
Information and recommendations for first responders

- Patients exposed only to ethylenimine vapor do not pose a significant risk of secondary contamination. Patients whose clothing or skin is contaminated with ethylenimine liquid can secondarily contaminate rescue and medical personnel by direct contact or through evaporation of ethylenimine.
 - Ethylenimine can produce immediate eye, skin, and respiratory tract irritation and may cause nausea and vomiting. These symptoms as well as signs of accumulation of fluid in the lungs (shortness of breath, cyanosis, expectoration, cough) may be delayed for more than 3 hours after exposure.
 - Immediate decontamination by flushing of exposed skin and eyes with copious amounts of water is required in order to avoid irreversible damage.
 - There is no antidote to be administered to counteract the effects of ethylenimine. Treatment consists of supportive measures.
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1. Substance information

Ethylenimine (C₂H₅N), CAS 151-56-4

Synonyms: azacyclopropane, aziridine, dimethylenimine

Ethylenimine is a colorless liquid at room temperature with a boiling point of 56°C (133°F, respectively). Both the vapor and liquid are potential fire and explosion hazards. Ethylenimine has an ammonia-like odor at air concentrations of 1.5 ppm and above. However, dangerous exposures may occur at levels too low to smell.

Ethylenimine is a highly reactive chemical, used as an intermediate and monomer for oil additive compounds, ion exchange resins, coating resins, pharmaceuticals, adhesives, polymer stabilizers, and surfactants. Polymerization products of ethylenimine are used in the manufacture of paper.

2. Routes of exposure

Inhalation

Inhalation of vapor is a relevant route of ethylenimine exposure.

Eye and nose irritation have been reported to occur at concentrations of 100 ppm and above. **Ethylenimine's odor is not a reliable indicator of exposure and provides insufficient warning of hazardous exposure.**

Skin/eye contact

Liquid ethylenimine is absorbed readily through the skin and eyes. It is a potent irritant and vesicant. Fatal ethylenimine intoxication caused mainly by skin absorption has been observed. Percutaneous absorption of vapor probably does not occur, but ethylenimine vapors severely irritate the eyes and may irritate moist skin.

Ingestion

Involuntary ingestion of ethylenimine is unlikely.

3. Acute health effects

Exposure to ethylenimine vapors may produce immediate severe local irritation of the eyes, nose, throat, and lungs, and moist skin.

At high doses, it may cause accumulation of fluid in the lungs immediately or up to 3 hours or more after exposure.

Skin contact with liquid ethylenimine may cause irritation with redness of the skin, blistering, and slowly healing necrotic burns. Skin reactions may be delayed up to 3 hours or more after exposure.

Liquids and vapors can cause tearing and redness of the eye, and severe corneal injury.

4. Actions

Rescuer self-protection

If the zone which has to be entered by the rescuer is suspected of containing ethylenimine, pressure-demand, self-contained breathing apparatus and chemical-protective clothing shall be worn; do not use equipment that is contaminated itself.

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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 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 ethylenimine vapor 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 ethylenimine 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.

In this document BASF has made a diligent effort to ensure the accuracy and currency of the information presented but makes no claim that the document comprehensively addresses all possible situations related to this topic. This document is intended as an additional resource for first responders in assessing the condition and managing the treatment of patients exposed to ethylenimine. It is not, however, a substitute for the judgement of a first responder and must be interpreted in the light of specific information regarding the patient available to such a first responder and in conjunction with other sources of authority.

BASF SE
Corporate Health Management
Carl-Bosch-Straße 38
67056 Ludwigshafen
Germany

BASF Corporation
Medical Department
100 Campus Drive, M/S F 221
Florham Park, NJ 07932
USA