



## FACT SHEET

### Hydrogen fluoride (hydrofluoric acid)

#### What hydrogen fluoride is

- Hydrogen fluoride is a chemical compound that contains fluorine. It can exist as a colorless gas or as a fuming liquid, or it can be dissolved in water.
- When hydrogen fluoride is dissolved in water, it may be called hydrofluoric acid.
- Hydrogen fluoride also can be released when some other fluoride-containing compounds such as ammonium fluoride are combined with water.

#### Where hydrogen fluoride is found and how it is used

- Hydrogen fluoride is used to make refrigerants, herbicides, pharmaceuticals, high-octane gasoline, aluminum, plastics, electrical components, and fluorescent light bulbs. Sixty percent of the hydrogen fluoride used in manufacturing is for processes to make refrigerants.
- Hydrogen fluoride is also used for etching glass and metal.

#### How you could be exposed to hydrogen fluoride

- In a natural disaster, you could be exposed to high levels of hydrogen fluoride when storage facilities or containers are damaged and the chemical is released. This release could occur at an industrial site or even a retail location.
- You could be exposed to hydrogen fluoride if it is used as a chemical terrorism agent.
- If you work in an occupation that uses hydrogen fluoride, you may be exposed to this chemical.
- You may be exposed to hydrogen fluoride as part of a hobby.

#### How hydrogen fluoride works

- Hydrogen fluoride goes easily and quickly through the skin and into the tissues in the body. There it damages the cells and causes them to not work properly.
- The seriousness of poisoning caused by hydrogen fluoride depends on the amount, route, and length of time of exposure, as well as the age and preexisting medical condition of the person exposed.
- Breathing hydrogen fluoride can burn lung tissue and cause swelling and fluid accumulation in the lungs (pulmonary edema).
- Skin contact with hydrogen fluoride may cause severe burns that develop after several hours and form skin ulcers.

#### Immediate signs and symptoms of exposure to hydrogen fluoride

- Hydrogen fluoride gas, even at low levels, can irritate the eyes, nose, and respiratory tract. Breathing in hydrogen fluoride at high levels or in combination with skin contact can cause death from irregular heartbeat or from fluid buildup in the lungs. Even splashes of hydrogen fluoride on the skin can be fatal. Skin contact with hydrogen fluoride may cause no immediate signs of exposure.
- Swallowing only a small amount of highly concentrated hydrogen fluoride will affect major internal organs and may be fatal.

## **Facts About Hydrogen Fluoride**

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- Often, patients exposed to low concentrations of hydrogen fluoride on the skin do not show effects right away. Severe pain at the exposure site may be the only symptom for several hours. Visible damage may not be shown until 12 to 24 hours after the exposure.
- Depending on the concentration of the chemical and the length of time of exposure, skin contact may cause severe pain at the point of contact; a rash; and deep, slow-healing burns. Severe pain can occur even if no burns can be seen.
- Showing these signs and symptoms does not necessarily mean that a person has been exposed to hydrogen fluoride. Other chemicals also can cause these effects.

### **Long-term health effects of acute exposure to hydrogen fluoride**

- People who survive after being severely injured by breathing in hydrogen fluoride may suffer lingering chronic lung disease.
- Burns caused by concentrated hydrogen fluoride may take a long time to heal and may result in severe scarring.
- Fingertip injuries from hydrogen fluoride may result in persistent pain, bone loss, and injury to the nail bed.
- Eye exposure to hydrogen fluoride may cause prolonged or permanent visual defects, blindness, or total destruction of the eye.
- Swallowing hydrogen fluoride can damage the esophagus and stomach. The damage may progress for several weeks, resulting in gradual and lingering narrowing of the esophagus.

### **How you can protect yourself, and what to do if you are exposed to hydrogen fluoride**

- First, if the hydrogen fluoride was released into the air, get fresh air by leaving the area where the chemical was released.
  - If the hydrogen fluoride release was outside, move away from the area where the chemical was released.
  - If the hydrogen fluoride release occurred indoors, get out of the building.
- If you are near a release of fluorine or hydrogen fluoride, emergency coordinators may tell you to either evacuate the area or “shelter in place” inside a building to avoid being exposed to the chemical. For more information on evacuation during a chemical emergency, see “Facts About Evacuation” at <http://www.bt.cdc.gov/planning/evacuationfacts.asp>. For more information on sheltering in place during a chemical emergency, see “Facts About Sheltering in Place” at <http://www.bt.cdc.gov/planning/Shelteringfacts.asp>.
- If you think you may have been exposed to hydrogen fluoride, you should remove your clothing, rapidly wash your entire body with water, and get medical care as quickly as possible.
- **Removing your clothing**
  - Quickly take off clothing that may have hydrogen fluoride on it. Any clothing that has to be pulled over the head should be cut off the body.
  - If you are helping other people remove their clothing, try to avoid touching any contaminated areas, and remove the clothing as quickly as possible.

## Facts About Hydrogen Fluoride

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- **Washing yourself**

- As quickly as possible, wash any hydrogen fluoride from your skin with large amounts of water.
- If your eyes are burning or your vision is blurred, rinse your eyes with plain water.
- If you wear contacts, remove them after washing your hands and put them with the contaminated clothing. Do not put the contacts back in your eyes (even if they are not disposable contacts). If you wear eyeglasses, wash them with soap and water. You can put your eyeglasses back on after you wash them.

- **Disposing of your clothes**

- After you have washed yourself, place your clothing inside a plastic bag. Avoid touching contaminated areas of the clothing. If you can't avoid touching contaminated areas, or you aren't sure which areas are contaminated, put the clothing in the bag using tongs, tool handles, sticks, or similar objects. Anything that touches contaminated clothing should also be placed in the bag.
- Seal the bag, and then seal that bag inside another plastic bag. Disposing of your clothing in this way will help protect you and other people from any chemicals that might be on your clothes.
- When local or state health department or emergency personnel arrive, tell them what you did with your clothes. The health department or emergency personnel will arrange for further disposal. Do not handle the plastic bags yourself.
- For more information about cleaning your body and disposing of your clothes after a chemical release, see “Chemical Agents: Facts About Personal Cleaning and Disposal of Contaminated Clothing” at <http://www.bt.cdc.gov/planning/personalcleaningfacts.asp>.
- If someone has swallowed hydrogen fluoride, do not induce vomiting. Do not give the person activated charcoal. If the person is alert and able to swallow, have them chew several calcium- or magnesium-containing antacid tablets or take a magnesium-containing liquid antacid along with 1 to 2 glasses of water or 1 to 2 glasses of milk to dilute their stomach contents.
- Seek medical attention immediately. Dial 911 and explain what has happened.
- **If you are sure the person has swallowed hydrogen fluoride, do not attempt CPR unless you are able to take appropriate measures to protect yourself from exposure to hydrogen fluoride. Performing CPR on someone who has swallowed hydrogen fluoride could expose you to the chemical.**

### How hydrogen fluoride poisoning is treated

The most important thing is for exposed people to seek medical treatment as soon as possible. Your doctor may recommend or use products to help neutralize the effects of poisoning. Calcium gluconate (a calcium sugar) gels, solutions, and medications are used to neutralize the effects.

### How you can get more information about hydrogen fluoride

You can contact one of the following:

- Regional poison control center (1-800-222-1222)
- Centers for Disease Control and Prevention
  - Public Response Hotline (CDC)
    - English (888) 246-2675
    - Español (888) 246-2857
    - TTY (866) 874-2646
  - Emergency Preparedness and Response Web site (<http://www.bt.cdc.gov/>)
  - E-mail inquiries: [cdcresponse@ashastd.org](mailto:cdcresponse@ashastd.org)

## **Facts About Hydrogen Fluoride**

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*This fact sheet is based on CDC's best current information. It may be updated as new information becomes available.*

For more information, visit [www.bt.cdc.gov/chemical](http://www.bt.cdc.gov/chemical) or call CDC at 800-CDC-INFO (English and Spanish) or 888-232-6348 (TTY).

August 30, 2005

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