Right to Know

Hazardous Substance Fact Sheet

Common Name: **POTASSIUM HYDROGEN FLUORIDE**

Synonyms: Potassium Bifluoride; Potassium Hydrogen Fluoride

Chemical Name: Potassium Fluoride

Date: August 1999 Revision: June 2008

CAS Number: 7789-29-9

RTK Substance Number: 1568

DOT Number: UN 1811

EMERGENCY RESPONDERS >>>> SEE BACK PAGE

Description and Use

Potassium Hydrogen Fluoride is a colorless to white, crystalline substance. It is used as a wood preservative, in metal treatment, as a welding and soldering agent and chemical intermediate, and as a precursor for the production of nerve agents (such as *Sarin*).

Reasons for Citation

- **Potassium Hydrogen Fluoride** is on the Right to Know Hazardous Substance List because it is cited by DOT.
- 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 30 minutes, lifting upper and lower lids. Remove contact lenses, if worn, while flushing. Seek medical attention immediately.

Skin Contact

- Immediately flush with large amounts of water. Continue flushing while removing clothing. Apply 2.5% *Calcium Gluconate* gel to the affected skin. Massage the gel into the skin while wearing rubber gloves. Continue to reapply and massage until pain is entirely relieved. Seek medical assistance 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

Hazard Summary

Hazard Rating	NJDOH	NFPA
HEALTH	3	-
FLAMMABILITY	0	-
REACTIVITY	0	-
CORROSIVE POISONOUS GASES ARE PRODUCED IN FIRE		

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

- **Potassium Hydrogen Fluoride** can affect you when inhaled.
- **Potassium Hydrogen Fluoride** is a CORROSIVE chemical and contact can severely irritate and burn the skin and eyes with possible eye damage.
- Inhaling **Potassium Hydrogen Fluoride** can irritate the nose and throat.
- Inhaling **Potassium Hydrogen Fluoride** can irritate the lungs. Higher exposures may cause a build-up of fluid in the lungs (pulmonary edema), a medical emergency.
- Exposure to **Potassium Hydrogen Fluoride** can cause headache, nausea and vomiting.
- Very high exposure to **Potassium Hydrogen Fluoride** can cause the deposit of *Fluoride* in the bones and teeth, a condition called *Fluorosis*. This may cause pain, disability and mottling of the teeth.
- The above health effects do NOT occur at the level of *Fluoride* used in water for preventing cavities in teeth.

Workplace Exposure Limits

The following exposure limits are for *Hydrogen Fluoride* (measured as *Fluorine*):

OSHA: The legal airborne permissible exposure limit (PEL) for is **2.5 mg/m^3** averaged over an 8-hour workshift.

NIOSH: The recommended airborne exposure limit (REL) is **2.5 mg/m^3** averaged over a 10-hour workshift and **5 mg/m^3**, not to be exceeded during any 15-minute work period.

ACGIH: The threshold limit value (TLV) is **0.4 mg/m^3** averaged over an 8-hour workshift and **1.7 mg/m^3**, not to be exceeded during any part of the working 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) 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 **Potassium Hydrogen Fluoride**:

- Contact can severely irritate and burn the skin and eyes with possible eye damage.
- Inhaling **Potassium Hydrogen Fluoride** can irritate the nose and throat.
- Inhaling **Potassium Hydrogen Fluoride** 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 **Potassium Hydrogen Fluoride** can cause headache, nausea and vomiting.

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

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

Other Effects
- Very high exposure to **Potassium Hydrogen Fluoride** can cause the deposit of *Fluoride* in the bones and teeth, a condition called *Fluorosis*. This may cause pain, disability and mottling of the teeth.
- **Potassium Hydrogen Fluoride** can irritate the lungs. Repeated exposure may cause bronchitis to develop with coughing, phlegm, and/or shortness of breath.

Medical

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

- Consider chest x-ray after acute overexposure
- *Fluoride* levels in urine higher than **4 mg/liter** indicate 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
- 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:

- Use a vacuum 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 **Potassium Hydrogen Fluoride**. 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 Neoprene and Polyvinyl Chloride gloves for *solid* **Potassium Hydrogen Fluoride** and Silver Shield®/4H® as glove material for *Hydrogen Fluoride gas*. DuPont Tychem® Polycoat, CPF 1, QC, CPF 2, and SL, or the equivalent, are recommended as protective materials for *solid* **Potassium Hydrogen Fluoride**; DuPont Tychem® Responder® and TK, and Saint-Gobain CHALLENGE ULTRAPRO® Vapor fabrics are recommended for *Hydrogen Fluoride gas*.
- All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

Eye Protection

- For *solid* **Potassium Hydrogen Fluoride** wear eye protection with side shields or goggles.
- Wear non-vented, impact resistant goggles when working with fumes, gases, or vapors.
- Wear a face shield along with goggles when working with corrosive, highly irritating or toxic substances.

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 overexposure to *solid* **Potassium Hydrogen Fluoride**, use a NIOSH approved full facepiece air-purifying respirator with cartridges specific for *Hydrogen Fluoride* with high efficiency particulate pre-filters. 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 **Potassium Hydrogen Fluoride**, (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 overexposure to *Fluorine* or *Hydrogen Fluoride gas* 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.
- Exposure to **25 mg/m^3** (as *Hydrogen Fluoride*) is immediately dangerous to life and health. If the possibility of exposure above **25 mg/m^3** 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. **Potassium Hydrogen Fluoride** itself does not burn.
- Use WATER with care as heat will be released.
- POISONOUS GASES ARE PRODUCED IN FIRE, including *Hydrogen Fluoride, Potassium Hydroxide and Potassium Fluoride.*

- Use water spray to keep fire-exposed containers cool. DO NOT get water inside containers.
- **Potassium Hydrogen Fluoride** may ignite combustibles (wood, paper and oil).

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 **Potassium Hydrogen Fluoride** 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.
- Ventilate and wash area after clean-up is complete.
- DO NOT wash into sewer.
- It may be necessary to contain and dispose of **Potassium Hydrogen Fluoride** 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 **Potassium Hydrogen Fluoride** you should be trained on its proper handling and storage.

- **Potassium Hydrogen Fluoride** may be corrosive to METALS in the presence of WATER, MOISTURE or HIGH HUMIDITY and may release flammable and explosive *Hydrogen gas*.
- **Potassium Hydrogen Fluoride** is not compatible with STRONG ACIDS (such as HYDROCHLORIC, SULFURIC and NITRIC) and STRONG BASES (such as SODIUM HYDROXIDE and POTASSIUM HYDROXIDE).
- Do not allow **Potassium Hydrogen Fluoride** to contact SILICA-CONTAINING MATERIALS (such as GLASS, CEMENT and PORCELAIN).
- Store in tightly closed containers in a cool, dry, well-ventilated area.

Occupational Health Information Resources

The New Jersey Department of 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.

Acute Exposure Guideline Levels (AEGLs) 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^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: **POTASSIUM HYDROGEN FLUORIDE**

Synonyms: Potassium Bifluoride
CAS No: 7789-29-9
Molecular Formula: F_2HK
RTK Substance No: 1568
Description: Colorless to white, crystalline substance

HAZARD DATA

Hazard Rating	Firefighting	Reactivity
3 - Health **0 - Fire** **0 - Reactivity** **DOT#:** UN 1811 **ERG Guide #:** 154 **Hazard Class:** 8 (Corrosive)	Extinguish fire using an agent suitable for type of surrounding fire. **Potassium Hydrogen Fluoride** itself does not burn. Use WATER with care as heat will be released. POISONOUS GASES ARE PRODUCED IN FIRE, including *Hydrogen Fluoride*, *Potassium Hydroxide* and *Potassium Fluoride*. Use water spray to keep fire-exposed containers cool. DO NOT get water inside containers. **Potassium Hydrogen Fluoride** may ignite combustibles (wood, paper and oil).	**Potassium Hydrogen Fluoride** may be corrosive to METALS in the presence of WATER, MOISTURE or HIGH HUMIDITY and may release flammable and explosive *Hydrogen gas*. **Potassium Hydrogen Fluoride** is not compatible with STRONG ACIDS (such as HYDROCHLORIC, SULFURIC and NITRIC) and STRONG BASES (such as SODIUM HYDROXIDE and POTASSIUM HYDROXIDE). Do not allow **Potassium Hydrogen Fluoride** to contact SILICA-CONTAINING MATERIALS (such as GLASS, CEMENT and PORCELAIN).

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 wash into sewer.

May affect aquatic life.

PHYSICAL PROPERTIES

Odor Threshold:	Slightly pungent
Flash Point:	Nonflammable
Vapor Pressure:	1 mm Hg at 1,625°F (885°C)
Specific Gravity:	2.37 (water = 1)
Water Solubility:	Soluble
Boiling Point:	Decomposes
Melting Point:	437°F (225°C)
Molecular Weight:	78.1

EXPOSURE LIMITS

OSHA:	2.5 mg/m^3, 8-hr TWA
NIOSH:	2.5 mg/m^3, 10-hr TWA; 5 mg/m^3, 15-min Ceiling
ACGIH:	0.4 mg/m^3, 8-hr TWA; 1.7 mg/m^3, 15-min STEL
IDLH:	25 mg/m^3

(All of the above are for *Hydrogen Fluoride*)

PROTECTIVE EQUIPMENT

Gloves: Neoprene and Polyvinyl Chloride for *solid* **Potassium Hydroxide Fluoride** and Silver Shield®/4H® for *Hydrogen Fluoride gas*

Coveralls: DuPont Tychem® Polycoat, CPF 1, QC, CPF 2 and SL, for *solid* **Potassium Hydrogen Fluoride**; DuPont Tychem® Responder® and TK and Saint-Gobain CHALLENGE ULTRAPRO® Vapor for *Hydrogen Fluoride gas*

Respirator: For *solid* **Potassium Hydrogen Fluoride** - full facepiece APR with cartridges specific for *Hydrogen Fluoride* with High efficiency particulate pre-filters
Use Supplied Air or SCBA if there is a potential for exposure to *Fluorine* or *Hydrogen Fluoride*.

HEALTH EFFECTS

Eyes:	Severe irritation and burns
Skin:	Severe irritation and burns
Inhalation:	Nose, throat and lung irritation with coughing and shortness of breath (pulmonary edema) Headache, nausea and vomiting

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.

Immediately flush with large amounts of water. Continue flushing while removing clothing. Apply 2.5% *Calcium Gluconate* gel to the affected skin. Seek medical assistance 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.