



Phenol

What is phenol?

- Phenol is a highly corrosive, flammable chemical with a sweet, tar-like odor.
- Pure phenol is a colorless-to-white solid. The commercial product is usually a liquid.

What are the uses of phenol?

- Phenol is used as a general disinfectant and antiseptic in various products. These include toilet and floor disinfectants and medicinal preparations such as mouthwashes, sore throat lozenges and sprays, and antiseptic lotions.
- Other uses of phenol include the manufacture of nylon and other synthetic fibers, explosives, fertilizers, paints, rubber, textiles, adhesives, drugs, paper, soap, wood preservatives and photographic developers.
- Phenol can be used as a component of fluids injected underground to aid in the recovery of natural gas.

Is phenol in the environment?

- Phenol can enter air, water and soil during its manufacture and use.
- Phenol can enter the environment after an accidental spill or a leak during storage or burial at a waste site.
- Phenol is found in air as a result of car and truck emissions.
- Phenol enters indoor and outdoor air in cigarette smoke.
- Phenol has been detected in city and suburban air at a median concentration of 0.03 parts per billion (ppb).
- Phenol breaks down in air into less harmful chemicals.
- Phenol is released to the environment from decomposing animal and leaf litter and other organic wastes.
- Phenol is not commonly found in drinking water. However, sometimes it is present in residential drinking water wells near landfills, waste sites or leaking underground fuel storage tanks.
- Phenol rapidly breaks down in water into less harmful chemicals. However, it can remain in water for a week or more if present in high concentrations.

- Phenol is not commonly found in soils, but, it has been measured in sediment at concentrations ranging from 0.07 to 0.7 milligrams per kilogram (mg/kg) or 0.07 to 0.7 parts per million (ppm).
- Phenol breaks down in soils into less harmful chemicals in about two to five days.
- Phenol is present in some foods. These foods include bottom feeding fish, cheese, clams, fried chicken, fried bacon, black fermented tea, smoked sausage and smoked pork belly.
- Phenol has been detected in smoked summer sausage and smoked pork belly at concentrations of 7 ppm and 28.6 ppm, respectively.
- Commercial mouthwashes and lozenges contain phenol at concentrations of about 1.45 percent and 33 mg, respectively.
- Phenol has also been found in cigarette smoke at estimated concentrations ranging from 60 – 140 micrograms.

How are people exposed to phenol?

- Breathing contaminated air is a major route of exposure to phenol.
- Exposure to phenol in indoor air may occur from breathing vapors from household cleaning and disinfectant products.
- Exposure to phenol occurs by inhaling or breathing cigarette smoke.
- Exposure to phenol may occur by breathing contaminated outdoor air.
- Exposure to phenol may occur through skin contact with the substance during the use of household or workplace products.
- Exposure to phenol occurs during the use of medicinal products containing the substance.

How does phenol enter and leave the body?

- Phenol readily enters the body through the gut and the lungs when ingested or inhaled. Phenol is also well absorbed into the body through skin.
- Phenol does not usually accumulate in the body.
- Most of the phenol in the body is rapidly broken down in the liver into non-toxic compounds and quickly eliminated in urine.

How harmful is exposure to phenol?

- Phenol is irritating and corrosive by all routes of exposure. Exposure by any route can cause responses that affect the entire body.

- Breathing high concentrations of phenol can cause severe respiratory irritation.
- Skin contact with phenol may cause redness, swelling, chemical burns and tissue breakdown. Prolonged exposure may produce a dark pigment in the skin.
- Prolonged exposure to phenol can cause vomiting, difficulty swallowing, excessive salivation, diarrhea, headache, fainting, dizziness and mental disturbances.
- Ingesting or applying large amounts of phenol to the skin can cause heart rhythm disturbances and may produce tremors and seizures.

Can exposure to phenol cause cancer?

- There is no evidence that phenol causes cancer in humans.
- The International Agency for Research on Cancer (IARC) and the U.S. Environmental Protection Agency (EPA) have determined that phenol is not classifiable as to its cancer potential in humans.

Is there a medical test to show whether I've been exposed to phenol?

- Phenol can be measured in urine.
- The normal mean concentration of phenol in the urine of unexposed individuals is 10 milligrams of phenol per liter of urine (mg/L). Normal concentrations in urine generally do not exceed 20 mg/L. However, the urinary concentration of phenol can vary widely (five-fold) within a given population.
- An excess concentration of phenol in urine may suggest recent exposure to phenol or to substances that are converted to it in the body.
- The presence of phenol in urine can be increased in persons with liver disorders, digestive problems and after taking drugs such as aspirin and eating certain foods.
- Most of the phenol that enters the body is excreted in the urine within 24 hours.
- The detection of phenol and/or its breakdown products in urine cannot be used to predict the kind of health effects that might develop from that exposure.

What is the treatment for phenol?

- There is no antidote for phenol poisoning.
- Phenol poisoning is treated by removing the person from the source, followed by supportive medical care in a hospital setting.

Are there recommendations to protect public health?

- The Occupational Safety Health Association's (OSHA) Permissible Exposure Limit (PEL) for phenol in air is 5 ppm or 19 milligrams per cubic meter (mg/m³) averaged over an eight-hour work shift.

- The National Institute for Occupational Safety and Health's Short-term Exposure Limit (STEL) for phenol in air is 15.6 ppm (60 mg/m³) for periods not to exceed 15 minutes.
- The EPA's Long-term Health Advisory (LTHA) for phenol in drinking water is 2000 ppb.

What can I do to reduce or prevent exposure to phenol?

- Avoid smoking. If you do smoke, avoid smoking in enclosed spaces such as inside the home or car.
- Store household cleaning products and medications containing phenol out of the reach of young children.
- If phenol contacts the skin, immediately wash the affected areas with soap and water.
- Immediately remove clothes containing phenol and safely clean the clothing.

What should I do if I believe I am ill as a result of exposure to phenol?

- Eliminate the source of exposure and seek rapid emergency medical treatment in a hospital setting if your condition or history suggests phenol poisoning.

Where can I get more information?

For more information, contact:

The Pennsylvania Department of Health, Division of Environmental Health Epidemiology, P.O. Box 90, Harrisburg, PA, 17108. Telephone number: 717-787-1708.

The U.S. Department of Health and Human Services, Agency for Toxic Substances and Disease Registry, Atlanta, Georgia. Telephone number: 800-CDC-INFO (800-232-4636).

References

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- (3) U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry (ATSDR). September 2011. ToxGuideTM for Phenol.
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Content last modified on 11/07/12