

Chemical Emergency Medical Guideline

Information and recommendations for healthcare professionals

Phenol

CAS No.: 108-95-2

GHS symbols:



GHS05
Corrosive



GHS06
Acute toxicity



GHS08
Health hazard

Signal word: Danger

Hazard statements:

H301	Toxic if swallowed.
H311	Toxic in contact with skin.
H314	Causes severe skin burns and serious eye damage.
H331	Toxic if inhaled.
H341	May cause genetic defects.
H373	May cause damage to organs through prolonged or repeated exposure.

Brief information

- A patient who is covered in phenol or whose clothing is contaminated with phenol may endanger other people through direct contact or through phenol vapors.
- Phenol is a corrosive chemical that is absorbed very easily and quickly by the body through any route of exposure. Phenol can cause severe damage at the site of exposure as well as systemic poisoning, which can lead to central nervous system disorders, cardiovascular and renal failure.
- Significant local damage can occur even before the patient feels any pain.
- The most important measure to take after phenol has come into contact with the skin is to cleanse (decontaminate) the area as quickly as possible by immediately rinsing it thoroughly with polyethylene glycol and water.
- 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. Central Nervous System	3
3.2. Respiratory tract	3
3.3. Skin and eye contact	4
3.4. Gastrointestinal tract	4
3.5. Cardiovascular system	4
3.6. Kidney	4
3.7. Possible consequences	4
4. Measures	4
4.1. Self-protection of first responders	4
4.2. Rescue	4
4.3. Cleaning	5
4.4. Initial treatment (preclinical or clinical)	5
4.5. Further procedures and treatment	5
4.6. Biomonitoring	6
4.7. Discharge of the patient / instructions for further action	6
5. References	7

1. Information on the substance

Phenol (C₆H₅OH), CAS 108-95-2

Synonyms: carbolic acid, hydroxybenzene, phenyl alcohol.

At room temperature, phenol has low vapor pressure and is a clear to slightly pink crystalline solid, a white powder or a viscous liquid. Phenol is highly soluble in alcohol and moderately soluble in water. Phenol has a sweet, pungent odor.

Phenol is obtained by organic synthesis or fractional distillation of coal tar. It is used in the manufacture of a variety of products such as synthetic resins, plastics, photographic chemicals, rubber chemicals and dyes. Phenol is also used as a disinfectant, preservative and in some medical preparations as a local anesthetic or anti-itching agent.

2. Exposition

2.1. Inhalation

When inhaled, phenol is rapidly absorbed by the lungs and can then have a systemic toxic effect. However, due to its low volatility, the risk of inhaling phenol at room temperature is limited. The smell of phenol usually provides sufficient warning of dangerous concentrations.

2.2. Skin/eye contact

Dangerous exposure to phenol occurs primarily through skin contact. Phenol is absorbed very well and quickly through the skin and eyes as a vapor and as a liquid and can then have a systemic toxic effect. If more than 100cm² of skin is affected (an area approximately the size of one palm), there is an immediate risk to life. Even diluted solutions (<2%) can cause severe burns to the eyes and skin if exposed for a prolonged period.

2.3. Ingestion

Accidental ingestion of phenol can quickly lead to systemic toxicity. Deaths in adults have been reported after ingesting as little as one gram or more.

3. Acute health effects

Phenol can cause severe chemical burns with permanent damage to all exposed areas, including the mouth, throat, esophagus, skin and eyes. Inhalation can cause irritation, swelling and ulcers in the upper respiratory tract, as well as pulmonary oedema.

As a sign of systemic toxicity, central nervous system stimulation may initially occur, with nausea, headaches, dizziness and convulsions, followed shortly afterwards by central nervous system depression with loss of consciousness, respiratory paralysis and coma.

Hemolysis and cardiovascular symptoms such as tachycardia, cardiac arrhythmia and a drop in blood pressure may occur and impair oxygen transport. After relevant exposure, acute renal failure is also possible as a systemic toxicity. Vomiting and diarrhea are common with significant exposure to phenol, regardless of the route of exposure.

3.1. Central Nervous System

As a sign of systemic toxicity, central nervous system stimulation may occur initially, followed shortly thereafter by inhibition with loss of consciousness, respiratory paralysis and coma. Initial symptoms may include nausea, excessive sweating, headache and dizziness. Seizures and coma often manifest within minutes to a few hours after exposure but may also occur up to 24 hours after exposure.

3.2. Respiratory tract

Exposure to low concentrations of phenol can cause irritation of the upper respiratory tract. In cases of more severe exposure, oedema in the throat area, inflammation and ulcers in the trachea and pulmonary oedema may occur.

3.3. Skin and eye contact

When phenol comes into direct contact with the skin, a white coating develops. This quickly turns red and eventually peels off, leaving the surface slightly brownish in color. If phenol is not removed from the skin, it penetrates very quickly into deeper layers, leading to cell death and gangrene. If more than 100 cm^2 of skin is affected (an area approximately the size of one palm), there is an immediate risk of death.

Phenol is said to have local anesthetic properties and can therefore cause extensive damage before pain is felt. Contact with concentrated phenolic solutions can cause severe eye damage such as clouding of the surface and cornea, as well as inflammation of the eye and eyelids.

3.4. Gastrointestinal tract

Vomiting and diarrhea are common in cases of significant exposure to phenol, regardless of the route of exposure. If swallowed, diffuse damage to the mucosa throughout the gastrointestinal tract may occur. Swallowing may also lead to death due to respiratory disorders.

3.5. Cardiovascular system

Hemolysis and cardiovascular symptoms such as tachycardia, cardiac arrhythmia and a drop in blood pressure may occur and impair oxygen transport. The formation of methemoglobin has also been described.

3.6. Kidney

Acid-base balance disorders and acute renal failure have been described after acute poisoning. People who excrete higher concentrations of unmetabolized phenol directly due to a genetic deficiency of certain enzymes (UDP-glucuronyltransferase, PAPS-sulfotransferase) are particularly at risk of phenol-induced kidney damage.

3.7. Possible consequences

Permanent nerve damage has been reported after acute exposure. Damage to the skin, eyes and mucous membranes caused by chemical burns can be irreversible, e.g. gangrene, blindness or esophageal stenosis.

4. Measures

4.1. Self-protection of first responders

If there is a suspicion that phenol vapors may be present or that there may be contact with liquid phenol in the area that the helper must enter, a self-contained breathing apparatus and a chemical protection suit must be worn. Contaminated equipment should not be used.

A patient who is wet with liquid phenol or whose clothing is wet with liquid phenol may endanger other people through direct contact or through phenol vapors. When exposed to concentrated phenol vapors, phenol can be absorbed by clothing; appropriate care should be taken when cleaning.

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 yourself. 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 for any person who does not respond to verbal commands and is not breathing normally)

"CRASH" decontamination

- Rescue patients contaminated with phenol who are unconscious or immobile (critically ill/injured patients according to the ABCDE scheme) from the immediate danger zone, taking care to protect yourself with suitable personal protective equipment.
- If necessary, perform emergency measures ("basic life support"; e.g. bleeding control using tourniquets, chest compressions, etc.)
- At a suitable location outside the danger zone, completely undress the contaminated patient using an emergency rescue knife, taking care to protect yourself (duration: approx. 1 minute).
- Shower/rinse with plenty of water (duration: approx. 1 minute).
- Transfer to a clean stretcher. Ensure body heat is maintained. Transport/handover to the emergency services/emergency doctor (duration: approx. 1 minute)

4.3. Cleaning

All patients who have been exposed to phenol must be cleaned immediately. If possible, patients should assist in their own cleaning. If liquid phenol has come into contact with clothing, it must be removed and securely wrapped.

If the eyes have been exposed to phenol or if there is eye irritation, rinse with water or a 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.

In all cases of phenol exposure, affected areas of skin and hair must be repeatedly dabbed with swabs soaked in polyethylene glycol (PEG) 300 or 400 for at least 20 minutes, unless this has already been done. If polyethylene glycol is not immediately available, the affected areas of skin and hair should be rinsed with plenty of water for at least 20 minutes. After cleaning with polyethylene glycol, rinse the affected area again with plenty of water for at least 10 minutes. Other important first aid measures should be continued during this time.

If swallowed, do not induce vomiting under any circumstances. Vomit may contain phenol and thus endanger other people.

If there are signs or symptoms of esophageal irritation or burns, the patient should be taken to an endoscopy center as soon as possible. An endoscopy to determine the extent of the damage (suspected gastrointestinal necrosis or perforation?) should be considered.

Only if a significant dose was swallowed less than 30 minutes before the patient's endoscopic examination and perforation can be ruled out should immediate gastric lavage be considered.

4.4. Initial treatment (preclinical or clinical)

Immediate and thorough cleansing (decontamination) is a prerequisite for any successful treatment. Empirical treatment; no specific antidote available.

If there are signs of hypoxia, administer humidified oxygen. In the event of respiratory insufficiency, perform endotracheal intubation or alternative airway management. If this is not feasible, perform a coniotomy if necessary.

Patients who have inhaled or swallowed phenol or who have had significant dermal exposure (affecting more than 100cm² of skin area) should be classified as critically exposed.

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.

4.5. Further procedures and treatment

All patients classified as dangerously exposed should be admitted immediately to a hospital with intensive care facilities. Collect urine samples for biomonitoring immediately after exposure and during treatment to assess and quantify systemic exposure.

Exposure to the eyes can cause severe damage; this should be treated as a burn. Consult an ophthalmologist immediately.

Skin contact with phenol vapors or liquid phenol can cause severe damage; this should also be treated as a burn: adequate fluid administration, analgesic therapy, maintenance of body temperature, covering the affected skin area with a sterile dressing.

4.6. Biomonitoring

Biomonitoring with determination of the phenol concentration in urine can be carried out to estimate the systemic dose absorbed after exposure.

4.7. Discharge of the patient / instructions for further action

Clinically asymptomatic patients who show no abnormal clinical findings and no signs of toxic effects of phenol after an appropriate follow-up period may be discharged 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 problems arise.
- The patient is aware of and understands the toxic effects of phenol.
- The attending physician has been informed that regular contact between the patient and the physician is possible in the following 24 hours.
- Heavy physical work should not be carried out 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 skin or eye injuries should be re-examined after 24 hours at the latest.

5. References

Berufsgenossenschaft der chemischen Industrie (German Chemical Industry Association), ed. Phenol, Cresols and Xylenols. Heidelberg: Jedermann-Verlag, 1988. (Information sheets on hazardous substances; M 018.)

Ellenhorn MJ, Schonwald S, Ordog G, Wasserberger J. Ellenhorn's Medical Toxicology: Diagnosis and Treatment of Human Poisoning. 2nd ed. Baltimore: Williams & Wilkins, 1997: 100, 1228-1229, 1265-1266.

Goldfrank LR, Flomenbaum NE, Lewin NA, Weisman RS, Howland MA, Hoffman RS. Toxicologic Emergencies. 6th ed. Norwalk: Appleton & Lange, 1998: 919-920, 1363-1365, 1409.

Horch R, Spilker G, Stark GB. Phenol Burns and Intoxications. Burns 1994; 20: 45-50.

U.S. Department of Health & Human Services - Agency for Toxic Substances and Disease Registry, ed. Phenol. Atlanta, 1994. (Managing Hazardous Materials Incidents; Vol III.)

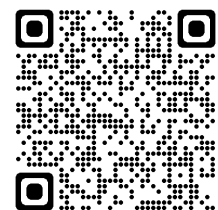
Olasveengen TM, Semeraro F, et. Al: European Resuscitation Council Guidelines 2021: Basic Life Support. Resuscitation 2021, 161: 98-114

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

Document Type	Chemical Emergency Medical Guideline
Number of Version	DE.2.0.0
Initial Publication	01.01.2026
Next Revision	2029
Responsible Unit (Author)	ESG/CH ESG/AS
Contact	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 phenol. 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.