



Right to Know Hazardous Substance Fact Sheet

Common Name: **HELIUM**

Synonyms: None

Chemical Name: Helium

Date: August 2007 Revision: July 2016

CAS Number: 7440-59-7

RTK Substance Number: 0972

DOT Number: UN 1046 - Compressed Gas
UN 1963 - Cryogenic Liquid

Description and Use

Helium is a colorless, odorless gas. It is used in weather balloons, in welding gases, and as a carrier gas in some industrial operations. *Liquid Helium* is used as a closed system cooling agent.

Reasons for Citation

- ▶ **Helium** is on the Right to Know Hazardous Substance List because it is cited by ACGIH and DOT.

SEE GLOSSARY ON PAGE 5.

FIRST AID

Eye Contact

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

Skin Contact

- ▶ Immerse affected part in warm water. Seek medical attention.

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 BACK PAGE

Hazard Summary

Hazard Rating	NJDHSS	NFPA
HEALTH	3 (liquid) 1 (gas)	-
FLAMMABILITY	0	-
REACTIVITY	0	-
ASPHYXIAN CONTAINERS MAY RUPTURE OR BURST IN FIRE		

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

- ▶ **Helium** can affect you when inhaled.
- ▶ Exposure to high levels can cause headache, dizziness, and lightheadedness.
- ▶ Very high levels can cause passing out and death due to suffocation from lack of *Oxygen*.
- ▶ Contact with *liquid Helium* can cause frostbite.

Workplace Exposure Limits

- ▶ No occupational exposure limits have been established for **Helium**. However, it may pose a health risk. Always follow safe work practices.
- ▶ Large amounts of **Helium** decreases the amount of available *Oxygen*. Routinely measure *Oxygen* content to make sure it is at least 19.5% by volume.

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 (<http://www.state.nj.us/health/workplacehealthandsafety/right-to-know/>) 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 **Helium**:

- ▶ Exposure to high levels of **Helium** can cause headache, dizziness, and lightheadedness.
- ▶ Very high levels can cause passing out and even death due to suffocation from lack of *Oxygen*.
- ▶ Contact with *liquid Helium* can cause frostbite.

Chronic Health Effects

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

Cancer Hazard

- ▶ According to the information presently available to the New Jersey Department of Health and Senior Services, **Helium** has not been tested for its ability to cause cancer in animals.

Reproductive Hazard

- ▶ According to the information presently available to the New Jersey Department of Health and Senior Services, **Helium** has not been tested for its ability to affect reproduction.

Other Effects

- ▶ **Helium** has not been tested for other chronic (long-term) health effects.

Medical

Medical Testing

There is no special test for this chemical. However, seek medical attention if illness occurs or overexposure is suspected.

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).

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:

- ▶ Specific engineering controls are required for this chemical by OSHA. Refer to the OSHA Compressed Gases Standard (29 CFR 1910.101).
- ▶ Before entering a confined space where **Helium** is present, check to make sure sufficient *Oxygen* (19.5%) exists.
- ▶ Fill and utilize gas cylinders in forced ventilated areas or in hoods with forced ventilation or use outdoors.

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 **Helium**. 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.
- ▶ Where exposure to cold equipment, vapors, or liquid may occur, employees should be provided with special clothing designed to prevent the freezing of body tissues.
- ▶ Use gloves resistant to tears.
- ▶ All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

Eye Protection

- ▶ Wear non-vented, impact resistant goggles when working with fumes, gases, or vapors.
- ▶ If additional protection is needed for the entire face, use in combination with a face shield. Never use a face shield without another type of eye protection.

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).

- ▶ Exposure to **Helium** is dangerous because it can replace *Oxygen* and lead to suffocation. Only NIOSH approved self-contained breathing apparatus with a full facepiece operated in the positive pressure mode should be used in *Oxygen* deficient environments.

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. **Helium** itself does not burn.
- ▶ CONTAINERS MAY RUPTURE OR BURST IN FIRE.
- ▶ Use water spray to keep fire-exposed containers cool.
- ▶ WATER may cause heavy icing and WARM WATER will greatly increase the evaporation rate of **Helium**. A dense fog or cloud may result.

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 **Helium** is leaked, take the following steps:

- ▶ Evacuate personnel and secure and control entrance to the area.
- ▶ Ventilate area of leak to disperse the gas.
- ▶ Stop flow of gas. If source of leak is a cylinder and the leak cannot be stopped in place, remove the leaking cylinder to a safe place in the open air, and repair leak or allow cylinder to empty.
- ▶ *Liquid Helium*, when exposed to the atmosphere, will produce a cloud of ice or fog.
- ▶ It may be necessary to contain and dispose of **Helium** 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 **Helium** you should be trained on its proper handling and storage.

- ▶ Store in tightly closed containers in a cool, well-ventilated area away from SUNLIGHT and HEAT.
- ▶ *Liquid Helium* should be stored and transferred under positive pressure to prevent infiltration of air and other gases.
- ▶ Store at temperatures less than 125°F (52°C).
- ▶ Ensure that ice does not form around cylinder neck as the ice may cause the pressure valve to fail.

Occupational Health Services 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.nj.gov
Web address:
[http://www.state.nj.us/health/workplacehealthandsafety/
right-to-know/](http://www.state.nj.us/health/workplacehealthandsafety/right-to-know/)

***The Right to Know Hazardous Substance Fact Sheets
are not intended to be copied and sold
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.

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.

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 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/m³ 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: **HELIUM**

Synonyms: None

CAS No: 7440-59-7

Molecular Formula: He

RTK Substance No: 0972

Description: Colorless, odorless gas or liquid

HAZARD DATA

Hazard Rating	Firefighting	Reactivity
<p>3 (liquid) - Health 1 (gas) - Health</p> <p>0 - Fire</p> <p>0 - Reactivity</p> <p>DOT#: UN 1046 (Compressed Gas) UN 1963 (Cryogenic liquid)</p> <p>ERG Guide #: 121 (Compressed Gas) 120 (Cryogenic liquid)</p> <p>Hazard Class: 2.2 (Non-flammable Gas)</p>	<p>Extinguish fire using an agent suitable for type of surrounding fire. Helium itself does not burn.</p> <p>CONTAINERS MAY RUPTURE OR BURST IN FIRE.</p> <p>Use water spray to keep fire-exposed containers cool.</p>	<p>Protect from HEAT and SUNLIGHT.</p> <p>Water applied directly to leak may cause ice and a dense fog or cloud.</p>

SPILL/LEAKS

Isolation Distance: 100 meters (330 feet)

No adverse effect to plant life.

PHYSICAL PROPERTIES

Odor Threshold: Odorless
Flash Point: Non-flammable
Relative Density: 0.138 (air = 1)
Vapor Pressure: No information
Water Solubility: Very slightly soluble
Boiling Point: -452°F (-269°C)
Melting Point: -458°F (-272.2°C)

EXPOSURE LIMITS

OSHA: Maintain Oxygen Level above 19.5%

ACGIH: Simple Asphyxiant

IDLH LEVEL: N/A

PROTECTIVE EQUIPMENT

Gloves: Resistant to tears and cold
Coveralls: Insulating materials
Boots: No information
Respirator: < 19.5% Oxygen - SCBA

HEALTH EFFECTS

Eyes: Contact with liquid - causes frostbite

Skin: Contact with liquid - causes frostbite

Acute: Headache, dizziness, lightheadedness, passing out, suffocation from lack of Oxygen, and death

Chronic: No information

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.

For skin contact, immerse affected part in warm water.

Transfer to a medical facility.