

DESERT RESEARCH INSTITUTE

Guidelines for Laboratory-Scale Use of BENZENE

(Benzol Cyclohexatriene, Phenyl hydride)

INTRODUCTION

Benzene is a known human carcinogen and as such is considered a particularly hazardous substance (PHS). The use of benzene requires completion of a PHS Use Approval Form and the purchase of this chemical must be approved by the Principal Investigator before ordering. Quantities ordered will be limited to the smallest amount necessary to complete the experiment. The amount purchased should be limited to only the quantity needed to complete the project to avoid disposing the excess as hazardous waste. The user is responsible for ensuring a current Material Safety Data Sheet (MSDS) is obtained unless a one is already available within the laboratory.

The use of benzene must be conducted in designated areas within the laboratory unless the laboratory itself has been deemed a designated use area. Use areas are required to be posted with appropriate warnings (see Section V.B of the DRI Chemical Hygiene Plan). Additional lab specific details on how and where benzene is used in the lab and lab specific safety measures shall be outlined on the PHS Use Approval Form and may be appended to this document or included in other lab specific safety documents that are used for employee lab specific safety education.

POTENTIAL HAZARDS

In addition to its carcinogenic effect, benzene is highly flammable (vapors may travel a considerable distance to a source of ignition and "flash back") and is considered to be a chronic toxin affecting the blood-forming organs of the body.

Acute Exposure: The acute toxicity of benzene is low. Inhalation of benzene can cause dizziness, euphoria, giddiness, headache, nausea, drowsiness, and weakness. Benzene can cause moderate irritation to skin and severe irritation to eyes and mucous membranes. Benzene readily penetrates the skin to cause the same toxic effects as inhalation or ingestion.

Chronic Exposure: The chronic toxicity of benzene is significant. Exposure to benzene affects the blood and blood forming organs such as bone marrow, causing irreversible injury; blood disorders including anemia and leukemia may result. The symptoms of chronic benzene exposure may include fatigue, nervousness, irritability, blurred vision, and labored breathing.

Benzene is a known human carcinogen, regulated by OSHA in Title 29 Code of Federal Regulation 1910.1028. Lab-scale use of benzene is exempted from the benzene standard provided exposures to laboratorians is less than the action level of 5 ppm (which is one half the permissible exposure limit) as averaged over an eight hour working day. **If airborne exposure is suspected** at or above the action level, **stop work** and contact EH&S for assistance in conducting a work hazard assessment and hazard mitigation and monitoring protocol.

PERSONAL PROTECTIVE EQUIPMENT

Gloves shall be used when potential for skin contact exists. Disposable Nitrile gloves provide minimum protection for general laboratory use and should be changed frequently or whenever contamination is suspected. Viton[®] gloves are required when hand immersion in benzene is expected. Chemical safety goggles should be worn when a splash hazard exists; ANSI Z87 safety glasses are required at a minimum when benzene is used in a closed system. A laboratory coat should be worn when working with chemicals. A chemically resistant apron should be used if transferring or using large quantities of benzene in an open container.

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ENGINEERING CONTROLS

Work with benzene in a chemical hood. Emergency eyewash and safety shower should be nearby.

SPECIAL HANDLING PROCEDURES AND STORAGE REQUIREMENTS

Use benzene in areas free of ignition sources. Keep in a tightly closed container. Store in a FM approved flammable liquid storage cabinet, with compatible materials (e.g., away from oxidizers and corrosives).

SPILL AND ACCIDENT PROCEDURES

Skin contact: Immediately wash with soap and water and remove contaminated clothing (including shoes). Get medical attention if irritation persists.

Eye contact: promptly wash with copious amounts of water for 15 minutes (lifting upper and lower eyelids occasionally) and seek medical attention.

Inhalation: Move person to fresh air and seek medical attention. Give artificial respiration if not breathing.

Ingestion: Drink copious amounts of water. Do not induce vomiting. Get medical attention immediately. Poison Control #: 1-800-222-1222.

Incidental spill: Remove all ignition sources. Absorb with solvent spill kit materials and transfer absorbed material to a closed container. Label as "hazardous waste". Do not flush to sanitary sewer and avoid runoff into storm sewer and ditches which lead to waterways.

Large spill: Notify others in room of spill. Extinguish all ignition sources. Evacuate room/immediate area, close the doors and call the EH&S emergency number 775-742-6330.

DECONTAMINATION

After cleaning up spilled materials, thoroughly wash the area with soap and water, then rinse. Treat all clean up materials as non-RCRA wastes. Specific instructions may be developed for the lab and should be included here _____

WASTE DISPOSAL PROCEDURES

Excess benzene and spill clean up materials should be collected in an appropriate closed container and clearly labeled. Submit a [Request for Waste Disposal Form](#) to EH&S to arrange for pick up and disposal.

MSDS LOCATION (list lab specific location here) _____

TRAINING

Lab specific standard operating procedures must be developed and all laboratorians who work with or are potentially exposed to benzene in the lab must receive documented training and education about the hazards and how to minimize them.