Right to Know

Hazardous Substance Fact Sheet

Common Name: **TRICHLORFON**

Synonyms: Dylox®, Proxol®;
Trichlorohydroxyethyldimethylphosphonate

Chemical Name: Phosphonic Acid, (2,2,2-Trichloro-1-Hydroxyethyl)-, Dimethyl Ester

Date: November 2004 Revision: April 2011

CAS Number: 52-68-6

RTK Substance Number: 1882

DOT Number: UN 2783

Description and Use

Trichlorfon, when pure, is a white, crystalline (sand-like) solid. It is an *Organophosphate pesticide* used for outdoor turf, ornamental plants, livestock and in private dwellings.

Reasons for Citation

- **Trichlorfon** is on the Right to Know Hazardous Substance List because it is cited by ACGIH, DOT, DEP, IARC and EPA.
- This chemical is on the Special Health Hazard Substance List.

SEE GLOSSARY ON PAGE 5.

FIRST AID

Eye Contact
- Immediately flush with large amounts of water for at least 15 minutes, lifting upper and lower lids. Remove contact lenses, if worn, while rinsing.

Skin Contact
- Quickly remove contaminated clothing. Immediately wash contaminated skin with large amounts of soap and water. Seek medical attention.
- Shampoo hair immediately if contaminated.

Inhalation
- Remove the person from exposure.
- Begin rescue breathing (using universal precautions) if breathing has stopped and CPR if heart action has stopped.
- Transfer promptly to a medical facility.

EMERGENCY NUMBERS

Poison Control: 1-800-222-1222

CHEMTREC: 1-800-424-9300

NJDEP Hotline: 1-877-927-6337

National Response Center: 1-800-424-8802

EMERGENCY RESPONDERS >>>> SEE LAST PAGE

Hazard Summary

Hazard Rating	NJDOH	NFPA
HEALTH	3	-
FLAMMABILITY	0	-
REACTIVITY	0	-

MUTAGEN
TERATOGEN
ORGANOPHOSPHATE PESTICIDE
POISONOUS GASES ARE PRODUCED IN FIRE
CONTAINERS MAY EXPLODE IN FIRE

Hazard Rating Key: 0=minimal; 1=slight; 2=moderate; 3=serious; 4=severe

- **Trichlorfon** can affect you when inhaled and by passing through the skin.
- Because this is a MUTAGEN, handle it as a possible carcinogen--WITH EXTREME CAUTION
- **Trichlorfon** may be a TERATOGEN.
- Contact can irritate the skin and eyes.
- Exposure to **Trichlorfon** can cause rapid, severe *Organophosphate* poisoning with headache, dizziness, blurred vision, nausea and vomiting, diarrhea, muscle twitching, loss of coordination, convulsions, coma and death.
- High or repeated exposure may damage the nerves, causing weakness, “pins and needles,” and poor coordination in the arms and legs.
- Repeated exposure may cause personality changes such as depression, anxiety or irritability.
- **Trichlorfon** does not burn, however, it is often dissolved in a liquid carrier that may be flammable or combustible.

Workplace Exposure Limits

ACGIH: The threshold limit value (TLV) is **1 mg/m^3** (as the *inhalable fraction*) averaged over an 8-hour workshift.

- **Trichlorfon** is a MUTAGEN. Mutagens may have a cancer risk. All contact with this chemical should be reduced to the lowest possible level.
- **Trichlorfon** may be a teratogen in humans.
- The above exposure limit is for air levels only. When skin contact also occurs you may be overexposed, even though air levels are less than the limit listed above.

Determining Your Exposure

- Read the product manufacturer's Material Safety Data Sheet (MSDS) and the label to determine product ingredients and important safety and health information about the product mixture.
- For each individual hazardous ingredient, read the New Jersey Department of Health Hazardous Substance Fact Sheet, available on the RTK website (www.nj.gov/health/eoh/rtkweb) or in your facility's RTK Central File or Hazard Communication Standard file.
- You have a right to this information under the New Jersey Worker and Community Right to Know Act and the Public Employees Occupational Safety and Health (PEOSH) Act if you are a public worker in New Jersey, and under the federal Occupational Safety and Health Act (OSHA) if you are a private worker.
- The New Jersey Right to Know Act requires most employers to label chemicals in the workplace and requires public employers to provide their employees with information concerning chemical hazards and controls. The federal OSHA Hazard Communication Standard (29 CFR 1910.1200) and the PEOSH Hazard Communication Standard (N.J.A.C. 12:100-7) require employers to provide similar information and training to their employees.

This Fact Sheet is a summary of available information regarding the health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

Health Hazard Information

Acute Health Effects
The following acute (short-term) health effects may occur immediately or shortly after exposure to **Trichlorfon**:

- Contact can irritate the skin and eyes.
- Exposure can cause rapid, severe, *Organophosphate poisoning* with headache, dizziness, blurred vision, tightness in the chest, sweating, nausea and vomiting, diarrhea, muscle twitching, loss of coordination, convulsions, coma and death.

Chronic Health Effects
The following chronic (long-term) health effects can occur at some time after exposure to **Trichlorfon** and can last for months or years:

Cancer Hazard
- While **Trichlorfon** has been tested, it is not classifiable as to its potential to cause cancer.
- **Trichlorfon** causes MUTATIONS (genetic changes). Such chemicals may have a cancer risk.

Reproductive Hazard
- **Trichlorfon** may be a TERATOGEN in humans since it is a teratogen in animals.
- There is limited evidence that **Trichlorfon** may damage the male reproductive system (including decreasing the sperm count) and may affect female fertility.

Other Effects
- High or repeated exposure may damage the nerves, causing weakness, "pins and needles," and poor coordination in the arms and legs.
- Repeated exposure may cause personality changes, such as depression, anxiety or irritability.

Medical

Medical Testing
Before employment and at regular times after that, the following are recommended:

- Plasma and red blood cell cholinesterase levels (tests for the enzyme poisoned by this chemical). If exposure stops, plasma levels return to normal in 1-2 weeks, but red blood cell levels may be reduced for 1-3 months.
- When cholinesterase enzyme levels are reduced by 25% or more below pre-employment levels, risk of poisoning is increased, even if results are in lower ranges of "normal." Reassignment to work not involving *Organophosphate* or *Carbamate* pesticides is recommended until enzyme levels recover.

If symptoms develop or overexposure occurs, repeat the preceding tests as soon as possible and get an exam of the nervous system.

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.

You have a legal right to request copies of your medical testing under the OSHA Access to Employee Exposure and Medical Records Standard (29 CFR 1910.1020).

Mixed Exposures
- You may be at higher risk if you are exposed to other chemicals that affect cholinesterase levels in the body (*Carbamates*).

Workplace Controls and Practices

Very toxic chemicals, or those that are reproductive hazards or sensitizers, require expert advice on control measures if a less toxic chemical cannot be substituted. Control measures include: (1) enclosing chemical processes for severely irritating and corrosive chemicals, (2) using local exhaust ventilation for chemicals that may be harmful with a single exposure, and (3) using general ventilation to control exposures to skin and eye irritants. For further information on workplace controls, consult the NIOSH document on Control Banding at www.cdc.gov/niosh/topics/ctrlbanding/.

The following work practices are also recommended:

- Label process containers.
- Provide employees with hazard information and training.
- Monitor airborne chemical concentrations.
- Use engineering controls if concentrations exceed recommended exposure levels.
- Provide eye wash fountains and emergency showers.
- Wash or shower if skin comes in contact with a hazardous material.
- Always wash at the end of the workshift.
- Change into clean clothing if clothing becomes contaminated.
- Do not take contaminated clothing home.
- Get special training to wash contaminated clothing.
- Do not eat, smoke, or drink in areas where chemicals are being handled, processed or stored.
- Wash hands carefully before eating, smoking, drinking, applying cosmetics or using the toilet.

In addition, the following may be useful or required:

- For *solid* **Trichlorfon** use a vacuum or a wet method to reduce dust during clean-up. DO NOT DRY SWEEP.

Personal Protective Equipment

The OSHA Personal Protective Equipment Standard (29 CFR 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.

Gloves and Clothing

- Avoid skin contact with **Trichlorfon**. Wear personal protective equipment made from material that can not be permeated or degraded by this substance. Safety equipment suppliers and manufacturers can provide recommendations on the most protective glove and clothing material for your operation.
- The recommended glove materials for *Organophosphorus compounds* are Nitrile and Neoprene.
- The recommended protective clothing materials for *Organophosphorus compounds* are Tychem® BR, CSM and TK, or the equivalent.
- Do not wear leather shoes. **Trichlorfon** is absorbed into the leather and can not be removed by cleaning.
- All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

Eye Protection

- Wear eye protection with side shields or goggles.
- Wear indirect-vent, impact and splash resistant goggles when working with liquids.
- If additional protection is needed for the entire face, use in combination with a face shield. A face shield should not be used without another type of eye protection.

Respiratory Protection

Improper use of respirators is dangerous. Respirators should only be used if the employer has implemented a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing, and medical exams, as described in the OSHA Respiratory Protection Standard (29 CFR 1910.134).

- Where the potential exists for exposure over **1 mg/m^3**, use a NIOSH approved respirator with an organic vapor cartridge and particulate prefilters. Increased protection is obtained from full facepiece powered-air purifying respirators.
- Leave the area immediately if (1) while wearing a filter or cartridge respirator you can smell, taste, or otherwise detect **Trichlorfon**, (2) while wearing particulate filters abnormal resistance to breathing is experienced, or (3) eye irritation occurs while wearing a full facepiece respirator. Check to make sure the respirator-to-face seal is still good. If it is, replace the filter or cartridge. If the seal is no longer good, you may need a new respirator.
- Consider all potential sources of exposure in your workplace. You may need a combination of filters, prefilters or cartridges to protect against different forms of a chemical (such as vapor and mist) or against a mixture of chemicals.
- Where the potential exists for exposure over **10 mg/m^3**, 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 or an emergency escape air cylinder.

Fire Hazards

If employees are expected to fight fires, they must be trained and equipped as stated in the OSHA Fire Brigades Standard (29 CFR 1910.156).

- **Trichlorfon** may burn, but does not readily ignite. However, it is often dissolved in a liquid carrier that may be flammable or combustible.
- POISONOUS GASES ARE PRODUCED IN FIRE.
- CONTAINERS MAY EXPLODE IN FIRE.
- Use water spray to keep fire-exposed containers cool.

Spills and Emergencies

If employees are required to clean-up spills, they must be properly trained and equipped. The OSHA Hazardous Waste Operations and Emergency Response Standard (29 CFR 1910.120) may apply.

If **Trichlorfon** is spilled or leaked, take the following steps:

- Evacuate personnel and secure and control entrance to the area.
- Eliminate all ignition sources.
- Absorb liquids in dry sand, earth, or a noncombustible material and place into sealed containers for disposal.
- Moisten *solid* material first or use a HEPA-filter vacuum for clean-up and place into sealed containers for disposal.
- Ventilate and wash area after clean-up is complete.
- DO NOT wash into sewer.
- It may be necessary to contain and dispose of **Trichlorfon** as a HAZARDOUS WASTE. Contact your state Department of Environmental Protection (DEP), Nuclear Regulatory Commission (NRC) or your regional office of the federal Environmental Protection Agency (EPA) for specific recommendations.

Handling and Storage

Prior to working with **Trichlorfon** you should be trained on its proper handling and storage.

- **Trichlorfon** is not compatible with OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE); STRONG ACIDS (such as HYDROCHLORIC, SULFURIC and NITRIC); and STRONG BASES (such as SODIUM HYDROXIDE and POTASSIUM HYDROXIDE).
- Store in tightly closed containers in a cool, well-ventilated area away from METALS and MOISTURE.
- Sources of ignition, such as smoking and open flames, are prohibited where flammable solutions of **Trichlorfon** are used, handled, or stored in a manner that could create a potential fire or explosion hazard.

Occupational Health Information Resources

The New Jersey Department of Health offers multiple services in occupational health. These services include providing informational resources, educational materials, public presentations, and industrial hygiene and medical investigations and evaluations.

For more information, please contact:

New Jersey Department of Health
Right to Know
PO Box 368
Trenton, NJ 08625-0368
Phone: 609-984-2202
Fax: 609-984-7407
E-mail: rtk@doh.state.nj.us
Web address: http://www.nj.gov/health/eoh/rtkweb

GLOSSARY

ACGIH is the American Conference of Governmental Industrial Hygienists. They publish guidelines called Threshold Limit Values (TLVs) for exposure to workplace chemicals.

Acute Exposure Guideline Levels (AEGLs) are established by the EPA. They describe the risk to humans resulting from once-in-a lifetime, or rare, exposure to airborne chemicals.

Boiling point is the temperature at which a substance can change its physical state from a liquid to a gas.

A **carcinogen** is a substance that causes cancer.

The **CAS number** is unique, identifying number, assigned by the Chemical Abstracts Service, to a specific chemical.

CFR is the Code of Federal Regulations, which are the regulations of the United States government.

A **combustible** substance is a solid, liquid or gas that will burn.

A **corrosive** substance is a gas, liquid or solid that causes destruction of human skin or severe corrosion of containers.

The **critical temperature** is the temperature above which a gas cannot be liquefied, regardless of the pressure applied.

DEP is the New Jersey Department of Environmental Protection.

DOT is the Department of Transportation, the federal agency that regulates the transportation of chemicals.

EPA is the Environmental Protection Agency, the federal agency responsible for regulating environmental hazards.

ERG is the Emergency Response Guidebook. It is a guide for emergency responders for transportation emergencies involving hazardous substances.

Emergency Response Planning Guideline (ERPG) values provide estimates of concentration ranges where one reasonably might anticipate observing adverse effects.

A **fetus** is an unborn human or animal.

A **flammable** substance is a solid, liquid, vapor or gas that will ignite easily and burn rapidly.

The **flash point** is the temperature at which a liquid or solid gives off vapor that can form a flammable mixture with air.

IARC is the International Agency for Research on Cancer, a scientific group.

Ionization Potential is the amount of energy needed to remove an electron from an atom or molecule. It is measured in electron volts.

IRIS is the Integrated Risk Information System database on human health effects that may result from exposure to various chemicals, maintained by federal EPA.

LEL or **Lower Explosive Limit**, is the lowest concentration of a combustible substance (gas or vapor) in the air capable of continuing an explosion.

mg/m^3 means milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

A **mutagen** is a substance that causes mutations. A **mutation** is a change in the genetic material in a body cell. Mutations can lead to birth defects, miscarriages, or cancer.

NFPA is the National Fire Protection Association. It classifies substances according to their fire and explosion hazard.

NIOSH is the National Institute for Occupational Safety and Health. It tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA.

NTP is the National Toxicology Program which tests chemicals and reviews evidence for cancer.

OSHA is the federal Occupational Safety and Health Administration, which adopts and enforces health and safety standards.

PEOSHA is the New Jersey Public Employees Occupational Safety and Health Act, which adopts and enforces health and safety standards in public workplaces.

Permeated is the movement of chemicals through protective materials.

ppm means parts of a substance per million parts of air. It is a measure of concentration by volume in air.

Protective Action Criteria (PAC) are values established by the Department of Energy and are based on AEGLs and ERPGs. They are used for emergency planning of chemical release events.

A **reactive** substance is a solid, liquid or gas that releases energy under certain conditions.

STEL is a Short Term Exposure Limit which is usually a 15-minute exposure that should not be exceeded at any time during a work day.

A **teratogen** is a substance that causes birth defects by damaging the fetus.

UEL or **Upper Explosive Limit** is the highest concentration in air above which there is too much fuel (gas or vapor) to begin a reaction or explosion.

Vapor Density is the ratio of the weight of a given volume of one gas to the weight of another (usually *Air*), at the same temperature and pressure.

The **vapor pressure** is a force exerted by the vapor in equilibrium with the solid or liquid phase of the same substance. The higher the vapor pressure the higher concentration of the substance in air.

Right to Know Hazardous Substance Fact Sheet

Emergency Responders Quick Reference

Common Name: **TRICHLORFON**

Synonyms: Dylox®; Proxol®; Trichlorohydroxyethyldimethylphosphonate
CAS No: 52-68-6
Molecular Formula: $C_4H_8Cl_3O_4P$
RTK Substance No: 1882
Description: White, crystalline solid when pure

HAZARD DATA

Hazard Rating	Firefighting	Reactivity
3 - Health **0 - Fire** **0 - Reactivity** **DOT#:** UN 2783 **ERG Guide #:** 152 **Hazard Class:** 6.1 (Poison)	**Trichlorfon** may burn, but does not readily ignite. However, it is often dissolved in a liquid carrier that may be flammable or combustible. POISONOUS GASES ARE PRODUCED IN FIRE. CONTAINERS MAY EXPLODE IN FIRE. Use water spray to keep fire-exposed containers cool.	**Trichlorfon** is not compatible with OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE); STRONG ACIDS (such as HYDROCHLORIC, SULFURIC and NITRIC); and STRONG BASES (such as SODIUM HYDROXIDE and POTASSIUM HYDROXIDE).

SPILL/LEAKS

Isolation Distance:

Spill (solid): 25 meters (75 feet)

Spill (liquid): 50 meters (150 feet)

Fire: 800 meters (1/2 mile)

Absorb liquids in dry sand, earth, or a noncombustible material and place into sealed containers for disposal.

Moisten solid material first or use a HEPA-filter vacuum for clean-up and place into sealed containers for disposal.

DO NOT wash into sewer.

Trichlorfon is very toxic to aquatic organisms.

PHYSICAL PROPERTIES

Flash Point:	242°F (117°C) (Solution)
Vapor Pressure:	7.8×10^{-6} mm Hg at 68°F (20°C)
Specific Gravity:	1.73 (water = 1)
Water Solubility:	Slightly soluble
Boiling Point:	212°F (100°C)
Melting Point:	181° to 183°F (83° to 84°C)
Molecular Weight:	257.4

EXPOSURE LIMITS

ACGIH: 1 mg/m^3; 8-hr TWA

PROTECTIVE EQUIPMENT

Gloves:	Nitrile and Neoprene (>8-hr breakthrough for *Organophosphorus compounds*)
Coveralls:	Tychem® BR, CSM and TK (>8-hr breakthrough for *Organophosphorus compounds*)
Respirator:	>1 mg/m^3 - full facepiece APR with *Organic vapor cartridges* and *High efficiency prefilters* >10 mg/m^3 - SCBA

HEALTH EFFECTS

Eyes:	Irritation
Skin:	Irritation (skin absorbable)
Inhalation:	Headache, sweating, nausea and vomiting, loss of coordination, and death (*Organophosphate poisoning)*

FIRST AID AND DECONTAMINATION

Remove the person from exposure.

Flush eyes with large amounts of water for at least 15 minutes. Remove contact lenses if worn. Seek medical attention immediately.

Quickly remove contaminated clothing and wash contaminated skin with large amounts of soap and water. Seek medical attention.

Shampoo hair immediately if contaminated.

Begin artificial respiration if breathing has stopped and CPR if necessary.

Transfer promptly to a medical facility.