

Chlorine

What is chlorine?

Chlorine (Cl₂) is a yellow-green gas at room temperature and has a distinct odor similar to bleach. The gas is often liquefied under pressure for transportation and storage (e.g., tanker trucks, rail cars, ships). If a container of compressed chlorine develops a leak, the liquid will rapidly escape and evaporate very quickly forming a greenish-yellow cloud of gas that will remain close to the ground.

What are the common uses of chlorine?

- Industrial applications including the production of chlorinated solvents, pesticides, polymers, synthetic rubbers, and refrigerants
- Bleaching agent in paper and cloth production
- Disinfectant in sewage and industrial waste, drinking water, and swimming pools
- Industrial and household cleaning solutions (e.g., bleach)

How can people be exposed to chlorine?

A person can be exposed to chlorine either through:

- inhalation (breathing it in),
- direct contact with skin or eyes,
- or ingestion (intentionally or unintentionally eating or drinking products containing chlorine).

Chlorine has a strong, pungent odor that is easily detectable at lower concentrations. If you cannot smell chlorine, it is probably not present in the air at a high enough concentration to be harmful.

What are the possible effects of exposure?

The extent of signs and symptoms of chlorine exposure will vary based on the amount, route, and duration of the exposure. Elderly people, children, and people with lung diseases such as asthma or chronic obstructive pulmonary disease may be especially sensitive to irritant chemicals, including chlorine.

See table below showing the relationship between exposure route, level of concentration, and symptoms.

Exposure Route	Symptoms
Short-term, low level inhalation of gas	Coughing, shortness of breath, blurred vision, chest pain, wheezing, lightheadedness
Short-term, high level inhalation of gas	Fluid build-up in lungs, severe shortness of breath, possible death
Long-term, low level inhalation of gas	Linked to diseases of the lungs

Direct contact (eyes, skin)	Frostbite, chemical burns
Ingestion	Corrosive tissue damage of the gastrointestinal tract

How can people reduce the risk of exposure?

- If there is a large chlorine release, follow the instructions given to you by local emergency response personnel.
- Store cleaning supplies out of reach of young children or pets.
- Follow the manufacturer's instructions when using strong cleaners (increased ventilation may be necessary).
- Never mix household cleaners.

What should I do if I think I have been exposed to chlorine?

- If there is a strong chlorine odor outdoors and you suspect an industrial spill or release, seek fresh air and move to high ground.
- Call 911 and follow the instructions given to you by your local emergency personnel.
- If strong chlorine odors are present in your home, identify the source and ventilate the area or remove the chlorine-containing product.
- Seek fresh air if chlorine odor persists.
- If you have direct skin or eye contact with chlorine or a chlorine-containing solution, quickly wash skin with soap and water, and flush eyes with large amounts of water. Remove clothing as quickly as possible.
- If someone swallows a chlorine-containing liquid, seek immediate medical attention and do not induce vomiting.

If you experience health effects similar to those mentioned in the table above, seek medical attention. Prolonged monitoring may be necessary with severe exposures as some effects may be delayed.

References:

www.atsdr.cdc.gov/toxprofiles/tp.asp?id=1079&tid=36 (Agency for Toxic Substances and Disease Registry)

<http://emergency.cdc.gov/agent/chlorine/basics/facts.asp> (Centers for Disease Control)

www.nlm.nih.gov/medlineplus/ency/article/002772.htm (National Library of Medicine/National Institutes of Health)