



## **CHLORINE**

### Public Fact Sheet

#### **What is chlorine?**

Chlorine is a naturally occurring element normally used in industry and found in some household products. It is normally found as a greenish-yellow gas with a strong, irritating odor like household bleach. Chlorine gas can also be stored under pressure as a liquid for transportation and storage. Although chlorine gas is not flammable, it reacts explosively with many common chemicals (such as alcohols, ammonia, and gasoline) and may ignite some objects (such as wood, paper, oil, and clothing).

**DO NOT** mix household bleach with acid-containing or ammonia-containing household chemicals (drain cleaners, ammonia, cleansers). Dangerous amounts of chlorine or other toxic gases can be released.

#### **How is chlorine used?**

Chlorine gas was the first chemical warfare agent to be used on a large scale during World War I. Today, chlorine is one of the most commonly used industrial chemicals. It is used as an ingredient in the production of some solvents, as a bleaching agent in paper and cloth production, as an agent to kill bacteria in drinking and swimming pool water, and as part of the sanitation process for industrial waste and sewage.

#### **How can people be exposed to chlorine?**

Significant exposure is usually associated with industrial processes or accidental spills. Most direct releases of chlorine to the environment are into air and/or water. Chlorine will react with other chemicals once it is released to air or water to form more stable compounds. It can enter groundwater if it is the form of one of these more stable compounds.

- **Breathing** - Inhalation of chlorine gas (breathing it) is the most common route of exposure. This type of exposure has occurred in or near industrial settings as well as in the home. People using chlorine-containing household products (laundry bleach, swimming pool chemicals) are usually not exposed to chlorine gas. However, one can be exposed to harmful levels of gases containing chlorine if these household products are mixed with acid-containing household products (toilet bowl cleaner) or ammonia-containing household products.
- **Drinking / Eating** – Treated drinking water contains very low levels of chlorine, but this consumption does not pose a health risk.
- **Touching** – The skin does not absorb chlorine well, but small amounts can pass through the skin when people are exposed to chlorine gas, bleach, or come into contact with water or soil containing high levels of chlorine. Although small amounts of chlorine can pass through the skin, it is eliminated from the body rapidly. Chlorine may irritate or burn the skin, especially moist areas.

- **Eye contact** – Eyes can be exposed to chlorine through a release of chlorine gas to the air or through contact with water that contains chlorine. Moisture on the eye will combine with chlorine to form an acid that can cause further irritation.

### **How can chlorine affect my health?**

The degree of reaction to exposure to any chemical depends on three main factors: the amount one is exposed to, the route of exposure (breathing, touching, etc.), and the length of time of the exposure.

#### **Short-term (acute) effects:**

- Short-term exposures to low levels of chlorine in the air rarely lead to any long-lasting lung changes. Any exposure from smelling appropriately treated drinking water or swimming pool water is not harmful.
- Acute exposure to high concentrations of chlorine can lead to a build-up of fluid in the lungs (pulmonary edema) and severe shortness of breath that could lead to death if untreated. Immediately or within a few hours after breathing chlorine gas, the lungs can become irritated, causing coughing and/or shortness of breath. The amount of time before these symptoms occur is dependent on the amount of chlorine to which one is exposed. (The higher the amount one is exposed to, the shorter the amount of time before symptoms are seen.) Exposure may result in nose and throat irritation, watery eyes, coughing, bloody nose, nausea, vomiting, chest pain, and/or lightheadedness.
- Drinking a chlorine solution can cause vomiting, nausea, and throat and stomach irritation. The vomit is likely to have a chlorine smell to it.
- Contact with chlorine gas can severely burn and irritate the eyes and skin upon contact, possibly causing permanent damage. Liquid chlorine solutions (such as bleach) can have vapors that are irritating to the eyes, nose and throat. Chlorine bleach can cause irritation to exposed skin.
- When chlorine vapor or solution comes into contact with moist tissues (such as those found in the nose, eyes, throat, and lungs), it forms an acid (hydrochloric acid) and can damage the exposed tissue.
- Contact with chlorine liquid (gas kept under pressure) can cause frostbite and chemical burns to the skin.
- The elderly, smokers, and persons with chronic pulmonary disease may be at greatest risk for breathing problems following acute exposure.

#### **Long-term (chronic) effects:**

- Long-term exposure to low levels of chlorine gas is potentially linked to diseases of the lung (bronchitis, shortness of breath, possible permanent damage) and tooth corrosion.
- No cancer or reproductive effects have been reported from chronic exposure to chlorine.

### **What should I do if I am exposed to chlorine?**

- If you think you have been exposed to a chlorine-containing solution (liquid): remove all your clothing and wash your entire body with soap and water. Clothing that would need to be pulled over the head should be cut off the body to avoid further contact with skin. Avoid touching any liquid chlorine solution that is on your clothing (chlorine vapor is not carried on contaminated clothing). Seek medical care as soon as possible.

- If your eyes are burning or vision is blurred: rinse eyes with plain water immediately for at least 15 minutes, preferably 30 minutes. Seek medical care as soon as possible.
- If you have ingested chlorine: do not induce vomiting and do not drink fluids. Seek medical care as soon as possible.
- If your skin has come into contact with liquid chlorine (compressed gas, normally kept under pressure): rinse the affected area immediately with room-temperature water to remove any chlorine. Seek medical care as soon as possible.

### **How is chlorine poisoning treated?**

Treatment involves removing the exposed individual from the source of exposure, removing chlorine from the skin and exposed mucous membranes as soon as possible, and providing supportive medical care in a hospital setting. There is no antidote to chlorine poisoning.

### **How can I prevent or minimize exposure to chlorine?**

- Under normal occupational conditions, wear the appropriate protective clothing and make sure that hazard and warning information is posted in the work area.
- Under accidental or intentional release conditions, leave the area where the chlorine was released. If outdoors, move upwind from the smell. Find the highest ground as chlorine is heavier than air and sinks. If indoors, leave the building immediately. If the release is not in your immediate area, follow the instructions of the emergency broadcast system (via television or radio).

### **Where can I get more information?**

- Local Health Departments. See <http://www.malph.org/page.cfm/108/> for your jurisdiction.
- The Michigan Department of Community Health “Toxics and Health Hotline” (1-800-648-6942)
- The Agency for Toxic Substances and Disease Registry (1-888-422-8737)
- The Centers for Disease Control & Prevention “Public Response Hotline” (1-888-246-2675)

<p><b>For immediate assistance, call the Poison Control Center hotline: 1-800-222-1222</b></p>
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