



**Environmental
Monitoring
Technology**

121 Shivel Drive • Hendersonville, TN 37075
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COMMENTS

The OSHA permissible exposure limit (PEL) for 1,2 Dichloroethane is 50 ppm averaged over an 8-hour workshift and 100 ppm as a ceiling not to be exceeded at any time except for an allowable peak up to 200 ppm for 5 minutes in any 3 hours of a workshift.

The value reported is the average concentration for the monitoring period used, based on the information provided by the user.

1,2 DICHLOROETHANE PROPERTIES

NAME: 1,2-Dichloroethane; 1,2-DCE; 1,2-Ethylene dichloride; 1,2-Ethylidene dichloride; 2-Dichloroethane; alpha, beta-dichloroethane; dichloremulsion; Dichloroethane, 1,2- ; di-chlor-mulsion; borer sol; Brocide; destruxol borer-sol; Dutch liquid; Dutch oil; EDC; Ethane dichloride; Ethylene dichloride; Ethylene chloride; Freon 150; glycol dichloride; sym-dichloroethane

CHEMICAL FORMULA: $C_2H_4Cl_2$

CAS (Chemical Abstract Service) NUMBER: 107-06-2

RTECS (NIOSH Registry of Toxic Effects of Chemical Substances) NUMBER: KI0525000

DOT (U. S. Department of Transportation) NUMBER: UN 1184 Flammable liquid

PROPERTIES:

1,2-Dichloroethane is a clear, colorless, oily liquid with a sweet odor like chloroform. It is used to make Vinyl Chloride and as a solvent, fumigant, degreaser and paint remover.

ODOR THRESHOLD: 87 ppm.

The range of accepted odor threshold values is quite broad. Caution should be used in relying on odor alone as a warning of potentially hazardous exposures.

SOLUBILITY:

1,2-Dichloroethane is slightly soluble in water. 0.8608 g/100 mL

TOXICITY:

1,2-Dichloroethane can cause CNS depression (dizziness, drowsiness, trembling, unconsciousness); nausea; vomiting, abdominal pain, skin irritation, dermatitis; eye irritation, corneal opacity, blurred vision;



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headache; sore throat; cough, bronchitis, pulmonary edema (may be delayed); liver, kidney, cardiovascular system damage, cardiac arrhythmia; INGES ACUTE: Abdominal cramps, diarrhea; internal bleeding (hemorrhagic gastritis and colitis); and respiratory failure. It is a potential occupational carcinogen.

HAZARD SUMMARY

1. 1,2-Dichloroethane can affect you when breathed in and by passing through your skin.
2. 1,2-Dichloroethane should be handled as a carcinogen--with extreme caution.
3. Contact can irritate the skin and eyes.
4. Breathing 1,2-Dichloroethane can irritate the lungs causing coughing and/or shortness of breath.
5. Exposure can cause nausea, vomiting, headache, dizziness, lightheadedness, confusion, tremor, loss of memory and even loss of consciousness.
6. 1,2-Dichloroethane may damage the liver and kidneys.
7. 1,2-Dichloroethane is a flammable liquid and a fire hazard.

CARCINOGENICITY/REPRODUCTIVE HAZARDS:

1,2-Dichloroethane may be a carcinogen in humans since it has been shown to cause stomach, lung, breast and other types of cancers in animals.

EXPOSURE LIMITS

OSHA: The legal airborne permissible exposure limit (PEL) is 50 ppm averaged over an 8-hour workshift and 100 ppm as a ceiling not to be exceeded at any time except for an allowable peak up to 200 ppm for 5 minutes in any 3 hours of a workshift.

NIOSH: The recommended airborne exposure limit is 1 ppm averaged over a 10-hour workshift and 2 ppm not to be exceeded during any 15 minute work period.

ACGIH: The recommended airborne exposure limit is 10 ppm averaged over an 8-hour workshift.

[Note: 1,2-Dichloroethane may be a CARCINOGEN in humans. There may be no safe level of exposure to a carcinogen, so all contact should be reduced to the lowest possible level. The above exposure limits are for air levels only. When skin contact also occurs, you may be overexposed, even though air levels are less than the limits listed above.]

WAYS OF REDUCING EXPOSURE

1. Enclose operations and use local exhaust ventilation at the site of chemical release. If local exhaust ventilation or enclosure is not used, respirators should be worn.
2. Wear protective work clothing.
3. Wash thoroughly immediately after exposure to 1,2-Dichloroethane and at the end of the workshift.
4. Post hazard and warning information in the work area. In addition, as part of an ongoing education and training effort, communicate all information on the health and safety hazards of 1,2-Dichloroethane to potentially exposed workers.



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ACUTE/CHRONIC HAZARDS

Acute Health Effects

The following acute (short-term) health effects may occur immediately or shortly after exposure to 1,2-Dichloroethane:

1. Contact can irritate the skin and eyes.
2. Breathing 1,2-Dichloroethane can irritate the lungs causing coughing and/or shortness of breath.
3. Exposure can cause nausea, vomiting, headache, dizziness, lightheadedness, confusion, tremor, loss of memory and even loss of consciousness.

Chronic Health Effects

The following chronic (long-term) health effects can occur at some time after exposure to 1,2-Dichloroethane and can last for months or years:

Cancer Hazard

1. 1,2-Dichloroethane may be a CARCINOGEN in humans since it has been shown to cause stomach, lung, breast and other types of cancers in animals.
2. Many scientists believe there is no safe level of exposure to a carcinogen.

Reproductive Hazard

1,2-Dichloroethane has not been tested for its ability to affect reproduction.

Other Long-Term Effects

1. 1,2-Dichloroethane can irritate the lungs. Repeated exposure may cause bronchitis to develop with cough, phlegm, and/or shortness of breath.
2. 1,2-Dichloroethane may damage the liver and kidneys.
3. This chemical has not been adequately evaluated to determine whether brain or other nerve damage could occur with repeated exposure. However, many solvents and other petroleum-based chemicals have been shown to cause such damage. Effects may include reduced memory and concentration, personality changes (withdrawal, irritability), fatigue, sleep disturbances, reduced coordination, and/or effects on nerves supplying internal organs (autonomic nerves) and/or nerves to the arms and legs (weakness, "pins and needles").

MEDICAL TESTING

If symptoms develop or overexposure is suspected, the following are recommended:

1. Liver and kidney function tests.
2. Lung function tests.
3. Evaluate for brain effects such as changes in memory, concentration, sleeping patterns and mood (especially irritability and social withdrawal), as well as headaches and fatigue. Consider evaluations of the cerebellar, autonomic and peripheral nervous systems. Positive and borderline individuals should be referred for neuropsychological testing.

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

WORKPLACE CONTROLS AND PRACTICES

Unless a less toxic chemical can be substituted for a hazardous substance, engineering controls are the most effective way of reducing exposure. The best protection is to enclose operations and/or provide local exhaust ventilation at the site of chemical release. Isolating operations can also reduce exposure. Using respirators or protective equipment is less effective than the controls mentioned above, but is sometimes necessary. In evaluating the controls present in your workplace, consider:

1. how hazardous is the substance
2. how much of the substance is released into the workplace
3. could harmful skin or eye contact occur.



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Special controls should be in place for highly toxic chemicals or when significant skin, eye, or breathing exposures are possible. In addition, the following controls are recommended:

1. Where possible, automatically pump liquid 1,2-Dichloroethane from drums or other storage containers to process containers.
2. Before entering a confined space where 1,2-Dichloroethane may be present, check to make sure that an explosive concentration does not exist.

Good work practices can help to reduce hazardous exposures. The following work practices are recommended:

1. Workers whose clothing has been contaminated by 1,2-Dichloroethane should change into clean clothing promptly.
2. Do not take contaminated work clothes home, family members could be exposed.
3. Contaminated work clothes should be laundered by individuals who have been informed of the hazards of exposure to 1,2-Dichloroethane.
4. Eye wash fountains should be provided in the immediate work area for emergency use.
5. If there is the possibility of skin exposure, emergency shower facilities should be provided.
6. On skin contact with 1,2-Dichloroethane, immediately wash or shower to remove the chemical. At the end of the workshift, wash any areas of the body that may have contacted 1,2-Dichloroethane, whether or not known skin contact has occurred.
7. Do not eat, smoke, or drink where Toluene is handled, processed, or stored, since the chemical can be swallowed.
8. Wash hands carefully before eating or smoking.

PERSONAL PROTECTIVE EQUIPMENT

Workplace controls are better than personal protective equipment. However, for some jobs (such as outside work, confined space entry, jobs done only once in a while, or jobs done while workplace controls are being installed), personal protective equipment may be appropriate. OSHA 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.

Clothing

1. Avoid skin contact with 1,2-Dichloroethane. Wear solvent-resistant gloves and clothing. Safety equipment suppliers/ manufacturers can provide recommendations on the most protective glove/clothing material for your operation.
2. All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.
3. ACGIH recommends Polyvinyl Alcohol, Viton, and Teflon as protective materials.

Eye Protection

Wear splash-proof chemical goggles and face shield when working with liquid, unless full facepiece respiratory protection is worn.

Respiratory Protection

Improper use of respirators is dangerous. Such equipment should only be used if the employer has a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing and medical exams, as described in OSHA 1910.134.

1. Where the potential exists for exposure over 1 ppm, use a NIOSH approved supplied-air respirator with a full facepiece operated in a pressure-demand or other positive pressure mode. For increased protection use in combination with an auxiliary self-contained breathing apparatus operated in a





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pressure-demand or other positive-pressure mode.

2. Exposure to 50 ppm is immediately dangerous to life and health. If the possibility of exposure above 50 ppm exists, use a NIOSH approved self-contained breathing apparatus with a full facepiece operated in a pressure-demand or other positive-pressure mode.

FIRE HAZARDS

1. 1,2-Dichloroethane is a flammable liquid.
2. Containers may explode in fire.
3. Poisonous gasses are produced in fire including Phosgene and Hydrogen Chloride.
4. Use dry chemical, CO₂, alcohol or polymer foam extinguishers. Water should be used to keep containers cool.
5. Vapors may travel to a source of ignition and flash back.
6. If employees are expected to fight fires, they must be trained and equipped as stated in OSHA 1910.156.

SPILLS AND EMERGENCIES

If 1,2-Dichloroethane is spilled or leaked, take the following steps:

1. Evacuate persons not wearing protective equipment from area of spill or leak until clean-up is complete.
2. Remove all ignition sources.
3. Ventilate area of spill or leak.
4. Absorb liquids in vermiculite, dry sand, earth, or a similar material and deposit in sealed containers.
5. Ventilate and wash area after clean-up is complete.
6. Keep 1,2-Dichloroethane out of a confined space, such as a sewer, because of the possibility of an explosion, unless the sewer is designed to prevent the build-up of explosive concentrations.
7. It may be necessary to contain and dispose of 1,2-Dichloroethane as a hazardous waste. Contact your Department of Environmental Protection (DEP) or your regional office of the federal Environmental Protection Agency (EPA) for specific recommendations.
8. If employees are required to clean-up spills, they must be properly trained and equipped. OSHA 1910.120(q) may be applicable.

HANDLING AND STORAGE

1. Prior to working with 1,2-Dichloroethane you should be trained on its proper handling and storage.
2. 1,2-Dichloroethane is not compatible with oxidizing agents (such as perchlorates, permanganates, chlorates, nitrates, Chlorine, Bromine and Fluorine); Chemically active metals (such as potassium, sodium, magnesium and zinc); strong bases (such as sodium hydroxide and potassium hydroxide); ammonia; reducing agents; mercaptans; and Nitric Acid.
3. Store in tightly closed containers in a cool, dry, well ventilated area away from light, heat, air and moisture.
4. Sources of ignition, such as smoking and open flames, are prohibited where 1,2-Dichloroethane is used, handled, or stored.
5. Metal containers involving the transfer of 1,2-Dichloroethane should be grounded and bonded.
6. Use only non-sparking tools and equipment, especially when opening and closing containers of 1,2-Dichloroethane.



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FIRST AID

Eye Contact

Immediately flush with large amounts of water for at least 15 minutes, occasionally lifting upper and lower lids. Seek medical attention immediately.

Skin Contact

Quickly remove contaminated clothing. Immediately wash area with large amounts of soap and water.

Breathing

Remove the person from exposure. Begin rescue breathing if breathing has stopped and CPR if heart action has stopped. Transfer promptly to a medical facility.

CURRENT REGULATORY STATUS



ational Safety and Health Administration) 1910.1000 - 1,2-DICHLOROETHANE

SCOPE AND APPLICATION

The standard applies to all occupational exposures to 1,2-Dichloroethane. i.e. from 1,2-Dichloroethane, its solutions and materials that release 1,2-Dichloroethane.

PERMISSIBLE EXPOSURE LIMIT (PEL)

OSHA has established a workplace health standard for 1,2-Dichloroethane to control employee exposure. The standard states that no employee shall be exposed in excess of the Permissible Exposure Limit (PEL), which is an airborne concentration of 1,2-Dichloroethane not exceeding 50 ppm 1,2-Dichloroethane per million parts of air averaged over an 8-hour workshift (TWA) and 100 ppm as a ceiling not to be exceeded at any time except for an allowable peak up to 200 ppm for 5 minutes in any 3 hours of a workshift

PERMISSIBLE EXPOSURE LIMIT SUMMARY

STANDARD	LIMIT
TWA	50 PPM
CEILING	100 PPM
PEAK	200PPM

EXPOSURE MONITORING

Exposure monitoring will be performed wherever a potential 1,2-Dichloroethane exposure exists. The employer shall identify all employees who may be exposed at or above the TWA and accurately determine the exposure of each employee so identified. Unless the employer chooses to measure the exposure of each employee potentially exposed to 1,2-Dichloroethane, a representative sampling strategy shall be developed that measures sufficient exposures within each job classification for each work-shift to correctly characterize and not underestimate the exposure of any employee within each exposure group. The employer shall institute exposure monitoring whenever there has been a change in the production process, control equipment, personnel, or work practices that may result in new or additional exposures to 1,2-Dichloroethane or when the employer has any reason to suspect that a change may result in new or additional exposure. Results of monitoring must be made



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available to employees in writing or by posting the results within 15 days of receipt by the employer. Employees must also be notified of any corrective actions that must be taken to bring exposure below the Permissible Exposure Limit.

ACCURACY OF MONITORING

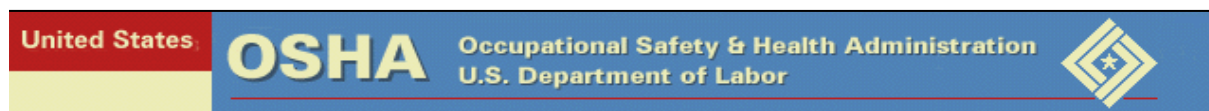
Monitoring shall be accurate, at the 95 percent confidence level, to within plus or minus 25 percent for airborne concentrations of 1,2-Dichloroethane at the 200 ppm TWA.

RESPIRATORY PROTECTION

Where respiratory protection is required, as in the case of an emergency spill, the employer shall provide respirators at no cost to the employee and shall assure that they are properly used. The respirator shall reduce the concentration of 1,2-Dichloroethane inhaled by the employee to at or below the TWA. Respiratory protective equipment is required any time engineering and work practice controls are not sufficient to reduce employee exposure to below the OSHA permissible exposure limit. The employer shall select respirators from those jointly approved as being acceptable for protection against 1,2-Dichloroethane by the Mine Safety and Health Administration (MSHA) and by the National Institute for Occupational Safety and Health (NIOSH) under provisions of 30 CFR Part 11. Additionally, a complete respirator protection program should be implemented meeting all the requirements in 29 CFR 1910.134 including yearly training, fit testing, maintenance inspection, and cleaning.

PROTECTIVE CLOTHING

The employer shall select protective clothing and equipment, at no cost to the employee, based on the form of 1,2-Dichloroethane to be encountered, the conditions of use, and the hazard to be prevented. All contact of eyes and skin with 1,2-Dichloroethane shall be prevented by the use of chemical protective clothing made of materials impervious to 1,2-Dichloroethane and the use of other personal protective equipment, such as goggles and face shields, as appropriate to the operation.



SCOPE AND APPLICATION

As of October 1990, OSHA has issued a new compliance instruction, CPL-2-2.38C, on enforcing the Hazard Communication Standard. The scope and requirements of 29 CFR 1910.1200 apply to all employers. Under the standard, all employers must provide information to their employees about hazardous chemicals to which they are exposed by means of a hazard communication program, labels and other forms of warning, MSDSs (Material Safety Data Sheets), and in-service training programs. The HCS applies to any chemical known to be present in the workplace in such a manner that employees may be exposed under normal conditions of use or in a foreseeable emergency.

WRITTEN HAZARD COMMUNICATION PROGRAM

Employers must maintain a written hazard communication plan that addresses hazards facility-wide and consistently. The written plan must designate a person(s) responsible for ensuring labeling of in-house containers of hazardous materials and labeling of shipped containers. The plan must contain a description of the labeling systems used and written alternatives to labeling of in-house containers where applicable, as well as procedures to review and update label information where necessary.



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The written plan must designate a person(s) responsible for obtaining and maintaining MSDSs and describe how MSDSs are to be maintained. In addition, the plan must describe procedures to follow when the MSDS is not received at the time of initial shipment.

The written plan must designate a person(s) responsible for conducting training and describe the format (audio-visuals classroom training, etc.) to be used along with the elements of the training program. The plan must include procedures to train new employees at the time of their initial employment, when new hazards are introduced into the workplace, and procedures to train employees about hazards they may be exposed to when working on or near another employee's work area. The training program must include the following:

ELEMENTS OF AN EFFECTIVE TRAINING PROGRAM

1. How to detect the presence or release of a hazardous chemical in the work area, such as odor recognition, visible signs, monitoring for exposure and continuous monitoring.
2. The physical and health hazards of the chemicals in the work area.
3. The measures employees can take to protect themselves from exposure.
4. Details of the employer's hazard communication program including explanations of labeling systems, MSDS'S and how the employee can obtain and use appropriate hazard information.

The written plan should contain a list of all hazardous chemicals, procedures for informing employees of non-routine tasks, and provisions for multi-employer workplaces. The written plan must be made available to all employees and their designated representatives.