Anhydrous Ammonia Basics

Anhydrous Ammonia is a compound formed through the combination of the two elements: nitrogen and hydrogen. The relationship between these elements is shown in the chemical symbol for anhydrous ammonia: NH_3 – with one part nitrogen and three parts hydrogen. The term anhydrous ammonia indicates that the ammonia water content is less than .2 percent. This differentiates it from the various widely used aqueous solutions of ammonia. At room temperature and atmospheric pressure, NH_3 is a colorless gas with a sharp and pungent odor. For economic purposes, Anhydrous Ammonia is usually transported and stored in a cooled and compressed liquid state.

About 4 million tons of NH_3 are used annually in directly applied soil applications in the United States. [Note 1] This constitutes approximately 80 percent of all ammonia produced in the United States. In agricultural applications, the nitrogen in ammonia is used to replenish soil fertility or as livestock feed supplements. NH_3 is widely used in the production of explosives. It is a necessary ingredient in the making of certain pharmaceuticals, textile fibers, and plastics. The compound is also used in the development of microfilm duplicates and in various petroleum and metal ore extracting operations.

Liquid anhydrous ammonia is lighter than water, the liquid has a specific gravity of .682 at -28°F. Gaseous anhydrous ammonia is lighter than air with a specific gravity of .597 at 32°F. At atmospheric pressure, NH_3 boils at -28°F. As the temperature rises, the vapor pressure increases rapidly. NH_3 vapor will ignite under atmospheric pressure conditions at a minimum temperature of 1562°F, but only in the very limited range of 16 to 25 percent of NH_3 vapor in air.

Anhydrous Ammonia has the potential to rapidly corrode copper, zinc, silver, and any alloy of each. It is therefore necessary to verify that these materials are not present in any pipe, pipe fittings, valves, gauges, regulators, relief valves, or any other piece of equipment that may come into contact with the ammonia. **For more detailed information regarding material restrictions and other safety requirements, refer to ANSI K 61.1[2] and your company safety manual as well as any local codes and ordinances which may apply.**

RegO® Products and NH3

Many RegO® Products are approved for use in anhydrous ammonia service. Suitable equipment has the “A”, “AA”, “TA”, or “SS” prefix in the model number. All RegO® equipment is suitable for service pressure in the temperature range of -40°F to 165°F. For a complete product listing, please refer to the A-102, L-102 or L-500 catalogs.

NH3 Safety Tips

1. Always have ample water available.
2. Always stay clear of hose and valve openings.
3. Always wear gloves and goggles around NH_3.
4. Always close valves and disconnect hoses when plant is unattended.
5. Always be sure pressure is relieved before disconnecting hose or parts.
6. Always use only approved NH_3 equipment.
7. Never fill a tank over 85% of capacity.
8. Never leave transfer operations unattended.
9. Never tamper with relief valves or other safety devices.
10. Never tow a trailer without securely connecting parts and safety chains.

[1] Handbook of compressed Gases Compressed Gas Association, Inc., Arlington, VA

[1] Handbook of Compressed Gases,Compressed Gas Association, Inc., Arlington, VA.

[2] American National Standard Safety Requirements for the Storage and Handling of Anhydrous Ammonia, American National Standards Institute, Inc., New York, NY.

Temperature °F	Pressure PSIG
-28	0
-20	3
-10	9
0	15
10	23
20	33
30	45
40	58
50	74
60	92
70	114
80	138
90	165
100	197
110	232
120	271
130	315

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