Right to Know

Hazardous Substance Fact Sheet

Common Name: **CESIUM HYDROXIDE**

Synonyms: Cesium Hydrate; Cesium Hydroxide Dimer

Chemical Name: Cesium Hydroxide

Date: August 1998 Revision: August 2007

CAS Number: 21351-79-1

RTK Substance Number: 0354

DOT Number: UN 2682 (Solid)
UN 2681 (Solution)

EMERGENCY RESPONDERS >>>> SEE BACK PAGE

Description and Use

Cesium Hydroxide is a colorless or yellowish crystalline (sand-like) solid which is used or transported in a solution. It is used as a catalyst, as an electrolyte for storage batteries and in color photography.

Hazard Summary

Hazard Rating	NJDOH	NFPA
HEALTH	3	-
FLAMMABILITY	0	-
REACTIVITY	1	-

CORROSIVE
DO NOT USE WATER
POISONOUS GASES ARE PRODUCED IN FIRE
CONTAINERS MAY EXPLODE IN FIRE

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

- **Cesium Hydroxide** can affect you when inhaled.
- Contact can severely irritate and burn the skin and eyes with possible eye damage.
- Inhaling **Cesium Hydroxide** can irritate the nose and throat.
- Inhaling **Cesium Hydroxide** can irritate the lungs. Higher exposures may cause a build-up of fluid in the lungs (pulmonary edema), a medical emergency.
- Contact with WATER or MOISTURE will give off enough heat to ignite COMBUSTIBLES.

Reasons for Citation

- **Cesium Hydroxide** is on the Right to Know Hazardous Substance List because it is cited by ACGIH, DOT and NIOSH.
- 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 cool water for at least 30 minutes, 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 water. 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

Workplace Exposure Limits

NIOSH: The recommended airborne exposure limit (REL) is **2 mg/m^3** averaged over a 10-hour workshift.

ACGIH: The threshold limit value (TLV) is **2 mg/m^3** averaged over an 8-hour workshift.

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 **Cesium Hydroxide**:

- Contact can severely irritate and burn the skin and eyes with possible eye damage.
- Inhaling **Cesium Hydroxide** can irritate the nose and throat.
- Inhaling **Cesium Hydroxide** 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.

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

Cancer Hazard
- According to the information presently available to the New Jersey Department of Health, **Cesium Hydroxide** 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, **Cesium Hydroxide** has not been tested for its ability to affect reproduction.

Other Effects
- **Cesium Hydroxide** can irritate the lungs. Repeated exposure may cause bronchitis to develop with coughing, phlegm, and/or shortness of breath.

Medical

Medical Testing
For frequent or potentially high exposure (half the TLV or greater), the following are recommended before beginning work and at regular times after that:

- Lung function tests

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

- Consider chest x-ray after acute overexposure

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, 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.
- Use a vacuum or a wet method to reduce dust during clean-up. DO NOT DRY SWEEP.

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 **Cesium Hydroxide**. 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 Rubber*, *Nitrile*, *Neoprene*, *Natural Rubber*, and *VITON*® gloves as protection for *corrosive bases* in solution, and DuPont *Tychem® SP*, *Polycoat*, *QC*, *CPF-1*, *SL* and *CPF-2* as protective materials for *inorganic acids* and *bases*.
- All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

Eye Protection

- Wear dust proof goggles and face shield unless full face respirator is worn.
- Wear indirect-vent, impact and splash resistant goggles when working with liquids.
- 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.
- 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 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).

- The filter classifications of dust/mist/fume, paint spray or pesticide prefilters, and filters for radon daughters, have been replaced with the N, R, and P series. Each series has three levels of filtering efficiency: 95%, 99%, and 99.9%.
- Where the potential exists for exposure over **2 mg/m^3**, use a NIOSH approved negative pressure, 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 **Cesium Hydroxide**, (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 exists for exposure over **20 mg/m^3**, 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).

- Extinguish fire using an agent suitable for type of surrounding fire. **Cesium Hydroxide** itself does not burn.
- POISONOUS GASES ARE PRODUCED IN FIRE.
- CONTAINERS MAY EXPLODE IN FIRE.
- Use water spray only to keep fire-exposed containers cool. DO NOT get water inside containers as **Cesium Hydroxide** will react with WATER or MOISTURE to produce enough heat to ignite COMBUSTIBLES.

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 **Cesium Hydroxide** 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.
- Absorb liquids in vermiculite or dry sand, and deposit in sealed containers.
- Ventilate area after clean-up is complete.
- DO NOT USE WATER.
- It may be necessary to contain and dispose of **Cesium Hydroxide** 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 **Cesium Hydroxide** you should be trained on its proper handling and storage.

- **Cesium Hydroxide** will react with WATER or MOISTURE to generate enough heat to ignite COMBUSTIBLES.
- **Cesium Hydroxide** may react violently with OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE) and STRONG ACIDS (such as HYDROCHLORIC, SULFURIC and NITRIC); and is not compatible with CARBON DIOXIDE and OXYGEN.
- **Cesium Hydroxide** attacks many METALS (such as TIN, LEAD, ALUMINUM and ZINC) to form flammable and explosive gases.
- Store in tightly closed containers in a cool, well-ventilated area away from COMBUSTIBLES.
- **Cesium Hydroxide** should be used in a chemical fume hood.

Occupational Health Services 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

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 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^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.

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.

Right to Know Hazardous Substance Fact Sheet

Emergency Responders Quick Reference

Common Name: **CESIUM HYDROXIDE**

Synonyms: Cesium Hydrate; Cesium Hydroxide Dimer
CAS No: 21351-79-1
Molecular Formula: (Cs(OH))
RTK Substance No: 0354
Description: Colorless to yellow, crystalline solid, which absorbs moisture from the air and is often in solution. It is a very strong base.

HAZARD DATA

Hazard Rating

3 - Health
0 - Fire
1 - Reactivity

DOT#:

UN 2682 (Solid)
UN 2681 (Solution)

ERG Guide #:

157 (Solid)
154 (Solution)

Hazard Class: 8

(Corrosive)

Firefighting

Extinguish fire using an agent suitable for type of surrounding fire. **Cesium Hydroxide** itself does not burn.

POISONOUS GASES ARE PRODUCED IN FIRE.

CONTAINERS MAY EXPLODE IN FIRE.

Use water spray only to keep fire-exposed containers cool.

DO NOT get water inside containers.

Reactivity

Cesium Hydroxide will react with WATER or MOISTURE to generate enough heat to ignite COMBUSTIBLES.

Cesium Hydroxide may react violently with OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE) and STRONG ACIDS (such as HYDROCHLORIC, SULFURIC and NITRIC); and is not compatible with CARBON DIOXIDE and OXYGEN.

Cesium Hydroxide attacks many METALS (such as TIN, LEAD, ALUMINUM and ZINC) to form flammable and explosive gases.

SPILL/LEAKS

Isolation Distance: 25 meters (75 feet) for solids
50 meters (150 feet) for liquids

Sweep up solid spills.
Absorb liquid spills with vermiculite or dry sand.

PHYSICAL PROPERTIES

Odor Threshold: No information
Flash Point: Not combustible
Specific Gravity: 3.68 g/cm^3
Vapor Pressure: 0 mm Hg at 68^{o}F (20^{o}C)
Water Solubility: Soluble/Reactive
Melting Point: 522^{o}F (272^{o}C)

EXPOSURE LIMITS

OSHA: N/A
NIOSH: 2 mg/m^3, 10-hr TWA
ACGIH: 2 mg/m^3, 8-hr TWA
IDLH LEVEL: N/A

PROTECTIVE EQUIPMENT

Gloves: Butyl Rubber, Nitrile, Neoprene, Natural Rubber or VITON® for *corrosive bases* in *solution*

Coveralls: DuPont *Tychem*® SP, Polycoat, QC, CPF-1, SL and CPF-2 for *inorganic acids* and *bases*

Boots: Butyl, Neoprene

Respirator: >2 mg/m^3 APR with High Efficiency filters
>20 mg/m^3 Supplied Air

HEALTH EFFECTS

Eyes: Irritation and burns

Skin: Irritation and burns

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

Chronic: Bronchitis with coughing, phlegm and shortness of breath

FIRST AID AND DECONTAMINATION

Remove the person from exposure.

Flush eyes with large amounts of water for at least 30 minutes. Remove contact lenses if worn. Seek medical attention immediately.

Quickly remove contaminated clothing. Wash contaminated skin with large amounts of water. 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.