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MONTHLY SAFETY BRIEF: AMMONIA

Some of our clients through ISNetworld require awareness training on specific contaminants. We have done Safety Briefs already on several such as benzene, mercury, lead and others. One contaminant that we don't run into as frequently as others, but a few of our clients are now requiring awareness training, is Ammonia. Many of our food clients use anhydrous ammonia in their refrigeration systems and ammonia can be present in manufacturing operations of out petroleum clients. This month's safety brief is dedicated to Ammonia.

> **Ammonia** is a compound of nitrogen and hydrogen with the formula NH3 and is normally encountered as a gas with a characteristic pungent odor. Ammonia, as used commercially, is often called Anhydrous Ammonia, emphasizing the absence of water in the material. Because of its many uses, ammonia is one of the most highly produced inorganic chemicals.

Hazards

The main safety hazard of ammonia is that it is extremely corrosive to the skin, eyes, and respiratory tract. Because it does not contain water, it will absorb moisture from any source, including human tissues, causing severe burns. In some cases, these burns may be fatal, especially if they affect the lungs/respiratory tract.

In the refrigeration industry, the corrosivity hazard of ammonia is aggravated by two other factors:

1. *Pressurization*. Ammonia boils and becomes a gas at temperatures of about 28 below zero F. Therefore, to use it as a liquid at normal temperatures, it must be pressurized to about 200 psi. So, if a significant leak/release develops, it is almost always under high pressure and is likely to spray workers nearby before they have a chance to react and escape the area. This pressurization also results in larger areas of the body being affected, and more material being involved.
2. *Gas*. When a leak develops, the liquid ammonia will immediately become a gas, which will make it much more likely to be inhaled into the respiratory tract/lungs, where injuries will be much more serious.

Occupational Exposure Limits

- Federal OSHA has a permissible exposure limit (PEL) for NH3 of 50 parts per million (ppm) as an eight-hour time-weighted average (TWA).
- The American Conference of Governmental Industrial Hygienists (ACGIH) recommends an eight-hour TWA of 25 ppm to control potential health hazards. The ACGIH also recommends a short-term exposure limit (STEL) of 35 ppm as a 15-minute average.
- The National Institute for Occupational Safety and Health (NIOSH) has also set a recommended exposure limit (REL) of 25 ppm for up to a 10-hour work day during a 40-hour work week. They also recommend not exceeding a STEL of 35 ppm.

In our jobs as consultants, we do not work directly with ammonia in most cases but do need to be aware of its unique hazards. Appropriate PPE will be assigned if ever there is a situation that requires working in an environment where there may be an exposure to ammonia. For process engineers, common ammonia PPE include: • Tight-fitting eye protection (splash-proof goggles). • A face shield is strongly recommended in addition to goggles. • Chemical-resistant gloves • Long-sleeved shirt • Long pants • Leather work shoes/boots and potentially respiratory protection depending on the airborne levels.

More information is available here:

Safety and health topics: Ammonia refrigeration (Federal OSHA)
https://www.osha.gov/SLTC/ammoniarefrigeration/index.html

AMMONIA AWARENESS QUIZ

1) Which of the following best describes the hazard of ammonia?
   a. Toxic
   b. Corrosive
   c. Flammable
   d. Reactive

2) Which of the following is a health affect associated with ammonia exposure?
   a. Skin Irritation
   b. Leukemia
   c. Kidney disease
   d. None of the Above

3) Ammonia has an aroma similar to gasoline?
   ☐ True
   ☐ False

4) The ACGIH TLV for ammonia is more conservative than the OSHA PEL.
   ☐ True
   ☐ False

5) Full body personal protection is needed when working directly with ammonia?
   ☐ True
   ☐ False

Instructor – John Feller, CIH, CSP

SCORE: PASS / FAIL

_____	_____	_____
Employee Signature	Supervisor Signature	Date