## Safety Precautions:

- Hoses are one of the major causes of ammonia releases, be sure that all fittings are tight and hoses are in good condition.
- Always wear the proper personal protection equipment when working with ammonia, 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 a supply of water nearby when working with ammonia, if exposure occurs, flush the exposed area with large quantities of water immediately.
- Use equipment that is specifically designed for handling ammonia.
- Have a thorough, consistent, maintenance schedule for all equipment.
- Be cautious when moving equipment or other items around an ammonia storage area or piping systems.
- Be sure to properly train all new staff and hold annual refreshers for all employees.

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

# Ammonia 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 ammonia and ammonia releases in Colorado. As the second most commonly released substance in Colorado and as the substance with the second highest percentage of releases with victims, it is imperative to have a clear understanding of the causes and impacts of ammonia releases.

Ammonia was the sixth highest-volume chemical produced in the U.S. in 1995. It is primarily used as a fertilizer, however, it is also used as a refrigerant, cleaning product, and is used in the manufacture of plastics, explosives and synthetic fibers. It is a colorless gas (or liquid) with a pungent odor. The inhalation of concentrated ammonia fumes may be fatal, with an Immediately Dangerous to Life and Health Value of 300ppm. Ammonia has a Threshold Limit Value of 25ppm in air and minor nose, throat and eye irritation may be experienced at 35ppm. Symptoms of exposure may range from coughing and watery eyes to severe burns and asphyxiation. It is lighter than air with a vapor pressure of 6658 mm/Hg @ 70F or 8.5 atm (20C). It is a combustible material. Commercial and refrigerant grade ammonia are maintained at over a 99% concentration. Ammonia is a moderate fire risk and may be explosive in air at concentrations of 16-25%. It also may form explosive compounds when in contact with silver or mercury. The UN Number is 1005, it is placarded as Class 2.2 and response procedures can be found in the Emergency Response Guidebook, Number 125.

From 1993-1997, there were 101 reported ammonia releases in Colorado, 67 (66.3%) occurred at fixed facilities and 34 (33.7%) occurred in transportation. The majority of fixed facility releases (28.4%) occurred in the beverage manufacturing industry, followed by food manufacturing (19.4%), deliveries at facilities (19.4%), dairy industry (9%) and agriculture (9%). The amounts released ranged from 1 milliliter to 20,000 gallons. Of the 101 ammonia releases, 13 (12.9%) of the events involved 18 victims. Of the victims, 8 (44.4%) were from agriculture, 6 (33.3%) were from the beverage industry, and 4 (22.2%) were from the dairy industry. Evacuations were ordered in 21 (20.8%) of the events.

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

- During unloading of a transport vehicle a storage unit at a farmers cooperative, hose ruptured releasing 2,870 pounds ammonia into the air. An employee an two members of the general public we taken to the hospital with respiratory distress and fifteen acres of crops wer destroyed.

- A worker at a beverage manufacturing company was painting in a personnel ca above an ammonia receiving tank when the cage crashed to the ground, breakin off a gauge on the evaporative pressure regulator, releasing 225 pounds of ammonia. Two employees were taken the hospital with respiratory distress ar gastrointestinal problems. Over 25 people had to be evacuated for eight hours while the situation was remediat

- A crack in a chiller tube at a beverage manufacturer caused ammonia to be released into a lithium chloride salt un When the unit was turned on, ammonia was released into the building. More th 25 people were evacuated for four hou and five employees were taken to the hospital.