

MATERIAL  
SAFETY  
DATA SHEET

<b>PRODUCT NAME</b> Ammonia	<b>CAS#</b> 7664-41-7
<b>TRADE NAME AND SYNONYMS</b> Anhydrous Ammonia	<b>DOT I.D. NO.</b> UN 1005
<b>CHEMICAL NAME AND SYNONYMS</b> Ammonia; Anhydrous Ammonia	<b>DOT HAZARD CLASS</b> Division 2.2
<b>ISSUE DATE AND REVISIONS</b> Revised March 2007	<b>FORMULA</b> NH <sub>3</sub>

### HEALTH HAZARD DATA

<b>EMERGENCY OVERVIEW</b>	
Ammonia is a colorless, pungent, flammable gas at atmospheric pressure and temperature. It is irritating to the mucous membranes and toxic in high concentrations.	
<b>SYMPTOMS OF EXPOSURE</b>	
<p><u>Inhalation</u>: May cause irritation of the eyes, nose, and throat. Indications of this exposure will include burning sensations, coughing, wheezing, shortness of breath, headache, nausea with eventual collapse.</p> <p><u>Skin Contact</u>: Liquid contact may cause severe redness and swelling, which depends on the degree and duration of contact. At concentrations of 3% or greater after a few minutes of contact, superficial blistering will be caused. Rapidly evaporating liquid will cause cryogenic burns when contact dermal tissue.</p> <p><u>Eye Contact</u>: Vapor causes pain and excessive tearing, with inflammation and acute corneal injury at high concentrations. Liquid can cause pain, severe redness and swelling of the conjunctiva, damage to the iris with possible loss of vision.</p>	
<b>TOXICOLOGICAL PROPERTIES</b>	
PEL	50 ppm
LC <sub>50</sub> RAT	7338 ppm
STEL	35 ppm
TLV-TWA	25 ppm
IDLH	500 ppm
<b>RECOMMENDED FIRST AID TREATMENT</b>	
<p>PROMPT MEDICAL ATTENTION IS MANDATORY IN ALL CASES OF OVEREXPOSURE TO AMMONIA. RESCUERS SHOULD BE EQUIPPED WITH ADEQUATE PERSONAL PROTECTIVE APPARATUS.</p> <p><u>Inhalation</u>: Remove patients to fresh air. Give artificial respiration if not breathing. Qualified personnel may give oxygen if breathing is difficult.</p> <p><u>Skin Contact</u>: Remove contaminated clothing and flush affected area with water.</p> <p><u>Eye Contact</u>: Immediately flush eyes with copious quantities of water and continue flushing for at least 15 minutes.</p>	

### HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES

Ammonia is flammable over a relatively narrow range in air. It reacts vigorously with fluorine, chlorine, hydrogen chloride, hydrogen bromide, nitrosyl chloride, chromyl chloride, trioxygen difluoride, nitrogen dioxide and nitrogen trichloride.

### PHYSICAL DATA

BOILING POINT -33.4 °C	CRITICAL TEMPERATURE 132.4 °C
MOLECULAR WEIGHT 17.030	CRITICAL PRESSURE 112.77 bar abs
SOLUBILITY IN WATER Very soluble, liberating heat.	DENSITY, GAS (21.1 °C, 1 atm) 0.71 g/ml
EVAPORATION RATE N/A	SPECIFIC GRAVITY (AIR=1) 0.594 at 70°F
APPEARANCE AND ODOR Colorless gas with a pungent, irritating odor.	

### FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used) Gas	<b>AUTO IGNITION TEMPERATURE</b> 651 °C	<b>FLAMMABLE LIMITS % BY VOLUME</b> LEL 16      UEL 25
EXTINGUISHING MEDIA Water, Water Fog, CO <sub>2</sub> and Dry Chemicals.		
SPECIAL FIRE FIGHTING PROCEDURES If possible, stop the flow of gas. Since ammonia is soluble in water, it is the best extinguishing media for extinguishing the fire and absorbing the escaped ammonia gas. Use water spray to cool surrounding containers.		
UNUSUAL FIRE AND EXPLOSION HAZARDS The minimum ignition energy for ammonia is very high. It is approximately 500 times greater than the energy required for igniting hydrocarbons and 1000 to 10,000 times greater than that required for hydrogen.		

### REACTIVITY DATA

STABILITY		CONDITIONS TO AVOID N/A
Unstable		
Stable	X	
INCOMPATIBILITY (Materials to avoid) Fluorine, chlorine, hydrogen chloride, hydrogen bromide, nitrosyl chloride, chromyl chloride, trioxygen difluoride, nitrogen dioxide and nitrogen trichloride.		
HAZARDOUS POLYMERIZATION		HAZARDOUS THERMAL DECOMPOSITION PRODUCTS Hydrogen at very high temperatures (840 °C) in the absence of air and oxygen.
May Occur		
Will Not Occur	X	

### SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED Evacuate all personnel from affected area. Flush down with large amount of water. Wear Self-Contained Breathing Apparatus and protective clothing.
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**WASTE DISPOSAL METHOD**

Waste disposal must be in accordance with appropriate Federal, State, and local regulations. For emergency disposal assistance, contact HSG for specific advice.

### SPECIAL PROTECTION INFORMATION

<b>RESPIRATORY PROTECTION (Specify type)</b> Positive pressure air line with mask or self-contained breathing apparatus should be available for emergency use.	
<b>VENTILATION</b> Hood with forced ventilation.	<b>SPECIAL</b> N/A
<b>MECHANICAL (Gen.)</b> N/A	<b>OTHER</b> N/A
<b>LOCAL EXHAUST</b> To prevent accumulation of high concentrations so as to reduce the oxygen level in the air to less than 18 molar percent.	
<b>PROTECTIVE GLOVES</b> Neoprene, nitrile or natural rubber gloves.	
<b>EYE PROTECTION</b> Safety goggles or glasses	
<b>OTHER PROTECTIVE EQUIPMENT</b> Safety shoes, safety shower, eyewash "fountain".	

### SPECIAL PRECAUTIONS\*

<b>SPECIAL LABELING INFORMATION</b> DOT Shipping Name: Ammonia, Anhydrous, Liquefied DOT Shipping Label: Nonflammable Gas	DOT Hazard Class: Division 2.2 I.D. No.: UN 1005
<b>SPECIAL HANDLING RECOMMENDATIONS</b> Use only in well-ventilated areas. Valve protection caps must remain in place unless cylinder is secured with valve outlet piped to use point. Do not drag, slide or roll cylinders. Use a suitable hand truck for cylinder movement. Use a pressure-reducing regulator when connecting cylinder to lower pressure piping or system. Do not heat cylinder by any means to increase the discharge rate of product from the cylinder. Use a check valve or trap in the discharge line to prevent hazardous back flow into the cylinder.	
<b>SPECIAL STORAGE RECOMMENDATIONS</b> Keep valve-output plug tightly installed. Store away from heat, sparks, and open flame. Store with adequate ventilation. Do not allow the temperature where cylinders are stored to exceed 130°F. Also, cylinders should be stored upright and firmly secured to prevent falling.	
<b>OTHER RECOMMENDATIONS OR PRECAUTIONS</b> Earth-ground and bond all lines and equipment associated with the ammonia system. Electrical equipment should be non-sparking or explosion proof. Qualified producers of compressed gases should not refill except compressed gas cylinders.	

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