



Right to Know Hazardous Substance Fact Sheet

Common Name: **LITHIUM**

Synonym: None

Chemical Name: Lithium

Date: November 1999 Revision: June 2008

CAS Number: 7439-93-2

RTK Substance Number: 1119

DOT Number: UN 1415

Description and Use

Lithium is a soft, silver to grayish-white (or yellow if exposed to air), odorless metal, crystalline mass or powder. It is used in the manufacture of storage batteries, heat transfer liquids and metal alloys. It is also used as a medication.

Reasons for Citation

- ▶ **Lithium** is on the Right to Know Hazardous Substance List because it is cited by DOT and NFPA.
- ▶ This chemical is on the Special Health Hazard Substance List.

SEE GLOSSARY ON PAGE 5.

FIRST AID

Eye Contact

- ▶ Quickly brush off excess chemical from the face. Immediately flush with large amounts of water for at least 60 minutes, lifting upper and lower lids. Remove contact lenses, if worn, while flushing. **DO NOT INTERRUPT FLUSHING.** Seek medical attention immediately.

Skin Contact

- ▶ Quickly remove contaminated clothing. Immediately blot or brush off excess chemical and wash gently with large amounts of water for at least 60 minutes. **DO NOT INTERRUPT WASHING.** Seek medical attention immediately.

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 overexposure, as pulmonary edema may be delayed.

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	-	3
FLAMMABILITY	-	2
REACTIVITY	-	2-W
COMBUSTIBLE AND REACTIVE MAY IGNITE SPONTANEOUSLY IN AIR POISONOUS GASES ARE PRODUCED IN FIRE CONTAINERS MAY EXPLODE IN FIRE DO NOT USE WATER		

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

- ▶ **Lithium** can affect you when inhaled.
- ▶ Contact can severely irritate and burn the skin and eyes.
- ▶ Inhaling **Lithium** can irritate the nose and throat.
- ▶ Inhaling **Lithium** can irritate the lungs. Higher exposures may cause a build-up of fluid in the lungs (pulmonary edema), a medical emergency.
- ▶ Exposure to **Lithium** can cause loss of appetite, nausea and vomiting.
- ▶ **Lithium** can cause headache, muscle weakness, loss of coordination, confusion, seizures and coma.
- ▶ **Lithium** may affect the thyroid gland, kidneys and heart function.
- ▶ **Lithium** is REACTIVE and a DANGEROUS EXPLOSION HAZARD.
- ▶ **Lithium** is CORROSIVE when in contact with MOISTURE or WATER.

Workplace Exposure Limits

No occupational exposure limits have been established for **Lithium**. However, it may pose a health risk. Always follow safe work practices.

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) 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 **Lithium**:

- ▶ Contact can severely irritate and burn the skin and eyes.
- ▶ Inhaling **Lithium** can irritate the nose and throat.
- ▶ Inhaling **Lithium** can irritate the lungs causing coughing and/or shortness of breath. Higher exposures may cause a build-up of fluid in the lungs (pulmonary edema), a medical emergency, with severe shortness of breath.
- ▶ Exposure to **Lithium** can cause loss of appetite, nausea, vomiting, diarrhea and abdominal pain.
- ▶ **Lithium** can cause headache, muscle weakness, twitching, blurred vision, loss of coordination, tremors, confusion, seizures and coma.

Chronic Health Effects

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

Cancer Hazard

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

Reproductive Hazard

- ▶ While **Lithium** has not been identified as a teratogen or a reproductive hazard, certain *Lithium compounds* have been determined to be teratogens and may also cause reproductive damage. **Lithium** should be handled WITH EXTREME CAUTION.

Other Effects

- ▶ High exposure can affect the thyroid gland function resulting in an enlarged thyroid (goiter).
- ▶ **Lithium** may affect kidney and heart function.

Medical

Medical Testing

Before beginning employment and at regular times after that, for frequent or potentially high exposures, the following are recommended:

- ▶ Blood tests for **Lithium** level
- ▶ Kidney function tests
- ▶ Thyroid function tests

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

- ▶ Consider chest x-ray after acute overexposure
- ▶ EKG

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

- ▶ Smoking can cause heart disease, 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 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:

- ▶ Before entering a confined space where **Lithium** may be present, check to make sure that an explosive concentration does not exist.

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 **Lithium**. 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 Butyl, Nitrile, Neoprene and Silver Shield®/4H® for gloves and DuPont Tyvek®, or the equivalent, as protective material for clothing.
- ▶ 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 a face shield along with goggles when working with corrosive, highly irritating or toxic substances.
- ▶ Do not wear contact lenses when working with this substance.

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, use a NIOSH approved air-purifying, particulate filter respirator with an N95 filter. More protection is provided by a full facepiece respirator than by a half-mask respirator, and even greater protection is provided by a powered-air purifying respirator.
- ▶ Leave the area immediately if (1) while wearing a filter or cartridge respirator you can smell, taste, or otherwise detect **Lithium**, (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 for high exposure 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).

- ▶ **Lithium** is a COMBUSTIBLE SOLID which is WATER REACTIVE and the *powder* or *dust* may SPONTANEOUSLY IGNITE in AIR.
- ▶ Use a Class D, dry sand, Met-L-X powder, graphite, or Lith-X powder as extinguishing agents.
- ▶ DO NOT USE WATER, foam, CO₂, or halogenated extinguishing agents.
- ▶ POISONOUS GASES ARE PRODUCED IN FIRE, including *Lithium Dioxide* and *Lithium Hydroxide*.
- ▶ CONTAINERS MAY EXPLODE IN FIRE.
- ▶ Use water spray to keep fire-exposed containers cool.
- ▶ DO NOT get water inside containers.
- ▶ FIRE MAY RESTART AFTER IT HAS BEEN EXTINGUISHED.

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 **Lithium** is spilled, take the following steps:

- ▶ Evacuate personnel and secure and control entrance to the area.
- ▶ Eliminate all ignition sources.
- ▶ Collect powdered material in the most convenient and safe manner and deposit in sealed containers. May explode in air.
- ▶ DO NOT USE WATER OR WET METHOD.
- ▶ DO NOT wash into sewer.
- ▶ Ventilate and wash area after clean-up is complete.
- ▶ Keep **Lithium** out of confined spaces, such as sewers, because of the possibility of an explosion.
- ▶ It may be necessary to contain and dispose of **Lithium** 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 **Lithium** you should be trained on its proper handling and storage.

- ▶ *Finely divided Lithium particles, powder or dust* may IGNITE SPONTANEOUSLY in AIR.
- ▶ **Lithium** reacts violently with MOISTURE, WATER or STEAM to produce heat and flammable and explosive *Hydrogen gas* and toxic *Lithium Hydroxide*.
- ▶ **Lithium** reacts violently with OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE); COMBUSTIBLES; HALOGENATED HYDROCARBONS; ALCOHOLS; METALS; METAL ALLOYS; METAL SALTS; STRONG ACIDS (such as HYDROCHLORIC, SULFURIC and NITRIC); REDUCING AGENTS (such as SODIUM, ALUMINUM and their HYDRIDES) and many other substances.
- ▶ Store in tightly closed containers in a cool, well-ventilated area.
- ▶ Sources of ignition, such as smoking and open flames, are prohibited where **Lithium** is used, handled, or stored.
- ▶ Use explosion-proof electrical equipment and fittings wherever **Lithium** is used, handled, manufactured, or stored.
- ▶ Use only non-sparking tools and equipment, especially when opening and closing containers of **Lithium**.

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>

***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.

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/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: **LITHIUM**

Synonym: None

CAS No: 7439-93-2

Molecular Formula: Li

RTK Substance No: 1119

Description: Soft, silver to grayish-white (or yellow if exposed to air), odorless metal, crystalline mass or powder

HAZARD DATA

Hazard Rating	Firefighting	Reactivity
3 - Health 2 - Fire 2-W - Reactivity DOT#: UN 1415 ERG Guide #: 138 Hazard Class: 4.3 (Water Reactive/ Dangerous when wet)	Lithium is a COMBUSTIBLE SOLID which is WATER REACTIVE and the powder or dust may SPONTANEOUSLY IGNITE in AIR. Use a Class D, dry sand, Met-L-X powder, graphite, or Lith-X powder as extinguishing agents. DO NOT USE WATER, foam, CO ₂ , or halogenated extinguishing agents. POISONOUS GASES ARE PRODUCED IN FIRE, including <i>Lithium Dioxide</i> and <i>Lithium Hydroxide</i> . CONTAINERS MAY EXPLODE IN FIRE. Use water spray to keep fire-exposed containers cool. DO NOT get water inside containers. FIRE MAY RESTART AFTER IT HAS BEEN EXTINGUISHED.	Finely divided Lithium particles, powder or dust may IGNITE SPONTANEOUSLY in AIR. Lithium reacts violently with MOISTURE, WATER or STEAM to produce heat and flammable and explosive Hydrogen gas and toxic Lithium Hydroxide. Lithium reacts violently with OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE); COMBUSTIBLES; HALOGENATED HYDROCARBONS; ALCOHOLS; METALS; METAL ALLOYS; METAL SALTS; STRONG ACIDS (such as HYDROCHLORIC, SULFURIC and NITRIC); REDUCING AGENTS (such as SODIUM, ALUMINUM and their HYDRIDES) and many other substances.

SPILL/LEAKS
Isolation Distance:

Spills: 25 meters (75 feet)

Fire: 800 meters (1/2 mile)

Collect powdered material in the most convenient and safe manner and deposit in sealed containers.

DO NOT USE WATER OR WET METHOD.

DO NOT wash into sewer.

Keep Lithium out of confined spaces, such as sewers, because of the possibility of an explosion.

EXPOSURE LIMITS

No occupational exposure limits have been established for Lithium.

HEALTH EFFECTS
Eyes: Severe irritation and burns

Skin: Severe irritation and burns

Inhalation: Nose, throat and lung irritation with coughing and severe shortness of breath (pulmonary edema)

Headache, muscle weakness, confusion and seizures

PHYSICAL PROPERTIES

Odor Threshold:	Odorless
Flash Point:	354°F (179°C)
Auto Ignition Temp:	354°F (179°C)
Vapor Pressure:	1 mm Hg at 1,333°F (723°C)
Specific Gravity:	0.53 (water = 1)
Water Solubility:	Reactive
Boiling Point:	2,448°F (1,342°C)
Melting Point:	357°F (181°C)
Molecular Weight:	6.94

PROTECTIVE EQUIPMENT

Gloves:	Butyl, Nitrile, Neoprene, and Silver Shield®/4H®
Coveralls:	DuPont Tyvek®
Respirator:	Low levels - APR with High efficiency filter

FIRST AID AND DECONTAMINATION
Remove the person from exposure.

Quickly brush off excess chemical from the face. Immediately flush with large amounts of water for at least 60 minutes, lifting upper and lower lids. Remove contact lenses, if worn, while flushing. DO NOT INTERRUPT FLUSHING. Seek medical attention immediately.

Quickly remove contaminated clothing. Immediately blot or brush off excess chemical and wash gently with large amounts of water for at least 60 minutes. DO NOT INTERRUPT WASHING. Seek medical attention immediately.

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

Transfer to a medical facility.

Medical observation is recommended as symptoms may be delayed.