PROFERTIL

SAFETY DATA SHEET

PRODUCT	Personal Protection Equipment
AMMONIA	 **Gloves**  **Safety classes**  **Full mask with filter**  **Self-contained breathing apparatus**  **Encapsulated suit Level A**

SECTION 1 PRODUCT IDENTIFIER

SGA product identifier AMMONIA

Other means of identification Anhydrous ammonia, volatile alkali, nitrogen trihydride

Uses
Fertilizer, fertilizer preparation, manufacturing
Of compounds with nitrogen
Both organic and inorganic, coolant, synthetic fibers, neutralizing agent, preparation of explosives

24 HOUR EMERGENCY TELEPHONE NUMBERS
(0291) 459-8188 - (0291) 459-8008 - Security
(0291) 154-050419 - EH&S
(0291) 459-8196 - Medical service

MANUFACTURER
Profertil S.A.
Fertilizer Plant, Port of Ing. White -
Zona Cangrejales, Bahía Blanca,
Argentina

DISTRIBUTORS
Profertil S.A.
Fertilizer Plant, Port of Ing.
White – Zona Cangrejales, Bahía Blanca,
Argentina

SECTION 2 HAZARD IDENTIFICATION

	Classification		Labeling				
			Pictogram				
	Type of hazard	Category of hazard	SGA	Rules United Nations Model	Signal word	Hazard statement	Hazard identification code
Classification of the substance	**Flammable gases**	2	No Pictogram	Not required	Attention	Flammable gas	H221
	Pressurized gases	Compressed gas			Attention	It contains pressurized gas, it can explode if heated	H280
	Corrosive substances and blends for metals	1			Attention	It can be corrosive for metals	H290
	Corrosion / Skin irritation	1B			Danger	Causes severe skin burns	H314
	Sever eye injuries / Eye irritation	1		Not required	Danger	It causes eye injuries accidents	H318

PROFERTIL

Classification of the substance	**Acute toxicity**	3			Danger	Toxic if inhaled	Inhalation: H331
	Short-term (acute) danger to the aquatic environment	Acute 1			Attention	Very toxic to aquatic organisms.	H400
Summary	Corrosive. It is considered toxic by inhalation. Harmful in contact with skin. Contact with eyes may cause irritation with possible burning and permanent blindness. Affected organs: lungs, central nervous system, skin and eyes.						
Prudent advice	P280: Wear protective gloves/clothes/glasses/mask P210: Keep away from heat sources, open flame, or hot surfaces - No smoking P273: Avoid release into the environment. P304+P340+P315: IN CASE OF INHALATION: Transport victim outdoors and keep at rest in a position comfortable for breathing. Consult a doctor immediately. P303+P361+P353+P315: IN CASE OF SKIN (or hair) CONTACT: Remove immediately the contaminated garments. Wash with water or take a shower. P305+P351+P338+P315: IN CASE OF CONTACT WITH EYES: Wash carefully with water for several minutes. Remove contact lenses, if you wear them and it's easy. Continue to wash. Consult a doctor immediately.						

SECTION 3 Composition/information on ingredients

Composition: Pure **Commercialization:** Liquid

Chemical name	Synonyms	CAS Number	Chemical family	Formula	Composition (% by weight)
Ammonia	Anhydrous ammonia, volatile alkali Nitrogen trihydride	7664-41-7	Inorganic gas	NH_3	>99.6
Water		7732-18-5		H_2O	<0.4

SECTION 4 FIRST AIDS

Eye contact	Wash with plenty of water, at least for 30 minutes. Lift and separate the eyelids to ensure the removal of the chemical. If irritation persists, repeat the washing. Seek medical attention immediately.
Skin contact	Remove contaminated clothing and shoes. Wash the affected area with plenty of water for at least 30 minutes. If irritation persists, repeat the washing. Seek medical attention immediately.
Inhalation	Move the affected person to a properly ventilated area. If not breathing, give artificial respiration (avoid mouth-to-mouth). If breathing is difficult, give oxygen. Keep victim warm and at rest. Request immediate medical attention.
Ingestion	Not applicable (the compound is gaseous at ambient temperature)

SECTION 5 FIRE FIGHTING MEASURES

Suitable extinguishing media	Dry chemical powder, foam, carbon dioxide or water in the form of a mist. Abundant water should be provided in the form of a mist forming a curtain of water applied in the direction of the wind. Extinguishing agent for fire A, B or C. Do not direct the water jet directly at the leak. The addition of water heats the cryogenic liquid resulting in increased evaporation.

Specific hazards	Flammable. It is combustible under specific conditions. Containers can explode when heated. Forms flammable mixtures with air. Combination with certain incompatible materials may cause explosion. Slightly explosive in presence of reducing materials (hypochlorites or other halogenated compounds). Toxic and irritating fumes (nitrogen oxides) are generated during a fire.
Special measures for firefighting teams	Evacuate the danger area. Position yourself crosswise to the wind direction. Fire managers should use self-contained breathing apparatus and structural firefighting equipment, positioned with the wind behind them. If there is no risk of fire, stop the leak. Cool containers exposed to fire by applying water in the form of a curtain or mist from a safe distance. Collect water used in fire fighting for later reuse or treatment.
SECTION 6 ACCIDENTAL RELEASE MEASURES	
Personal precautions, protective equipment and emergency procedure.	Apply Emergency Response Procedure. Evacuate or isolate the danger area within a minimum radius of 80 m if the spill is small and more than 150 m in the case of a major spill. Evacuate or protect all persons downwind between 800 m (if daytime) and 2.3 km (if nighttime). Ask the authorities that people in the radius involved remain in closed places (closed doors and windows) until the emergency is over. Eliminate all sources of ignition. Position yourself crosswise to the wind. Use ammonia-resistant encapsulated suit (level A) and self-contained breathing apparatus.
Environmental precautions	Avoid spilled material from entering drains, surface waterways, groundwater, soil, etc.
Methods and materials for containment and clean-up	Counteract the vapors with water in the form of a mist or curtain. Remove the cylinders to a safe place, outdoors in open areas, in case the leak cannot be stopped. Keep the cylinders with the leak pointing upwards to prevent liquid from escaping. If liquid escapes, it quickly reaches a very low temperature, due to its rapid evaporation. Collect the ammonia water for later reuse or treatment.
SECTION 7 HANDLING AND STORAGE	
Precautions for safe handling	Always use personal protection even if your exposure or activity with the product is short. Handle the elements with waterproof PVC protective gloves, safety masks and protective suits for anhydrous ammonia, Level 3 and 4 (Mists and splashes). Maintain strict hygiene standards, do not smoke or eat in the workplace. Know where the emergency response equipment is located. Read the label instructions before using the product. Label containers properly. Keep ammonia containers isolated and protected.
Safe storage conditions	Cool, dark, dry and ventilated places along the floor and ceiling. Protect from moisture. Store in containers other than aluminum or galvanized steel. Away from heat and ignition sources (steam pipes, radiators, etc.). Separate from incompatible materials. Label containers properly and keep them tightly closed. Can be stored under high pressure, refrigerated at low pressure, or as aqueous ammonia in low pressure tanks. For permanent storage the containers should be located at least 16 meters away from excavations or any source of potable water supply. Ventilation equipment should be corrosion resistant. Electrical and lighting equipment must be explosion-proof.

SECTION 8 Exposure controls/personal protection	
Control parameters	ACGIH TLV-TWA: 25 ppm – 17,4 mg/m^3 ACGIH TLV-STEL: 35 ppm – 24,3 mg/m^3 OSHA PEL (Gen Indu) 8H TWA 50 ppm (35 mg/m^3) REFERENCE: "Code of Federal Regulations (CRF) 29:1910.1000,1994. NIOSH REL AMMONIA - air: 10H TWA 25 ppm; STEL 35 ppm, IDLH 300 ppm. Res. MTySS 295/2003 (Argentine). CMP: 25 ppm Res. MTySS 295/2003 (Argentine). CMP-CPT [CMP-C]: 35 ppm Guidelines for planning AIHA's emergency response ERPG-1:<25 ppm for 1 hour. Objectionable smell ERPG-2: 25 - 200 ppm for 1 hour. Strongly objectionable odor, some eye, nose and throat irritation ERPG-3: 200 - 1,000 ppm for 1 hour. Severe eye and respiratory irritation, may cause various symptoms up to death.
Appropriate technical controls	Control of process conditions must be rigorous, with adequate systems for storage, transfer and use. Local and general ventilation, to ensure that the concentration does not exceed occupational exposure limits. This equipment should be corrosion-proof. Showers and eye wash stations and adequate space for confinement of people should be available.
Individual protection measures, Personal protection Equipment (PPE)	**Eyes and face**: Full face mask with ammonia filters, or semi-mask with Filter for ammonia with Safety glasses for chemicals Do not use contact lenses **Skin**: Gloves, boots and waterproof clothing butyl, nitrile, neoprene or polyvinyl chloride **Respiratory:** Breathing apparatus with filter for ammonia vapors. **In case of emergency:** Self-contained breathing apparatus and level A encapsulated suit in presence of high ammonia concentrations. Air supplied by a portable tube

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES			
Physical status and appearance	Cryogenic liquid or gas	**Higher /lower flammability or explosiveness limits**	Lower limit: 15.5% Upper limit: 27%
Color	Colorless	**Vapor pressure**	6657 mmHg at 21 ºC 7,598 mmHg at 26 ºC
Odor	Penetrating characteristic	**Vapor density**	0.6 (air 1)
Odor threshold	0.7 / 50 ppm	**Solubility**	Soluble in water (38% at 20 ºC), partially soluble in methanol. Scarcely soluble in diethyl ether, n-octanol and acetone.
pH	11.6 (aqueous solution at 25ºC)	**Distribution coefficient n-octanol/water**	More soluble in water
Melting/ Freezing point	-77.7 ºC	**Autoignition temperature**	651 ºC
Initial point and boiling interval	-33.4 ºC	**Decomposition temperature**	Not available
Flash point	Not applicable	**Liquid density**	0.683 kg/l (1 atm)
Evaporation rate	Not available	**Gas density**	0.723 g/l (20° C 1 atm)
Flammability	Flammable liquid and vapors)	**Viscosity**	0.317 cp at -50 ºC

SECTION 10 STABILITY AND REACTIVITY	
Chemical stability	Stable under normal storage and handling conditions
Possibility of hazardous reactions	Reacts with halogens (bromine, chlorine), alkaline metals, strong oxidizing agents, strong acids, amides, aldehydes, organic anhydrides. It forms shock-sensitive compounds with silver, mercury and gold oxides, which once dry can explode. Reacts violently with boron halides.
Conditions to avoid	Minimize contact with material. Avoid inhalation of the material or combustion by-products. Avoid all sources of ignition or heat. Do not place in contact with oils or combustible materials, acids and other incompatible materials.
Incompatible materials	It corrodes copper, galvanized steel, aluminum, zinc and its alloys, lead and bronze.
Hazardous decomposition products	By effect of combustion it can produce nitrogen oxides (NOX), hydrogen and nitrogen.
Special observations	Polymerization does not occur.
SECTION 11 TOXICOLOGICAL INFORMATION	
Acute toxicity	Ammonia in a gaseous or liquid state is very corrosive to body surfaces, reacting to contact with body moisture. The odor threshold can range from 0.7 to 50 ppm for accustomed people. Generally, concentrations below 25 ppm are tolerable despite the unpleasant and pungent smell. Above this concentration, irritation of the eyes, nose and throat begins. The eye and throat irritation is most profound between 100 and 400 ppm. Above 400 ppm, skin irritation is visually noticeable and immediately leads to throat irritation and coughing. NIOSH has established 300 ppm as an immediately dangerous to health or life concentration (IDLH), which is defined as the concentration above which self-evacuation may be difficult or impossible due to psychological effects. At concentrations between 1,000 ppm and 2,500 ppm, chest tightness increases, resulting in bronchospasm and severe eye and skin irritation. Late effects such as chemical pneumonitis and lung edema may develop several hours after exposure. At concentrations above 2,500 ppm, laryngeal spasm may occur causing suffocation. The effects may be more pronounced in children, the elderly and persons with impaired lung function, even at lower concentrations. At higher concentrations it can cause death. LC_{50}/30 min (inhalation, rats) = 7,040 mg NH_3 per m^3 of air LC_{50}/1h (inhalation, mouse) = 4,230 mg NH_3 per m^3 of air. DL_{50} (oral, male rat) = 350 mg NH_3 per kg of living being
Skin corrosion / irritation	Liquid or concentrated ammonia can cause liquefaction necrosis and deep penetration burns. Exposure may result in damage from skin injury.
Severe eye injuries	Corneal damage. Irritation, blisters and burns. Contact with liquid ammonia causes blindness.
Respiratory or skin sensitization	Symptoms can be retarded. Irritating to nose and throat, burning sensation. Causes coughing, nausea, cold, chest pain and difficulty breathing.
Mutagenicity in germ cells	Not mutagenic.
Carcinogenicity	Not carcinogenic.
Reproductive toxicity	Not available

Target Organ Specific Systemic Toxicity - Single Exposure	Not available
Specific target organ toxicity - Repeated exposures	Repeated exposure to the gas may cause irritation of the eyes, nose and respiratory tract. Workers exposed to a Workers exposed to ammonia may develop tolerance to the irritating effects. Continuous exposures to 70 ppm may be tolerated without adverse effects Daily exposures to concentrations between 97 - 122 ppm cause respiratory impairment and eye irritation.
Aspiration hazard	Severe exposure causes pulmonary edema and death. The substance can be absorbed by inhalation.
SECTION 12 ECOTOXICOLOGICAL INFORMATION	
Toxicity	Very toxic to aquatic organisms. Free ammonia concentrations of 2.5 mg/l at pH 7.4 to 8.5 are considered harmful to marine life. LC_{50}/48 h Daphnia Magna 0.53 ppm. LC_{50}/96 h Fish 0.89 mg/l.
Persistence and degradability	The substance is readily biodegradable and is not persistent.
Bioaccumulative potential	Low bioaccumulation potential. $LogP_{OW}$: 0.23.
Mobility in soil	Not available
Other adverse effects	It can cause changes in the pH of aqueous ecological systems.
SECTION 13 PRODUCT DISPOSAL CONSIDERATIONS	
Methods	Reuse the product if possible, to use it for agricultural purposes, taking into account that it is a corrosive and reactive product.
Handling	The corresponding PPE for handling should be used. Discharge into surface water or groundwater should be avoided.
Treatment	Depending on the type of contamination, contact EH&S staff on call. If the material cannot be recovered and/or reused, it must be treated as hazardous waste.
SECTION 14 TRANSPORT INFORMATION	
International rules	Mercosur Agreement on the Transport of Hazardous Goods. National Transit Law 24.499 National Law on Hazardous Waste 24,051 General Regulations for the Transport of Hazardous Goods, DEC 779/95 Resolution 195/97 Technical Standards
Special Transport provisions	White toxic gas label. Do not transport with explosive substances, flammable liquids, spontaneously burning solids, oxidizing substances, organic peroxides, substances with fire risk, no food.
Environmental risks	IMGD/IMO: 2.3 (8). P200.  ADN: 1005. Anhydrous ammonia 2 RID/ADR: 
UN Number	1005
UN shipping name designation	Anhydrous ammonia

Types of Hazard for transport	8
Packing group	-
Bulk transport according to annex II of Marpol 73/78 agreement and IBC Code	Not applicable
SECTION 15 REGULATORY INFORMATION	
Other regulations	Mercosur Agreement on the Transport of Hazardous Goods National Transit Law No. 24.449 National Law on Hazardous Waste 24051 Resolution 195/97 Technical Rules Dec. Nº 351/79 Resolution MTySS 295/2003 Resolution SRT 801/2015. SGA - Globally Harmonized System of Classification and Labeling of Chemicals 5th Edition Revised United Nations, New York and Geneva, 2013 TOMES Plus®, Vol 28, January 1996 Micomedex Inc.
SECTION 16 Other information	
Glossary	GHS: Globally Harmonized System ACGIH: American Conference of Industrial Hygienists (USA) AIHA WEEL: Environmental exposure level of American Industrial Health Association (USA) Carcinogenic: It is said of the physical, chemical or biological agent that induces cancer development. CAS: Chemical summary Service CL50 Median Lethal concentration Median CNRT: National committee of transport Regulation DL50 Median lethal dose EPA: Environmental Protection Agency (USA) IARC: International Agency for Research Of Cancer Mutagenic Substance or agent that alters permanently the cell DNA. STEL: Concentration to which workers may be continuously exposed for a short period of time without suffering irritation, irreversible tissue damage or narcosis NIOSH: National Institute of Health and Occupational Safety (USA) ERPG: Guides for planning of emergency response PPE: Personal Protection Equipment OCD: Organization for Cooperation and Development OSHA: Industrial Occupational Safety and Health Administration (USA) Teratogenic: That generates malformations PEL: Limit of allowable exposure TLV: Threshold limit value TWA: Time weighted average IATA International Air Transport Association IMDG: International maritime code of hazardous goods IMO: International maritime organization ADN: European Agreement on International Carriage of Dangerous Goods by Inland Waterways RID: Rules for International carriage of hazardous goods by railroad ADR: European Agreement on International Carriage Hazardous Goods by Road CRF: Code of Federal Regulations (USA) IDLH: Immediately dangerous to life or health CMP: Maximum allowable concentration weighted in time CMP-C Maximum allowable concentration - Roof value (c) CMP - CPT: Maximum allowable concentration for short periods of time
FOR FURTHER INFORMATION	CONTACT PROFERTIL SA
Date of latest Revision	Rev. No. 03 Sunday, October 4, 2015
Revision history	This document replaces revision Number 2 of year 2009 Revision 2015 follows the requirement in SGA and Res. *SRT Nº 801/15 of the Argentine Republic.*

Notice to reader

The information contained in this sheet has been developed by Profertil S.A. based on Documentation and Studies existing at the date of its elaboration, which according to industry practice, are understood to be efficient and reliable. Profertil S.A. assumes no responsibility or liability for the misuse of the product. The buyer assumes all risk associated with the use of this material and will be solely responsible for ensuring that the product is used in a safe manner in compliance with laws, policies and health, safety and environment guidelines.