

# Chemical Emergency Medical Guideline

Information and recommendations for healthcare professionals

## Ethylbenzene

CAS No.: 100-41-4

GHS symbols:



**GHS06**

Acute toxicity



**GHS08**

Health hazard

**Signal word: Danger**

**Hazard statements:**

- H304 May be fatal if swallowed and enters airways.
- H332 Harmful if inhaled.
- H373 May cause damage to organs (hearing) through prolonged or repeated exposure.

### Overview

- There is no danger from contact with patients who have only been exposed to ethylbenzene vapors. A patient who is wet with liquid ethylbenzene (boiling point 136°C) or whose clothing is wet with it may endanger other people through direct contact or through ethylbenzene vapors.
- Ethylbenzene irritates the skin, eyes and respiratory tract and can cause headaches, nausea, dizziness, weakness, confusion and unconsciousness.
- There is no known specific antidote. Treatment depends on the extent of exposure and the symptoms.

**Table of Contents**

- 1. Information on the substance** ..... 3
- 2. Exposition** ..... 3
  - 2.1. Inhalation** ..... 3
  - 2.2. Skin/eye contact** ..... 3
  - 2.3. Ingestion** ..... 3
- 3. Acute health effects** ..... 3
  - 3.1. Dose-response relationship** ..... 3
  - 3.2. Respiratory tract** ..... 3
  - 3.3. Skin contact** ..... 4
  - 3.4. Eye contact** ..... 4
  - 3.5. Possible consequences** ..... 4
- 4. Measures** ..... 4
  - 4.1. Self-protection of first aiders** ..... 4
  - 4.2. Rescue** ..... 4
  - 4.3. Cleaning** ..... 4
  - 4.4. Initial treatment (preclinical or clinical)** ..... 5
  - 4.5. Further procedure and treatment** ..... 5
  - 4.6. Biomonitoring** ..... 6
  - 4.7. Discharge of the patient / instructions for further rules of conduct** ..... 6
- 5. References** ..... 7

**1. Information on the substance**

Ethylbenzene (C6H5-C2H5), CAS 100-41-4  
 Synonyms: Phenylethane

At room temperature (boiling point 136°C), ethylbenzene is a clear to slightly yellowish liquid. The vapor and liquid are flammable. Ethylbenzene has a sweetish odor. The odor threshold is 2.3 ppm. It is slightly soluble in water but highly soluble in alcohol and ether. Combustion produces carbon monoxide. Ethylbenzene is an organic solvent with a low vapor pressure and is used in the manufacture of styrene and as a chemical intermediate in the plastics and rubber industries. It is found in various refinery products, such as petrol.

**2. Exposition**

**2.1. Inhalation**

Exposure to ethylbenzene occurs mainly through inhalation. Ethylbenzene is rapidly absorbed through the lungs.

**2.2. Skin/eye contact**

Ethylbenzene is absorbed through the skin and can lead to general symptoms of poisoning.

**2.3. Ingestion**

Ethylbenzene is absorbed through the gastrointestinal tract. However, ingestion is rare in the workplace.

**3. Acute health effects**

Ethylbenzene can cause general symptoms of poisoning such as headache, nausea, dizziness, weakness, confusion and unconsciousness. Exposure to high concentrations may cause signs of upper respiratory tract irritation, followed by asphyxia, muscle weakness, coma and respiratory arrest. Liver and kidney damage may occur with chronic exposure.

**3.1. Dose-response relationship**

<u>Ethylbenzene concentration</u>		<u>Effects/action</u>
2.3 ppm	-	Odor threshold
100 ppm	-	TLV-TWA (ACGIH, USA)
125 ppm	-	TLV-STEL (ACGIH, USA)
200 ppm	-	Mild irritation of the eyes and tearing
800 ppm	-	IDLH value (NIOSH, USA)
2000 ppm	-	Dizziness, severe eye and nose irritation, tightness in the chest

**TLV:** Threshold limit value → Air concentration below which it is assumed that almost all workers can be repeatedly exposed to this concentration day after day throughout their working lives without this leading to harmful effects on their health.  
**TWA:** Time weighted average  
**ACGIH:** American Conference of Governmental Industrial Hygienists  
**TLV-STEL:** Threshold Limit Value-Short-Term Exposure Limit → Average concentration over 15 minutes to which workers may be exposed up to four times per day with at least 60 minutes between successive exposures without adverse health effects  
**IDLH:** Immediately Dangerous to Life and Health  
**NIOSH:** National Institute for Occupational Safety and Health

**3.2. Respiratory tract**

Ethylbenzene irritates the upper respiratory tract.

### 3.3. Skin contact

Local exposure to liquid ethylbenzene may cause skin irritation.

### 3.4. Eye contact

Local exposure to liquid ethylbenzene or high vapor concentrations may cause eye irritation with redness, burning, tearing or spasmodic eyelid closure.

### 3.5. Possible consequences

If the patient survives 48 hours after exposure, further improvement in symptoms can be expected. After acute exposure, lung function usually returns to normal within 7 to 14 days. Complete recovery is usually achieved. Increased sensitivity to irritants may persist and cause bronchospasm or chronic bronchitis. Such "reactive airways dysfunction syndrome" (RADS) may persist for several years. Destruction of lung tissue or scarring can lead to chronic dilation of the bronchi and increased susceptibility to infection. Liver damage may occur.

## 4. Measures

### 4.1. Self-protection of first aiders

If there is a suspicion that the area the helper must enter contains ethylbenzene, a self-contained breathing apparatus and a chemical protection suit must be worn.

There is no danger from contact with patients who have only been exposed to ethylbenzene vapors. A patient who is wet with liquid ethylbenzene or whose clothing is wet with liquid ethylbenzene may endanger other people through direct contact or through ethylbenzene vapors.

### 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 suitable means, taking care to protect themselves. The "A, B, C procedure" 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 on any person who does not respond to verbal commands and is not breathing normally)

### 4.3. Cleaning

Patients who have only been exposed to ethylbenzene vapors 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 cleaning. If liquid ethylbenzene has been exposed and clothing is contaminated, it must be removed and securely wrapped.

In the event of exposure to ethylbenzene, rinse the eyes with water or neutral saline solution for at least 15 minutes. Remove any contact lenses, if possible, without causing additional danger to the eye. Other important first aid measures must be continued during this time.

Rinse affected skin and hair with water for at least 15 minutes. Other important first aid measures must be continued during this time. Protect eyes while rinsing.

If swallowed, do not induce vomiting under any circumstances; this may cause irritation of the esophagus and aspiration.

#### 4.4. Initial treatment (preclinical or clinical)

Empirical therapy; no specific antidote available.

The following measures are recommended if the ethylbenzene concentration is 100 ppm or higher (depending on the duration of exposure), symptoms are present (e.g. irritation of the eyes or upper respiratory tract) or if no concentration can be estimated but exposure is very likely:

- Oxygen administration
- Administration of 8 sprays of beclomethasone (800µg beclomethasone dipropionate) from a metered dose inhaler.

If there are signs of airway constriction (e.g. bronchospasm or stridor)

- Nebulization of adrenalin (epinephrine): mix 2mg adrenalin (2ml) with 3ml NaCl 0.9% and administer via a nebulizer mask
- Administration of a  $\beta_2$ -selective adrenoceptor agonist, e.g. four puffs of terbutaline or salbutamol or fenoterol (one puff usually contains 0.25mg terbutaline sulphate; or 0.1mg salbutamol; or 0.2mg fenoterol); this can be repeated once after 10 minutes.

Alternatively, 2.5mg salbutamol and 0.5mg ipratropium bromide can be administered via a nebulizer mask.

If inhalation is not possible, administer terbutaline sulphate (0.25mg to 0.5mg) subcutaneously or salbutamol (0.2mg to 0.4mg over 15 minutes) intravenously.

c) Intravenous administration of 250mg methylprednisolone (or an equivalent steroid dose).

If there are signs of toxic pulmonary oedema (e.g. frothy sputum, moist rales)

- CPAP therapy
- Intravenous administration of 1000mg methylprednisolone (or an equivalent steroid dose)  
In case of (increasing) respiratory insufficiency, advanced airway management, e.g. endotracheal intubation or, if necessary, coniotomy.

*Note: The efficacy of corticosteroid administration has not yet been proven in controlled clinical trials.*

Patients who are conscious and able to swallow should, if possible, be given 50 g of activated charcoal (or 1 g/kg body weight for children weighing up to 50 kg). Activated charcoal may be administered repeatedly at any time to complete decontamination if there are signs or suspicion of ongoing absorption. For multiple doses, start with the single-dose amount mentioned above, followed by the same dose every four hours or half the dose every two hours. Avoid inhaling the product.

Avoid vomiting; it can cause irritation of the esophagus and aspiration.

#### 4.5. Further procedure and treatment

Patients with an exposure concentration of 100ppm or more (depending on the duration of exposure) and patients for whom no exposure dose can be estimated but exposure is very likely to be transported immediately to a hospital with intensive care facilities.

Skin contact with liquid ethylbenzene can cause skin irritation; this should be treated as a burn.

Exposure to the eyes may also cause irritation; this should also be treated as a burn. Consult an ophthalmologist.

*Note: Any contact with liquid ethylbenzene in the facial area can have serious consequences.*

Laboratory tests: The diagnosis of ethylbenzene poisoning is based primarily (in addition to the medical history) on the clinical signs of irritation, central nervous system disorders and probable exposure to ethylbenzene. In addition, a mandelic acid test (biological tolerance value 1g/l) can be performed on urine.

In addition to medical history, physical examination and vital signs, spirometry should be performed.

However, laboratory tests can be performed to monitor and assess complications. Blood count, glucose and electrolytes should be determined routinely. Prophylactic administration of antibiotics is not recommended but may be considered based on the results of sputum cultures.

#### 4.6. **Biomonitoring**

To estimate the systemic dose absorbed after exposure, biomonitoring can be performed by determining the concentrations of mandelic acid and phenylglyoxylic acid in the urine.

#### 4.7. **Discharge of the patient / instructions for further rules of conduct**

Clinically asymptomatic patients who have been exposed to an ethylbenzene concentration of less than 100 ppm (depending on the duration of exposure) and who have normal clinical examination findings and no signs of toxic effects after appropriate follow-up period may be discharged from hospital under the following circumstances:

- Information and recommendations for patients with instructions for further action were provided verbally and in writing. The patient was instructed to seek immediate medical attention if any health complaints arise.
- The patient is aware of and understands the toxic effects of ethylbenzene.
- The attending physician has been informed that regular contact between the patient and the physician is possible in the following 24 hours.
- Drinking alcohol should be prohibited for at least 72 hours.
- Heavy physical work should not be done in the following 24 hours.
- Do not smoke or be exposed to cigarette smoke for at least 72 hours; smoke can impair lung function.
- Patients with serious skin or eye injuries should be re-examined after 24 hours.

## 5. References

Buttgereit, F., Dimmeler, S., Neugebauer, E., Burmester, G.R.: Wirkungsmechanismen der hochdosierten Glucocorticoidtherapie, *Deutsche Medizinische Wochenschrift* 1996; 121: 248-252.

Diller, W.F.: Anmerkungen zum Unglück in Bhopal, *Deutsche Medizinische Wochenschrift* 1985; 110: 1749-1751.

IPCS (International Programme on Chemical Safety): International Chemical Safety Card # 0268, Ethylbenzene, 1994

ACGIH (American Conference of Governmental Industrial Hygienists): Documentation of the Threshold Limit Values: Ethyl benzene, 2002

ACGIH (American Conference of Governmental Industrial Hygienists.): Documentation of the Biological Exposure Indices: Ethyl benzene, 2007

RTECS (Registry of Toxic Effects of Chemical Substances.): RTECS # DA700000, Ethyl benzene, 2009

Haz-Map (Occupational Exposure to Hazardous Agents), Specialized Information Service, U.S. National Library of Medicine: Ethyl benzene, 2010

HSDB (Hazardous Substances Data Bank), U.S. National Library of Medicine: HSDB # 84, Ethylbenzene, 2010

IARC (International Agency for Research on Cancer): Monographs on the Evaluation of Carcinogenic Risks to Humans Vol. 77, 2000

ATSDR (Agency for Toxic Substances and Disease Registry): ToxGuide for Ethylbenzene, 2007

IDLH (Immediately Dangerous to Life or Health): National Institute for Occupational Safety and Health, Documentation Ethyl benzene, 1996

MEDITEXT – Medical Management: Ethyl benzene, 2011

Foncerrada G et al, Safety of Nebulized Epinephrine in Smoke Inhalation Injury, *J Burn Care Res* 2017;38:396–402

Walker PGF et al, Diagnosis and management of inhalation injury: an updated review, *Critical Care* (2015) 19:351

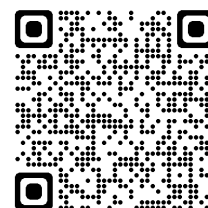
Olasveengen TM, Semeraro F, et. Al: European Resuscitation Council Guidelines 2021: Basic Life Support. *Resuscitation* 2021, 161: 98-114

Hoegberg, L. C. G., Gosselin, S., Buckley, N. A., Wood, D. M., Shepherd, G., Hanley, J., ... Hoffman, R. S. (2026). Recommendations from the Clinical Toxicology Recommendations Collaborative on the administration of activated charcoal in acute oral overdose. *Clinical Toxicology*, 1–127. <https://doi.org/10.1080/15563650.2025.2609807>

**Administrative Information**

<b>Document Type</b>	Chemical Emergency Medical Guideline
<b>Number of Version</b>	DE.2.0.0
<b>Initial Publication</b>	01.01.2026
<b>Next Revision</b>	2029
<b>Responsible Unit (Author)</b>	ESG/CH ESG/AS
<b>Contact Person</b>	ESG/CH: Dr. M. Conzelmann, T. Schröck ESG/AS: Dr. D. Frambach

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



BASF has taken every possible care to ensure that the information presented in this document is accurate and up to date but does not claim that this document comprehensively covers all possible situations in this regard. This document is intended as an additional source of information for doctors in hospitals and is designed to assist in the assessment of the condition and treatment of patients exposed to ethylbenzene. However, it does not replace the professional assessment of the respective situation by physicians in hospitals and must be interpreted in accordance with legal regulations and provisions as well as specific information available about the respective patients.