

Potassium Bifluoride

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Material Safety Data Sheet

Chemical: Potassium Bifluoride

NFPA: H=3 F=0 I=0 S=None

HMIS: H=3 F=0 R=0 PPE= Supplied by user;
dependent on conditions

MSDS Number: KBF-1103

Effective Date: 14 November 2003

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1. Company and Product Identification

1.1 Product Name: Potassium Bifluoride

Chemical Name: Potassium bifluoride

Synonyms: Potassium hydrogen fluoride

Chemical Formula: KF•HF

Molecular Weight: 78

CAS Number: 7789-29-9

EINECS Number: 232-156-2

Grade/Trade Names: None

1.2 Recommended Uses: Chemical industry; metal treatment; welding and soldering agents; Intermediates

1.3 Supplier: Solvay Fluorides, LLC
PO BOX 27328 Houston, TX 77227-7328
3333 Richmond Ave. Houston, Texas 77098

1.4 Emergency Telephone Numbers

Emergencies (USA): 1-800-424-9300 (CHEMTREC®)

Transportation Emergencies (INTERNATIONAL/MARITIME): 1-703-527-3887 (CHEMTREC®)

Transportation Emergencies (CANADA): 1-613-996-6666 (CANUTEC)

Transportation Emergencies (MEXICO-SETIQ): 01-800-00-214-00 (MEX. REPUBLIC)
525-559-1588 (Mexico City and metro area)



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2. Composition/Information on Ingredients

INGREDIENTS	FORMULA	WT. PERCENT	CAS #
Potassium bifluoride	KF•HF	Ca. 99	7789-29-9

3. Hazards Identification

Emergency Overview:

- Corrosive product, hazardous to human health.
- Presents hazards from its ionizing fluorine.
- In case of decomposition, releases hydrogen fluoride.
- Hazardous product for the aquatic environment.

3.1 Route of Entry: Inhalation: Yes Skin: Yes Ingestion: Yes

3.2 Potential Effects of exposure:

- Corrosive to mucous membranes, eyes, and skin.
- Risk of cardiac and nervous disorders.
- The seriousness of the lesion and the prognosis of intoxication depend directly on the concentration and duration of exposure.
- Chronic exposure to the product can cause bone fluorosis.

Inhalation:

- Severe irritation of the nose and throat.
- Spasmodic cough and difficulty in breathing.
- At high concentrations, risk of chemical pneumonitis, pulmonary edema.
- At high concentrations, risk of hypocalcemia with nervous problems (tetany) and cardiac arrhythmia.
- In the case of repeated or prolonged exposure: risk of sore throat, nosebleeds, chronic bronchitis.

Eyes:

- Severe eye irritation, watering, redness and swelling of the eyelids.
- Burns.
- Risk of serious or permanent eye lesions or blindness.

Skin contact:

- Painful irritation, delayed appearance.
- Risk of severe burns; slow healing.
- Risk of shock.
- If fingernails are touched, severe pain after several hours.
- Risk of hypocalcemia depending the extent of the lesions.

Ingestion:

- Severe irritation, burns, perforation of the gastrointestinal tract accompanied by shock.
- Risk of throat edema and suffocation.
- Nausea, vomiting (bloody), abdominal cramps and diarrhea (bloody).
- Cough and difficulty breathing.
- Risk of hypocalcemia with nervous disorders (tetany) and cardiac rhythm disorders.
- Risk of convulsions, loss of consciousness, deep coma and cardiopulmonary arrest.
- Risk of general symptoms having a severe prognosis.

Carcinogenicity: See section 11.3.

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4. First-Aid Measures

4.1 General Recommendations:

Inhalation:

- Remove the subject from the contaminated area as soon as possible; transport him/her lying down, with the head higher than the body, to a quiet, uncontaminated and well-ventilated location.
- Administer oxygen or cardiopulmonary resuscitation if necessary.
- Keep warm (blanket).
- Consult a physician in all cases.
- Take to a hospital.

Eyes:

- Consult an ophthalmologist immediately in all cases.
- Take to a hospital immediately.
- Flush eyes as soon as possible with running water for 15 minutes, while keeping the eyelids wide open.
- Rinse the eyes with calcium gluconate (1% solution in physiological serum) (10 ml of calcium gluconate 10% in 90 ml of physiological serum).
- In case of difficulty opening the lids, administer an analgesic eyewash (oxybuprocaine).

Skin:

- Remove contaminated shoes, socks and clothing, under the shower if necessary; wash the affected skin with running water.
- Immediately apply calcium gluconate gel (2.5%) and massage into the affected area using rubber gloves; continue to massage while repeatedly applying gel until 15 minutes after pain is relieved.
- If fingers/fingernails are touched, even if there is no pain, dip them in a bath of 5% calcium gluconate for 15 to 20 minutes.
- Keep warm (blanket); provide clean clothing.
- Consult a physician in all cases.

Ingestion:

General recommendations:

- Consult a physician immediately in all cases.
- Take to a hospital immediately.

If the subject is completely conscious:

- Rinse mouth with fresh water.
- Give a 1% aqueous calcium gluconate solution to drink.
- Do not induce vomiting.
- If the subject presents nervous, respiratory or cardiovascular disorders: administer oxygen.

If the subject is unconscious:

- NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON.
- Administer classical resuscitation measures.

4.2 Medical Treatment/Notes to Physician: See section 4.1.

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5. Fire-Fighting Measures

5.1 Flash point: Not applicable.

5.2 Auto-ignition Temperature: Not applicable.

5.3 Flammability Limits: Not applicable.

5.4 Unusual Fire and Explosion Hazards: None.

5.5 Extinguishing Methods:

Common: In case of fire in close proximity, all means of extinguishing are acceptable (subject to section below).

Inappropriate extinguishing means: No restriction.

5.6 Fire Fighting Procedures:

Specific hazards:

- Non-combustible/non-flammable, but may produce dangerous fumes if involved in fire.
- Formation of dangerous gas/vapors in case of decomposition (see section 10).
- Formation of flammable gas on contact with certain metals (see section 10).

Protective measures in case of intervention:

- Evacuate all non-essential personnel.
- Intervention only by capable personnel who are trained and aware of the hazards of the product.
- In all cases wear self-contained breathing apparatus.
- When intervention in close proximity, wear full protective acid-resistant suit.
- Protect intervention team with water spray when approaching the fire.
- After intervention, take a shower, remove clothing carefully, clean and check equipment.

Other precautions:

- If safe to do so, remove the exposed containers, or cool with large quantities of water.
- Approach from upwind.
- Disperse gas/vapors with water spray.
- After the fire, proceed rapidly to clean the surfaces exposed to the fumes in order to limit the damage to the equipment.
- As for any fire, ventilate and clean the rooms before reentry.

6. Accidental Release Measures

6.1 Precautions:

- Follow the protective measures given in section 8.
- Keep away materials and products which are incompatible with the product (see section 10).
- Avoid dispersing the dust into a cloud.

6.2 Cleanup methods:

- Collect the product with suitable means avoiding dust formation.
- Place everything into a closed, labeled container compatible with the product.
- For disposal methods, refer to section 13.
- Clean the area with large quantities of water

6.3 Precautions for protection of the environment:

- Immediately notify the appropriate authorities in case of significant discharge.
- Prevent discharges into the environment (sewers, rivers, soils, etc.).

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7. Handling and Storage

7.1 Handling:

- Use only equipment and materials which are compatible with the product.
- Keep away from reactive products (see section 10).
- Avoid heating the product above the decomposition temperature (see section 9).

7.2 Storage:

- Keep in original packaging, closed.
- Store in a ventilated, cool, dry area.
- Keep away from heat sources.

7.3 Specific Uses: See Section 1.2.

7.4 Other precautions:

- Avoid dust and formation of dust clouds.
- Follow the protective measures given in section 8.
- Warn people about the dangers of the product.

7.5 Packaging:

- Cardboard + PE.
- Paper + PE.

8. Exposure Controls/Personal Protection

8.1 Exposure Limit Values:

Authorized limit Values

TLV® ACGIH®-USA (2002)

OSHA PEL

Fluorides

2.5 mg/m³ (as F)

2.5 mg Fluoride/m³ as 8 hr TWA

ACGIH® and TLV® are registered trademarks of the American Conference of Governmental Industrial Hygienists.

8.2 Exposure Controls:

- Maintain employee exposures to levels below the applicable exposure limits.
- Follow the protective measures given in section 7.

8.2.1 Occupational Exposure Controls:

8.2.1.1 Ventilation:

- Provide local ventilation suitable for the product decomposition risk (see section 10).
- Provide local ventilation suitable for the dust risk.

8.2.1.2 Respiratory protection:

- Self-contained breathing apparatus in medium confinement/insufficient oxygen/in case of large uncontrolled emissions/in all circumstances when the mask and cartridge do not give adequate protection.
- Use only respiratory protection that conforms to international/national standards.

8.2.1.3 Hand protection: Protective gloves - chemical-resistant: PVC, neoprene, rubber.

8.2.1.4 Eye protection: Dustproof goggles obligatory.

8.2.1.5 Skin protection:

- Impervious overalls.
- Apron/boots of PVC, neoprene, rubber in all case of dusts.

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8.3 Other precautions:

- Do not smoke, eat, or drink in working area.
- Remove contaminated clothing immediately after work.
- Provide shower and eyewash stations.
- Consult the industrial hygienist or the safety manager for the selection of personal protective equipment suitable for the working conditions.

8.4 Other information: Respect local, state and federal regulations for aqueous emissions (see section 15).

9. Physical and Chemical Properties

9.1 Appearance: Crystalline, hygroscopic powder.

Color: White.

Odor: Slightly pungent.

9.2 Important Health, Safety and Environmental information:

pH: 1 - Concentration: 7.8 g/l @ 20°C (68°F).

Change of state:

Melting point: 225°C (437°F).

Boiling point: Decomposition.

Decomposition Temperature: > 400°C (> 750°F).

Flash Point: Not applicable.

Flammability: Not applicable.

Explosive Properties: No data.

Oxidizing Properties: Not applicable.

Vapor pressure: Not applicable.

Relative Density:

Specific gravity (H₂O=1): 2.37.

Solubility:

Water: 390 g/l @ 20°C (68°F). Dissolution with heat release.

Fat: No data.

Partition coefficient: Not applicable.

Viscosity: No data.

Vapor Density (air=1): Not applicable.

Evaporation Rate: Not applicable.

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10. Stability and Reactivity

Stability:

10.1 Conditions to avoid:

- Heating the product to its decomposition temperature (see section 9).
- Moisture.

10.2 Materials and substances to avoid:

- Strong acids.
- Strong bases.
- Silicate-containing materials (glass, cement, etc.).
- Metals.

10.3 Hazardous decomposition products:

- Hydrogen fluoride.
- Potassium hydroxide.
- Potassium fluoride.

10.4 Hazardous Polymerization: Will not occur.

10.5 Other information:

- Exothermic reaction when dissolved in water.
- Corrosive action on some metals when moisture is present.
- In presence of humidity, contact with metals releases hydrogen.

11. Toxicological Information

11.1 Acute toxicity:

Inhalation: No data.

Oral: LD₅₀, 160 mg/kg, rat.

Dermal: No data.

Irritation: Corrosive.

Sensitization: No data.

Comments:

- Toxic effect linked with corrosive properties.
- Chronic exposure may entail dental or skeletal fluorosis.
- The carcinogenic effect found in animals is not demonstrated in humans.
- Risk of toxic effect on reproduction.

11.2 Chronic toxicity:

- Oral route, after prolonged exposure, rat/mouse, Target organ: skeleton / thyroid / testes / kidney, liver, ca. 1 mg/kg, observed effect.
- Ambiguous mutagenic effect.
- Ambiguous carcinogenic effect.
- Foetotoxic and fertility effects.

11.3 Carcinogenic Designation: None.

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12. Ecological Information

12.1 Acute ecotoxicity:

- 10 mg KF•HF/l: pH = 3.9; 100 mg KF.HF/l: pH = 2.9.
- 10 mg HF/l: pH = 3.15; 100 mg HF/l: pH = 2.65.
- Fish, *Poecilia reticulata*, LC₅₀, 96 h, from 65-80 mg/l.
- Algae, *Scenedesmus* sp., LOEC, 110 mg/l.
- Fish, *Salmo gairdneri*, LC₅₀, 96 h, 51 mg/l (fluorides).
- Crustaceans, *Daphnia magna*, EC₅₀, 48 h, 97 mg/l; Conditions: fresh water (fluorides).
- Crustaceans, *Mysidopsis bahia*, EC₅₀, 96 h, 10.5 mg/l; Conditions: salt water (fluorides).
- Algae, *Scenedesmus* sp., EC₅₀, 96 h, 43 mg/l (fluorides).

12.2 Chronic ecotoxicity:

- Fish, *Salmo gairdneri*, LC₅₀, 21 days, from 2.7-4.7 mg/l (fluorides).
- Crustaceans, *Daphnia magna*, NOEC, 21 days, 3.7 mg/l (fluorides).

12.3 Mobility:

- Air - mobility as solid aerosols.
- Water - considerable solubility and mobility.
- Soil / sediments - adsorption on mineral soil constituents.
Conditions: slightly acid pH (Fluorides).

12.4 Degradation

Abiotic:

- Air - neutralization by natural alkalinity.
- Water / soil - ionization/neutralization.
- Water / Soil - complexation/precipitation of inorganic materials.
Degradation products: aluminum / iron / calcium / phosphate complexes and/or precipitates as a function of pH (fluorides).

Biotic: Not applicable (inorganic compound).

12.5 Potential for bioaccumulation:

- Bioconcentration: log Po/w - not applicable (ionizable inorganic compound).
- Result: accumulation into vegetable leaves (fluorides).

12.6 Other adverse effects /Comments:

- Harmful for aquatic organisms.
- Hazard for the aquatic environment is limited due to product properties: low chronic toxicity.
- Product is highly dependent on environmental conditions: pH, temperature, oxidoreductive potential, mineral and organic content of the medium.

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13. Disposal Considerations

13.1 Waste treatment: Consult current federal, state and local regulations regarding the proper disposal of this material.

13.2 Packaging treatment:

- Consult current federal, state and local regulations regarding the proper disposal of emptied containers.
- Rinse the empty containers with alkaline water and treat the effluent in the same way as waste.
- Dispose of the containers by dispatching them to an approved incineration facility for hazardous waste.

13.3 RCRA Hazardous Waste: Listed as D002 (Corrosive).

14. Transport Information

Mode	DOT	IMDG	IATA
UN Number	1811	1811	1811
Class (Subsidiary)	8	8	8
Proper Shipping Name	Potassium Bifluoride, Solid	Potassium Bifluoride, Solid	Potassium Bifluoride, Solid
Hazard label (Subsidiary)	8	Corrosive	Corrosive
Placard [Subsidiary]	Corrosive	1811	
Packing Group	II	II	II
Reportable Quantity			
MFAG			
Emergency Info	ERG: 154	EmS: 8-06	ERG Code: 8P

15. Regulatory Information

National Regulations (US)

TSCA Inventory 8(b): Yes.

SARA Title III Sec. 302/303 Extremely Hazardous Substances (40 CFR 355): No.

SARA Title III Sec. 311/312 (40 CFR 370):

Hazard Category: Acute and chronic health hazard.

Threshold planning quantity: 10,000 lbs.

SARA Title III Sec. 313 Toxic Chemical Emissions Reporting (40 CFR 372): No.

CERCLA Hazardous Substance (40 CFR Part 302):

Listed: No.

Unlisted Substance: Yes, Reportable Quantity 100 lbs.

Characteristic: D002 (Corrosive).

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State Component Listing:

State	Comment
CA	Airborne Contaminants & Emissions Inventory
CA	Hazardous Substance List
CT	Hazardous Materials Survey
IL	Toxic Substances Disclosure to Employees Act
IN	Occupational Health & Safety Standards - Air
KY	Occupational Health & Safety Standards - Air
MN	Hazardous Substance List
NJ	Right to Know Substances List
NC	Exposure limits for Air Contaminants
PA	Right to Know
RI	Right to Know

National Regulations (Canada)

Canadian DSL Registration: DSL.

WHMIS Classification: D2B - Toxic Material.

This product has been classified in accordance with the hazard criteria of the **Controlled Products Regulations**, and the MSDS contains all the information required by the **Controlled Products Regulations**.

Labeling according to Directive 1999/45/EC.

<u>Category</u>	<u>ID</u>	<u>Phrase</u>
Symbols	T	Toxic.
	C	Corrosive.
Phrases R	25	Toxic if swallowed.
	34	Causes burns.
Phrases S	22	Do not breathe dust.
	26	In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
	37	Wear suitable gloves.
	45	In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

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16. Other Information

16.1 Ratings:

NFPA (NATIONAL FIRE PROTECTION ASSOCIATION)

Health = 03 Flammability = 0 Instability = 0 Special = None

HMIS (HAZARDOUS MATERIAL INFORMATION SYSTEM)

Health = 3 Fire = 0 Reactivity = 0 PPE = Supplied by User; dependent on local conditions

16.2 Other Information:

The previous information is based upon our current knowledge and experience of our product and is not exhaustive. It applies to the product as defined by the specifications. In case of combinations or mixtures, one must confirm that no new hazards are likely to exist. In any case, the user is not exempt from observing all legal, administrative and regulatory procedures relating to the product, personal hygiene, and integrity of the work environment. (Unless noted to the contrary, the technical information applies only to pure product).

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16.3 Reason for revision:

Supersedes edition: None

Purpose of revision: Original