



HAZARD ALERT

Hydrofluoric (HF) acid in commercial cleaners for vehicles

Employers use hydrofluoric (HF) acid, in significant quantities, in a number of common commercial cleaners. Specifically, in wax removers for cleaning farm equipment, spoke wheels, and walls inside drive-through car washes.

A car wash worker was afflicted with severe tissue burns on his feet after spilling car wash cleaner on his shoes. Someone diluted the cleaner to contain approximately two percent HF. Because of the low concentration, his pain was delayed and the HF saturated deep into his tissues before he sought medical attention. This car wash worker lost three weeks of work.



At another car wash, a worker put on a pair of latex gloves that were tainted with the substance. Her fingers turned black within a day and had to be amputated a few days later. The employer thought the cleaning substance was safe.

Health Effects

Skin contact, even with diluted solutions, should be considered dangerous. Solutions with less than two percent HF can cause burns. HF is similar to other acids in that the initial extent of a burn depends on the concentration, the temperature, the duration of contact with the acid, and the size of the burn. HF acid differs, however, from other acids because the fluoride ion readily penetrates the skin, causing destruction of deep tissue layers. Unlike other acids that are rapidly neutralized, this process may continue for days if it's left untreated.

All cases with extensive skin burns will have some vapor inhalation unless a respirator is used. Eye exposure to liquid HF acid can result in serious injury. Blindness may result from severe or untreated exposures. The cornea and conjunctiva can be damaged by hydrogen fluoride gas alone.

Ammonium bifluoride (ABF) is often substituted for HF and passed off as an "acid-free" ingredient in products. ABF's fluoride ions are just as hazardous as those of HF.

Damage often occurs without any warning pain sensation in the early stages. As the HF concentration increases, so does the speed and severity of tissue destruction. An HF burn covering less than two percent of your body can kill you.



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Precautions for Safe Use

Due to the serious burns that can occur even at low concentrations, it is important to select the proper protective equipment and clothing. Neoprene and Nitrile-NBR are the best materials to be used with HF.

HF poses a serious inhalation hazard. For this reason, liquid HF cleaner should not be applied with pump sprayers because it puts the HF in aerosol form.

Preventing exposure and injury must be the primary goal. Everyone who handles HF must be trained on the following: (The codes listed below relate to each topic.)



- HF's properties and dangers. OAR [437-002-1910.1200](#) and [1910.145\(a\)](#).
- Proper handling and safety precautions. OAR [437-002-1910.1200\(h\)\(1\)\(i\)](#), OAR [437-001-0760\(1\)\(d\)](#), and [1910.120\(q\)](#).
- Proper use of engineering controls. Employers must maintain these controls and make sure they are functioning properly at all times. OAR [437-001-0760\(1\)\(c\)](#) & (d).
- Proper use of personal protective equipment. Oregon OSHA Standards [1910.134](#) and [437-002-0134](#)
- First aid and medical treatment. OAR [437-002-0161\(3\)\(a\)](#), OAR [437-002-0161\(5\)](#), and OAR [437-002-0042](#).



First Aid Guidelines

Review your material safety data sheet (MSDS) for first aid procedures. Contact a medical provider for instructions on first aid provisions. When HF contacts the skin or eye:

- Immediately wash the affected area with water for at least 15 minutes. Using water is critical but may not stop all destructive action.
- Immediately after washing, seek professional medical treatment.
- Apply calcium gluconate gel or magnesium oxide paste to skin burns and sterile one percent calcium gluconate in saline drops for eye burns to limit tissue damage. This treatment should be applied by trained first aid personnel, preferably while en route to a medical treatment facility.
- In case of inhalation exposure or burns on the nose or mouth, transport the victim to a treatment facility immediately. If a treatment facility is not nearby and the acid is concentrated, the victim can breathe 100 percent oxygen by a mask with a nebulized mist of 2.5 percent calcium gluconate.
- If acid is ingested and the person is conscious, give them large quantities of water immediately. DO NOT attempt to make the person vomit.

References:

- Program Directive [A-204](#), Hydrofluoric Acid and Hydrogen Fluoride
 Honeywell International Inc [www51.honeywell.com/sm/chemicalintermediates/index.html](#)
 International Carwash Association [www.carwash.org/Pages/default.aspx](#)
 Federal OSHA Hazard Information Bulletin on the Use of Open Containers in Transporting Corrosive Chemicals [www.osha.gov/dts/hib/hib_data/hib19890523.html](#)
 Federal OSHA Guideline for Hydrogen Fluoride [www.osha.gov/SLTC/healthguidelines/hydrogenfluoride/recognition.html](#)