



# Right to Know Hazardous Substance Fact Sheet

Common Name: **ARSENIC DISULFIDE**

Synonyms: Red Arsenic Glass; Realgar

Chemical Name: Arsenic Sulfide

Date: May 2000

Revision: April 2008

CAS Number: 56320-22-0

RTK Substance Number: 0156

DOT Number: UN 1557

## Description and Use

**Arsenic Disulfide** is a reddish brown, odorless solid. It is used in the leather industry as a hair removal (depilatory) agent, as a paint pigment, and to kill weeds, insects, and rodents.

## Reasons for Citation

- ▶ **Arsenic Disulfide** is on the Right to Know Hazardous Substance List because it is cited by OSHA, ACGIH, DOT, NIOSH, NTP, DEP, IARC, IRIS 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 flushing. Seek medical attention.

### 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

EMERGENCY RESPONDERS >>>> SEE PAGE 6

## Hazard Summary

Hazard Rating	NJDHSS	NFPA
HEALTH	3	-
FLAMMABILITY	0	-
REACTIVITY	0	-
CARCINOGEN AND TERATOGEN POISONOUS GASES ARE PRODUCED IN FIRE DOES NOT BURN		

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

- ▶ **Arsenic Disulfide** can affect you when inhaled.
- ▶ **Arsenic Disulfide** is a CARCINOGEN and TERATOGEN. HANDLE WITH EXTREME CAUTION.
- ▶ Skin contact can cause irritation, burns, rash and loss of pigment.
- ▶ Eye contact can cause irritation and burns.
- ▶ Inhaling **Arsenic Disulfide** can irritate the nose and throat and can cause an ulcer or hole in the "bone" (septum) dividing the inner nose.
- ▶ Exposure to **Arsenic Disulfide** can cause weakness, poor appetite, headache and even death.
- ▶ **Arsenic Disulfide** may damage the nervous system and the liver.

## Workplace Exposure Limits

The following exposure limits are for *inorganic Arsenic compounds* (measured as *Arsenic*):

OSHA: The legal airborne permissible exposure limit (PEL) is **0.01 mg/m<sup>3</sup>** averaged over an 8-hour workshift.

NIOSH: The recommended airborne exposure limit (REL) is **0.002 mg/m<sup>3</sup>**, which should not be exceeded at any time.

ACGIH: The threshold limit value (TLV) is **0.01 mg/m<sup>3</sup>** averaged over an 8-hour workshift.

- ▶ **Arsenic Disulfide** is a CARCINOGEN and TERATOGEN in humans. There may be no safe level of exposure to a carcinogen, so all contact should be reduced to the lowest possible level.

## 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 and Senior Services Hazardous Substance Fact Sheet, available on the RTK Program website ([www.nj.gov/health/eoh/rtkweb](http://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 **Arsenic Disulfide**:

- ▶ Skin contact can cause irritation, burns, itching, rash and loss of pigment.
- ▶ Eye contact can cause irritation, burns, and red, watery eyes.
- ▶ Inhaling **Arsenic Disulfide** can irritate the nose and throat causing coughing and wheezing.
- ▶ Exposure to **Arsenic Disulfide** can cause weakness, poor appetite, nausea, vomiting, headache, muscle cramps, and even death.

### Chronic Health Effects

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

#### Cancer Hazard

- ▶ **Arsenic Disulfide** is a CARCINOGEN in humans. There is some evidence that *Arsenic compounds* cause lung and skin cancer in humans.
- ▶ Many scientists believe there is no safe level of exposure to a carcinogen.

### Reproductive Hazard

- ▶ **Arsenic Disulfide** is a PROBABLE TERATOGEN in humans.

### Other Effects

- ▶ Repeated skin contact can cause thickened skin and/or patchy areas of darkening and loss of pigment. Some persons may develop white lines on the nails.
- ▶ Long-term exposure can cause an ulcer or hole in the "bone" (septum) dividing the inner nose, hoarseness and sore eyes.
- ▶ **Arsenic Disulfide** may damage the nervous system causing numbness, "pins and needles," and/or weakness in the hands and feet.
- ▶ **Arsenic Disulfide** may damage the liver.

## Medical

### Medical Testing

Before first exposure and every 12 months thereafter, OSHA requires your employer to provide (for persons exposed to greater than **0.005 mg/m<sup>3</sup>** of *Arsenic*) a work and medical history and exam which shall include:

- ▶ Chest x-ray
- ▶ Exam of the nose, skin and nails
- ▶ Test for urine *Arsenic*. This is most accurate at the end of the workday. Eating shellfish or fish may elevate *Arsenic* levels for up to two days. At NIOSH recommended exposure levels, urine *Arsenic* should not be greater than **100 micrograms per liter** of urine.

After suspected overexposure, repeat these tests and consider an exam of the nervous system and liver function tests. Also examine your skin periodically for abnormal growths. Skin cancer from *Arsenic* can be easily cured when detected early.

OSHA requires your employer to provide you and your doctor with a copy of the OSHA *Inorganic Arsenic* Standard (29 CFR 1910.1018).

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 more than light alcohol consumption can cause liver damage, drinking alcohol may increase the liver damage caused by **Arsenic Disulfide**.

### Conditions Made Worse By Exposure

- ▶ Many scientists believe that skin changes, such as thickening and pigment changes, make those skin areas more likely to develop skin cancer.

## 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/](http://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:

- ▶ Specific engineering controls are required for this chemical by OSHA. Refer to the OSHA *Inorganic Arsenic* Standard (29 CFR 1910.1018).
- ▶ Use a vacuum or a wet method to reduce dust during clean-up. DO NOT DRY SWEEP.
- ▶ Use a high efficiency particulate air (HEPA) filter when vacuuming. Do not use a standard shop vacuum.

## 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 **Arsenic Disulfide**. Wear personal protective equipment made from material which 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.
- ▶ Safety equipment manufacturers recommend *Nitrile* and *Natural Rubber* for gloves and DuPont *Tyvek*®, or the equivalent, as protective materials for clothing.
- ▶ All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

### Eye Protection

- ▶ Wear impact resistant eye protection with side shields.
- ▶ Wear a face shield with goggles when working with corrosive, high irritating or toxic substance.

### Respiratory Protection

**Improper use of respirators is dangerous.** Respirators 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 exists for exposure not higher than **0.1 mg/m<sup>3</sup>** (as *Arsenic*), use a half-mask air purifying respirator equipped with high efficiency filters.
- ▶ Where the potential exists for exposure not higher than **0.5 mg/m<sup>3</sup>** (as *Arsenic*), use a full facepiece, air purifying respirator with high efficiency filters.
- ▶ Where the potential exists for exposure not higher than **5 mg/m<sup>3</sup>** (as *Arsenic*), use any powered-air purifying respirator with high efficiency filters or a half-mask supplied-air respirator operated in a positive pressure mode.
- ▶ Leave the area immediately if (1) while wearing a filter or cartridge respirator you can smell, taste, or otherwise detect **Arsenic Disulfide**, (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.
- ▶ Exposure to **5 mg/m<sup>3</sup>** (as *Arsenic*) is immediately dangerous to life and health. If the possibility of exposure above **5 mg/m<sup>3</sup>** exists, use a NIOSH approved self-contained breathing apparatus with a full facepiece operated in a pressure-demand or other positive-pressure mode equipped with 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).

- ▶ Extinguish fire using an agent suitable for type of surrounding fire. **Arsenic Disulfide** itself does not burn.
- ▶ POISONOUS GASES ARE PRODUCED IN FIRE, including *Sulfur Oxides* and *Arsenic fumes*.
- ▶ 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 **Arsenic Disulfide** is spilled, take the following steps:

- ▶ Evacuate personnel and secure and control entrance to the area.
- ▶ Eliminate all ignition sources.
- ▶ Collect solid material in the most convenient and safe manner, or use a HEPA-filter vacuum for clean-up, and deposit in sealed containers.
- ▶ Ventilate area of spill or leak after clean-up is complete.
- ▶ DO NOT wash into sewer.
- ▶ It may be necessary to contain and dispose of **Arsenic Disulfide** 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 **Arsenic Disulfide** you should be trained on its proper handling and storage.

- ▶ A regulated, marked area should be established where **Arsenic Disulfide** is handled, used or stored as required by the OSHA *Inorganic Arsenic* Standard (29 CFR 1910.1018).
- ▶ **Arsenic Disulfide** may react violently with OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE); BROMINE AZIDE; SODIUM SULFIDE; SULFUR; and POTASSIUM NITRATE.
- ▶ **Arsenic Disulfide** reacts with STRONG ACIDS (such as HYDROCHLORIC, SULFURIC and NITRIC) and ACID FUMES to form toxic *Arsenic*, *Hydrogen Sulfide* and *Sulfur Dioxide fumes and vapors*.
- ▶ Contact with WATER or STEAM releases toxic *Hydrogen Sulfide gas*.
- ▶ Store in tightly closed containers in a cool, well-ventilated area.

### Occupational Health Information Resources

The New Jersey Department of Health and Senior Services, Occupational Health Service, 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 & Senior Services  
 Right to Know Program  
 PO Box 368  
 Trenton, NJ 08625-0368  
 Phone: 609-984-2202  
 Fax: 609-984-7407  
 E-mail: [rtk@doh.state.nj.us](mailto:rtk@doh.state.nj.us)  
 Web address: <http://www.nj.gov/health/eoh/rtkweb>

***The Right to Know Hazardous Substance Fact Sheets  
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 for commercial purposes.***

## 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 (AEGs)** 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.

**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 are intended to 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 maintained by federal EPA. The database contains information on human health effects that may result from exposure to various chemicals in the environment.

**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<sup>3</sup>** 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.

**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.



Common Name: **ARSENIC DISULFIDE**

Synonyms: Red Arsenic Glass; Realgar

CAS No: 56320-22-0

Molecular Formula:  $As_2S_2$

RTK Substance No: 0156

Description: Reddish brown, odorless solid

HAZARD DATA

Hazard Rating	Firefighting	Reactivity
<p><b>3 - Health</b>  <b>0 - Fire</b>  <b>0 - Reactivity</b></p> <p>DOT#: UN 1557                      ERG Guide #: 152                      Hazard Class: 6.1 (Poison)</p>	<p>Extinguish fire using an agent suitable for type of surrounding fire. <b>Arsenic Disulfide</b> itself does not burn.</p> <p>POISONOUS GASES ARE PRODUCED IN FIRE, including <i>Sulfur Oxides</i> and <i>Arsenic fumes</i>.</p> <p>Use water spray to keep fire-exposed containers cool.</p>	<p><b>Arsenic Disulfide</b> may react violently with OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE); BROMINE AZIDE; SODIUM SULFIDE; SULFUR; and POTASSIUM NITRATE.</p> <p><b>Arsenic Disulfide</b> reacts with STRONG ACIDS (such as HYDROCHLORIC, SULFURIC and NITRIC) and ACID FUMES to form toxic <i>Arsenic</i>, <i>Hydrogen Sulfide</i> and <i>Sulfur Dioxide fumes</i> and <i>vapors</i>.</p> <p>Contact with WATER or STEAM releases toxic <i>Hydrogen Sulfide</i> gas.</p>

SPILL/LEAKS

**Isolation Distance:**

Spills: 25 to 50 meters (80 to 160 feet)

Fire: 800 meters (1/2 mile)

Collect solid material in the most convenient and safe manner, or use a HEPA-filter vacuum to clean-up, and deposit in sealed containers.

Harmful to aquatic life at very low concentrations.

PHYSICAL PROPERTIES

<b>Odor Threshold:</b>	Odorless
<b>Flash Point:</b>	Nonflammable
<b>Vapor Pressure:</b>	<0 mm Hg at 68°F (20°C)
<b>Specific Gravity:</b>	3.5 (water = 1)
<b>Water Solubility:</b>	Insoluble
<b>Boiling Point:</b>	1,049°F (565°C)
<b>Melting Point:</b>	585°F (307°C)
<b>Molecular Weight:</b>	214

EXPOSURE LIMITS

<b>OSHA:</b>	0.01 mg/m <sup>3</sup> , 8-hr TWA
<b>NIOSH:</b>	0.002 mg/m <sup>3</sup> , 15-min Ceiling
<b>ACGIH:</b>	0.01 mg/m <sup>3</sup> , 8-hr TWA
<b>IDLH LEVEL:</b>	5 mg/m <sup>3</sup>
	(All of the above are for <i>inorganic Arsenic compounds</i> measured as <i>Arsenic</i> )

PROTECTIVE EQUIPMENT

<b>Gloves:</b>	Nitrile and Natural Rubber
<b>Coveralls:</b>	DuPont Tyvek®
<b>Respirator:</b>	<0.1 mg/m <sup>3</sup> - APR with High efficiency filter <0.5 mg/m <sup>3</sup> - Supplied air

HEALTH EFFECTS

<b>Eyes:</b>	Irritation, burns, red and watery eyes
<b>Skin:</b>	Irritation, burns, itching, rash and loss of pigment
<b>Inhalation:</b>	Nose and throat irritation with coughing, wheezing, and hoarseness Weakness, nausea and vomiting, headache and muscle cramps
<b>Chronic:</b>	<i>Arsenic compounds</i> cause lung and skin cancer in humans

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.

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

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

**Transfer** to a medical facility.