

Chlorine Release Fact Sheet

What is Chlorine?

Chlorine (Cl_2) is a naturally occurring chemical element that belongs to a group of chemicals called halogens. It is an element that is found in nature bonded to other elements like sodium, potassium, and calcium and is an essential nutrient for plants and animals. Chlorine in its elemental form is a very powerful oxidant and chlorine containing compounds are used to keep swimming pools clean and sanitary, protect food and crops, design pharmaceuticals, and make plastics.

Warning Signs of a Chlorine Release

Chlorine has a distinct odor that is detectable by most individuals at low concentrations of 0.2 to 0.4 parts per million (ppm) in air. The odor usually provides a warning of its presence at concentrations far below the concentration level that creates a health hazard to humans. The OSHA Permissible Exposure Limit (PEL) is a ceiling limit of 1 ppm (parts per million).

Physical Properties of Chlorine Gas

While chlorine may exist in a liquid or gas phase, it vaporizes quickly under normal atmospheric conditions; therefore, liquid chlorine is typically only found at the source of a leak. Chlorine is visible as a greenish-yellow gas which is $2\frac{1}{2}$ times heavier than air and may settle in low lying areas. Chlorine is only slightly soluble in water (0.3% to 0.7%) depending on the water temperature. Chlorine reacts with many organic compounds to form chlorinated derivatives. Some reactions can be extremely violent, especially those with hydrocarbons, alcohols and ethers.

Effects of Exposure to Chlorine Gas

Chlorine is a potential irritant to the eyes, skin, mucous membranes, and the respiratory system. The principal concerns with exposure to chlorine are the respiratory system followed by the eyes. At low concentrations chlorine gas has an odor similar to household bleach. As the concentrations increase from the level of detection by smell, so does symptomatology in the exposed individual. At chlorine concentrations above 5 ppm the gas is very irritating, and it is unlikely that any person would remain in such an exposure for more than a very brief time, unless trapped or unconscious. If the symptoms persist for more than a few hours, the effects of exposure to chlorine may become more severe for several days after the incident. In such cases, observation of exposed individuals should be a part of the medical response program.

For personal protective equipment and first aid treatments for chlorine exposure, refer to a chlorine Safety Data Sheet and medical personnel. Responders should take the necessary precautions to protect themselves from any exposure to chlorine while administering first aid and should move the victim from any contaminated area as quickly as possible.

Emergency Response

Options for the protection of employees and the public include sheltering-in-place, evacuation from the affected area, or a combination of the two.

Shelter-In-Place

Persons in an area affected by a chlorine release may be advised by local emergency authorities to shelter-in-place. This is frequently done to protect people and pets until the risk of exposure to the chemical has passed. Additional guidance for sheltering-in-place can be found at:

- <https://emergency.cdc.gov/shelterinplace.asp>
- <https://www.osha.gov/SLTC/etools/evacuation/shelterinplace.html>

Evacuation

Evacuation of a large segment of population is always very difficult and time consuming. Evacuation can also expose both the public and responders to the hazardous material. When the leak of hazardous material is large, will continue for an extended period of time, or poses a risk of explosion or flashover, it may be necessary to proceed with an evacuation.

More Information

Local emergency phone number for immediate medical attention in the U.S.: 911

Regional Poison Control Center phone number in the U.S.: 1-800-222-1222

Refer to a Chlorine Safety Data Sheet (SDS)

The information provided in this Fact Sheet is not meant to be complete. For more information on first aid, refer to your Safety Data Sheet (SDS) for Chlorine. For additional information on first aid, visit www.chlorineinstitute.org to download free editions of Chlorine Institute Pamphlet 63) First Aid, Medical Management/Evaluation and Occupational Hygiene Monitoring Practices for Chlorine and Pamphlet 1) Chlorine Basics.