OPERATING INSTRUCTION

according to § 14 GefStoffV

DESCRIPTION OF THE HAZARDOUS MATERIAL

Hydrofluoric Acid (HF)

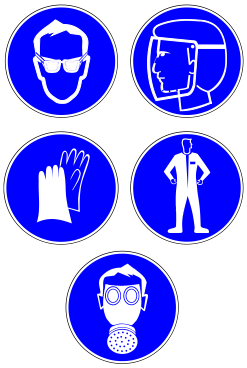
contains: Hydrogen fluoride 40 – 50 %

HAZARDS TO HUMANS AND ENVIRONMENT

- Very toxic by inhalation, in contact with skin and if swallowed. Causes severe acid burns. Quickly penetrates the skin (hydrofluoric acid is immediately absorbed by the skin) and causes deep, poorly healing tissue destruction (down to the bones) without skin injures visible from the outside. Concentrations below 5% cause significant redness and burning pain on the skin. Often no skin changes are detectable, pain then only occurs after hours, while the chemical burn progresses unnoticed into deeper layers of tissue! Symptoms can occur after a 1-2 day latency period! Hydrofluoric acid damages the nervous system.
- If the vapours are inhaled, severe chemical burns to the lungs and pulmonary oedema are to be expected; If clothing gets wet near your head, always expect inhalation of vapours! Risk of blindness in case of eye contact. If swallowed, danger of gastric perforation, danger to life. Skin contact, ingestion or Inhalation of vapours can cause acute life-threatening metabolic disorders or disorders of the liver or kidney functions. There is already a risk if the damaged surface exceeds 50 cm² of skin and with every inhalation!
- Very toxic to aquatic organisms, causing long term adverse effects in the aquatic environment.

PROTECTIVE MEASURES AND RULES OF CONDUCT

- Do not eat, drink or smoke. Observe employment restrictions.
- Check whether hydrofluoric acid can be replaced by a less hazardous substance for the intended purpose (replacement requirement). Avoid aerosols and vapours.
- Avoid any contact with skin, mucous membranes and eyes.
- Only work in a fume hood or with closed apparatus. Keep container dry (never add water), extract vapours at point of origin.
- Always keep containers tightly closed and locked up. Do not store together with alkalis. Further storage specifications can be found in the substance-specific EC safety data sheets.
- Do not allow to enter surface water, sewers and groundwater



- **Eye protection:** Safety goggles with side protection or over-goggles for people who wear glasses. A face shield is recommended.
- **Breathing:** if vapors/gases are released (e.g. in case of danger), wear a full protective mask with filter type E3-P3 (also B3-P3).
- **Hand protection:** Wear long protective gloves (glove material and penetration time can be found in the substance-specific EC safety data sheet, e.g. chemical-resistant gloves made of butyl rubber or neoprene according to EN 374), minimum thickness 0.65 mm.
- **Body protection:** Wear chemical-resistant protective clothing (if necessary protective apron). Wear closed shoes. Preventive skin protection required. Apply a suitable skin protection cream to uncovered areas of skin, especially on the forearms. Wash hands after work and pay attention to regular skin care.

CONDUCT IN EMERGENCY SITUATION

Fire

Emergency call**:**
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- **Suitable extinguishing agents:** Adapt extinguishing measures to the environment. Use existing fire extinguishers. Do not inhale gases.
- **In case of spillage/release:** Wear personal protective equipment. Apply calcium hydroxide solution (dissolve 2g $Ca(OH)_2$ in 1L H_2O and then filter) to immobilize the hydrofluoric acid. Check the pH of the resulting calcium fluoride. If the pH is neutral to alkaline, the product can be wiped up with a damp cloth and discarded.
- **Spillage of high amounts**: Clear area. Alert neighbouring areas. Alert the fire brigade (note: chemical accident) and follow the instructions.

OPERATING INSTRUCTION

according to § 14 GefStoffV

DESCRIPTION OF THE HAZARDOUS MATERIAL

Flusssäure (HF)

contains: Hydrogen fluoride 40 – 50 %

FIRST AID

First aid

Emergency call**:**
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- **After eye contact:** Rinse opened eyelids under running water for at least 15 minutes. Call in an ophthalmologist immediately.
- **After skin contact:** Immediate action is urgent and can be life-saving! Parallel to measures immediately call an ambulance! Report every hydrofluoric acid burn to the doctor! Take off contaminated clothing, including underwear and shoes, immediately. For every seemingly harmless contact, immediately rinse the skin or mucous membranes (nose or oral cavity) with plenty of water, preferably with an emergency shower! For the treatment of hydrofluoric acid burns of the skin the following measures have proven successful: After thorough washing off with water, apply calcium gluconate gel to the affected skin and massage in until the pain disappears. The calcium gluconate gel should be rinsed off with water in the meantime and replaced with new gel. After pain relief, continue the massage with calcium gluconate gel for a further 15 minutes. If calcium gluconate gel is not available: After rinsing off the skin, apply a wet compress with 20% calcium gluconate solution. Have 10 ml calcium gluconate ampoules ready and use them. 50 ml (5 ampoules) are sufficient for a 15x15 cm compress. **In the case of extensive chemical burns:** Complete removal of clothing under plenty of running water, if possible in an emergency shower (water shower with a water output of up to 200 L/min). Helpers must wear acid-proof gloves, closed clothing and protective goggles! After thorough rinsing of the skin, apply calcium gluconate compresses as described above. Ensure body rest, protect against heat loss.
- **After inhaling:** Immediate action is urgent and can be life-saving! Parallel to measures immediately call an ambulance! Remove from danger area, pay attention to self-protection. Attention, even if subjectively symptom-free, the injured persons should not walk themselves, but should be carried (stretcher) or driven. Lying down with upper body raised is advised! Immediately after the accident and then at intervals of 2 hours, even if there are no signs of illness, inhale 400 µg (equivalent to 4 sprays with 100 µg each) of beclomethasone-17,21-dipropionate aerosol, better using an autohaler. Observe correct handling (head position, inhalation and exhalation phase)! Ensure body rest, protect against heat loss. If breathing is difficult, inhale oxygen. In the event of respiratory arrest, ventilation with a device if possible, but avoid inhalation of HF from exhaled air in any case.
- **After swallowing:** Immediate action is urgent and can be life-saving! Parallel to measures immediately call an ambulance! Immediately rinse mouth vigorously. Drink 1% calcium gluconate solution in small sips; if absent, a lot of water in small sips. Never induce vomiting! Ensure body rest, protect against heat loss, shock positioning.
- Present the EC safety data sheet or these operating instructions to those providing first aid. Enter the accident and first aid in the first-aid book.

STORAGE AND PROPER DISPOSAL

- Storage of daily requirements at the workplace in the fume hood.
- Store stocks in the hazardous materials cupboard.
- Collect remains, soaked binding agents, etc. in marked containers.
- Dispose according to the manufacturer's disposal specifications in the safety data sheet. Dispose of emptied containers and residues via the waste management centre.