Safety Data Sheet

Martrex, Inc.

Section 1: Chemical Product and Company Information

Product name: Anhydrous Ammonia

Supplier/ Further Information: **Martrex, Inc.**

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Suite 535 MD 27,
Chaska, Minnesota 55318

Phone: 952/933-5000
Toll Free: 800/328-3627
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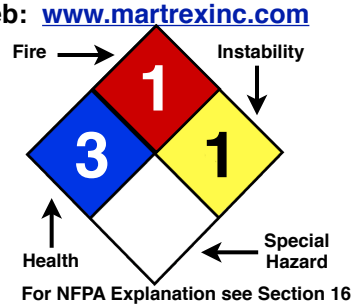
Web: www.martrexinc.com

EPA Registration Number: n/a
CAS#: 7664-41-7
Chemical Name: Anhydrous Ammonia
Synonyms: Ammonia; Ammonia Gas; Anhydrous, Liquified
Chemical Family: inorganic, gas
SDS Number: n/a



For NFPA Explanation see Section 16

24 Hour Emergency Phone - Chemtrec Transport: 1-800-424-9300; Medical: 1-800-441-3637

Section 2: Hazards Identification

Emergency Overview

Danger! **Stay upwind. Isolate the release area and deny entry. Evaluate the affected areas to determine whether to evacuate or shelter in place. Anhydrous ammonia causes severe eye injury, severe damage to lungs and respiratory system, and severe skin damage. Harmful or fatal if swallowed or inhaled. This product is acutely toxic by inhalation as defined by OSHA. This product is classified as an Inhalation Hazard (DOT) and can cause chemical burns. If spilled into a waterway, ammonia can be toxic to aquatic life and may cause eutrophication. See NAERG, Guide 125.**

GHS Classification:

Flammable gas,	**Category 1**	(H220)
Gas under pressure,	**Liquefied gas**	(H280)
Acute toxicity, inhalation	**Category 3**	(H331)
Skin corrosion/irritation,	**Category 1A**	(H314)
Serious eye damage/eye irritation,	**Category 1**	(H318)
Sensitization, respiratory	**Category 1**	(H334)
Germ cell mutagenicity,	**Category 2**	(H341)
Specific target organ toxicity, single exposure,	**Category 1**	(H370)
Specific target organ toxicity, repeated exposure,	**Category 2**	(H373)
Hazardous to the aquatic environment, acute hazard,	**Category 1**	(H400)
Hazardous to the aquatic environment, long term hazard,	**Category 1**	(H410)

GHS Label, Hazards and Precautionary Statements

GHS Pictogram:

(GHS Pictogram Hazards Definitions See Section 16)

Label Signal Word: **Danger!**

24 Hour Emergency Phone - Chemtrec: 1-800-424-9300 Transportation
1-800-441-3637 Medical

Hazard Statements:

Extremely flammable gas (H220)
Contains gas under pressure; may explode if heated (H280)
Toxic if inhaled (H331)
Causes severe skin burns and eye damage (H314)
Causes serious eye damage (H318)
May cause allergy or asthma symptoms or breathing difficulties if inhaled (H334)
Suspected of causing genetic defects (H341)
Causes damage to organs (H370)
May cause damage to organs through prolonged or repeated exposure (H373)
Very toxic to aquatic life (H400)
Very toxic to aquatic life with long lasting effects (H410)

Precautionary Statements:

Prevention:

Obtain special instructions before use. (P201)
Do not handle until all safety precautions have been read and understood. (P202)
Keep away from heat, sparks, open flame, and hot surfaces - No smoking.(P210)
Do not breathing dust/fume/gas/mist/vapor/spray (P260+P261)
Use only outdoors or in well-ventilated area (P271)
Do not eat, drink or smoke when using this product. (P270)
In case of inadequate ventilation wear respiratory protection. (P284)
Wash thoroughly after handling. (P264)
Wear protective gloves/protective clothing/eye protection/face protection. (P280)
Avoid release to the environment. (P273)

Response:

Leaking gas fire: Do not extinguish, unless leak can be stopped safely. (P377)
Eliminate all ignition sources if safe to do so. (P381)
IF INHALED: Remove person to fresh air and keep comfortable for breathing (P304+P340)
IF experiencing respiratory symptoms, call a Poison Control Center/ Doctor (P342+P311)
Specific Treatment see Section 4: First Aid Measures, Inhalation. (P321)
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
Wash contaminated clothing before reuse.(P303+P361+P353+P363)
Immediately Call a Poison Control Center/ Doctor (P310+P311)
Specific Treatment see Section 4: First Aid Measures, Skin Exposure. (P321)
IF SWALLOWED: Rinse mouth. **Do NOT** induce vomiting.(P301+P330+P331)
Immediately Call a Poison Control Center/ Doctor (P310+P311)
Specific Treatment see Section 4: First Aid Measures, Ingestion. (P321)
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.(P305+P351+P338)
Immediately Call a Poison Control Center/ Doctor (P310+P311)
Specific Treatment see Section 4: First Aid Measures, Eye Exposure.. (P321)
IF YOU FEEL UNWELL: Get medical attention. (P314)
If exposed or concerned, call a **Poison Center**/doctor... (P308+P311+P313)
Collect Spillage. (P391)

Storage:

Protect from sunlight. (P410)
Store in well-ventilated place. P403)
Keep container tightly closed. (P233)
Store locked up. (P405)

Disposal Considerations:

Dispose of content/container to hazardous or special waste collection point, in accordance with local, regional, national and/or international regulation. (P501)

Section 3: Composition/Information on Ingredients

Hazardous Component	CAS#	%	OSHA (final) TWA	OSHA (vacated) STEL
Ammonia	7664-41-7	99%+	50ppm(35mg/m^3)	35ppm(24mg/m^3)

ACGIH TWA	ACGIH STEL	NIOSH TWA	NIOSH STEL
25ppm(17 mg/m^3)	35ppm(24mg/m^3)	25ppm(17 mg/m^3)	35ppm(24mg/m^3)

Non-Hazardous Component	CAS#	%
Water	7732-18-5	trace

Section 4: First Aid Measures

Inhalation: Remove from area of exposure immediately. GET MEDICAL ATTENTION IMMEDIATELY. Exposure to ammonia vapor causes both immediate and delayed effects, which may be serious. See Section 2.

Eye Exposure: Wash eyes IMMEDIATELY and thoroughly (for 30 minutes). Hold eyelids apart to ensure complete irrigation of all eye and eyelid tissues. GET MEDICAL ATTENTION IMMEDIATELY.

Skin Exposure: Flush skin immediately and thoroughly (for 20 minutes), while removing contaminated clothing. GET MEDICAL ATTENTION IMMEDIATELY.

Ingestion: Drink large amounts of water, DO NOT INDUCE VOMITING. NEVER give anything by mouth to an unconscious person. GET MEDICAL ATTENTION IMMEDIATELY.

NOTE TO THE PHYSICIAN: Pneumonitis should be anticipated after inhalation or ingestion. If severe exposure is suspected, observe for 48-72 hours for delayed pulmonary edema. Do not apply salves or ointments for first 24 hours.

Section 5: Fire Fighting Measures

Flammability Classification:

NFPA= 1
HMIS = 1
DOT= Nonflammable Gas
Flash Point: Not Applicable
Auto-ignition Temperature: 1204ºF
Lower explosion limit (LEL): 16% by volume, in air
Upper explosion limit (UEL): 25% by VOlume, in air
Extinguishing Media: Use water fog or spray.
Unusual Fire and Explosive Hazards: Airborne concentrations between 16-25% can explode when exposed to an ignition source. See Section 10 for Chemical Incompatibilities.
Hazardous Decomposition Materials: Nitrogen oxides, hydrogen
Special Procedures:

Fire-Fighting Instructions: Stopping the flow of gas is recommended when escaping gas is ignited, rather than extinguishing the fire. Use water spray to allow personnel access to shut off valves. Keep containers cool by application of water spray. Do not put water on liquid ammonia. Mixing of liquid ammonia and water will generate heat and vapors. Do not release runoff from fire control methods to sewers or waterways. See NAERG, Guide 125.

Personal Protective Equipment: Because of ammonia presence and the potential that the fire may produce toxic decomposition products, wear chemical resistant suit, gloves, boots, and a self-contained breathing apparatus (SCBA) with a full face piece operated in positive-pressure mode. Suits must be rated for use with anhydrous ammonia.

CAUTION: Normal fire fighting gear does not provide adequate protection. Liquid ammonia can cause PPE to become brittle and crack.

Section 6: Accidental Release Measures

Spill and Leak Procedures: Wear chemical resistant suit, gloves, and boots or a fully encapsulated suit rated for use with anhydrous ammonia, based on spill/leak volume and conditions. Wear a self-contained breathing apparatus (SCBA) with a full face piece. Stop the leak if possible. Use water spray to control vapors. See Section 10 for Chemical Incompatibilities.

Containment of Spill: **SMALL SPILLS:** Use water spray to control vapors. Dilute with water. Do not release into sewers or waterways. **LARGE SPILLS:** Place dirt berms or other barriers down gradient to prevent loss into sewers or waterways. DO NOT USE MOBILE EQUIPMENT OR INTRODUCE A POTENTIAL IGNITION SOURCE IN AREAS OF AMMONIA VAPOR CONCENTRATIONS BETWEEN LEL & UEL. Use water fog or spray to absorb ammonia vapors.

Cleanup and Disposal of Spill: Recovery of liquid ammonia should only be conducted by highly trained personnel.

Environmental and Regulatory Reporting: Follow applicable OSHA regulations (29 CFR 1910.120) to protect workers during cleanup. See Section 15 for additional regulatory requirements. Additional information is available in the NAERG, Guide 125.

Section 7: Handling and Storage

Minimum/maximum Storage Temperature: Protect storage containers from excessive temperatures.

Handling: Wear splash proof chemical goggles, ammonia resistant gloves, and protective clothing as a minimum while handling ammonia. Additional full-face protection is recommended. Respiratory selection should be based on known or anticipated exposure levels. See Section 8 for additional information. CAUTION: Liquid ammonia can cause PPE to become brittle and crack.

Storage: Protect storage containers from impact and excessive temperatures. Use only system components and containers rated for use with anhydrous ammonia. Zinc, copper, silver, cadmium, and their alloys should not be used in ammonia systems due to their potential for rapid corrosion when exposed to ammonia. Storage systems must have adequate pressure relief valves. Refer to the current ANSI K61.1 Standard, Safety Requirements for the Storage and Handling of Anhydrous Ammonia for additional information.

Shelf Life: Indefinite

REGULATORY REQUIREMENTS: See Section 8 for employee exposure controls and Section 15 for other regulatory requirements.

Section 8: Exposure Controls / Personal Protection

Ventilation Protection: Provide general or local exhaust ventilation systems or other engineering controls to maintain airborne concentrations below regulatory levels (See Section 15).

Respiratory Protection (specify type)**:** If concentrations exceed recommended exposure levels, use a NIOSH-approved ammonia vapor respirator suitable for the exposure conditions (as a minimum level of protection). Seek professional advice prior to respirator selection and use. Follow OSHA respirator regulations (29 CFR 1910.134). Select respirator based on its suitability to provide adequate worker protection for given working conditions, level of airborne contamination, and presence of sufficient oxygen. WARNING! AIR-PURIFYING RESPIRATORS DO NOT PROTECT WORKERS IN OXYGEN DEFICIENT ATMOSPHERES. If respirators are required, OSHA requires a written respiratory protection program that includes at least: medical certification, training, fit-testing, periodic environmental monitoring, maintenance, inspection, cleaning, and convenient, sanitary storage areas.

Eye Protection: Wear protective splash proof safety goggles and face protection, per OSHA eye- and face protection regulations (29 CFR 1910.133). Contact lenses should not be worn while handling anhydrous ammonia.

Skin Protection: Wear chemical resistant gloves and boots (such as neoprene or rubber) and appropriate chemical resistant clothing to prevent skin contact.

Other Protective Clothing and Equipment: SAFETY STATIONS: Make emergency eyewash stations and showers available in the immediate work area. Agricultural distribution requires shower and/or > 100 gallons fresh water in open top container. Field transportation requires >5 gallons of fresh water.

Hygienic Work Practices: Decontaminate and air dry all contaminated personal protective equipment prior to storage and inspection for possible reuse. Separate heavily contaminated work clothes from street clothes. Launder before reuse. COMMENTS: Practice good personal hygiene during and after use of this material, especially before eating, drinking, smoking, using the toilet, or applying cosmetics.

Section 9: Physical and Chemical Properties

Chemical Name: Anhydrous Ammonia
Physical State: Gas under atmospheric conditions, liquid under pressure
Color and Appearance: Colorless gas or clear liquid.
Odor: Sharp, irritating, pungent odor.
Odor Threshold: 25 ppm (in air)
pH (in water)**:** 11.6 (1 N), 11.1 (0.1 N), 10.6 (0.01N)
Specific Gravity: n/a
Vapor Pressure, 8.5 atm @ 20ºC
Vapor Density: (Air=1): 0.5967
Density: Gas=0.7710 g/L; Liq=0.6818 g/L(-33.4ºC/1 atm)
Volatiles by Volume: 100%
Boiling Point: -33.35ºC
Softening Point: n/a
Melting Point: -77.7ºC
Evaporation Rate: n/a
Solubility in water 42.8% (0ºC) Hydroscopic material
Other Solubilities: Soluble in alcohol, ether, organic solvents
Chemical Formula: NH_3
Formula Wt: 17.03

Section 10: Stability and Reactivity

Chemical Stability: Stable__X__ Unstable____
Hazardous Polymerization: May Occur____
Will Not Occur__X__
Conditions to Avoid: Exposure to elevated temperatures and fire.
Chemical Incompatibility: Strong acids, oxidizing gases. Under certain conditions ammonia reacts with chlorine, bromine, fluorine, or iodine (halogens) to form compounds that explode spontaneously. May form explosive compounds on contact with gold, silver, mercury, or hypochlorite. Reacts with copper, copper alloys, aluminum alloys, and galvanized surfaces.
Hazardous Decomposition Products: Nitrogen oxides, hydrogen.

Section 11: Toxicological Information

Acute Data

Eye Effects: 100-200 ppm -- moderate to severe
200-1000 ppm -- eye damage
Skin Effects: Liquid Ammonia = severe burns
Ammonia Vapor = mild to severe irritation, relative to exposure concentration & duration
Oral LD_{50}(rat): No data (Not a likely route of exposure.)
Dermal LD_{50}: no data
Inhalation LC_{50}(rat): 4230 - 19960 mg/m3/1-hr ; This product has been determined to be acutely toxic per the criteria of OSHA 1910.1200, Appendix A.
Skin Sensitization: no data

Chronic Data

Chronic Effects: See Section 2
Chronic Toxicity Studies: no data
Mutagenicity Data: no data
Reproductive and Teratological Data: no data
Carcinogenicity Data: (See NIOSH, RTECS BO 0875000 for additional information)
NTP: no data **OSHA:** no data **IARC Monograph:** no data **Not Listed:**

Section 12: Ecological Information

Eco-acute Toxicity: Ammonia in elevated concentrations can cause vegetation kill and contribute to eutrophication. Ammonia has been determined to be slightly toxic to aquatic organisms per USEPA criteria.

Environmental Fate: Ammonia is a naturally occurring compound. Ammonia in soil can be rapidly transformed to nitrate by the microbial population through nitrification. The nitrate form will either leach through the soil or be taken up by plants or other organisms. In water ammonia can undergo sequential transformation by two processes in the nitrogen cycle, nitrification and denitrification, which would produce ionic nitrogen compounds, and from these, elemental nitrogen.

Section 13: Disposal Considerations

Disposal Procedures: Contact federal or state regulatory agencies for acceptable disposal/use of the recovered materials. Ammonia contaminated water from vapor control may be suitable for use as fertilizer or may need to be sent to a waste treatment facility.

Disposal Regulatory Requirements: Follow applicable Federal, state, and local regulations if disposal is necessary.

Container Cleaning And Disposal: Not applicable.

Section 14: Transport Information

DOT Transportation Data (49 CFR 172.101):
Proper Shipping Name: Ammonia, anhydrous
Hazard Class: 2.2
ID NO.: UN1005
Packing Group: n/a
LABEL: Nonflammable Gas with "Inhalation Hazard" marking (See 172.102, Special Provision 13)
PLACARD: Nonflammable Gas with "Inhalation Hazard" marking (See 172.102, Special Provision 13)

Section 15: Regulatory Information

EPA Regulations:
RCRA Hazardous Waste Number (40 CFR 261.33): Not listed
CERCLA Hazardous Substance (40 CFR 302.4)**:** Yes
CERCLA Reportable Quantity (RQ): 100 lbs.
SARA 311/312 Codes: Yes-Acute**,** Sudden Release of Pressure.
SARA Toxic Chemical (40 CFR 372.65)**:** Yes
SARA EHS (Extremely Hazardous Substance) (40 CFR 355): Yes
SARA EHS Threshold Planning Quantity (TPQ): 500 lbs.
CAA/RMP (Toxic Substances) (40 CFR 68.130): Yes, Ammonia (anhydrous)
CAA/RMP (TQ): 10,000 lbs.
OSHA Regulations:
AIR CONTAMINANT (29 CFR 1910.1000, Table Z-1, Z-1-A): OSHA, ACGIH, and NIOSH data for ammonia follows:
OSHA (final): TWA = 50 ppm (35 mg/m^3); **OSHA (vacated): STEL** = 35 ppm (24 mg/m^3)
ACGIH: TWA = 25 ppm (17 mg/m^3), **STEL** = 35 ppm (24 mg/m^3)
NIOSH: TWA = 25 ppm (17 mg/m^3), **STEL** = 35 ppm (24 mg/m^3)

IDLH = 300 ppm
Process Safety Management (29 CFR 1910.119): Yes
Threshold Quantity (TQ): 10,000 lbs.
Storage And Handling Of Anhydrous Ammonia (29 CFR 1910.111): Yes

State Regulations: This product is regulated in commerce by state agricultural and/or consumer protection laws. This product is listed in various state Right-to-know, worker protection, and/or environmental protection laws. If you are unable to determine the proper status of this product under your respective state laws contact the manufacturer.

Section 16: Other Information

ACGIH - American Conference of Governmental Industrial Hygienists
ANSI - American National Standards Institute
CAS - Chemical Abstracts Service
CERCLA - Comprehensive Environmental Response, Compensation & Liability Act of 1980
CFR - Code of Federal Regulations
CHEMTREC - Chemical Transportation Emergency Center
CPR - Controlled Products Regulations
CWC - Chemical Weapons Convention
DOT - U.S. Department of Transportation
DSL - Canadian Domestic Substance List
EHS - Extremely Hazardous Substance
EPA - U.S. Environmental Protection Agency
HMIS - Hazardous Material Identification System
IARC - International Agency for Research on Cancer
IDLH - Immediately dangerous to life or health
LEL/UEL - Lower and Upper Explosive Limit
NAERG - North American Emergency Response Guidebook
NIOSH - National Institute of Occupational Safety and Health
NFPA - National Fire Protection Association
NTP - National Toxicology Program
OSHA - Occupational Safety and Health Administration
PEL - Permissible Exposure Limit (set by OSHA)
PPE - Personal Protective Equipment
RCRA - Resource Conservation and Recovery Act of 1976
RTECS - The Registry of Toxic Effects of Chemical Substances
SARA - Superfund Amendments and Reauthorization Act
SDS - Safety Data Sheet

GHS Pictograms and Hazards

Health Hazard	Flame	Exclamation Mark
		
• Carcinogen • Mutagenicity • Reproductive Toxicity • Respiratory Sensitizer • Target Organ Toxicity • Aspiration Toxicity	• Flammables • Pyrophorics • Self-Heating • Emits Flammable Gas • Self-Reactives • Organic Peroxides	• Irritant (skin and eye) • Skin Sensitizer • Acute Toxicity (harmful) • Narcotic Effects • Respiratory Tract Irritant • Hazardous to Ozone Layer (Non-Mandatory)
Gas Cylinder	**Corrosion**	**Exploding Bomb**
		
• Gases Under Pressure	• Skin Corrosion/ Burns • Eye Damage • Corrosive to Metals	• Explosives • Self-Reactives • Organic Peroxides
Flame Over Circle	**Environment** (Non-Mandatory)	**Skull and Crossbones**
		
• Oxidizers	• Aquatic Toxicity	• Acute Toxicity (fatal or toxic)

24 Hour Emergency Phone - Chemtrec: 1-800-424-9300 Transportation
1-800-441-3637 Medical

STEL - Concentration to which workers can be exposed continuously for a **short** period of time without suffering from irritation, irreversible tissue damage or narcosis of sufficient degree to increase the likelihood of accidental injury, impair self-rescue or materially reduce work efficiency.

TDG (Canadian)**:** Transport of Dangerous Goods Regulations

TLV - Threshold Limit Value (set by ACGIH)

TWA - 8-hour Time Weighted Average

TSCA - US Toxic Substance Control Act

WHMIS - Workplace Hazardous Material Information System

NFPA Rating Explanation Guide

Rating Number	Health Hazard	Flammability Hazard	Instability Hazard
4	Can be lethal	Will vaporize and readily burn at normal temperatures	May explode at normal temperatures and pressures
3	Can cause serious or permanent injury	Can be ignited under almost all ambient temperatures	May explode at high temperature or shock
2	Can cause temporary incapacitation or residual injury	Must be heated or high ambient temperature to burn	Violent chemical change at high temperatures or pressures
1	Can cause significant irritation	Must be preheated before ignition can occur	Normally stable. High temperatures make unstable
0	No Hazard	Will not burn	Stable

Rating Symbol	Special Hazard
ALK	Alkaline
ACID	Acidic
BIO	BioHazard
COR	Strong Corrosive
CRYO	Cryogenic
OXY	Oxidizer
☢	Radioactive
W	Reacts violently or explosively with water
W OX	Reacts violently or explosively with water or oxidizer

This chart for reference only - For complete specifications consult the NFPA Standard

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