

Safety Precautions:

- Deteriorated/leaking valves are one of the major causes of chlorine releases. Be sure that all fittings are tight and in good condition.
- Use equipment that is specifically designed for handling chlorine, and have a thorough, consistent, maintenance schedule for all equipment.
- Always wear the proper personal protection equipment when working with chlorine. Normal firefighter turnout gear is not sufficient.
- Never leave equipment unattended during a transfer operation.
- Store tanks and other containers in a well lit, secure area to prevent possible theft and/or vandalism.
- Keep chlorine stored in a dry, cool, well-ventilated area away from combustible substances.
- Be cautious when moving equipment or other items around a chlorine storage area or piping systems.
- Be sure to properly train all new staff and hold annual refreshers for all employees.
- Always check the content of chemicals before mixing to ensure they are compatible.

Colorado Department of Public Health & Environment
Hazardous Materials and Waste Management Division
4300 Cherry Creek Drive South
Denver, Colorado 80246-1530

Chlorine Facts



Colorado Hazardous Substances Emergency Event Surveillance System



Colorado Department
of Public Health
and Environment

In 1990, the Colorado Department of Public Health and Environment (CDPHE) began participating in the Hazardous Substances Emergency Event Surveillance System (HSEES) under a cooperative agreement with the Agency for Toxic Substances and Disease Registry. The purpose of this project is to investigate hazardous substance releases and, based on the results of these investigations and data analyses, conduct prevention outreach activities to reduce injuries and deaths resulting from these releases. This fact sheet is one of the prevention outreach activities of the project.

This fact sheet contains information on chlorine and chlorine releases in Colorado. Analyses have shown chlorine to be the substance with the highest percentage of releases with victims in Colorado. Based on these analyses, it is critical that potentially impacted parties have a clear understanding of the causes and impacts of chlorine releases.

Chlorine was the tenth highest-volume chemical produced in the U.S. in 1995. Over twelve million tons of chlorine are used annually in North America. It is a highly reactive chemical which is usually found in combination with other elements. It is used for a variety of purposes, including, but not limited to, common household table salt (sodium chloride), household bleach, chlorine based pesticides, vinyl plastics, water purification, and food processing. In its pure form, chlorine is a greenish-yellow gas that is about 2.5 times heavier than air and has a pungent, irritating odor. The inhalation of

chlorine fumes may be fatal, with an Immediately Dangerous to Life and Health Value of 10ppm. Chlorine has a Threshold Limit Value of 0.5ppm in air. Symptoms of exposure may range from coughing, watery eyes and a running nose to severe respiratory irritation. These symptoms result from the formation of a weak acid when chlorine combines with moisture in the lungs. Direct contact with chlorine may cause significant tissue injury. It is a noncombustible material, but it is a strong oxidizing agent. The UN Number is 1017, and response procedures can be found in the Emergency Response Guidebook, Number 124.

From 1993-1997, there were 20 reported chlorine releases in Colorado, 19 (95.0%) occurred at fixed facilities and 1 (0.05%) occurred in transportation. The majority of fixed facility releases (25.0%) occurred in water/waste water facilities, followed by private residences (15.0%), private industries (15.0%), federal facilities (15.0%), beverage/food manufacturing industries (10.0%), electric light/power industries (10.0%), recreational facilities (5.0%) and trucking services (5.0%). The amounts released ranged from 2 ounces to 300 gallons. Of the 20 chlorine releases, 6 (30.0%) of the events involved 18 victims. Evacuations were ordered in 9 (45.0%) of the events. The most common cause of the releases were equipment failure (55.0%) and improper mixing and/or operator error (45.0%).

The following events are examples of chlorine incidents which have occurred in Colorado:

- Due to the deterioration of an expansion plug in a valve at a meat processing facility, approximately forty pounds of chlorine was released to the interior of the building, forcing the evacuation of over 100 employees. The company has since installed a back up system to prevent recurrences.
- A DD cell battery exploded at a battery supply warehouse, forcing the building to be evacuated for more than four hours. Six employees were taken to the hospital with respiratory irritation, eye irritation, dizziness and gastrointestinal problems. Two employees had to be decontaminated.
- Twenty pounds of calcium hypochlorite was accidentally poured into a 500 gallon vat of ferric sulfate at a beverage manufacturing plant, creating a chlorine vapor cloud. Forty workers had to be evacuated for more than three hours, and one employee was sent to the hospital with respiratory distress.
- While cleaning a mens locker room, workers mixed two incompatible cleaning agents, creating a chlorine vapor cloud. Five janitorial staff were evacuated and transported to the hospital with respiratory distress.