

EC Safety Data Sheet

BEGO Bremer Goldschlägerei Wilh. Herbst GmbH & Co.

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1. Product and company identification

Data on product

Name of product: **Fluxsol**

Data on manufacturer/supplier

Manufacturer/supplier: BEGO Bremer Goldschlägerei Wilh. Herbst GmbH & Co.
Street/P.O. box: Wilhelm-Herbst-Strasse 1
Nat. postal code/town: D-28359 Bremen
Country: Germany
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Dept. providing information: Material Development
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2. Composition / information on components

Chemical characterization of specific substance

Designation	CAS No.	EC No.	EC Index No.
Potassium hydrogen difluoride	7789-29-9	232-156-2	009-008-00-9
Ethylene glycol	107-21-1	203-473-3	603-027-00-1

Component	Hazard symbols	R provisions	Total formula
Potassium hydrogen difluoride	T, C	R 25-34	F ₂ HK
Ethylene glycol	Xn	R 22	C ₂ H ₆ O ₂

Chemical characterization of product

Description: Complex mixture, contains potassium hydrogen difluoride and ethylene glycol
Hazardous components: potassium hydrogen difluoride (potassium bifluoride, hydrogen potassium fluoride, potassium acid fluoride)
ethylene glycol (ethandiol)

Component	Concentration	Hazard symbols	R provisions
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Potassium hydrogen difluoride	< 5%	C	R 22-34
Ethylene glycol	1%	-	-

3. Possible risks

Designation of hazards

Hazard identification: C caustic
Xn harmful to health

Special indications of risk for people and environment

Causes acid burns. Harmful to health if swallowed.

Specific risks

Possible harmful impact on people and possible symptoms:

Acid burns must be treated immediately, otherwise wounds that are difficult to heal result. Skin contact and inhalation of aerosols/vapours of the preparation should be avoided. During work wear suitable protective clothing, safety gloves and safety goggles / face screen.

4. First aid measures

General instructions

Call in physician immediately. In case of risk of unconsciousness, place and transport person in a lateral recovery position. Remove dirty, soaked clothing immediately. In the event of contact with the eyes, rinse thoroughly with water and consult a physician. In the case of an accident or indisposition, call in a physician at once (if possible, show this label). In case of cessation of breathing, place person on back, overstretch head, mouth-to-nose respiration. Do not carry out mouth-to-mouth respiration.

After inhalation

Remove person to fresh air at once. In case of cessation of breathing, carry out artificial respiration. In event of difficulty with breathing, administration of oxygen if necessary. Keep person warm. Have person rest. Call in physician immediately.

After skin contact

In case of contact with the skin, wash off with plenty of water for at least 15 minutes. Dab with polyethylene glycol 400. Remove contaminated clothing at once. In any case call in physician. Acid burns that are not treated lead to wounds that are difficult to heal.

After eye contact

In the event of contact with the eyes, rinse eyes under running water with eyelids open for at least 15 minutes. Consult an eye doctor at once.

After swallowing

Do not induce vomiting. Immediately rinse mouth thoroughly with water. Have person drink plenty of water (at least 0.5 l) in small sips (dilution effect). Obtain medical assistance at once. Rest, warmth, place and transport person in lateral recovery position.

Remove contaminated clothing while rinsing continuously with plenty of water.

Symptoms of acid burns may not emerge until many hours later, therefore medical supervision for at least 48 hours after accident.

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5. Fire-fighting measures

Suitable extinguishing agents

CO₂, fire extinguishing powder, water spray or foam. Adapt fire-fighting measures to surroundings. Suppress vapours with spray jet.

Special risk due to substance or the product itself, its products of combustion or resulting gases, further information

The product itself is not combustible. Hazardous vapours may form due to ambient fire. In the event of fire, hydrogen fluoride (HF) may be released. In case of contact with light metals, hydrogen gas may form (risk of explosion).

Special protective equipment for fire fighting

Use suitable breathing apparatus that is independent of ambient air. Use protective clothing for fire-fighting so as to avoid skin and eye contact. Stay in the danger zone only with suitable, impervious chemical protection suit.

Other instructions

Avoid penetration of fire-fighting water in surface waters or groundwater.

6. Measures in the event of unintentional release

Personal precautionary measures

Avoid contact with substance. Do not pick up with unprotected hands. Wear protective clothing in accordance with section 8 of this safety data sheet.

Environmental protection measures

Do not allow to enter sewer system or waterbodies.

Cleaning/collection procedure

Collect mechanically with liquid-binding material (e.g. sand, clay mineral, diatomaceous earth, vermiculite, universal binder). Put leaky receptacles, residues and contaminated material in identified and sealable containers. If necessary, clean again. Disposal as waste in accordance with section 13 of this safety data sheet.

7. Handling and storage

Handling – instructions for safe handling

Only use in well ventilated areas. Keep work area well ventilated when soldering. Suction-extract and discharge safely vapours/aerosols directly at the site of generation. Do not allow paste to dry out. Avoid contact with eyes and skin. Do not inhale gas/smoke/vapour/aerosol.

Handling – instructions regarding fire and explosion protection

The product is not combustible. Keep away from ignition sources – do not smoke.

Storage – storeroom and container requirements

Keep under lock and key. Keep containers tightly sealed and store in a cool, dry and well ventilated place. Unsuitable material for containers/equipment: aluminium, tin or zinc. VCI storage class: LGK8BS – Non-combustible caustic substances (solid).

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8. Exposure control and personal protective equipment

Components with workplace-related or biological limit values that must be monitored

TRGS 900 (maximum permissible workplace concentration – MPWC):

Scope of application: fluorides (calculated as fluorine)

MPWC of fluorides: 2.5 mg/m³ breathable dust portion

Peak limitation: excess factor 4 (The mean concentration shall not exceed the fourfold limit concentration in any 15-minute period.)

Limitation and monitoring of exposure

See section 7. No measures beyond that are necessary.

Personal protective equipment

Respiratory protection

Respiratory protection is necessary if there is increased concentration in the air and dust is generated.

Type of mask: full mask (DIN EN 136) or half-mask (DIN EN 140).

Respiratory protection filter: filter class E 2 (acid gases) or P2 (particles).

Hand protection

Use solvent-resistant safety gloves made of NBR (nitrile rubber) or butyl (butyl rubber) with at least 10 cm long sleeve.

Eye protection

Tightly sealing safety goggles with lenses made of safety glass.

Body protection

Wear acid-resistant, impervious protective work clothing. Protective aids for the body are to be selected depending on the concentration and amount of hazardous substance and according to the specific workplace. Pay attention to chemical resistance of the protective aids (suppliers).

General safety and hygienic measures

Avoid contact with eyes, skin and clothing. Remove contaminated and/or soaked clothing at once. Keep away from food. Do not eat, drink, smoke or take snuff during work. Wash hands before breaks and at the end of work. Preventive skin protection by means of protective skin ointment. Further suitable skin care measures according to code of practice "Skin protection" of the employer's liability insurance association (e.g. BG Chemie [employer's liability insurance association for chemical industry] No. M 042). Minimum standards for protective measures when handling working substances are listed in TRGS 500 (Technical Rules for Hazardous Substances).

9. Physical and chemical properties

Non-combustible, pasty solid. Soluble in water. Hygroscopic in dry state. Aqueous solution has acidic reaction. The solution with potassium hydrogen difluoride has a more corrosive effect than that with potassium fluoride.

Appearance

State: pasty, viscous

Colour: white

Odour: odourless

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Important data on health and environmental protection and on safety

pH value:	5.3 (50% aqueous solution)	
Flash point:	not applicable	
Explosion limits:	not applicable	
Density:	1.6 g/cm ³ (20°C)	
Aqueous solubility:	can be mixed without restriction	
	Melting temperature	Density
Potassium hydrogen difluoride	239°C	2.37 g/cm ³

10. Stability and reactivity

Conditions to be avoided

Do not allow paste to dry out. No further data available.

Substances to be avoided

Materials containing glass and silicate are corroded. In case of contact with strong acids: formation of hydrogen fluoride. Pay attention to pungent odour!

Hazardous decomposition products

No decomposition given proper use. Reaction with strong acids: formation of hydrogen fluoride. Suction-extract vapours and discharge safely. Decomposition products in event of fire: see section 5.

Further information

Dry product is hygroscopic. Incompatible with metals, various plastics, glass, animal/plant fibres.

11. Toxicological information

The product has a caustic and harmful effect on the mucous membranes of the eyes and the respiratory organs. In the event of skin injuries and mucous membrane contact, toxic and caustic effect must be expected; if swallowed, damage in the gastrointestinal tract and intoxication must be expected. Harmful if swallowed, inhaled or in the case of contact with the skin. The main component, potassium hydrogen difluoride, poses acute or chronic risks to health.

Further toxicological information

After inhalation

Causes acid burns to the mucous membrane and may be harmful if inhaled. Inhalation may lead to spasms, inflammation and oedema of larynx and bronchial tubes, chemical pneumonia and pulmonary oedema. Extremely damaging effect on the tissue of the mucous membranes and upper respiratory tracts as well as on eyes and skin.

After skin contact

Causes acid burns and may be harmful in the event of intake via the skin.

After eye contact

Causes acid burns. Risk of corneal clouding. Risk of blindness!

After swallowing

Causes acid burns and is harmful if swallowed in the mouth, throat, oesophagus and gastrointestinal tract.

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Tissue damage. Risk of perforation for oesophagus and stomach. In the event of intake of large amounts of potassium ions, risk of reduction in blood pressure, coma and death.

After resorption

Heat sensation, spasms, coughing, headache, cardiac dysrhythmia, shock, unconsciousness. If allowed to react for a longer period: damage to bone marrow. For soluble inorganic fluorides the following generally applies: Contact with eyes, skin and mucous membranes leads to irritation or even acid burns. Symptoms of excessive exposure to fluorides are salivation, nausea, vomiting, abdominal pains, fever, shortness of breath and cessation of breathing. Systemic effect of fluoride ions: reduction of blood serum-calcium level with risk of fatal hypocalcaemia, excitation, spasms, cardiovascular disorders, central nervous system disorders. Exposure to fluoride dust, vapours or mist for a longer period leads to perforation of the nasal septum. Chronic effects include excessive calcification of the bones, ligaments and tendons.

Organs affected

Kidneys, heart, bones, nerves, gastrointestinal tract, teeth

Further information

The product must be handled with special care.

12. Ecological information

Ecotoxic effects

Harmful effect on water organisms. Toxic effect on fish and plankton. Harmful effect due to pH shift. In spite of dilution, still forms caustic mixtures with water. Does not cause any biological oxygen depletion. Neutralization possible in treatment plants. Hazardous for drinking water. Do not allow to enter waterbodies, sewer system or soil!

Biological effects – data for potassium fluoride

Fish toxicity:	fish	LC ₅₀ > 2.3 mg/l
Protozoa	Entosiphon sulcatum	EC ₅ : 101 mg/l

Further ecological information

Biological effects for inorganic fluorides (all data as sodium fluoride):

Fish toxicity:	L. idus	LC ₅₀ = 660 mg/L
Bacterial toxicity:	Ps. putida	toxic from 231 mg/l and up
Algae toxicity:	Sc. quadricauda	toxic from 249 mg/l and up
Protozoa toxicity:	E. sulcatum	toxic from 101 mg/l and up
	U. parduczzi	toxic from 71 mg/l and up

Biological degradability

Methods for determination of biodegradability are not applicable for inorganic substances.

Behaviour in the environment

Accumulation in organisms is not expected.

13. Disposal considerations

Product

Uniform regulations on disposal of chemicals in the Member States of the EU do not exist. In Germany the requirement of recycling is stipulated by the Closed Substance Cycle and Waste Management Act. The

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waste producer has to differentiate between "wastes for recycling" and "wastes for disposal" and carry out waste determination according to defined rules. This determination is geared to the material characteristics and in particular to the origin of the wastes. Furthermore, additional special features regarding the implementation of disposal are regulated by the German *Länder*. It is recommended that contact be made with the authorities and/or waste management companies and further information be obtained on recycling or disposal.

Waste regulations according to Ordinance on the List of Wastes (AVV)

Due to the hazardous components, the wastes require special monitoring. Accountability for disposal. Proposals for waste determination:

Waste group 06 01	Wastes from production, preparation, distribution and use of acids
Waste group 11 01	Wastes from chemical surface treatment and coating of metals and other materials (e.g. electroplating, galvanized coating, pickling, etching, phosphatizing, alkaline degreasing and electrolytic oxidation)
Waste group 16 05	Gases in pressure vessels and used chemicals
Waste key	Waste designation
06 01 06*	other acids
11 01 05*	acid pickling solutions
11 01 06*	acids not otherwise specified
11 01 98*	other wastes that contain hazardous substances
16 05 06*	laboratory chemicals that consist of or contain hazardous substances, including mixtures of laboratory chemicals
16 05 07*	used inorganic chemicals that consist of or contain hazardous substances

Packaging

Disposal according to the provisions of the waste law. Packaging contaminated with the product is considered to be waste requiring special monitoring.

Waste key	Waste designation
15 01 10*	Packaging that contains residues of hazardous substances or is contaminated with hazardous substances.

If not expressly stipulated, non-contaminated packaging can be recycled without documentary proof.

14. Transport information

Overland transport: Road transport ADR/GGVSE and rail transport RID/GGVSE

UN no.:	1811
Designation of product:	POTASSIUM HYDROGEN DIFLUORIDE, MIXTURE
Class:	8
Classification code:	CT2
Packaging group:	II
Hazard label:	8 + 6.1
Hazard identification no.:	86
Remark:	Product is pasty in accordance with 2.3.4 ADR/RID

Inland shipping transport (ADNI/ADNR)

UN no.:	1811
Designation of product:	POTASSIUM HYDROGEN DIFLUORIDE, MIXTURE

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Class: 8
Classification code: CT2
Packaging group: II
Hazard label: 8 + 6.1
Remark: Product is pasty in accordance with 2.3.4 ADR/RID

Maritime shipping transport (IMDG code)

UN no.: 1811
Proper Shipping Name: POTASSIUM HYDROGEN DIFLUORIDE, SOLID, MIXTURE
Class: 8
Packaging group: II
EmS no.: 8-06
Marine pollutant: No
Hazard identification: 8 + 6.1
Remark: Product is pasty in accordance with 2.3.4 ADR/RID (not a liquid substance in accordance with 1.2.1 IMDG code)

Air transport (ICAO-TI/IATA-DGR)

UN / ID no.: 1811
Designation of product: POTASSIUM HYDROGEN DIFLUORIDE, SOLID, MIXTURE
Proper Shipping Name: RESIN POTASSIUM HYDROGEN DIFLUORIDE, SOLID, MIXTURE
Class: 8
Packaging group: II
Hazard identification: corrosive (RCM), toxic (RPB)
Remark: Product is pasty in accordance with 2.3.4 ADR/RID (not a liquid substance in accordance with Annex A IATA-DGR)

Further information

The product is not approved for postal delivery.

15. Regulatory information

The product was classified according to the specifications of the Dangerous Substance Directive (EC Directive 67/548/EEC, Annex I). Hazard-determining component for labelling: potassium hydrogen difluoride (caustic C; toxic T).

Labelling according to EC directives

Hazard symbols:	C	caustic
R provisions:	R 34	Causes acid burns.
	R 22	Harmful if swallowed.
S provisions:	S 1/2	Keep under lock and key such that inaccessible to children (if designed for the general public).
	S 22	Do not inhale dust.
	S 26	In the event of contact with the eyes, rinse thoroughly with water at once and consult a physician.
	S 37	Wear suitable safety gloves.
	S 45	In event of accident or indisposition call in physician immediately (show this label if possible).

German regulations

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The national legal regulations must additionally be observed!

Employment restriction:	Comply with Section 22 of Youth Employment Protection Law (JarbSchG) and Section 5 of Maternity protection Guideline Regulation (MuSchRiV)!
Hazardous Incident Ordinance:	Product is not subject to Hazardous Incident Ordinance.
Classification acc. to VbF:	Product is not subject to VbF.
Clean Air Directive:	Not applicable.
Water hazard class:	WGK 1 (low degree of water endangerment) classification of the components in accordance with Administrative Regulation on the Classification of Substances Hazardous to Waters (VwVwS), Annex 2 potassium hydrogen difluoride (identification no. 342: WGK 1)

Other national regulations

Swiss toxin class: 3

Miscellaneous regulations, restrictions and prohibitory regulations

VCI storage class:	LGK8BS – Non-combustible caustic substances (solid)
BG-Chemie codes of practice:	M004 Irritating substances / caustic substances M005 Hydrogen fluoride, hydrofluoric acid and inorganic fluorides M050 Handling harmful substances M051 Hazardous chemical substances
Application restrictions:	The product may be used exclusively as a flux for soldering dental alloys in the dental laboratory.

16. Other information

Data sheet issued by:	Material Development Department
Contact person:	Dr. Thomas Wiest
Reasons for change:	Complete revision
Revised on:	20.12.2002
Replaces issue dated:	22.11.1999

The data are based on the current level of our knowledge. They are intended in particular to describe our product with regard to the hazards related to its use and the safety precautions to be taken. They do not represent any guarantee of product and quality characteristics.