

# The National Institute for Occupational Safety and Health (NIOSH)

Promoting productive workplaces  
through safety and health research



## Organic Solvents



### Overview

Organic solvents are carbon-based substances capable of dissolving or dispersing one or more other substances.

Organic solvents can be carcinogens, reproductive hazards, and neurotoxins. Carcinogenic organic solvents include benzene, carbon tetrachloride, and trichloroethylene. Organic solvents recognized as reproductive hazards include 2-ethoxyethanol, 2-methoxyethanol, and methyl chloride. Organic solvents recognized as neurotoxins include n-hexane, tetrachloroethylene, and toluene. Many classes of chemicals are used as organic solvents, including aliphatic hydrocarbons, aromatic hydrocarbons, amines, esters, ethers, ketones, and nitrated or chlorinated hydrocarbons.

Organic solvents are used in many industries. They are used in paints, varnishes, lacquers, adhesives, glues, and in degreasing and cleaning agents, and in the production of dyes, polymers, plastics, textiles, printing inks, agricultural products, and pharmaceuticals. Millions of U.S. workers are exposed to organic solvents. The level of exposure depends upon the dose, duration, and work being done.

NIOSH recommends that employers use [Hierarchy of Controls](#) to prevent injuries. If you work in an industry that uses organic solvents, please read chemical labels and the accompanying Safety Data Sheets for hazard information. Visit NIOSH's page on [Managing Chemical Safety in the Workplace](#) to learn more about controlling chemical workplace exposures.

The following resources provide information about occupational exposure to organic solvents.

### NIOSH Chemical Resources

NIOSH Pocket Guide to  
Chemical Hazards



Manual of Analytical  
Methods



Health Hazard  
Evaluations





The NIOSH Pocket Guide to Chemical Hazards (NPG) helps workers, employers, and occupational health professionals recognize and control workplace chemical hazards.



The NIOSH Manual of Analytical Methods (NMAM) is a collection of methods for sampling and analysis of contaminants in workplace air, and in the blood and urine of workers who are occupationally exposed.



The Health Hazard Evaluation Program (HHE) conducts onsite investigations of possible worker exposure to chemicals. Search the HHE database for more information on chemical topics.

## Related NIOSH Resources

- [NIOSHTIC-2 search results on organic solvents](#)—NIOSHTIC-2 is a searchable database of worker safety and health publications, documents, grant reports, and journal articles supported in whole or in part by NIOSH
- [NIOSH Worker Health Study Summaries](#) — The NIOSH Worker Notification Program notifies workers and other stakeholders about the findings of research studies.
- [Occupational Health Guidelines for Chemical Hazards](#)—DHHS (NIOSH) No. 81-123. These guidelines contain technical information about chemical hazards to workers, employers, and safety and health professionals.
- [Rubber Products Manufacturing Industry: Special NIOSH Hazard Review](#)—DHHS (NIOSH) No. 93-106. Excess deaths from bladder, stomach, lung, hematopoietic, and other cancers have occurred among workers involved in the manufacture of rubber products. These workers may also risk adverse respiratory effects, dermatologic effects, reproductive effects, injuries, and repetitive trauma disorders.

## Selected Publications

- [2-Nitropropane \(2-NP\)](#)– DHHS (NIOSH)No. 80-142. As a confirmed animal carcinogen, 2-NP has the potential to cause cancer in humans. This document summarizes the cancer studies of 2-NP in laboratory animals and its toxic effects in humans.
- [Preventing Adverse Health Effects from Exposure to Dimethylformamide \(DMF\)](#)– DHHS (NIOSH) No. 90-105. This describes engineering controls, good work practices, and personal protective equipment (PPE) recommended for controlling exposures to DMF by inhalation and skin contact.
- [Preventing Death from Excessive Exposure to Chlorofluorocarbon 113 \(CFC-113\)](#)– DHHS (NIOSH) No. 89-109. A number of workers have died recently as a result of exposure to CFC-113 in confined spaces or in areas with insufficient ventilation. These workers were apparently unaware that CFC-113 might generate vapor concentrations sufficient to cause death by cardiac arrhythmia or asphyxiation.

## Criteria Documents (Criteria for a Recommended Standard)

Criteria documents are developed and recommended by NIOSH for preventing disease and hazardous conditions in the workplace. These documents generally contain a critical review of the scientific and technical information available on the prevalence of hazards, the existence of safety and health risks, and the adequacy of methods to identify and control hazards.

- [Alkanes \(C5-C8\)](#) DHHS (NIOSH) No. 77-151
- [Benzene](#) DHHS (NIOSH) No. 74-137
- [Benzenethiol](#) DHHS (NIOSH) No. 78-213
- [Carbon Tetrachloride](#) DHHS (NIOSH) No. 76-133, ([Revised Abstract](#)) DHHS (NIOSH) No. 76-133r
- [Chlorobenzene](#) DHHS (NIOSH) No. 93-102
- [Chloroform](#) DHHS (NIOSH) No. 75-114
- [Cyclohexanethiol](#) DHHS (NIOSH) No. 78-213

- [2-Diethylaminoethanol](#) DHHS (NIOSH) No. 96-104
- [Ethylene Dichloride \(1,2-Dichloroethane\)](#) DHHS (NIOSH) No. 78-211
- [Ethyl Ether](#) DHHS (NIOSH) No. 93-103
- [Ethylene Glycol Monobutyl Ether](#) DHHS (NIOSH) No. 90-118
- [Ethylene Glycol Monobutyl Acetate](#) DHHS (NIOSH) No. 90-118
- [Ethylene Glycol Monoethyl Ether](#) DHHS (NIOSH) No. 91-119
- [Ethylene Glycol Monoethyl Ether Acetate](#) DHHS (NIOSH) No. 91-119
- [Ethylene Glycol Monomethyl Ether](#) DHHS (NIOSH) No. 91-119
- [Ethylene Glycol Monomethyl Ether Acetate](#) DHHS (NIOSH) No. 91-119
- [Glycidyl Ethers](#) DHHS (NIOSH) No. 78-166
- [Isopropyl Alcohol](#) DHHS (NIOSH) No. 76-142
- [Ketones](#) DHHS (NIOSH) No. 78-173
- [Metalworking Fluids](#) DHHS (NIOSH) No. 98-102
- [Methyl Alcohol](#) DHHS (NIOSH) No. 76-148
- [Methylene Chloride](#) DHHS (NIOSH) No. 76-138
- [Phenol](#) DHHS (NIOSH) No. 76-196
- [Propylene Glycol Ethers and Their Acetates](#) DHHS (NIOSH) No. 91-103
- [Refined Petroleum Solvents](#) DHHS (NIOSH) No. 77-192
- [1,1,2,2-Tetrachloroethane](#) DHHS (NIOSH) No. 77-121
- [Thiols, n-Alkane Mono](#) DHHS (NIOSH) No. 78-213
- [Toluene](#) DHHS (NIOSH) No. 73-11023
- [1,1,1-Trichloroethane \(Methyl Chloroform\)](#) DHHS (NIOSH) No. 76-184
- [Trichloroethylene](#) DHHS (NIOSH) No. 73-11025
- [Xylene](#) DHHS (NIOSH) No. 75-168

## Current Intelligence Bulletins (CIBs)

CIBs review and evaluate new and emerging information about occupational hazards. A CIB may draw attention to a previously unrecognized hazard, report new data on a known hazard, or disseminate information about hazard controls.





- [Carcinogenic Effects of Exposure to Propylene Oxide](#) CIB#51
- [Chloroethanes](#) CIB#27
- [Chloroform \(DDM\)](#) CIB#9
- [Ethylene Dibromide and Disulfiram Toxic Interaction](#) CIB#23
- [Ethylene Dibromide \(EDB\)](#) CIB#3
- [Ethylene Dibromide \(EDB\) \(Revised\)](#) CIB#37
- [Ethylene Dichloride \(1,2-Dichloroethane\)](#) CIB#25
- [Glycol Ethers: 2-Methoxyethanol and 2-Ethoxyethanol](#) CIB#39
- [Hexamethylphosphoric Triamide \(HMPA\)](#) CIB#6
- [Methylene Chloride](#) CIB#46
- [Monohalomethanes: Methyl Chloride CH<sub>3</sub>Cl, Methyl Bromide CH<sub>3</sub>Br Methyl Iodide CH<sub>3</sub>I](#) CIB#43
- [2-Nitropropane](#) CIB#17
- [Organic Solvent Neurotoxicity](#) CIB#48
- [Tetrachloroethylene \(Perchloroethylene\)](#) CIB#20
- [Trichloroethylene \(TCE\)](#) CIB#2

## Related Resources

## RELATED RESOURCES

- [EPA Chemistry Dashboard](#) 
- [OSHA Hazard Communication](#) 

## International Resources

- [International Chemical Safety Cards](#) 
- [Canadian Centre for Occupational Health and Safety \(CCOHS\): Chemical Hazards](#) 
- [European Chemicals Agency \(ECHA\)](#) 
- [Gestis Substance Database](#) 
- [International Program on Chemical Safety \(IPCS\) INCHEM](#)
- [OECD Global Portal to Information on Chemical Substances](#)

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