential exposure to glutaraldehyde. The hospital areas covered by this program include, but are not limited to: ambulatory surgery, cardiology, endoscopy, emergency room, OB/GYN, oncology, oral surgery, otolaryngology, ultrasound, and urology. Any other departments in the university or hospital which currently use or intend to use glutaraldehyde and are not addressed in this policy should contact the Office of Environmental Health and Safety (OEHS) to insure compliance with the applicable guidelines.

3. Policy. It is the policy of the university to ensure that glutaraldehyde is handled in the safest manner possible and in compliance with all applicable codes and standards. Engineering controls should be utilized to the maximum extent feasible to maintain exposures below the recommended exposure limits, followed by other control methods including work practices, administrative controls, and the use of personal protective equipment.

4. Standard. At this time, the Occupational Safety & Health Administration (OSHA) does not have a standard for glutaraldehyde. The American Conference of Government Industrial Hygienists (ACGIH) has established a ceiling Threshold Limit Value (TLV) of 0.05 ppm (parts per million), which is used as the university standard.

5. Definitions and Key Terms

A. Glutaraldehyde: Glutaraldehyde is a colorless liquid often used as a high-level disinfectant or cold sterilant to sterilize heat sensitive medical, surgical, and dental equipment. Glutaraldehyde is also used in histology and pathology labs as a tissue fixative, in X-ray development as a hardening agent, as well as in leather tanning, water treatment, and as a chemical preservative. It is in products such as Metricide, Cidex, Glutarex, Soniacide, Aldesen, and Hospex, as well as others.

B. OEHS: Office of Environmental Health and Safety, Virginia Commonwealth University.

C. STEL: Short-Term Exposure Level. This is the maximum concentration of a regulated substance to which workers can be exposed to continuously over a period of 15 minutes.

D. TLV (ceiling): Threshold Limit Value-ceiling. The recommended exposure limit that should not be exceeded at any time during the day. These values are published yearly by the American Conference of Governmental Industrial Hygienists (ACGIH).

6. Glutaraldehyde Hazard Assessment. Processes or occupational activities that may result in glutaraldehyde exposure include:

A. Workplace exposures include primarily processes involved with disinfection/sterilant procedures, i.e., handling of instruments containing residual glutaraldehyde, opening soaking basins, pouring glutaraldehyde solutions, etc.

B. Other industries that use glutaraldehyde and may contribute as a source of emission include crude oil and natural gas extraction, and beverage manufacturers.

7. Exposure Monitoring Strategy

A. Employees in work areas of the university which may involve exposure to glutaraldehyde are monitored periodically to accurately determine exposure concentrations. Employee exposure levels are determined at the breathing zone using passive dosimeters. Dosimeters and badges are one method of effective monitoring while direct-reading methods offer another approach.

B. The Office of Environmental Health & Safety will monitor employee exposure to glutaraldehyde to determine if any employee is being exposed to glutaraldehyde in excess of the 15 minute STEL of 0.05 ppm. The frequency of such monitoring will be determined by OEHS based upon results of the baseline characterization of exposure.

8. Health Effects

A. There are several health effects, both short and long-term, that can result from exposure to glutaraldehyde. Short-term health effects that may result as a consequence of contact with glutaraldehyde liquid or vapor include irritation of the eyes, nose, throat, and respiratory tract which may lead to conjunctivitis, dizziness, drowsiness, headaches, nosebleeds, nausea, and/or wheezing.

B. In addition to acute health effects, there are also long-term or chronic health effects that may result from exposure to glutaraldehyde. Glutaraldehyde is a sensitizer which means people who work with it or are exposed to it may become sensitive and have strong reactions when exposed to even small amounts. Reactions could include asthma like symptoms, i.e., difficulty breathing, coughing, and/or tightness in chest. In addition, skin reactions including rashes and severe itching may also result from prolonged exposure.

9. Medical Surveillance

If an employee has been exposed to glutaraldehyde with regards to the following conditions, he or she should notify his or her supervisor and seek medical attention from the university's Employee Health Services office.

A. If the employee has been exposed to glutaraldehyde in an emergency situation.

B. If the employee shows signs/symptoms of glutaraldehyde exposure.

10. Monitoring and Reporting Results. The area supervisor shall report the results of all glutaraldehyde monitoring to the person(s) monitored within 15 calendar days of the date on which the area supervisor receives the results. Posting of the monitoring results is acceptable for

this purpose (the results should be posted for a minimum of three days). If the TLV has been exceeded, affected employees must be notified of any corrective action being taken.

11. Training Program. Employees with any potential exposure to glutaraldehyde must receive training to confirm their understanding of glutaraldehyde, its hazards, and methods of protection. Employees should be trained at the time of initial assignment, and whenever a new exposure to glutaraldehyde is introduced into the work area. The training program shall be conducted in a manner in which the employee is able to understand and apply the following information:

A. The properties of glutaraldehyde, its forms, uses, synonyms, and common occurrence work areas at VCU and VCUHS.

B. Recommended exposure limits for glutaraldehyde established by ACGIH.

C. Glutaraldehyde detection by workers.

D. A description of the potential health effects of glutaraldehyde exposure with signs and symptoms of various ambient concentrations.

E. Routes of exposure and acute/chronic exposure effects.

F. Monitoring methods to detect the presence and concentration of glutaraldehyde in the work area.

G. Overview of applicable OSHA standards:

(1) Hazard Communication standard (29 CFR 1910.1200)

(2) Occupational Exposure to Chemicals in Laboratories (29 CFR 1910.1450)

H. Measures employees must take to protect themselves:

(1) Engineering controls

(2) Administrative/Work practice controls

(3) Personal protective equipment

I. Emergency procedures for skin or eye contact.

J. Medical Surveillance

K. Employee responsibilities regarding signs and symptoms of exposure – what to do if you think you have been exposed or have concerns.

12. Engineering Controls. The policy of VCU is that all glutaraldehyde-related work activities with potential for exceeding the threshold limit value shall implement feasible engineering controls. Examples of engineering controls used to control glutaraldehyde exposures include ventilation systems and fume hoods. The following considerations should be included in the design and installation process for such equipment:

A. On an annual basis, laboratory fume hoods must be evaluated for proper operation and airflow.

B. To minimize glutaraldehyde exposure and control the buildup of gases and vapors in the general work area, adequate room ventilation must be provided. The recommended ventilation rate for laboratory areas is 4 to 12 air changes per hour. The exhaust duct stack must be located a sufficient distance from any building air intakes to prevent re-introduction of contaminated air.

C. If the facility ventilates containers of contaminated clothing and equipment, the facility shall establish an appropriately labeled storage area for this purpose and locate and arrange this area in a manner that minimizes glutaraldehyde exposure. The facility shall allow only persons trained in recognizing the hazards of glutaraldehyde to remove containers from the storage area.

13. Work Practices/Administrative Controls. Work practices and administrative procedures are also an important part of a control system. If an employee is asked to perform a task in a certain manner to limit the exposure to glutaraldehyde, then the recommended procedures should be followed exactly as outlined. In context with minimizing glutaraldehyde exposure, the following work practices should be applied:

A. Minimize the amount of glutaraldehyde used by using only the amount required to perform the procedure.

B. Where possible, maintain glutaraldehyde baths under a fume hood.

C. Keep glutaraldehyde stored in closed containers in well ventilated areas. Use posted signs to remind personnel to replace lids after using product.

14. Personal Protective Equipment (PPE). Certain types of PPE are effective in controlling glutaraldehyde exposure. In normal work situations, PPE should be used only as a supplement to engineering controls. Employees must not take glutaraldehyde-contaminated materials, clothing, or equipment home.

A. Impermeable Gloves: Gloves made of butyl rubber, Nitrile, or Viton® should be used to provide full shift protection against skin contact with glutaraldehyde. Polyethylene gloves can be used to protect skin for shorter exposures. Neoprene and PVC gloves do not provide adequate protection from glutaraldehyde. Latex gloves should only be used when short-term, incidental contact is expected.

B. Eye and Face Protection: Eye and face protection in the form of goggles will reduce exposure in cases of splash hazards.

C. Lab coats/aprons: For additional protection, lab coats or aprons made of an appropriate material such as polypropylene can be used.

D. Respiratory Protection: If an employee may be exposed to glutaraldehyde vapor concentrations where respiratory protection is warranted, please contact OEHS for guidance on appropriate respirators for glutaraldehyde vapor protection. When employees are required to wear respirators to reduce exposure, they must be enrolled in VCU's Respiratory Protection Program as required by OSHA.

15. Emergency Situations. In case of an emergency involving glutaraldehyde:

A. Personnel should immediately evacuate the effected area, and assist injured personnel to safety.

B. Seek medical assistance for injured personnel.

C. Call OEHS or VCU Telepage operator immediately.

D. Never re-enter contaminated area without proper PPE and back-up personnel.

16. Housekeeping and Spill Response. Managers of facilities where glutaraldehyde is utilized shall create and maintain a program to detect leaks and spills. The equipment leak and spill detection program should include:

A. Regular visual inspections for leaks and spills.

B. Preventative maintenance of equipment, including surveys for leaks, at regular intervals.

C. Regular testing of monitoring equipment to assure proper function.

D. Provisions for glutaraldehyde spill containment, surface decontamination, and waste disposal in work areas where spillage may occur.

E. Prompt cleanup of spills and repair of leaks using persons who wear appropriate protective clothing and equipment and are trained in the proper methods for glutaraldehyde cleanup and decontamination.

17. Sources & Further Reading:

A. OSHA Publication 3258 (2006) Hospital eTool:
<http://www.osha.gov/SLTC/etools/hospital/hazards/glutaraldehyde/glut.html>

B. DHHS (NIOSH) Publication No. 2001-115 (May 2001):
<http://www.cdc.gov/niosh/docs/2001-115/>

C. OSHA Publication 3258-08N (2006) Best Practices for the Safe Use of Glutaraldehyde in Health Care: <http://www.osha.gov/Publications/3258-08N-2006-English.html>

D. EPA Environmental Best Practices for Health Care Facilities: Reducing Ethylene Oxide and Glutaraldehyde Usage (2002):
<http://www.epa.gov/region09/waste/p2/projects/hospital/glutareth.pdf>