Right to Know
Hazardous Substance Fact Sheet

Common Name: **DISULFOTON**

Synonyms: Solvirex; Thiodemeton; Di-Syston

Chemical Name: Phosphorodithioic Acid,
O,O-Diethyl S-2-(Ethylthio) Ethyl Ester

Date: February 2022 Revision: June 2023

CAS Number: 298-04-4
RTK Number: 0812
DOT Number: UN 3018/UN 2783
DOT Hazard: 6.1 (poison)

Description and Use

Disulfoton is an oily, colorless to yellow liquid in the *Organophosphate* class of pesticides. It is used to control insects and mites on seeds, grains and crops. It is soluble in most organic solvents. It is also available in granular form.

Reason for Citation

- **Disulfoton** is on the *Right to Know Hazardous Substance List because* it is cited by ACGIH, DOT, NIOSH, DEP and EPA.

SEE GLOSSARY ON PAGE 5

Eye Contact
- Immediately flush eyes with large amounts of water for at least 15 minutes, occasionally lifting upper and lower lids. Remove contact lenses, if worn, while flushing. Seek medical attention immediately.

Skin Contact
- Quickly remove contaminated clothing. Immediately wash contaminated skin with large amounts of soap and water.
- 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.
- Medical observation is recommended for 24 to 48 hours after breathing overexposure.

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 BACK PAGE

Hazard Summary

Hazard Rating	NJDOH	NFPA
HEALTH	4	-
FLAMMABILITY	1	-
REACTIVITY	1	-
COMBUSTIBLE POISONOUS GASES ARE PRODUCED IN FIRE CONTAINERS MAY EXPLODE IN FIRE		

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

- **Disulfoton** can affect you when breathed in and by passing through your skin.
- **Disulfoton** can irritate the skin causing a rash or burning feeling on contact.
- Exposure can cause blurred vision and severe eye irritation and burns leading to permanent damage.
- Breathing **Disulfoton** can irritate the lungs causing coughing and shortness of breath.
- Very high exposures can cause a build-up of fluid in the lungs (pulmonary edema), a medical emergency, with severe shortness of breath.
- Exposure can cause *Organophosphate poisoning.* Symptoms develop quickly and can be fatal. Symptoms include headache, dizziness, chest tightness, twitching,loss of coordination, convulsions, coma and death.
- High or repeated exposure can damage the nervoussystem causing numbness, pins and needles, and weakness in the hands and feet.
- Repeated exposure may cause personality changes of depression, anxiety or irritability.

Workplace Exposure Limits

NIOSH: The recommended airborne exposure limit is **0.1 mg/m^3** averaged over a 10-hour work shift.
ACGIH: The recommended airborne exposure limit is **0.1 mg/m^3** averaged over an 8-hour work shift.

- The above exposure limits are for air levels only. When skincontact also occurs, you may be overexposed, even thoughair levels are less than the limits listed above.

Determining Exposure

- Read the product Material Safety Data Sheet (MSDS) andlabel to determine ingredients and important safety and health information.
- Read the New Jersey Department of Health Hazardous Substance Fact Sheets on the chemicals in the product athttp://nj.gov/health/workplacehealthandsafety/right-to-know/ or in your facility's Right to Know Central File or Hazard Communication Standard file.
- Public workers in New Jersey have a right to information about the chemicals with which they work under the New Jersey Worker and Community Right to Know Act and the Public Employees Occupational Safety and Health Act (PEOSHA). Private workers have the same right under thefederal Occupational Safety and Health Act (OSHA).
- The New Jersey Worker and Community Right to Know Act and the PEOSH Hazard Communication Standard require most employers to label chemicals in the workplace and require public employers to provide employees with information and training on chemical hazards and controls. The federal OSHA Hazard Communication Standard requires private employers to provide similar information and training to employees.

Health Hazard Information

Below is a summary of available information regarding health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors affect individual susceptibility.

Acute Health Effects

The following acute (short-term) health effects may occur immediately or shortly after exposure:

- Exposure can cause blurred vision and severe eye irritation and burns leading to permanent damage.
- Breathing **Disulfoton** can irritate the lungs causing coughing and shortness of breath.
- Very high exposures can cause a build-up of fluid in the lungs (pulmonary edema), a medical emergency, with severe shortness of breath.
- Exposure can cause *Organophosphate poisoning.* Symptoms develop quickly and can be fatal. Symptoms include headache, dizziness, chest tightness, twitching, loss of coordination, convulsions, coma and death.

Other Health Effects

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

Cancer Hazard

- There is no evidence that **Disulfoton** causes cancer in animals based on test results presently available to the New Jersey Department of Health from published studies.

Reproductive Hazard

- While **Disulfoton** has been tested, there is inadequate evidence to assess the reproductive toxicity of **Disulfoton**.

Other Effects

- High or repeated exposure can damage the nervous system causing numbness, pins and needles, and weakness in the hands and feet.
- Repeated exposure may cause personality changes of depression, anxiety or irritability.

Medical

Medical evaluations should include a detailed history of past and present symptoms and a physical exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of test results. You have a right to your medical information under the OSHA Access to Employee Exposure and Medical Records Standard (29 CFR 1910.1020).

Medical Testing

Before employment and regularly thereafter, the following are recommended:

- Test for *Cholinesterase* levels in plasma and red blood cells. Once exposure stops, *Cholinesterase* levels will return to normal in 1-2 weeks in plasma and 1-3 months in red blood cells.
- When *Cholinesterase* enzyme levels are reduced by 25 % or more below pre-employment levels, risk of poisoning is increased, even if the reduced levels are still considered normal.
- Reassignment to work not involving *Organophosphate* or *Carbamate* pesticides is recommended until enzyme levelsrecover.

If symptoms develop, the following are recommended:

- Evaluate for brain effects such as changes in memory, concentration, sleeping, mood, headaches and fatigue.
- Consider evaluating the central, autonomic and peripheral nervous systems, with follow-up testing if results are positive or borderline.
- Consider neurobehavioral, nerve conduction and urinary enzyme testing.

Mixed Exposures

- There may be greater risk of experiencing effects if there is also exposure to other chemicals that affect

*Cholinesterase*levels *(Organophosphates, 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 andeye irritants. For further information on workplace controls, consult the NIOSH document on Control Banding at www.cdc.gov/niosh/topics/ctrlbanding/.

The following practices are recommended:

- Label process containers.
- Train and inform employees about hazards.
- Monitor airborne chemical concentrations.
- Automatically transfer combustible and flammable liquids from storage to process containers.
- Use engineering controls at elevated levels of exposure.
- Provide eye wash fountains and emergency showers.
- Wash skin after contact with a hazardous material.
- Wash at the end of the work shift.
- Do not wear clothing once it becomes contaminated.
- Do not take contaminated clothing home.
- Special training is required 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, consult the following:

- Special controls and practices for occupational exposure to pesticides are required by the *Worker Protection Standard* (40 CFR Part 170).
- For more information, contact the New Jersey Departmentof Environmental Protection Pesticide Control Program (http://www.nj.gov/dep/enforcement/pcp/index.htm).
- The recommended protective clothing materials are Tychem® BR, CSM and TK, or the equivalent.

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. All personal protective equipment (including suits, gloves, footwear and headgear) should be clean, available each day and put on before work.

Consult safety equipment suppliers and manufacturers for specific recommendations. The following recommendations areonly guidelines and may not apply to every situation:

Gloves and Clothing

- Do not use leather. This substance is absorbed into leather and cannot be removed by cleaning.
- The recommended glove materials for *Organophosphorus compounds* are Nitrile and Neoprene.

Eye Protection

- Wear indirect-vent, impact-resistant and splash-resistant goggles when working with liquids.
- Wear a face shield along with impact-resistant goggles when working with corrosive, highly irritating or toxic substances.

Respiratory Protection

Improper use of respirators is dangerous. Respirators only should be used in accordance with a written program that takes into account workplace conditions, worker training, respirator fit testing, and medical exams, as described in the OSHA Respiratory Protection Standard (29 CFR 1910.134). **Only use NIOSH-approved respirators.**

- For outdoor use, check with your supervisor and yoursafety equipment supplier regarding the appropriate respiratory equipment.
- Leave the area immediately if (1) while wearing a filter or cartridge respirator you can smell, taste, or otherwise detect the chemical substance, (2) while wearing particulate filters abnormal resistance to breathing is experienced, or (3) eye irritation occurs while wearing a full facepiece respirator.
- Consider all potential exposure sources. You may need a combination of filters, pre-filters 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 **0.1 mg/m^3**, use a 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 pressure-demand or other positive-pressure mode.

Fire Hazards

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

- **Disulfoton** is COMBUSTIBLE.
- **Disulfoton** may burn but does not readily ignite.
- Use dry chemical, CO_2, water spray or foam extinguishers.
- POISONOUS GASES ARE PRODUCED IN FIRE,

including *Sulfur Oxides* and *Phosphorus Oxides*.
- CONTAINERS MAY EXPLODE IN FIRE when organic solvent is used as a carrier.

Spills and Emergencies

Employees who are required to clean-up spills or leaks must be properly trained and equipped. The OSHA Hazardous Waste Operations and Emergency Response Standard (29CFR 1910.120) may apply.

It may be necessary to contain and dispose of this substanceas HAZARDOUS WASTE. Contact your state Department of Environmental Protection (DEP) or your regional office of the federal Environmental Protection Agency (EPA) for specific recommendations.

In case of accidental release:

- Evacuate personnel.
- Secure and control entrance to the area.
- If it is safe to do so, remove potential ignition sources.
- Absorb liquids in vermiculite, dry sand, earth, or a similar material and deposit in sealed containers.
- Do not allow this substance to enter waterways, including sewer systems, as this substance is toxic to aquatic life withlong-lasting effects.
- Ventilate area of spill or leak after clean-up is complete.

Handling and Storage

Prior to working with this substance, employees should be trained on proper handling and storage.

- Store in tightly closed containers in a cool, well-ventilated area.
- Store separately from *Alkalis*.
- Sources of ignition, such as smoking and open flames, are prohibited where this substance is used, handled, or storedin a manner that could create a potential fire or explosion hazard.
- Storage should be under lock and key and secure from access by unauthorized persons.

Occupational Health Resources

The New Jersey Department of Health's Occupational Health Service offers information, resources, educational materials, public presentations, and industrial hygiene and medical investigations and evaluations, among other services.

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.nj.gov
Web address:
http://nj.gov/health/workplacehealthandsafety/right-to-know/

GLOSSARY

ACGIH is the American Conference of Governmental Industrial Hygienists. It determines Threshold Limit Values (TLVs).

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

The **CAS number** is the 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 can weakenor destroy human skin or chemical containers.

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, a resource for responding to chemical emergencies during transportation.

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

IARC is the International Agency for Research on Cancer.

IDLH is the level of substance which is Immediately Dangerous to Life or Health.

IRIS is the EPA's Integrated Risk Information System.

LEL or **Lower Explosive Limit**, is the lowest concentration of a substance in 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 changes the genetic material ofcells, and can lead to birth defects, miscarriages, or cancer.

NJDEP is the New Jersey Department of Environmental protection.

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

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

NTP is the National Toxicology Program, which tests chemicals and reviews evidence to determine carcinogenicity.

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

PEOSHA is the New Jersey Public Employees OccupationalSafety and Health Act.

PEL is the permissible exposure. It is established by OSHA.

PIH stands for Poison Inhalation Hazard. This classification is established by the DOT.

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

Protective Action Criteria (PAC) are values established by the Department of Energy for chemical emergencies.

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

REL is the recommended exposure limit by NIOSH.

STEL is a Short-Term Exposure Limit, which should never be exceeded during the work-day.

TLV is the Threshold Limit Value, an exposure limit for airborne concentrations.

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

UEL or **Upper Explosive Limit** is the concentration of a substance in air above which there is too much fuel to continuean explosion.

RIGHT TO KNOW
HAZARDOUS SUBSTANCE FACT SHEET

Emergency Responders Quick Reference

Common Name: **DISULFOTON**

Synonyms: Solvirex; Thiodemeton; Di-Syston
CAS Number: 298-04-4
Molecular Formula: $C_8H_{19}O_2PS_3$
RTK Number: 0812
Description: Oily, colorless to yellow liquid in the *Organophosphate* class of pesticides; also available in granular form

HAZARD DATA

Hazard Rating		Firefighting	Reactivity
Health:	4	**Disulfoton** is COMBUSTIBLE.	Store separately from *Alkalis.*
Fire:	1	**Disulfoton** may burn but does not readily ignite. Use dry chemical, CO_2, water spray or foamextinguishers.	
Reactivity:	1	POISONOUS GASES ARE PRODUCED IN FIRE, including *Sulfur Oxides* and *Phosphorus Oxide gases.*	
DOT #:	UN 3018/2783	CONTAINERS MAY EXPLODE IN FIRE when organic solvent is used as a carrier.	
ERG #:	152		
DOT Hazard:	6.1 (poison)		

SPILLS/LEAKS

Isolation Distances:
Liquid Spill: 50 meters (150 fee)
Solid Spill: 25 meters (75 feet)
Fire: 800 meters (1/2 mile)

Evacuate personnel.
Secure and control entrance to the area.
If it is safe to do so, remove potential ignition sources.
Absorb liquids in vermiculite, dry sand, earth, or a similar material and deposit in sealed containers.
Do not allow this substance to enter waterways, including sewer systems, as this substance is toxic to aquatic life with long-lasting effects.
Ventilate area of spill or leak after clean-up is complete.

PHYSICAL PROPERTIES

Molecular Weight: 274.38
Flash Point: >82 ˚C (>180 ˚F)
Melting Point: > -10˚C (>13 ˚F)
Vapor Pressure: 0.0002 mm Hg at 20 ˚C (68 ˚F)
Specific Gravity: 1.144
Water Solubility: Insoluble
Boiling Point: 132-133 ˚C (270-271 ˚F)

EXPOSURE LIMITS

The following exposure limits are for **Disulfoton**:

NIOSH: 0.1 mg/m^3, 10-hour average
ACGIH: 0.1 mg/m^3, 8-hour average
PAC: PAC-1 = 0.18 mg/m^3
PAC-2 = 2 mg/m^3
PAC-3 = 8.8 mg/m^3

PROTECTIVE EQUIPMENT

Gloves: Nitrile and Neoprene (>8-h breakthrough for *Organophosphorus Compounds*)
Coverall: Tychem® BR, CSM, and TK (>8-h breakthrough for *Organophosphorus Compounds*)
Respirator: >0.1 mg/m^3 – supplied-air, full-facepiece, pressure-demand or another positive-pressure mode

ACUTE HEALTH EFFECTS

Eyes: Irritation, burns, permanent damage
Skin: Rash, burning sensation
Inhalation: Headache, dizziness, chest tightness, twitching, loss of coordination, convulsions, pulmonary edema, coma, death

FIRST AID AND DECONTAMINATION

Immediately flush eyes with large amounts of water for at least 15 minutes, occasionally lifting upper and lower lids.
Remove contact lenses, if worn, while flushing.
Quickly remove contaminated clothing. Immediately wash contaminated skin with large amounts of soap and water.
Shampoo hair promptly if contaminated.
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.
Medical observation is recommended for 24 to 48 hours after breathing overexposure.