

Working with hydrofluoric acid

Also with low concentrations, safe working is essential!

The chemical substance hydrofluoric acid (or hydrogen fluoride), with chemical formula HF, is a non-oxidising mineral acid that because of its etching effect in diluted form is used for the composition of pickling and cleaning agents for chemical metal surface treatment. The substance 'hydrofluoric acid' does, however, have a particularly adverse effect: it is toxic.

Pickling agents for stainless steel are available in liquid form, as pickling spray or paste, packed small or in bulk, and used for pickling and passivation of stainless steel. The pickling process removes weld discoloration and restores the corrosion resistance of the stainless steel surface. Hydrofluoric acid in diluted form is also often used in a pickling solution for the chemical surface treatment of carbon steel systems such as vessels, piping and steam boiler installations. The active percentages of hydrofluoric acid in these pickling agents vary from 0.5 to 7 per cent. Despite dilution it remains a highly toxic mixture that must be used professionally.

General

Hydrofluoric acid is a non-oxidising mineral acid. In pure form it is gaseous at room temperature, and a colourless liquid when diluted or at lower temperatures. It has a characteristic pungent odour and gives off corrosive fumes in the air that are heavier than air. The toxicity has an immediate caustic effect on the skin, eyes and mucous membranes with deep (3rd degree) burns. In the body calcium compounds are extracted from the blood and bones by the reaction of the free fluoride ion. With concentrations lower than 20% the phenomena only occur over time (sometimes after 24 hours) making diagnosis difficult. It has even been demonstrated that brief contact with a few drops on the skin with a low concentration of 3% hydrofluoric acid solution on a protected body part followed by a shower can cause a large reduction of calcium in the blood when hospitalised later. A fall in the calcium level in the blood can cause a cardiac arrest.



Work instructions and safety rules

Before starting to use cleaning products one must always first carefully read the product information sheets and safety instructions. These contain relevant information on the use of a product and the necessary protective measures.

Work instructions describing the minimum personal protective equipment and action to be taken are available in different forms depending on use, operating conditions and the company.

For more information on working safely we refer to our Technical Bulletin "Working safely with stainless steel pickling agents".

Experience has taught us that even with a low HF concentration a rapid fall in calcium in the blood is possible. This is why Vecom has tightened its personal protection policy for pickling sprays.

Spray pickling may only be carried out by persons wearing acid-proof chemical suits with external, independent breathing air

supply. Persons carrying out spray pickling work must be in possession of a 'respiration certificate'.

When working with HF solutions one must always have at least a calcium-gluconate gel/cream and calcium-gluconate solution at hand. The calcium-gluconate gel is available without a prescription. The practitioner or hospital in the work vicinity must be informed and be familiar with the treatment of HF contaminations. They must also be given the instructions (see below).

Information about dealing with and treating HF contamination can be downloaded free of charge at www.eurofluor.org. Under the chapter "Publications & Recommendations" you will find "General Documents and" Medical Documents "in several languages.

Ensure that the "First Aid brochure" and the "Guidelines in case of Exposure with Hydrogen Fluoride and Hydrofluoric acid" are present at the workplace.

In the event of a contamination, take this information with you to a doctor or hospital.

On this website you can also find other information about dealing with HF.

In all cases of HF contamination go to a doctor or the first aid post of a hospital.

First aid with injury and contact with hydrogen fluoride

- Ensure your own safety and bring the casualty to safety
- Check consciousness, respiration and blood circulation and calm the casualty
- Eyes
 - Thoroughly rinse with water for 30 minutes using the eye-wash fountain
 - Rinse in between with a calcium gluconate solution
 - Avoid physical exertion
- Mouth
 - Drink 1 to 2 glasses of water
- Airways
 - Provide the casualty with clean / fresh air
 - If necessary keep in a half-seated posture
 - Have the casualty drink 6 Calcium Sandoz Forte effervescent tablets (Belgium)
- Body parts
 - Immediately rinse affected parts with water (at least five minutes) until gluconate ointment is present
 - Rub calcium gluconate gel or cream onto affected parts
 - Have the casualty drink 6 Calcium Sandoz Forte effervescent tablets (Belgium) (with burns larger than the palm of a hand)
- Clothing
 - Remove contaminated clothing under the shower, but ensure your own safety
- Wounds
 - Apply a sterile covering and stop any bleeding
- Casualty
 - Do not allow the casualty to cool and keep the casualty at rest
 - Immediately take the casualty to a hospital or the nearest general practitioner. Also take the product information sheet and/or MSDS, the Eurofluor medical information and telephone number of the company doctor with you

Interested and want to know more?

For further information and/or questions about this subject or in case you have other questions, please contact one of our specialists via +31 10 59 30 258 or go to our website.