BASF Chemical Emergency Medical Guidelines

Ethylene oxide ($[CH_2]_2O$) A 1

Information and recommendations for first responders

- **Patients exposed only to ethylene oxide gas do not pose a significant risk of secondary contamination. Patients whose clothing or skin is contaminated with ethylene oxide liquid or solution can secondarily contaminate rescue and medical personnel by direct contact or through off-gassing ethylene oxide.**
- **Ethylene oxide can produce central nervous system depression and immediate eye, skin, and respiratory tract irritation and may lead to seizures, coma, or respiratory paralysis. Signs of accumulation of fluid in the lungs (shortness of breath, cyanosis, expectoration, cough) may evolve 12 hours or more after exposure.**
- **There is no antidote to be administered to counteract the effects of ethylene oxide. Treatment consists of supportive measures.**

1. Substance information

Ethylene oxide ($[CH_2]_2O$), CAS 75-21-8
Synonyms: epoxyethane, ETO, oxirane
Ethylene oxide is a colorless gas at room temperature and a colorless liquid below 11°C (51°F, respectively). It is highly reactive and water soluble. Both the gas and liquid are potential fire and explosion hazards. Ethylene oxide has a sweet ether-like odor at air concentrations of 500 ppm and above. However, dangerous exposures may occur at levels too low to smell.
Ethylene oxide is an important industrial solvent, plasticizer, and chemical intermediate. Ethylene oxide is used in the sterilization of hospital supplies, foods, and cosmetics, as a fumigant for spices, tobacco, furs, bedding, etc., and in the manufacture of antifreeze and other chemicals. It reacts with strong acids, alkalis and oxidizers.

2. Routes of exposure

Inhalation

Inhalation is a major route of ethylene oxide exposure. Ethylene oxide's odor is not a reliable indicator of any level of exposure and provides insufficient warning of hazardous exposure. The gas is heavier than air; exposure will be higher in enclosed, poorly ventilated, or low-lying areas.

Skin/eye contact

Ethylene oxide gas or liquids may be absorbed through the skin and eyes; however, direct contact with ethylene oxide gas or concentrated solutions may cause severe chemical burns.

Ingestion

Ingestion of ethylene oxide is unlikely because it is a gas at room temperature.

3. Acute health effects

Ethylene oxide exposure may produce central nervous system depression and immediate local irritation of the skin, eyes, nose, throat, and lungs. At high doses, it may cause accumulation of fluid in the lungs immediately or up to 12 hours or more after exposure.
Skin contact with ethylene oxide gas or aqueous solutions may cause irritation with redness of the skin, blistering, and crusted ulcerations. Skin reactions may be delayed up to 12 hours or more after exposure. Contact with liquefied ethylene oxide can result in frostbite. High concentrations of gas or splashes of concentrated solutions can cause tearing and redness of the eye, and corneal injury.

4. Actions

Rescuer self-protection	**If the zone which has to be entered by the rescuer is suspected of containing ethylene oxide, pressure-demand, self-contained breathing apparatus and chemical-protective clothing shall be worn; do not use equipment that is contaminated itself.** Patients exposed only to ethylene oxide gas do not pose a significant risk of secondary contamination. Patients whose clothing or skin is contaminated with liquid ethylene oxide (ambient temperature below 11°C) can secondarily contaminate other people by direct contact or through off-gassing ethylene oxide.
Patient recovery	Patients should be removed from the contaminated zone immediately. Patients who are unable to walk may be removed on backboards or stretchers; if these are not available, carefully remove/transport patients with appropriate action to a safe zone, taking into account your self-protection. Immediate priorities must follow the ”A, B, C’s” of resuscitation: **A) Airway** (make sure the airway is not blocked by the tongue or by a foreign body) **B) Breathing** (check to see if the patient is breathing, provide ventilations with use of appropriate barrier devices, e.g. with a pocket face mask, if breathing is absent) **C)) Circulation** (start CPR in any unresponsive person with absent or abnormal breathing)
Decontamination	Patients exposed only to ethylene oxide gas who have no evidence of skin or eye irritation do not need decontamination. All others require decontamination. Patients who are able and cooperative may assist with their own decontamination. If the exposure involved liquid ethylene oxide (ambient temperature below 11°C) and if clothing is contaminated, remove and double-bag the clothing. **Flush exposed skin and hair with plain water for at least 15 minutes.** Protect eyes during flushing of skin and hair. Continue other basic care during flushing. **Irrigate exposed or irritated eyes with plain water or saline for at least 15 minutes.** Remove contact lenses if present and easily removable without additional trauma to the eye. Continue other basic care during flushing.
Further actions	**Each potentially exposed person should seek immediate medical advice and treatment.**

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