# **Diethyl Ether**

Introduction

Diethyl ether is a colorless and highly flammable liquid with a characteristic anesthetic odor. It poses a serious fire and explosion risk. Vapor may travel considerable distances to ignition sources, like a hot plate, Bunsen burner, and other sources that are not necessarily an open flame. Vapors may be ignited by the static electricity which can build up when ether is being poured from one vessel to another.

Diethyl Ether is a common laboratory solvent often used for liquid-liquid extraction. It is also important in the production of cellulose plastics and is used as a starting fluid for diesel and gasoline engines.

Synonyms: ether, ethyl ether, diethyl ether, ethoxyethane, ethyl oxide, diethyl oxide, anesthetic ether.

*This fact sheet is not intended to replace the Safety Data Sheet provided by the manufacturer.*

Hazards

Major Hazards:

* Diethyl Ether is an extremely flammable liquid and vapor (GHS Category = 1) and is one of the most dangerous fire hazards commonly encountered in the laboratory, owing to its volatility and extremely low ignition temperature. It can also form explosive peroxides after exposure to air and light. Peroxides can form even in unopened containers. Older chemical containers may form crystals on the cap, which is extremely dangerous and unstable.

Health Hazards:

* The acute toxicity of diethyl ether is low. Inhalation of high concentrations can cause sedation, unconsciousness, and respiratory paralysis. These effects are usually reversible upon cessation of exposure. It is mildly irritating to the eyes and skin but does not generally cause irreversible damage. Repeated contact can cause dryness and cracking of the skin due to removal of skin oils, but the liquid is not readily absorbed through the skin, in part because of its high volatility. Diethyl ether is slightly toxic by ingestion.
* There is no evidence for carcinogenicity of diethyl ether, and no reproductive effects have been reported. Chronic exposure to the vapors may lead to loss of appetite, exhaustion, drowsiness, dizziness, and other central nervous system effects.

Storage and Handling

* Diethyl ether should be used only in areas free of ignition sources (including hot plates, incandescent light bulbs, and steam baths, electric motors). It should be stored in tightly sealed metal containers in areas separate from oxidizers.
* Because of the tendency of diethyl ether to form peroxides on contact with air, containers should be dated upon receipt and at the time they are opened. Diethyl ether is generally supplied with additives that inhibit peroxide formation; distillation removes these inhibitors and renders the liquid more prone to peroxide formation.
* All containers of diethyl ether, opened or sealed, must be stored in a flammable storage cabinet. It should be stored in the smallest container possible. Sealed containers may also be stored in a refrigerator or freezer that is certified safe for storing flammable materials.
* Diethyl ether must be used in a chemical fume hood or with another adequate gas scavenging system. A bell jar used to anesthetize animals is not an adequate replacement for a fume hood and should only be used in a fume hood.
* When working with ether, wear a lab coat (fully buttoned), nitrile gloves, and safety goggles/glasses.
* Animals sacrificed with ether are an additional hazard. Off-gassing is necessary to allow the anesthetic gas to dissipate from the animal. The animal carcass should be placed in an open container within a fume hood for at least 30 minutes or overnight to allow the ether to evaporate before the carcass is bagged and placed in the cooler.

Disposal

* It is very important to write the date received and date opened on all containers of ether. Opened containers should be disposed of through OEHS chemical hazardous waste disposal program within 6 months, and unopened containers within one year. Submit a request for disposal through the [Chemical Waste Pick-Up and New Container Request Form](https://research.wayne.edu/oehs/forms/chem-waste).

Emergency Response & Contacts

**Spills:**

In the event of a spill of diethyl ether, exercise extreme caution because of its highly flammable nature. Remove all ignition sources, leave the area and call OEH&S at 577-1200 from a safe location. In the event of a fire or an after-hours spill, contact the WSU Police immediately at 313-577-1200.

**Exposures**:

* In the event of skin contact, immediately wash with soap and water and remove contaminated clothing. In case of eye contact, promptly wash with copious amounts of water for 15 min (lifting upper and lower lids occasionally) and seek medical attention. If diethyl ether is ingested, or if large amounts are inhaled, seek medical attention immediately. For all medical emergencies, call the WSU Police at 313-577-2222.
* **WSU Public Safety: (**313) 577-2222, emergency transportation
* **Henry Ford Occupational Health – Harbortown**

3300 East Jefferson, Suite 100

Detroit MI 48207

(313) 656-1618

Monday – Friday 8:00 AM to 6:30 PM

* **For help outside of health clinic hours**

**Detroit Receiving Hospital – Emergency Room:** (313) 745-3000

**OR**

**Henry Ford Hospital – Emergency Room**: (313) 916-8742

* **Office of Environmental Health and Safety:** (313) 577-1200, spills or clean-up
* **WSU Fire Marshall:** (313) 577-3110.

References

1. [Prudent Practices in the Laboratory: Handling and Disposing of Chemicals](http://www.nap.edu/catalog.php?record_id=4911) (1995), The National Academies Press.

**Ether Use Checklist**

This checklist must be completed to receive approval from OEHS and the Institutional Animal Care and Use Committee (IACUC) prior to use of ether as an anesthetic.

I have read the Diethyl Ether Use Fact Sheet/ Guidelines and it will be followed by all laboratory personnel.

I will always use ether in a chemical fume hood.

I will wear proper personal protective equipment when using ether, including a lab coat (fully buttoned), nitrile gloves, and chemical safety goggles.

I will minimize the amount of ether stored in the laboratory by ordering smaller quantities.

I will store ether containers in a flammable storage cabinet or an explosion proof/ rated refrigerator, away from heat, sunlight, and any sources of ignition.

I will write the date on all ether containers when they are received and properly dispose of all unopened containers within a year of that date.

I will write the date on all ether containers when they are opened and properly dispose of opened containers 6 months from that date.

I understand that OEHS has the right to dispose of any undated or expired ether containers.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

P.I. Signature: Date:

IACUC Protocol number:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

OEHS Signature: Date of Approval:

Comments:

WSU Office of Environmental Health & Safety

5425 Woodward, Suite 300

Detroit, MI 48201

313-577-1200

oehs@wayne.edu