
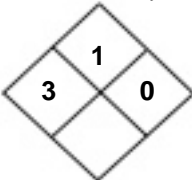


Material Safety Data Sheet

Revision Issued: 10/23/09	Supercedes: 11/25/08	First Issued: 5/31/1978
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Section I – Product and Company Identification

Product Name: Anhydrous Ammonia	PotashCorp MSDS No.: 30 ERG No.: 125
 <p>1101 Skokie Blvd., Northbrook, IL 60062 Phone (800) 241-6908 / (847) 849-4200</p> <p>Suite 500, 122 – 1st Avenue South Saskatoon, Saskatchewan Canada S7K7G3 Phone (800) 667-0403 from Canada (800) 667-3930 from USA</p> <p>Emergencies (800) 424-9300 (CHEMTREC) Web Site www.potashcorp.com Health Emergencies, Contact Your Local Poison Center</p>	<p>Flammability</p> <p>Health  Instability</p> <p>Specific Hazard</p> <p>NFPA Code</p>

Common Name: Anhydrous Ammonia	Formula: NH ₃	Synonym: Ammonia	Uses: Industrial, Agricultural
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Section II – Composition / Information On Ingredients

Chemical Name	CAS No.	Exposure Limits								% by Weight
		OSHA PEL		TLV – TWA		STEL		CEIL		
		mg/m ³	ppm	mg/m ³	ppm	mg/m ³	ppm	mg/m ³	ppm	
Ammonia	7664-41-7		50		25		35			99.5-100

Section III – Hazard Identification

Potential Acute Health Effects:	Lung irritation and pulmonary edema after 12 – 24 hours delay. If contact with gas prolonged more than a few minutes, severe burning pain and corrosive damage. Inhalation of 500 PPM Ammonia considered immediately dangerous to life and health (OSHA). Contact with liquid will cause sever tissue damage.
Eyes and Skin:	Eyes: Contact with liquid will cause tissue damage. Contact with gas at 70 ppm causes irritation to the eyes, nose, and throat. Skin: If contact with gas prolonged more than a few minutes, severe burning pain and corrosive damage. Contact with liquid will cause severe tissue damage
Inhalation:	Highly irritating to throat at approximately 400 ppm. Causes edema, dyspnoea, bronchospasm, chest pain, pink frothy sputum. Airborne exposures of approximately 70 ppm will irritate the eyes, nose, and throat. Lung irritation and pulmonary edema after 12024 hour delay.
Ingestion:	Symptoms similar to inhalation.
Potential Chronic Health Effects:	Contact with liquid will cause severe tissue damage. Repeated long-term exposure to lower concentrations may cause chronic irritation to the eyes and upper respiratory system.
CARCINOGENICITY LISTS	IARC Monograph: No NTP: No OSHA: No

Section IV – First Aid Measures

Eyes:	Flood with water immediately for at least 15 minutes. Remove patient to uncontaminated area. In case of severe exposure, call physician promptly. Keep patient warm.
Skin:	Flood with water immediately for at least 15 minutes. Remove patient to uncontaminated area. In case of severe exposure, call physician promptly. Keep patient warm. Do not administer salves or ointments to the affected area.
Ingestion:	Give large quantities of water, but do not induce vomiting. Call a physician promptly. Give neutralizing agents, such as citrus fruit juices or diluted vinegar.
Inhalation:	Remove patient to an uncontaminated area. Prompt artificial respiration with 100% oxygen may be required.

Section V – Fire Fighting Measures			
Flash Point:	Not Applicable	Autoignition Temperature:	651°C / 1204°F at 1 atm
Lower Explosive Limit:	16%	Upper Explosive Limit:	25%
Unusual Fire and Explosion Hazards:	Presence of oil or other combustible materials will increase the fire hazard. See Hazardous Decomposition Products, Section X.		
Extinguishing Media:	Stop flow of gas before extinguishing fire. All standard agents are acceptable. (Water, carbon dioxide (CO ₂), dry chemical, foam) Note: Ammonia has a strong attraction to water. Large quantities of heat may be generated.		
Special Firefighting Procedures and Equipment:	Stop flow of gas before extinguishing fire. Use water spray to keep fire-exposed containers cool when contain gas and to protect persons effecting the shut-off. Wear full protective clothing and self-contained breathing apparatus approved by NIOSH. Ammonia may be an explosion hazard in a confined space. Do not apply water directly to container as ammonia boils at -28°F (direct water will heat container), and more vapors will be released.		

Section VI – Accidental Release Measures	
Small Spill:	Restrict access to the area until completion of cleanup. For liquid spill, evacuate downwind from the area. For gas leak, evacuate. Remain upwind of spill or leak. Eliminate ignition sources and provide ventilation. Emergency workers should use full protective clothing and positive pressure self-contained breathing apparatus and may return to dike spill area to mitigate release or close off valve, etc Use cold water to absorb ammonia vapor from air. Thoroughly wash down area with water. Do not directly discharge this ammonia/water solution to municipal sewers, confined drains, or surface waters. In unknown concentrations SCBA must be worn. Keep ignition sources away.
Large Spill:	Remain upwind of spill or leak. For liquid spill, evacuate area. A person with complete protection may return to dike spill area to mitigate release. For gas leak, evacuate. A person with appropriate protective equipment may return to mitigate release. In unknown concentrations SCBA must be worn. Keep ignition sources away.
Release Notes:	If spill could potentially enter any waterway, including intermittent dry creeks, contact the local authorities. If in the U.S., contact the US COAST GUARD NATIONAL RESPONSE CENTER toll free number 800-424-8802. In case of accident or road spill notify: CHEMTREC IN USA at 800-424-9300; CANUTEC in Canada at 613-996-6666 CHEMTREC in other countries at (International code)+1-703-527-3887.
Comments:	See Section XIII for disposal information and Section XV for regulatory requirements. Large and small spills may have a broad definition depending on the user's handling system. Therefore, the spill category must be defined at the point of release by technically qualified personnel.

Section VII – Handling and Storage	
Ventilation:	Natural ventilation should be provided. Use mechanical (general) ventilation if natural ventilation is found inadequate.
Handling:	Avoid heating containers. Use proper level of personal equipment as defined in Section VII. Also see OSHA 29 CFR 1910.111. Never trap ammonia between closed valves.
Storage:	Preferably stored outside. Otherwise store in cool, well-ventilated, non-combustible location, away from all possible sources of ignition and contamination. Also see OSHA 29 CFR 1910.111. Protect containers from excessive heat (Greater than 120 degree F). Use only approved pressure vessels with appropriate safety devices. Never fill pressure storage tanks over 85% of vessel volume. Do not contact liquid ammonia pools, or leaks from containers, with direct streams of water. Avoid copper or copper-containing alloys such as brass, for tanks, vessels, pipe, or valves. Use iron or steel tanks and piping, and valves especially designed for ammonia service. Equipment, Pressure Vessels, Testing, Etc.: All equipment used to handle, store, transfer or apply anhydrous ammonia must be properly engineered, constructed and maintained in compliance with all applicable regulations, standards and Recognized and Generally Accepted Good Engineering Practice [RAGAGEP]. Pressure vessels, piping and appurtenances should be regularly inspected and tested using methods designed to reveal external and internal deterioration or defects that may impair the integrity of the equipment such that an unintended release of anhydrous ammonia may result. Consult with your State Department of Agriculture and other experts, as applicable, concerning the methods that would be most appropriate given the particular circumstances. Refer to 29 CFR 1910.111 Storage and Handling of Anhydrous Ammonia, 29 CFR 1910.119 Process Safety Management of Highly Hazardous Materials and the current ANSI standard K61.1, Safety Requirements for the Storage and Handling of Anhydrous Ammonia, for additional information.

Section VIII – Exposure Controls/ Personal Protection	
Engineering Controls:	Use mechanical (general) ventilation if natural ventilation is found inadequate.

Personal Protection:	
Eye Protection:	Tight fitting unvented goggles and face shield to protect against splashing. Contact lenses should not be worn.
Protective Clothing:	Level "A" Clothing – Full encapsulating suit with self contained breathing apparatus should be utilized for handling large liquid spills or vapor clouds. Use impervious clothing and rubber gloves for small liquid spills and normal loading and unloading operations.
Respiratory Protection:	Use NIOSH approved respirator relating to the exposure concentration. Use a self-contained breathing apparatus in the event Ammonia concentrations cannot be determined. Use a specific cartridge or canister for Ammonia gas. Supplied air respirator required for exposure of 300 ppm or greater. All respirators must meet NIOSH standards.
Other Protective Clothing or Equipment:	Safety shower/eye wash facility at sites of handling or storage

Section IX – Physical and Chemical Properties			
Appearance/Color/Odor:	This material at normal conditions is a gas with an intensely irritating, penetrating strong pungent odor and is shipped as a liquid under pressure.	Boiling Point:	-33.3°C (-28°F)
Melting Point/Range:	-77.7°C (-108°F)	Boiling Point Range:	Not Available
Solubility in Water:	510 - 530 g/L @ 20°C (68°F)	Vapor Pressure (mmHg):	7520 mmHg at 25°C (77°F)
Specific Gravity:	0.682 @ -33.35°C (-28°F) and 1 atm	Molecular Weight:	17.03
Vapor SP GR:	0.596 @ 0°C (32°F)	% Volatiles:	by Volume (at 20°C) 100%
Bulk Density:	Not Available	Evaporation Rate:	Not Available
pH:	11.6 for 1% AQ sol 11.1 for 0.1 AQ sol 10.6 for .01 AQ sol	Freezing Point:	-77.7°C (-108°F)
Vapor:	0.00982 cP at 20°C	Density: Critical Temperature:	42.57 Lb / ft ³ 5.69 lbs/gal 132-133°C

Section X – Stability and Reactivity	
Stability:	This product is stable under normal ambient conditions of temperature and pressure.
Hazardous Polymerization:	Will not occur
Conditions to Avoid:	High temperatures and ignition sources.
Materials to Avoid (Incompatibles):	Separate from other chemicals, particularly oxidizing gases, silver oxide, mercury, chlorine, bromine, iodine, and acids. Also avoid: copper, tin, and zinc. Note: hazardous reactions have been documented for contact of anhydrous ammonia with: acetaldehyde, acrolein, boron, boron trioxide, bromine, chlorine, chlorites, chromium trioxide, ethylene oxide, fluoride, gold, hypochlorous acid, iodine, mercury, nitric acid nitrogen, tetroxide, nitrogen trichloride, nitrogen trifluoride, phosphorus trioxide, picric acid, potassium chlorate, potassium ferricyanide, silver, silver chloride. Liquified gases in contact with water can explode violently.
Hazardous Decomposition Products:	Normal combustion of Ammonia in air yields Nitrogen and water (steam). Under certain conditions of temperature and pressure some quantity of Hydrogen and Oxides of Nitrogen may also be formed.

Section XI – Toxicological Information		
Significant Routes of Exposure:	Skin or eye contact, lungs (breathing). Ingestion (swallowing) is unlikely.	
Toxicity to Animals:	Acute Oral Toxicity:	No data available.
	Acute Inhalation Toxicity:	(rat, mouse) LC ₅₀ =4,230 – 19,960 mg/m ³ total NH ₃ /m ³ (1 hr)
	Acute Toxicity: Other Routes:	(rat, mouse) LC ₅₀ = 45.5 - 195.1 mg/total NH ₃ /kg bw (1 hr intra venous)
	Acute Dermal Toxicity:	No data available.
	Repeated Dose Toxicity:	No mortality seen in rats, guinea pigs, rabbits, beagle dogs and monkeys in Inhalation studies at up to 770 mg/m ³ . Acutely toxic by inhalation as defined by OSHA.

	Eye & Skin Irritation/Corrosion:	Skin: Corrosive Eye: Subacute and chronic exposure to 200-1,000 ppm produced eye damage. 100-200 ppm produced moderate to severe eye irritation.
	Developmental Toxicity/Teratogenicity:	No data available.
	Bacterial Genetic Toxicity In-Vitro: Gene Mutation:	Negative
	Non-Bacterial Genetic Toxicity In-Vitro: Chromosomal Aberration:	Chick fibroblasts: Induce chromosomal clumping, polyploidy and arrested spindle formation. No data showing that ammonia is mutagenic in mammals.
	Toxicity to Reproduction:	Temporarily Depressed Mean Daily Gain: (MDG) at 35 mg/kg in gilts
	Carcinogenicity:	No carcinogenic effects.
Other Effects on Humans:	Nasal and pulmonary irritation at concentrations of above 100 ppm or higher.	
Special Remarks on Chronic Effects on Humans	Repeated long-term exposure to lower concentrations may cause chronic irritation to the eyes and upper respiratory system.	
Special Remarks on Other Effects on Humans:	Exposure to liquid or high concentrations of gas is a severe irritant, and may cause burning and tearing of the eyes, runny nose, coughing, chest pains, and death. May cause severe delayed breathing difficulties. May cause temporary blindness and severe eye damage, and burning and blistering of the skin. 100-200 ppm produced moderate to severe eye irritation. Human Experience: Inhalation; human volunteers: Nasal and pulmonary irritation at concentrations of about 100 ppm and higher.	

Section XII – Ecological Information

Ecotoxicity	Acute Toxicity to Fish:	96-h: LC ₅₀ = 0.09 – 3.51 mg un-ionized NH ₃ /L
	Chronic Toxicity to Fish:	Various 12 d-5 yrs: NOEC=0.025-1.2 mg un-ionized NH ₃ /L.
	Acute Toxicity to Aquatic Invertebrates:	(<i>Daphnia magna</i>) 48 h LC ₅₀ = 2.94 mg un-ionized NH ₃ -N/L. ASTM E 129-80A.
	Chronic Toxicity to Aquatic Invertebrates:	(<i>Daphnia magna</i> & others) 21 d-76 weeks: NOEC = 0.163-0.42 mg un-ionized NH ₃ /L.
	Acute Toxicity to Aquatic Plants:	(Benthic diatoms) Up to 25 days: LOEC = 0.5-1.0 mg N/L (<i>Chlorella vulgaris</i>) 21 days: LOEC = 500 mg N/L. Slightly toxic to aquatic organisms as defined by USEPA.
	Toxicity to Soil Dwelling Organisms:	No data available.
	Toxicity to Terrestrial Plants:	Various (4 mins -16 hrs): LOEC = 3-250 ppm
	Toxicity to other Non –Mammalian Terrestrial Species	(<i>G. domestica</i>) 1 hr injections: LD ₅₀ = 2.72 mM
Environmental Fate:	Stability in Water:	Ke=25.6-47.3 cm/h at 15.2-15.0 °C. Removed from aquatic systems.
	Stability in Soil:	Mean sorptions; sand: 19% loam: 28% clay, clay loam, and silt loam: 38%. Monitoring Data: levels of ammonia in urban areas are on average about 20 Φg/m ³ . Non-urban sites have average levels of 4-5 Φg/m ³ . Areas close to point sources (e.g., large animal feedlots or industrial sites) may have local atmospheric concentrations exceeding 200 Φg/m ³ .
	Transport and Distribution:	Transport: the primary methods of transport in the atmosphere are via verticle and horizontal diffusion. Distribution: 99.98% to air, <0.1% each to water, soil, biota, and sediment
Toxicity:	No known toxicity.	
Degradation Products:	Biodegradation:	Inorganic. Undergoes photolytic degradation.
	Photodegradation:	Aerobic. BOD created within days. Rapidly biodegraded. Bioaccumulation: Rapidly assimilated by animals and plants.

Section XIII – Disposal Considerations

Product Disposal:	Disposal of Anhydrous or Aqueous Ammonia is subject to federal, state and local regulations. Receiving waters must not exceed established limitations for ammonia or its salts.
General Comments:	Users of this product should review their operations in terms of applicable federal, state and local laws and regulations. Consult with appropriate regulatory agencies before discharging or disposing of waste material.

Section XIV – Transportation Information		
	USDOT	TDG - Canada
Proper Shipping Name:	Ammonia, Anhydrous	Ammonia Anhydrous, Liquefied
Hazard Class:	2.2	2.3 (8)
Identification Number:	UN1005	UN1005
Packing Group (Technical Name):		PK GP X, Special Commodity
Labeling / Placarding:	Non-flammable Gas	Toxic Gas (Corrosive)
Authorized Packaging:	Rail DOT 105-A 112S 114S 112J 112T 114J 114T Truck DOT 51 MC330 MC331	
Notes:	<p>MARKING: AMMONIA, ANHYDROUS or AMMONIA, ANHYDROUS LIQUEFIED If Anhydrous Ammonia has less than 0.2% water by weight, it must ship in an NQT Cargo tank. All Anhydrous Ammonia is Inhalation Hazard.</p> <p>USDOT: Inhalation Hazard (contains 0.2% water) – to follow Identification Number. (If metallurgical or refrigeration grade omit “contains...0.2 and for truck shipments must show “Not for Q and T Tanks”)</p> <p>TDG-Canada: Inhalation Hazard (Corrosive gas) If product exceeds the CERCLA Reportable Quantity, the notation “RQ” shall be added before and after before the basic shipping description.</p>	
European Transportation:	International shipments: RQ, Ammonia Anhydrous 2.3, 1005 MUST BE PLACARDED: POISON GAS and MUST BE MARKED: POISON INHALATION HAZARD	

Section XV – Regulatory Information										
UNITED STATES: SARA Hazard Category:	This product has been reviewed according to the EPA Hazard Categories promulgated under Section 311 and 312 of the Superfund Amendment and reauthorization Act of 1986 (SARA title III) and is considered, under applicable definitions, to meet the following categories:									
	Fire:	Yes	Pressure Generating:	Yes	Reactivity:	No	Acute:	Yes	Chronic:	No
	40 CFR Part 355 - Extremely Hazardous Substances:						Applicable			
	40 CFR Part 370 - Hazardous Chemical Reporting:						Applicable			
All intentional ingredients listed on the TSCA inventory.										
SARA Title III Information:	This product contains the following substances subject of the reporting requirements of Title III (EPCRA) of the Superfund amendments and Reauthorization Act of 1986 and 40 CFR Part 372:									
	Chemical	CAS NO.	Percent by Weight	CERCLA RQ (lbs)*	SARA (1986) Reporting					
	Ammonia	7664-41-7	99.5-100	100	311	312	313			
					Yes	Yes	Yes			
CERCLA/Superfund, 40 CFR Parts 117, 302:	If this product contains components subject to substances designated as CERCLA reportable Quantity (RQ) Substances, it will be designated in the above table with the RQ value in pounds. If there is a release of RQ Substance to the environment, notification to the National Response Center, Washington D.C. (1-800-424-8802) is required.									
CANADA:	WHMIS Hazard Symbol and Classification:	This product is WHMIS controlled. Category A (Compressed Gas) D1b(Poisonous and infectious material, acutely toxic (LD ₅₀ < 200 mg/kg), E (Corrosive)								
	Ingredient Disclosure List:	This product does contain ingredient(s) on this list.								
	Environmental Protection:	All intentional ingredients are listed on the DSL (Domestic Substance List).								
EINECS#:	(Ammonia, anhydrous) 231-635-3									
California: Prop 65:	This is not a chemical known to cause cancer, nor is it listed.									
Chemical Facility Anti-terrorism Standards (CFATS)	This product is listed as a Chemical of Interest in 6 CFR 27. Please determine if your use of this product meets the Screening Threshold Quantity as identified in Appendix A to this regulation. If so, you will be required to submit a Top Screen under DHS's Chemical Security Assessment Tool.									

Section XVI – Other Information				
NFPA Hazard Ratings:	Health: 3	Flammability: 1	Instability: 0	Special Hazards:
	0 = Insignificant	1 = Slight	2 = Moderate	3 = High 4 = Extreme
COMMENTS:				
Section(s) changed since last revision:	I, III, V, VI, VII, IX, XI, XII, XIV, XV, XVI			

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