



Hazards of Ammonia in Ice Rinks

The Department of Government Services has developed this safety bulletin to help owners/operators of indoor skating rinks provide a safe atmosphere for skaters, spectators and employees at these facilities.

What is ammonia gas?

Ammonia is a corrosive, toxic gas with a very pungent odour. It is slightly lighter than air and it can mix with water vapour and become heavier than air, collecting in pockets at floor level. It is not normally flammable, but at extremely high concentrations it can create an explosive mixture with air.

What are the symptoms of exposure to ammonia gas?

Ammonia is a severe irritant of the eyes, nose and throat, where airborne concentrations between 25 and 50 ppm may be irritating to the mucous membranes. Exposures in excess of the allowable limit (25ppm) can cause headaches, coughing and difficulty breathing. Prolonged exposure to high concentrations of ammonia can lead to pulmonary edema (an accumulation of fluid in the lungs) which can be fatal.

Skin contact with liquid ammonia can cause burns, blisters and even frostbite. Eye contact can cause severe damage to the eye and may lead to blindness.

Where does ammonia come from in an indoor ice rink?

Ammonia is commonly used in mechanical refrigeration systems, including those found in ice rinks. Ammonia is used in liquid form in these systems, however, it becomes a gas once its release into the ambient air. This may happen through leaks in the system or a system failure that allows ammonia gas to be released into the atmosphere. Proper maintenance can prevent this from happening.

What are the requirements for refrigeration systems in ice rinks?

Ammonia mechanical refrigeration systems are required to be installed, operated and maintained in accordance with the requirements of the Boiler, Pressure Vessel, and Compressed Gas Regulations and the CSA B52 Mechanical Refrigeration Code. All work done on these systems is to be performed by licensed mechanical contractors or certified operators. Also, the systems are required to be inspected periodically by the Department of Government Services and must have current and valid inspection certificates.

How can you prevent ammonia from being released into the air?

A number of things that can be done to prevent the release of ammonia:

a) Maintenance

All facilities should have a preventative maintenance program in place that is based on the manufacturers recommendations for all of the refrigeration equipment. This program will ensure and document regular system maintenance. It should include (but is not limited to): compressors, pumps, evaporators, condensers, control valves, electrical equipment, ammonia detection system, emergency response equipment (i.e. air monitoring equipment, SCUBA, respirators etc.).

b) Ventilation and Detection System

All facilities utilizing an ammonia refrigeration system should have an ammonia detection system installed in the engine room that will detect an ammonia leak and trigger the onset of an independent ventilation system, as well as an alarm. The CSA B52 Mechanical Refrigeration Code outlines specific requirements of ammonia systems, which includes provisions for a detection system and ventilation. There are a number of suppliers that can install detection systems that are designed for this type of application.

c) Emergency Response Plan

All facilities that use an ammonia refrigeration system should have an emergency response plan in place. This plan should include provision for emergency repairs, evacuation procedures, location of safety showers and eye wash stations, phone numbers for the local fire department and hospital, and any other pertinent information that may be required in the case of an ammonia leak.

Where can I get more information?

For more information on ammonia in ice rinks you can contact:

www.gov.nl.ca/gs/

Occupational Health and Safety at 729-2706

Engineering & Inspection Services, Government Services Centre at 729-2746/2747



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