

LONGWOOD
UNIVERSITY

**BENZENE AWARENESS
TRAINING FOR
LABORATORIES**

Office of Environmental Health and
Occupational Safety

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BENZENE AWARENESS TRAINING for LABORATORIES**Substance:** Benzene (C₆H₆)**CAS Registry Number:** 71-43-2**Synonym:** Benzin, Benzol, Phenyl hydride

Introduction: The Occupational Safety and Health Administration (OSHA) considers Benzene to be a toxic and hazardous substance. The OSHA Standard can be found in the Code of Federal Regulations, 29 CFR 1910.1028. The major elements of OSHA's Benzene Standard are: A permissible exposure limit (PEL) of 1 ppm averaged over an 8-hour period and 5 ppm not to be exceeded during any 15-minute period. Requirements that employers use engineering controls and work practices, where feasible, to reduce worker exposure. Requirements that employees observe good personal hygiene practices. Requirements that employees be provided with protective clothing, and where necessary, with respiratory protection.

This document is intended to raise your awareness level about the health and safety hazards associated with the use and handling of Benzene, provide you with information on how to protect yourself from these hazards and provide you with a summary of key provisions of the OSHA standard.

Always read the Material Safety Data Sheet (MSDS) or Safety Data Sheet (SDS) before using this chemical.

Appearance and Odor: A clear, colorless liquid with a sweet Petroleum like odor.

Physical and Chemical Properties:

Solubility: Slightly soluble in water

Odor Threshold:	12 ppm
Flash Point:	-11°C
LEL:	1%
UEL:	85
Auto Ignition Temp:	498° to 580°C
Vapor Density:	2.7 (air=1)
Vapor Pressure:	75 mm Hg at 20°C
Specific Gravity:	0.88 (water=1)
Boiling Point:	80°C
Freezing Point:	6°C
Ionization Potential:	9.24eV
Molecular Weight:	78.1

Hazard Summary

Hazard Rating	NFPA
Health	2
Flammability	3
Reactivity	0
Special Hazard	
CARCINOGEN FLAMMABLE POISONOUS GASES ARE PRODUCED IN FIRE CONTAINERS MAY EXPLODE IN FIRE	

*Hazard Rating Key: 0=minimal: 1=slight: 2=moderate:
3=serious: 4=severe*

First Aid:

Eye Contact: Immediately flush large amounts of water for at least 15 minutes, lifting upper and lower lids. Remove contacts, if worn, while rinsing.

Skin Contact: Quickly remove contaminated clothing. Immediately wash contaminated skin with large amounts of soap and water.

Inhalation: Remove the victim from exposure. Begin rescue breathing (using universal precautions) if breathing has stopped and CPR is heart action has stopped. Transfer promptly to a medical facility. If the victim is transferred to a medical facility send the MSDS or SDS with the rescue squad.

EMERGENCY NUMBERS

Fire and Rescue: 911

Campus Police: (434)395-2091

Poison Control: (800)222-1222

Exposure Limits: The Occupational Safety and Health Administration (OSHA) legal airborne permissible exposure limit (PEL) is 1 ppm averaged over an 8-hour work shift and 5 ppm, not to be exceeded during any 15-minute work period. The National Institute for Occupational Safety and Health (NIOSH) recommends exposure limit (REL) is 0.1 ppm averaged over a 10-hour work shift and 1 ppm, not to be exceeded during any 15-minute work period. The American Conference of Governmental Industrial Hygienists (ACGIH) threshold limit value (TLV) is 0.5 ppm averaged over an 8-hour work shift and 2.5 ppm and a STEL (short-term exposure limit).

Benzene is a carcinogen in humans and a mutagen. There may be no safe level of exposure to a carcinogen, so all contact should be reduced to the lowest possible level.

Routes of Exposure: Benzene may cause adverse health effects following exposure via inhalation, ingestion, dermal contact or eye contact.

Signs and Symptoms of Exposure: Short-term (acute) exposure to Benzene may occur immediately or shortly after exposure and can cause irritation to the skin and eyes, nausea, vomiting, diarrhea and abdominal pain. Inhaling Benzene can irritate the nose and throat causing coughing and wheezing. Benzene can cause headaches, dizziness and lightheadedness. Convulsions and coma or sudden death from irregular heartbeat, may follow high exposure.

Chronic (long-term) health effects can occur at some time after exposure to Benzene and can last for months or years.

Cancer Hazard: Benzene is a carcinogen in humans. It has been shown to cause leukemia.

Reproductive Hazard: There is limited evidence that Benzene is a teratogen in animals. Until further testing has been done, it should be treated as a possible teratogen in humans.

Other Effects: Benzene can cause drying and scaling of the skin. Repeated exposure can cause damage to blood cells (aplastic anemia).

Medical Testing: Before exposure and every twelve months OSHA requires your employer to provide, (for persons exposed to greater than 0.5 ppm of Benzene) a work and medical history and exam which shall include:

A thorough physical examination, complete blood count (CBC) and any other tests determined necessary by the examining physician.

OSHA requires your employer to provide you and your physician with a copy of the OSHA Benzene Standard (29 CFR 1910.1028). Any evaluation should include a careful history of past and present symptoms with an exam. Medical test that look for damage already done are not a substitute for controlling exposure. Request copies of your medical testing by contacting Longwood University's Department of Environmental Health and Safety (434)395-2940. You have the legal right to this information under the OSHA Access to Employee Exposure and Medical Records Standard (209 CFR 1910.1020).

Workplace Controls and Practices: Very toxic chemicals, or those that are reproductive hazards or sensitizers, require expert advice on control measures if a less toxic chemical cannot be substituted. Control measures include enclosing chemical processes for severely irritating and corrosive chemicals, using local exhaust ventilation (fume hoods) for chemicals that may be

harmful with a single exposure, and using general ventilation to control exposure to skin and eye irritants. For further information on workplace controls contact Longwood University's Department of Environmental Health and Safety at (434)395-2490.

Personal Protective Equipment: The OSHA Personal Protective Equipment Standard (29 CFR 1910.132) requires employers to determine the appropriate personal protective equipment for each hazard and to train employees on how and when to use protective equipment.

The following recommendations are only guidelines and may not apply to every situation. Prior to using Benzene consult Longwood University's Department of Environmental Health and Safety at (434)395-29040 or the manufacture's MSDS or SDS.

Gloves and Clothing: Avoid skin contact with Benzene. Wear personal protective equipment made from material which cannot be permeated or degraded by this substance. Safety equipment manufactures recommend Polyvinyl Alcohol, Silver Shield®/4H®, Viton and Fluorelastomer for gloves. All protective clothing should be clean, available each work day, and put on before working with Benzene.

Eye Protection: Wear non-vented, Impact resistant goggles when working with fumes, gases, or vapors. For impact hazards (such as flying fragments, chips or particles), wear safety glasses with side shields or safety goggles. Wear a face shield along with goggles when working with corrosive, highly irritating or toxic substances. Do not wear contacts lenses when working with this substance.

Respiratory Protection: Always work with Benzene in a fume hood.

Spills and Emergencies: If a Benzene spill has occurred do not clean it up unless you have been properly trained by Longwood University's Department of Environmental Health and Safety. Call Campus Police at ext. 2091.

If you are trained to clean up a Benzene spill take the following steps: Evacuate personnel and secure and control the entrance to the area. Eliminate all ignition sources. Use only non-sparking tools. Absorb liquids in vermiculite, dry sand, earth, or a similar material and deposit in a Hazardous Waste Container. Ventilate area of spill or leaks. Keep Benzene out of confined spaces such as sewers, because of possibility of explosion. DO NOT wash into the sewer. Benzene is a HAZARDOUS WASTE contact Longwood University's Department of Environmental Health and Safety for disposal.

Handling and Storage: Prior to working with Benzene you should be trained on its proper handling and storage. A regulated, marked area should be established where Benzene is handled, used and stored. Benzene reacts violently or explosively with oxidizing agents such as

Perchlorates, Permanganates, Chlorates, Nitrates, Chloride, Bromine and Fluorine. Benzene reacts violently or explosively with strong acids such as Hydrochloric acid, Sulfuric acid and Nitric acid. Benzene ignites on contact with Chromic anhydride. Benzene is not compatible with liquid Oxygen, Hydrogen and Randy Nickle. Store in tightly closed containers in a cool, well-ventilated area away from air and heat, Benzene attacks some rubber, coatings and plastics. Sources of ignition, such as smoking and open flames are prohibited where Benzene is used, handled, or stored. Metal containers involving the transfer of Benzene should be grounded and bonded. Use explosion-proof electrical equipment and fittings wherever Benzene is used, handled or stored. Use only non-sparking tools and equipment, especially when opening and closing containers of Benzene.

Work Area Preparation and Clean-up: Always use a fume hood for your work area when using Benzene. Ensure that the fume hood is working correctly. The digital read out on the fume hood should be between 60 to 100 linear feet per minute. Place a temporary covering, such as bench paper, in the fume hood. Place a sign on the hood:

CAUTION BENZENE WORK AREA

SEE (Add your name and phone number) FOR ENTRY

When work with Benzene is complete carefully roll up the temporary covering and place it in a hazardous waste container. Wipe the area and places the rags or paper towels in a hazardous waste container. Finally remove the sign. Work areas should be cleaned as soon as the work with Benzene is complete.

For more information, please contact:

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