WEEKLY SAFETY MEETING

AMMONIA (NH3) AWARENESS

Ammonia (NH3) is an extremely hazardous chemical that is widely used in many industries. Ammonia can be explosive, especially in an enclosed space or when other flammable chemicals are present. By itself, its flammable range is between 15 percent and 28 percent by volume in air. When mixed with lubricating oils, the flammable range increases. Ammonia will react dangerously with some chemicals – most notably, chlorine bleach. Ammonia is also incompatible with other halogens (for example, fluorine), oxidizing agents (for example, nitrogen oxide), and heavy metals (for example, mercury and silver).

Ammonia is one of the most commonly produced industrial chemicals in the United States. It is used in industry and commerce, and also exists naturally in humans and in the environment. Ammonia is essential for many biological processes and serves as a precursor for amino acid and nucleotide synthesis. In the environment, ammonia is part of the nitrogen cycle and is produced in soil from bacterial processes. Ammonia is also produced naturally from decomposition of organic matter, including plants, animals and animal wastes.

Ammonia can be in liquid or gas form. Ammonia is colorless and has a strong pungent odor similar to your household cleaning ammonia. It is a common refrigerant in many industries. In agriculture, it is injected into soil as fertilizer. It is also used in the manufacture of plastics, dyes, textiles, detergents, and pesticides. Ammonia may be found in solution, as ammonia hydroxide (the form most people are familiar with), or packaged as a pressurized gas, in a waterless (anhydrous) form.

Anhydrous ammonia gas is lighter than air and will rise, so that generally it dissipates and does not settle in low-lying areas. However, in the presence of moisture (such as high relative humidity), the liquefied anhydrous ammonia gas forms vapors that are heavier than air. These vapors may spread along the ground or into low-lying areas with poor airflow where people may become exposed. Some examples may include, but not limited to:

- working on/near industrial refrigeration machinery rooms, equipment and/or piping
- working in petroleum refineries
- working with/near agricultural fertilizer
- working in industrial process facilities
- working in or around industrial meat packing plants

Anhydrous Ammonia can cause harm if inhaled and/or if it comes into contact with the eyes or skin. Ammonia interacts immediately upon contact with available moisture in the skin, eyes, oral cavity, respiratory tract, and particularly mucous surfaces to form the very caustic ammonium hydroxide. Ammonium hydroxide causes the necrosis of tissues through disruption of cell membrane lipids (saponification) leading to cellular destruction. As cell proteins break down, water is extracted, resulting in an inflammatory response that causes further damage.

Exposure of the eyes to ammonia may cause burning, tearing, temporary blindness and severe eye damage. Exposure of the skin to ammonia may cause severe burns and blistering. Exposure of the respiratory tract (mouth, nose and throat) to ammonia may cause runny nose, coughing, chest pain, severe breathing difficulties, severe burns and death. Skin and respiratory related diseases could be aggravated by exposure.

RULE OF EXPOSURE:

- **5 PPM** – You can *smell* it
- **50 PPM** – It can *harm* you – Long Term Exposure
- **300 PPM** – Immediate *Danger to Life & Health*
- **5,000 PPM** – It can *kill* you

What to do if you are exposed:

- **Use an air monitor that detects ammonia in your work area.** You may become desensitized to ammonia and not realize how strong it really is. When the air monitor alarms, leave the area immediately. The air monitor must have an ammonia sensor in it to be able to detect ammonia.
- **Wear personal protective equipment.** Employees will be provided with and required to use impervious gloves, face shields or full face respirators and other appropriate impervious protective clothing necessary to prevent any possibility of skin contact. Liquid ammonia can burn your eyes. Know where the emergency eyewash station is located in your work area and how to use it.
- **Take hot work permitting precautions** whenever hot work will be performed in areas where ammonia is present. If piping, vessels, or containers that have held ammonia will be welded, soldered, drilled, or cut, purge all ammonia first.
- **Use proper ventilation.** Never work with ammonia in an unventilated area. Always ensure that you have adequate ventilation, and make sure that ventilation is non-sparking or explosion proof.
- **Store ammonia separately** from incompatible chemicals, away from heat and ignition sources.
- **Know what to do in case of a spill or leak.** Employees should be aware of customers' contingency plans and provisions. Employees must be informed where ammonia is used in the host facility and aware of additional plant safety rules. Report the spill or leak so it can be appropriately controlled.

Meeting Date: _____ Trainer: _____

Supervisor: _____ Location: _____

Attendees: (Please print clearly)

_____ _____ _____

_____ _____ _____

_____ _____ _____

_____ _____ _____

_____ _____ _____

WINGER companies

WEEKLY SAFETY MEETING

AMMONIA AWARENESS QUIZ

(PLEASE CIRCLE OR FILL IN THE CORRECT ANSWER)

1. Some of the examples workers may exposed include, but not limited to:
   A. working on/near industrial refrigeration machinery rooms, equipment and/or piping
   B. working in petroleum refineries
   C. working with/near agricultural fertilizer
   D. working in industrial process facilities
   E. working in or around industrial meat packing plants
   F. All the above

2. Ammonia is colorless and has a strong pungent odor similar to your household cleaning ammonia. True or False?

3. Anhydrous Ammonia can cause harm if inhaled and/or if it comes into contact with the eyes or skin. True or False?

4. Some potential health effects of Anhydrous Ammonia are:
   A. Burning, tearing, temporary blindness and severe eye damage
   B. May cause severe burns and blistering to the skin
   C. May cause runny nose, coughing, chest pain, severe breathing difficulties, severe burns
   D. Skin and respiratory related diseases could be aggravated by exposure
   E. Death
   F. All of the above

5. What PPE is required when working with high levels of ammonia?
   A. Face shields and goggles or full face respirators
   B. Impervious gloves
   C. Impervious clothing
   D. All of the above

6. Safe work practices include:
   A. Utilize an air monitor with an ammonia sensor
   B. In case of a spill, leak or the air monitor alarms, leave the area immediately in a safe direction
   C. Wear personal protective equipment
   D. Hot work permitting procedures
   E. Purge all ammonia before welding, soldering, drilling or cutting
   F. Use proper ventilation
   G. Store ammonia separately from incompatible chemicals and away from heat and ignition sources
   H. All of the above

7. It is important to be aware of each site's specific emergency action plan. True or False?

8. The air monitor must have an ammonia sensor in it to be able to detect ammonia. True or False?

Printed Name: _____ **Trained by:** _____

Signature: _____ **Trained by Signature:** _____

Date: _____ **Location:** _____