SAFETY DATA SHEET
Anhydrous Ammonia

Section 1. IDENTIFICATION

Product Name: Anhydrous Ammonia

Synonyms: Ammonia; Ammonia Gas, Anhydrous

Recommended use: Fertilizer, Refrigerant, Industrial Use
Restrictions on use: Use only as directed

Manufacturer: Iowa Fertilizer Company, LLC
3550 180th St.
Wever, IA 52658
319-376-4500
319-376-4700 (24 hour)

Emergency phone number: 800-424-9300 (Chemtrec)

Section 2. HAZARD(S) IDENTIFICATION

Classification:

Physical	Health	Environmental
Flammable Gas Category 2 Compressed Gas	Acute Toxicity Category 3 (Inhalation) Skin Corrosion Category 1B Eye Damage Category 1	Hazardous the Aquatic Environment Acute Toxicity Category 1 Hazardous the Aquatic Environment Chronic Toxicity Category 2

Label Elements:

Danger!
Flammable gas.
Contains gas under pressure; may explode if heated.
Toxic if inhaled.
Causes severe skin burns and eye damage.
May cause respiratory irritation.
Very toxic to aquatic life.
Toxic to aquatic life with long lasting effects.

Precautionary Phrases
Keep away from heat, sparks, open flames and hot surfaces. No smoking.
Do not breathe vapors, spray or mists.
Wash thoroughly after handling.
Use only outdoors or in a well-ventilated area.
Avoid release to the environment
Wear protective gloves, protective clothing, eye protection and face protection.
IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
Immediately call a POISON CENTER or doctor.
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with soap and water.
Wash contaminated clothing before reuse.
Immediately call a POISON CENTER or doctor.
IF INHALED: Remove person to fresh air and keep comfortable for breathing.
Immediately call a POISON CENTER or doctor.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do.
Continue rinsing.
Immediately call a POISON CENTER or doctor.
Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
Eliminate all ignition sources if safe to do so.
Collect spillage.
Protect from sunlight. Store in a well-ventilated place. Keep container tightly closed.
Store locked up.
Dispose of contents and container in accordance with local and national regulations.

Section 3. COMPOSITION / INFORMATION ON INGREDIENTS

Chemical name	CAS No.	Concentration
Anhydrous Ammonia	7664-41-7	99.5-99.8 % wt
Water	7732-18-5	0.2-0.5 % wt

Section 4. FIRST-AID MEASURES

Inhalation: Immediately remove victim to fresh air. If breathing is difficult, oxygen should be administered by qualified personnel. If breathing has stopped, administer artificial respiration. Get immediate medical attention.
Skin contact: Immediately flush skin with plenty of water for 20 minutes while removing contaminated clothing and shoes. Get immediate medical attention. Launder clothing before re-use. (Discard contaminated shoes).
Eye contact: Immediately flush eyes with plenty of water for at least 30 minutes while holding the eyelids apart. Remove contact lenses, if present and easy to do. Get immediate medical attention.
Ingestion: None expected due to physical form.

Most important symptoms/effects, acute and delayed: Contact with gas may cause severe eyes and skin irritation or burns. Permanent eye damage may occur. Toxic if inhaled. Inhalation of gas may cause burns to eyes, nose, throat, and lungs. Over exposure may cause central nervous system effects including unconsciousness and convulsions. May cause pulmonary edema.

Indication of immediate medical attention and special treatment, if necessary: Immediate medical attention is required if eye or skin contact occurs or if inhaled.

Section 5. FIRE-FIGHTING MEASURES

Suitable (and unsuitable) extinguishing media: Use water spray, carbon dioxide or dry chemical. Do not use foam.

Specific hazards arising from the chemical: Gas is flammable and may readily be ignited by static charge, sparks and flames. Gas may travel a considerable distance to a source of ignition and flash back. Gases may form explosive mixtures with air. Cylinders can burst violently when heated, due to excess pressure build-up. Combustion may produce oxides of nitrogen, ammonia and amines.

Special protective equipment and precautions for fire-fighters: Firefighters should wear full emergency equipment and NIOSH approved positive pressure self-contained breathing apparatus. Cool fire exposure containers with water. In case of fire, allow gas to burn if flow cannot be shut off immediately. Evacuate immediate area. Apply fire media as far a distance as possible. Use approved gas detectors in confined spaces.

Section 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment, and emergency procedures: Do not breathe gas. Prevent contact with skin and eyes. Isolate and evacuate area. Shut off source, if safe to do so. Isolate any leaking container. Ventilate the area. Eliminate all sources of ignition and provide maximum explosion-proof ventilation. Take precautionary measures against static discharges. Wear personal protective equipment as described in Section 8. Check oxygen and flammability content in confined areas before entering the spill area.

Environmental hazards: Avoid release into the environment. Report spill as required by local, state, and federal regulations.

Methods and materials for containment and cleaning up: Stop the leak if it can be done safely. Use water spray to minimize and disperse vapors.

Section 7. HANDLING AND STORAGE

Precautions for safe handling: Do not breathe gas. Prevent contact with skin and eyes. Use non-sparking tools and explosion-proof electrical equipment. Ground container and transfer equipment to eliminate static electric sparks. Before entering storage tanks and confined areas check the atmosphere for oxygen content and flammability. Contains gas under pressure. Handle in accordance with all current regulations and standards. Prevent contact with liquid. Use only with adequate ventilation. Obtain appropriate training prior to handling. Use equipment rated for cylinder pressure. Close valve after each use and always replace cylinder cap after use. When transporting cylinders, use appropriate dolly or handling techniques. Protect cylinders from physical damage; do not drag, roll, slide, or drop.

Always store and handle compressed gases in accordance with the Compressed Gas Association, Inc. pamphlet. Local regulations may require specific equipment for storage and use.

Empty containers retain residue and may be hazardous. Do not pressurize, cut, heat, weld, or expose such containers to sources of ignition.

Conditions for safe storage, including any incompatibilities: Store in a cool, well-ventilated place. Keep container tightly closed. Secure cylinders in an upright position at all times and keep all valves closed when not in use. Protect from physical damage. Secure cylinders from falling or being knocked over. Separate ammonia cylinders form oxygen, chlorine and other oxidizers. Storage area must meet national electric codes for Class 1 hazardous areas. Store only where temperatures will not exceed 125°F (52°C).

Section 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure guidelines:

ANHYDROUS AMMONIA	
U.S. Federal Regulations:	
OSHA PEL	TWA: 50 ppm (8 hours)
	TWA: 35 mg/m^3 (8 hours)
	STEL: 35 ppm (15 minutes)
	STEL: 27 mg/m^3 (15 minutes)
	IDLH: 300 ppm
ACGIH TLV	TWA: 25 ppm (8 hours)
	TWA: 17 mg/m^3 (8 hours)
	STEL: 35 ppm (15 minutes)
	STEL: 24 mg/m^3 (15 minutes)
NIOSH REL	TWA: 25 ppm (10 hours)
	TWA: 18 mg/m^3 (10 hours)
	STEL: 35 ppm (15 minutes)
	STEL: 27 mg/m^3 (15 minutes)

Appropriate engineering controls: If the recommended exposure limit is exceeded increased mechanical ventilation such as local exhaust may be required. Explosion proof equipment should be used.

Individual protection measures, such as personal protective equipment:

Respiratory protection: If exposure limits are exceeded or if oxygen levels are unknown or deficient, use a NIOSH approved supplied air respirator. Selection of respiratory protection depends on the contaminant type, form and concentration. Select in accordance with OSHA 1910.134 and good Industrial Hygiene practice.

Skin protection: Insulated work gloves and safety shoes are recommended for cylinder handling. Wear rubber or neoprene gloves and protective clothing if contact with the gas is possible.

Eye/face protection: Wear chemical safety glasses when handling cylinders. Wear safety goggles and face if contact with the gas is possible.

Other: Hard hats and hearing protection should be worn when working with pressurized containers or equipment. An emergency eye wash fountain and quick drench shower should be provided in the work area.

Section 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Colorless liquid or gas
Odor: Pungent odor considered suffocating.

Odor threshold: 1-50 ppm	**pH:** 10.6-11.6 (0.02-1.7% aqueous ammonia solution)
Melting point/freezing point: -108°F (-77°C)	**Boiling point:** -28.1°F **(**-33.4°C)
Flash point: Not applicable	**Evaporation rate:** Not available
Flammability (solid, gas): Flammable gas	
Flammable limits: LEL: 16%	**UEL:** 25%
Vapor pressure: 8.5 atm @ 68°F (20°C)	**Vapor Density:** 0.597 (at 32°F and 760 mm Hg)
Relative density: 0.62 @ 60°F (16°C)	**Solubility in Water:** Soluble
Partition coefficient: n-octanol/water: -1.14 @ 68°F (25°C)	**Auto-ignition temperature:** 1,204°F (651°C)
Decomposition temperature: Not available	**Viscosity:** 0.475 cP @ -92°F (-69°C)

Section 10. STABILITY AND REACTIVITY

Reactivity: Not reactive.
Chemical stability: Stable.
Possibility of hazardous reactions: None known.
Conditions to avoid: Avoid high temperatures (>800°F / 426°C). Cylinders should not be exposed to temperatures above 125°F (52°C).
Incompatible materials: Avoid metals such as copper, silver, cadmium, tin and zinc and their alloys, mercury, acids, alcohol, aldehydes, halogens and oxidizing agents.
Hazardous decomposition products: Thermal decomposition may produce nitrogen oxides, amines and ammonia.

Section 11. TOXICOLOGICAL INFORMATION

Inhalation: Inhalation of gas may cause burns to the nose, throat, and upper respiratory tract irritation with pain, coughing, wheezing, shortness of breath. Overexposure may cause central nervous system effects including unconsciousness and convulsions. May cause pulmonary edema.

Ingestion: Not a normal route of entry due to physical form.

Skin contact: Vapors or gas may cause severe irritation or burns. Contact with liquid may cause frostbite followed by caustic corrosive burns and dehydration.

Eye contact: Vapors or gas may cause severe irritation or burns. Permanent damage may occur.

Chronic effects: None known.

Reproductive Toxicity: None of the components have been shown to cause reproductive or developmental toxicity.

Mutagenicity: None of the components have been shown to cause mutagenic activity.

Carcinogenicity: None of the ingredients are listed as a carcinogen by IARC, NTP or OSHA.

Acute Toxicity Values:
Anhydrous ammonia: Inhalation rat LC50 4.925 mg/L/1 hr

Section 12. ECOLOGICAL INFORMATION

Ecotoxicity:
Anhydrous ammonia 96 hr LC50 Pimephales promelas 0.75-3.4 mg/L, 48 hr EC50 daphnia magna 101 mg/L
Ammonia toxicity depends on the pH and temperature of the media, as well as the amount of ammonia already present. Increasing pH, and temperature to a lesser degree, results in the presence of more un-ionized ammonia. Ammonia that is unionized is toxic to aquatic organisms at concentrations below 1 mg/L.

Persistence and degradability: Biodegradation is not applicable to inorganic substances.

Bioaccumulative potential: Log Pow -1.14 @ 25°C

Mobility in soil: Ammonium can be taken up by plants or adsorbed onto clay particles in the soil. Leaching or run-off may occur via cation exchange dependent on soil texture, clay content, pH and ionic strength of the irrigation water. Soil bacteria may convert ammonium to nitrate. Nitrate can be taken up by plants or denitrified again to yield nitrogen and nitrous oxide gas. Ammonia may also directly volatilize from the soil.

Other adverse effects: Ammonia has indirect and long-term effects on ecosystems, e.g. eutrophication, groundwater pollution and soil acidification due to the nitrification of ammonia.

Section 13. DISPOSAL CONSIDERATIONS

Dispose in accordance with all local, state and federal regulations. Return cylinder and unused product to supplier.

Section 14. TRANSPORT INFORMATION

	UN Number	Proper shipping name	Hazard Class	Packing Group	Environmental Hazard
DOT	UN1005	Ammonia, Anhydrous	2.2		RQ=100 lbs
TDG	UN1005	Ammonia, Anhydrous	2.2		

Transport in bulk (according to Annex II of MARPOL 73/78 and the IBC Code): Not applicable

Special precautions: The words "Inhalation Hazard" required on trailer and Bill of Lading.
STCC Code: 4904210

Section 15. REGULATORY INFORMATION

Safety, health, and environmental regulations specific for the product in question.

CERCLA: This product has a Reportable Quantity (RQ) of 100 lbs. (based on the RQ for Anhydrous Ammonia of 10 lbs). Releases above the RQ must be reported to the National Response Center. Many states have more stringent release reporting requirements. Report spills required under federal, state and local regulations
SARA Hazard Category (311/312): Acute Health, Fire Hazard, Sudden Release of Pressure Hazard
SARA 313: This Product does contains chemicals Subject to Annual Release Reporting Requirements Under **SARA Title III, Section 313 (40 CFR 372).**

Ammonia	7664-41-7	99.5-99.8%

EPA TSCA Inventory: All of the components of this product are listed on the Toxic Substances Control Act (TSCA) Chemical Substances Inventory.
Canadian CEPA: All of the ingredients are listed on the Canadian Domestic Substances List.

Section 16. OTHER INFORMATION

NFPA Rating:	Health = 3	Flammability = 1	Instability = 0
HMIS Rating:	Health = 3	Flammability = 1	Physical Hazard = 0

SDS Revision History: Added STCC Code in Section 14.
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