Right to Know

Hazardous Substance Fact Sheet

Common Name: **ALLYL ISOTHIOCYANATE**

Synonyms: Mustard Oil

Chemical Name: 1-Propene, 3-Isothiocyanato-

Date: June 1998 Revision: June 2007

CAS Number: 57-06-7

RTK Substance Number: 0045

DOT Number: UN 1545

EMERGENCY RESPONDERS >>>> SEE BACK PAGE

Description and Use

Allyl Isothiocyanate is a colorless to pale yellow, oily liquid with an irritating odor. It is used in fumigants, ointments, and mustard plasters, and as a flavoring agent.

Hazard Summary

Hazard Rating	NJDOH	NFPA
HEALTH	-	3
FLAMMABILITY	-	2
REACTIVITY	-	1

COMBUSTIBLE
DO NOT USE WATER TO FIGHT FIRE
POISONOUS GASES ARE PRODUCED IN FIRE

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

Reason for Citation

- **Allyl Isothiocyanate** is on the Right to Know Hazardous Substance List because it is cited by DOT, IARC, and NFPA.

- **Allyl Isothiocyanate** can affect you when inhaled and may be absorbed through the skin.
- Contact can irritate and burn the skin.
- Exposure can irritate the eyes, nose, and throat.
- Exposure can cause an allergic reaction with watery eyes, runny nose, wheezing and coughing.
- **Allyl Isothiocyanate** may damage the developing fetus.

SEE GLOSSARY ON PAGE 5.

FIRST AID

Eye Contact

- Immediately flush with large amounts of cool water for at least 15 minutes, occasionally lifting upper and lower lids. Remove contact lenses while rinsing. Medical attention is necessary.

Skin Contact

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

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

Workplace Exposure Limits

No occupational exposure limits have been established for **Allyl Isothiocyanate**. This does not mean that this substance is not harmful. Safe work practices should always be followed.

- It should be recognized that **Allyl Isothiocyanate** can be absorbed through your skin, thereby increasing your exposure.

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, 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) requires private 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 **Allyl Isothiocyanate**:

- Contact can irritate the skin.
- Prolonged exposure can cause skin burns and blisters.
- Exposure can irritate the eyes, nose, and throat.

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

Cancer Hazard
- While **Allyl Isothiocyanate** has been tested, it is not classifiable as to its potential to cause cancer.

Reproductive Hazard
- **Allyl Isothiocyanate** may damage the developing fetus.

Other Effects
- Exposure can cause an allergic reaction with watery eyes, sneezing, runny nose and symptoms of asthma (wheezing, coughing and chest tightness). If allergy develops, very low future exposure can cause symptoms to develop.

Medical

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

- Lung function tests. These may be normal if the person is not having an attack at the time of the test.

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.

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

Mixed Exposures
- Because smoking can cause heart disease, as well as lung cancer, emphysema, and other respiratory problems, it may worsen respiratory conditions caused by chemical exposure. Even if you have smoked for a long time, stopping now will reduce your risk of developing health problems.

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 information and training concerning their hazards.
- 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.
- 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.

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 **Allyl Isothiocyanate**. Wear personal protective equipment made from material which can not be permeated and/or degraded by this substance. Safety equipment suppliers/manufacturers can provide recommendations on the most protective glove/clothing material for your operation.
- All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

Eye Protection

- Wear indirect-vent, impact and splash resistant goggles when working with liquids.
- Wear a face shield along with goggles when working with corrosive, highly irritating or toxic substances.
- Contact lenses should not be worn when working with this substance.

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 the OSHA Respiratory Protection Standard (29 CFR 1910.134).

- Where the potential for overexposure exists, 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 pressure-demand or other positive-pressure mode.

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).

- **Allyl Isothiocyanate** is a COMBUSTIBLE LIQUID.
- Use dry chemical, CO_2, alcohol resistant foam, or other foaming agents.
- DO NOT USE WATER.
- POISONOUS GASES ARE PRODUCED IN FIRE, including *Sulfur Oxides*, *Hydrogen Cyanide* and *Nitrogen Oxides*.
- Vapors may travel to a source of ignition and flash back.
- Vapor is heavier than air and may travel a distance to cause a fire or explosion far from the source.
- 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 **Allyl Isothiocyanate** 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 vermiculite, dry sand, earth, or a similar material and deposit in sealed containers.
- Ventilate and wash area after clean-up is complete.
- It may be necessary to contain and dispose of **Allyl Isothiocyanate** as a HAZARDOUS WASTE. Contact your state Department of Environmental Protection (DEP) or your regional office of the federal Environmental Protection Agency (EPA) for specific recommendations.

Handling and Storage

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

- **Allyl Isothiocyanate** on contact with STRONG ACIDS (such as HYDROCHLORIC, SULFURIC and NITRIC) produces highly toxic gases such as *Cyanides*, *Sulfur Oxides* and *Nitrogen Oxides*.
- **Allyl Isothiocyanate** is not compatible with WATER; ALCOHOLS; OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE); STRONG BASES (such as SODIUM HYDROXIDE and POTASSIUM HYDROXIDE); and AMINES.
- Store in tightly closed containers in a cool, well-ventilated area away from MOISTURE and HEAT.
- Sources of ignition, such as smoking and open flames, are prohibited where **Allyl Isothiocyanate** is used, handled, or stored in a manner that could create a potential fire or explosion hazard.
- Keep refrigerated.

Occupational Health Information Resources

The New Jersey Department of Health and offers multiple services in occupational health. These include: Right to Know Information Resources, Public Presentations, General References, Industrial Hygiene Information, Surveys and Investigations, and Medical Evaluation.

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.

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 assigned by the Chemical Abstracts Service to identify a specific chemical.

CFR is the Code of Federal Regulations, which are of 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.

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.

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 of the federal EPA that classifies chemicals according to their cancer-causing potential.

LEL, or **Lower Explosive Limit** is the lowest concentration in air below which there is not enough fuel (gas or vapor) to continue 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.

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

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.

PIH is a DOT designation for chemicals which are Poison Inhalation Hazards.

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

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 *Hydrogen*), at the same temperature and pressure.

The **vapor pressure** is a measure of how readily a liquid or a solid mixes with air at its surface. A higher vapor pressure indicates a higher concentration of the substance in air and therefore increases the likelihood of breathing it in.

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Emergency Responders Quick Reference

Chemical Name: **ALLYL ISOTHIOCYANATE**

Synonyms: Mustard Oil
CAS No: 57-06-7
Molecular Formula: C_4H_5NS
RTK Substance No: 0045
Description: Colorless to pale yellow, oily liquid with an irritating odor.

HAZARD DATA

Hazard Rating	Firefighting	Reactivity
3 - Health **2 - Fire** **1 - Reactivity** **DOT#:** UN 1545 **ERG Guide #:** 155 **Hazard Class:** 6.1 (Poison)	- Combustible liquid - Fire extinguishers – use dry chemical, CO_2, or foam - DO NOT USE WATER - Decomposition Products - Nitrogen Oxides, Sulfur Oxides and Hydrogen Cyanide - Vapors may travel to a source of ignition and flash back. - Vapor is heavier than air and may travel a distance to cause a fire or explosion far from the source.	- Reacts with WATER, ALCOHOLS, STRONG BASES (such as SODIUM HYDROXIDE and POTASSIUM HYDROXIDE); STRONG ACIDS (such as HYDROCHLORIC, SULFURIC and NITRIC); OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANTES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE); AMINES; MOISTURE; and HEAT.

SPILL/LEAKS

Isolation Distance: Isolate spill or leak in all directions for at least 50 meters (150 feet)

Absorb liquids in vermiculite, dry sand, earth, or a similar material and deposit in sealed containers.

PHYSICAL PROPERTIES

Odor Threshold:	No Information
Flash Point:	115°F (46°C)
LEL:	No Information
UEL:	No Information
Vapor Density:	3.4 (air = 1)
Vapor Pressure:	3.7 mm Hg at 86°F (30°C)
Water Solubility:	Insoluble
Boiling Point:	304°F (151°C)
Ionization Potential:	No Information

EXPOSURE LIMITS

ACGIH:	N/A
OSHA:	N/A
NIOSH:	N/A
IDLH LEVEL:	N/A

PROTECTIVE EQUIPMENT

Gloves:	No Information
Coveralls:	No Information
Boots:	No Information
Respirator:	Supplied air

HEALTH EFFECTS

Eyes:	Irritation
Skin:	Irritation, burns and blisters
Acute:	Nose and throat irritation
Chronic:	Cancer -Tested (Not Classifiable) May damage the fetus Symptoms of asthma - coughing and wheezing

FIRST AID AND DECONTAMINATION

- Remove the person from exposure.
- Flush eyes with cool water for at least 15 minutes.
- Remove contaminated clothing and wash contaminated skin with soap and water.
- Begin rescue breathing and CPR if necessary.
- Transfer to a medical facility.