Chemical Emergency Medical Guideline

Information and recommendations for first responders and patients

Aliphatic amines

CAS No.: 74-89-5; 124-40-3; 75-50-3; 75-04-7; 109-89-7; 121-44-8

GHS symbols:

GHS05
Corrosive

GHS06
Acute toxicity

Signal word: Danger

Hazard statements:

For detailed information on the H statements for the individual substances within this group, it is recommended to consult the relevant safety data sheets provided by the distributor or official databases (e.g. https://echa.europa.eu/de/search-for-chemicals).

Overview

- This guideline is based on information about the aliphatic amines, mono-, di-, trimethylamine and mono-, di- and triethylamine. Recommendations for other aliphatic amines are similar in many respects. However, this guideline does not cover any special considerations that may apply to other aliphatic amines.
- There is no danger from contact with patients who have only been exposed to gas or vapor from aliphatic amines. A patient who is wet with liquid aliphatic amines, or whose clothing is wet with them, may endanger other people through direct contact or through aliphatic amines that are outgassing/evaporating.
- Aliphatic amines are highly irritating as gases, vapors and liquids and can cause severe burns to the eyes and skin.
- Irritation of the respiratory tract can result in swelling of the nasal and throat mucosa, the larynx, coughing and shortness of breath. Signs of fluid accumulation in the lungs (shortness of breath, blue-red discoloration of the skin and mucous membranes, sputum, coughing) may occur.
- There is no known specific antidote. Treatment depends on the extent of exposure and the symptoms.

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1. Information about the substance

Aliphatic amines: (mono)methylamine (CH_3NH_2, CAS: 74-89-5), dimethylamine ($CH_{32}NH$, CAS: 124-40-3), trimethylamine ($(CH_3)_3$ N, CAS: 75-50-3), (mono-)ethylamines (CH_2CH_2 NH_2, CAS: 75-04-7), diethylamine ($(CH_3$ $CH_2)_2$ NH, CAS: 109-89-7), triethylamine ($(CH_3$ CH_2 $)_3$N, CAS: 121-44-8)
The lower aliphatic amines covered by this guideline are strongly alkaline derivatives of ammonia.
Methylamine and ethylamine are colorless gases at room temperature, while the other aliphatic amines are highly volatile liquids. These amines are highly to moderately soluble in water. All have a characteristic unpleasant odor. At high concentrations, this odor is like that of ammonia, while at lower concentrations it is fishy.
Aliphatic amines are widely used as starting materials for chemical synthesis, as intermediates and solvents in the manufacture of plastics, pesticides, explosives, dyes, surfactants, catalysts and other chemicals.

2. Exposition

2.1. Inhalation

Inhalation is a major route of exposure to aliphatic amines. The odor and irritant effect of aliphatic amines serve as a clear warning. However, the sense of smell can become dulled, so that low concentrations are hardly noticeable after prolonged exposure.

2.2. Skin/eye contact

Even low concentrations of aliphatic amines cause immediate irritation to the eyes and moist skin. Direct contact of the eyes or moist skin with liquid aliphatic amines, concentrated gas or vapor causes severe chemical burns.

2.3. Ingestion

Accidental ingestion of aliphatic amines is unlikely. Solutions containing aliphatic amines can cause severe damage to the mouth, throat and stomach if swallowed.

3. Acute health effects

Exposure to aliphatic amines generally causes irritation of the eyes, nose and throat. Breathing difficulties, including shortness of breath with coughing, constriction of the upper respiratory tract and bronchi, and accumulation of fluid in the lungs may occur.

If the skin is wet or damp, contact with gas or vapor from aliphatic amines can cause burning pain, inflammation, blisters and ulcers. Contact with pressurized liquid aliphatic amines may result in frostbite.

Low concentrations of gas or vapor can cause painless corneal swelling with blurred vision, grey-blue coloration and halos. Higher concentrations or contact with liquid aliphatic amines can cause bleeding in the conjunctiva, corneal opacity and inflammation. Other symptoms such as unbearable burning, spasmodic blinking or closing of the eyelids, redness and tearing may occur.

After inhalation, temporary headaches, nausea, weakness and restlessness may also occur.

A single, short-term exposure to low concentrations of aliphatic amines, from which the affected person recovers quickly, does not normally cause delayed or lasting damage to health. However, some symptoms may persist for a short period of time. Persistent visual disturbances can be the result of exposure to liquid aliphatic amines.

4. Measures

4.1. Self-protection of first aiders

If there is a suspicion that the area the helper must enter contains aliphatic amines in a concentration of 50ppm or more, a self-contained breathing apparatus and a chemical protection suit must be worn. Contaminated equipment should not be used.

Only for acute rescue measures can exposure to aliphatic amines in concentrations below 50ppm be accepted for a short time for helpers without protective equipment.
There is no danger from contact with patients who have only been exposed to gas or vapor from aliphatic amines. A patient who is wet with liquid aliphatic amines, or whose clothing is wet with liquid aliphatic amines, may endanger other people through direct contact or through outgassing aliphatic amines.

4.2. Rescue

Patients should be removed from the danger zone immediately. If they are unable to walk unaided, they should be removed from the danger zone quickly using appropriate means, taking care to protect themselves. The "A, B, C procedure" then has absolute priority.

A) Clear the airways (check for blockages caused by the tongue or foreign objects).
B) Ventilation (check the patient's breathing, if necessary, begin ventilation with adequate self-protection, e.g. breathing mask)
C) Circulation (begin resuscitation for any person who does not respond to verbal commands and is not breathing normally)

4.3. Cleaning

Patients who have only been exposed to gas or vapor from aliphatic amines and show no signs of skin or eye irritation do not require any special cleaning measures, unlike all others.
If possible, patients should assist in their own decontamination. If liquid aliphatic amines have been exposed and clothing is contaminated, it must be removed and securely wrapped.
If the eyes have been exposed to aliphatic amines or if eye irritation is present, rinse with water or neutral saline solution for 15 minutes. Remove any contact lenses, if possible, without causing further injury to the eye. Continue other important first aid measures during this time.
Rinse affected skin and hair with water for at least 15 minutes. Protect eyes while rinsing. Continue other important first aid measures during this time.

4.4. Further measures

If aliphatic amines are swallowed, do not induce vomiting. Anyone who may have been exposed to aliphatic amines should seek medical attention immediately.

4.5. Instructions for further rules of conduct

Consult your family doctor or the emergency department of the nearest hospital if any abnormalities or symptoms occur within the next 24 hours, in particular:

- Coughing, wheezing or whistling breath
- Difficulty breathing or shortness of breath
- Increased pain, swelling, redness or abnormalities in the affected skin areas or eyes
- Blurred vision, grey-blue colours appearing

5. References

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Administrative Information

Document Type	Chemical Emergency Medical Guideline
Number of Version	DE.1.0.0
Initial Publication	01.01.2026
Next Revision	2029
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