

Cyanide

What is it?

Cyanide is a rapidly acting, potentially deadly chemical that can exist in various forms. It can be a colorless gas, such as hydrogen cyanide (HCN) or cyanogen chloride (CNCl), or a crystal form such as sodium cyanide (NaCN) or potassium cyanide (KCN). Cyanide sometimes is described as having a “bitter almond” smell, but it does not always give off an odor, and not everyone can detect this odor. It is also known by the military designations AN (for hydrogen cyanide) and CK (for cyanogen chloride).

Its use

Hydrogen cyanide, under the name Zyklon B, was used as a genocidal agent by the Germans in World War II. Reports have indicated that during the Iran-Iraq War in the 1980s, hydrogen cyanide gas may have been used along with other chemical agents against the inhabitants of the Kurdish city of Halabja in northern Iraq.

Cyanide is naturally present in some foods and in certain plants such as cassava. Cyanide is contained in cigarette smoke and the combustion products of synthetic materials such as plastics. Combustion products are substances given off when things burn.

In manufacturing, cyanide is used to make paper, textiles, and plastics. It is present in the chemicals used to develop photographs. Cyanide salts are used in metallurgy for electroplating, metal cleaning, and removing gold from its ore. Cyanide gas is used to exterminate pests and vermin in ships and buildings.

If accidentally ingested (swallowed), chemicals found in acetonitrile-based products that are used to remove artificial nails can produce cyanide.

Exposure

People may be exposed to cyanide by breathing air, drinking water, eating food, or touching soil that contains cyanide.

Cyanide enters water, soil, or air as a result of both natural processes and industrial activities. In air, cyanide is present mainly as gaseous hydrogen cyanide.

Smoking cigarettes is probably one of the major sources of cyanide exposure for people who do not work in cyanide-related industries.

How does cyanide work?

Poisoning caused by cyanide depends on the amount of cyanide a person is exposed to, the route of exposure, and the length of time that a person is exposed.

- Breathing cyanide gas causes the most harm, but ingesting cyanide can be toxic as well.
- Cyanide gas is most dangerous in enclosed places where the gas will be trapped.
- Cyanide gas evaporates and disperses quickly in open spaces, making it less harmful outdoors.
- Cyanide gas is less dense than air, so it will rise.

- Cyanide prevents the cells of the body from getting oxygen. When this happens, the cells die.
- Cyanide is more harmful to the heart and brain than to other organs because the heart and brain use a lot of oxygen.

Immediate signs and symptoms

People exposed to a small amount of cyanide by breathing it, absorbing it through their skin, or eating foods that contain it may have some or all of the following symptoms within minutes:

- Rapid breathing
- Restlessness
- Dizziness
- Weakness
- Headache
- Nausea and vomiting
- Rapid heart rate
- Exposure to a large amount of cyanide by any route may cause these other health effects as well:
 - Convulsions
 - Low blood pressure
 - Slow heart rate
 - Loss of consciousness
 - Lung injury
 - Respiratory failure leading to death

Showing these signs and symptoms does not necessarily mean that a person has been exposed to cyanide.

Long-term health effects

Survivors of serious cyanide poisoning may develop heart and brain damage.

Protection

- First, get fresh air by leaving the area where the cyanide was released. Moving to an area with fresh air is a good way to reduce the possibility of death from exposure to cyanide gas.
- If the cyanide release was outside, move away from the area where the cyanide was released.
- If the cyanide release was indoors, get out of the building.
- If leaving the area that was exposed to cyanide is not an option, stay as low to the ground as possible.
- Remove any clothing that has liquid cyanide on it. If possible, seal the clothing in a plastic bag, and then seal that bag inside a second plastic bag. Removing and sealing the clothing in this way will help protect people from any chemicals that might be on their clothes.
- If clothes were placed in plastic bags, inform either the local or state health department or emergency coordinators upon their arrival. Do not handle the plastic bags.

- Rinse the eyes with plain water for 10 to 15 minutes if they are burning or vision is blurred.
- Wash any liquid cyanide from the skin thoroughly with soap and water.
- If cyanide is known to be ingested (swallowed), do not induce vomiting or give fluids to drink.
- Seek medical attention right away. Dial 911 and explain what has happened.

Treatment

Cyanide poisoning is treated with specific antidotes and supportive medical care in a hospital setting. The most important thing is for victims to seek medical treatment as soon as possible.