

## Organic Solvents

### Introduction

Organic solvents are commonly used in laboratories for a variety of applications including, but not limited to high performance liquid chromatography, chemical reactions, preservatives, or sanitizers. Organic solvents contain carbon in their molecular structure and are capable of dissolving or dispersing other substances such as oils, fats, resins, rubber, and plastics. As a result, many organic solvents are used in commercial products including adhesives, cleaning agents, degreasing agents, dyes, glues, lacquers, paints, pharmaceuticals, textiles, varnishes, and other materials.

Chemical classes of organic solvents include alcohols, aliphatic hydrocarbons, aromatic hydrocarbons, chlorinated hydrocarbons, esters, ethers, glycols, ketones, and others. The hazardous properties of organic solvents are determined by their molecular structures. Some organic solvents are carcinogenic (e.g., benzene, trichloroethylene), flammable (e.g., ethanol), irritants, and/or toxic (e.g., carbon tetrachloride). Others are confirmed reproductive hazards (e.g., 2-ethoxyethanol, methyl chloride), neurotoxins (e.g., n-hexane, tetrachloroethylene, toluene) or have narcotic effects. Lab personnel must review safety data sheets (SDSs) to identify the specific hazard(s) associated with each organic solvent and learn the proper controls and personal protective equipment to minimize the risk of exposure. A list of common non-halogenated and halogenated organic solvents in labs is listed below. The list is not comprehensive.

Common Organic Solvents in Laboratories	
Types	Examples
Non-Halogenated	Acetone, acetonitrile, ethanol, formaldehyde, ether, ethyl acetate, hexane, toluene, xylene
Halogenated	Carbon tetrachloride, chlorobenzene, chloroform, methylene chloride, tetrachloroethylene, trichloroethylene

### Safe Work Practices

Lab personnel must follow the work practices below when handling, storing, or disposing of organic solvents.

1. Review the safety data sheet (SDS) for each organic solvent prior to use.
2. Eliminate, substitute less toxic chemicals, or reduce the quantities of organic solvents being used if possible.
3. Label secondary containers (e.g., beakers, flasks, jars, tec.) containing organic solvents with the chemical name and hazard class(es).
4. Work with organic solvents in a chemical fume hood or under local exhaust ventilation.
5. Wear personal protective equipment indicated on the safety data sheet.
6. Store organic solvents away from incompatible materials.
7. Do not allow flammable organic solvents near open flames or other sources of ignition.
8. Ground containers during transfers of organic solvents to prevent the discharge of static electricity.
9. Do not use organic solvents for routine cleaning tasks if a less toxic substance is available.

### **Chemical Incompatibilities**

The following substances should not be added to hazardous waste containers with organic solvents:

- Acids or bases
- Aqueous solutions of toxic organic chemicals
- Substances containing toxic metals (e.g., arsenic, barium, cadmium, chromium, lead, mercury, selenium, or silver)
- Toxic substances
- Vacuum pump oil
- Sulfides or inorganic cyanides
- Strong oxidizers or reducers
- Water-reactive substances
- Unknowns or other incompatible materials listed on the SDS

### **Disposal**

All hazardous organic solvent waste must be disposed of through **Environmental Health and Safety**. Organic solvent waste must be stored in sturdy containers, marked with hazardous waste stickers or tags, labeled with full chemical names (i.e., do not use chemical formulas or abbreviations), and remain closed, unless adding waste. Waste containers with more than one chemical must list the approximate percentage of each chemical and add up to 100%. Lab personnel should avoid storing non-halogenated and halogenated wastes in the same waste container, if feasible. Corrosive wastes should not be added to organic solvent waste whenever possible.

## Resources

- **Centers for Disease Control and Prevention- Organic Solvents**  
<http://www.cdc.gov/niosh/topics/organsolv/>
- **Occupational Safety & Health Administration- Solvents**  
<http://www.osha.gov/SLTC/solvents/index.html>