

# Glutaraldehyde Facts

## **WHAT IS GLUTARALDEHYDE?**

Glutaraldehyde is a hazardous chemical used for cold sterilization of medical and dental equipment. Glutaraldehyde based products are effective sterilants and disinfectants for medical devices that cannot be steam sterilized, are particularly heat-sensitive, for lensed instruments that are commonly subjected to high-level disinfection between patient uses. It is a colorless, oily liquid with a pungent odor. As a cold sterilizer it is commonly used as a 2%-4% aqueous solution, and it is found in Ultizyme. Glutaraldehyde has also been used as a preservative in chemical products such as fabric softeners, antiperspirants and fixatives for biological specimens. Estimates of occupational exposure in 1990 by NIOSH indicate that at least 318,000 workers come in daily contact with glutaraldehyde. Glutaraldehyde is slightly acidic in aqueous solution and typically used at ambient temperature. When these solutions are adjusted by sodium bicarbonate (or other buffers) to a pH of 7.5 to 8.5, glutaraldehyde is considered to be activated and the antimicrobial activity is enhanced. The acute toxicity of activated glutaraldehyde solutions is similar to that of acidic glutaraldehyde. If used properly, glutaraldehyde-based products can be used without adverse health effects.



Material Safety Data Sheets (MSDS) for glutaraldehyde-containing products and other hazardous products can be found on the hospital's intranet site under "Manuals" or at [www.msds.sunysb.edu](http://www.msds.sunysb.edu)

## **HEALTH EFFECTS**

### **SHORT-TERM HEALTH EFFECTS:**

Glutaraldehyde is an irritant to the skin, eyes and respiratory system. Skin contact may cause minor irritation with itching and slight local redness. Prolonged contact causes mild to moderate local redness and swelling. In concentrations less than 10% it is not known to be absorbed through the skin in harmful amounts. Glutaraldehyde can be a skin sensitizer in a small percentage of exposed individuals. In concentrations less than 5% it is considered irritating to eyes, although higher concentrations can present a risk of serious damage to the eyes. Nose and throat irritation and general tightness of the chest have been reported by workers exposed to glutaraldehyde vapors, even at concentrations below 0.2 ppm. Inhalation of vapors can cause asthma-like symptoms.

These symptoms are generally temporary and should subside when the employee leaves the area of glutaraldehyde exposure.

### **LONG-TERM HEALTH EFFECTS:**

Respiratory irritation and skin sensitizing effects of glutaraldehyde have been confirmed. Reports in the literature have implicated glutaraldehyde as a possible causal factor in occupational asthma. There is no evidence of adverse reproductive or carcinogenic health effects from exposure to glutaraldehyde.

## **WHO IS AT RISK?**

Workers who use glutaraldehyde to sterilize instruments or perform other tasks using glutaraldehyde are most at risk.

## **CONTROL MEASURES**

### **VENTILATION**

Glutaraldehyde should be used in an area that is properly ventilated. Rooms in which

glutaraldehyde disinfection is performed should be large enough to ensure adequate dilution of vapor and should have a minimum air exchange rate of 10 exchanges per hour. Ideally, local exhaust ventilation should be located at the point of discharge of the glutaraldehyde vapor so harmful vapors can be pulled away from the workers breathing zone. In lieu of local exhaust ventilation, a ductless fume hood designed for glutaraldehyde (e.g., Glutaraldehyde User Station, GUS) can be used in a room with general ventilation. The hood filter must be replaced as per manufacturer's instructions. Also, in most circumstances, the room should be under negative pressure with respect to the surrounding area.

## **PERSONAL PROTECTIVE EQUIPMENT (PPE) AND EMERGENCY EQUIPMENT**

Workers should wear appropriate PPE designed to protect skin, eyes and clothing from splashes when disinfecting instruments with glutaraldehyde solutions. A gown or apron, splash-proof goggles and face shields should always be worn when working with glutaraldehyde solutions.



Skin should be protected from contact with glutaraldehyde. Gloves impervious to glutaraldehyde, such as nitrile or butyl rubber, should always be worn if there is any possibility of contact with the solution.

Emergency eyewash units must be located within 10 seconds travel time of glutaraldehyde usage locations. The eyewash stations must be identified with a highly visible sign, tested weekly and maintained in accordance with the manufacturer's instructions.

## **WORK PRACTICES**

All work practice procedures should aim to prevent contact with glutaraldehyde and reduce exposure to vapor to the lowest reasonably obtainable level.

Solutions should be poured from the container

to the disinfection basin by a method that will prevent employee contact with the solution and reduce exposure to glutaraldehyde vapors. Agitation and splashing during transfer should be avoided. Glutaraldehyde solutions should be stored in tightly closed containers in a cool, secure area and properly labeled. Transport of glutaraldehyde solutions in secondary containers such as trays and basins should be avoided. If transport of activated solution is absolutely necessary, a method of transportation should be selected that will minimize the potential for spills and personnel exposure (i.e. containers with secure lids).

The container of the glutaraldehyde should be placed inside a plastic tray to capture any spillage, not on a paper towel or cloth that can hold the liquid. The glutaraldehyde station must have proper secondary labeling, using the NFPA labeling system, and a biohazard label.

Follow the Hospital's policy and procedures on "High Level Disinfection of Instruments" (Manual Code 8498). Glutaraldehyde solutions must be changed as per manufacturer's requirements or when test results indicate a low concentration. Test the glutaraldehyde solution using a glutaraldehyde monitor (eg. Cold Sterilog) prior to submerging instruments, and maintain a test log. Submerge instruments at least 20 minutes or as per manufacturer's recommendations.

#### **WASTE DISPOSAL:**

To dispose of **Ultizyme 28**, in Model G-14 GUS Station (small and large cylinders), add 2 ounces of Glute Out to each cylinder and in Model G-17 GUS Station, add 8 ounces of Glute Out to the tray. Wait approximately 5 minutes until you see the color change from yellow/orange to red/orange. After color change, dispose down the drain.

To dispose of **Cidex OPA**, in Model G-14 GUS Station (small and large

cylinders), add 1/2 ounce of Glute Out to each cylinder and in Model G-17 GUS Station, add 2 ounces of Glute Out to the tray. Wait 1 hour and dispose down the drain. Thoroughly wash and dry cylinders/trays. Rinse with sterile water and dry overnight before refilling.

#### **SPILL RESPONSE:**

For minor spill cleanup less than 1 gallon, notify co-workers of the spill and restrict access to the affected area during clean up. Wear personal protective equipment: nitrile gloves, chemical splash goggles, and gown. Sprinkle the neutralizer (Glute Out) liberally over the spill. The neutralization process is complete when the solution turns from yellow orange to red orange. This usually takes about 5 minutes. Place an absorbent pad over the spill. Use the pad to pick up the spilled material. Place the waste material in a plastic waste bag and dispose of in regular trash.

For major spills, greater than 1 gallon, call University Police at 911 and request the Haz Mat Response Team.

#### **OCCUPATIONAL EXPOSURE STANDARDS AND GUIDELINES**

EH&S conducts routine exposure monitoring on staff that work in areas that use glutaraldehyde-containing products.

The occupational exposure limits for glutaraldehyde are for short term exposure limits or ceiling limits, usually 15 minutes time-weighted averages, that should not be exceeded at any time during the work day. The New York State Public Employees Safety & Health Bureau (PESH) has a regulatory ceiling Permissible Exposure Limit of 0.2 parts per million (ppm). The National Institute for Occupational Safety and Health (NIOSH) has a Recommended Exposure Limit of 0.2 ppm while the American Conference of Governmental Industrial Hygienists' (ACGIH) recommended ceiling threshold limit value is 0.05 ppm.



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### HEALTH AND SAFETY INFORMATION



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