

MATERIAL
SAFETY

DATA SHEET

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

HEALTH HAZARD DATA

EMERGENCY OVERVIEW										
Blue Ammonia is a colorless, pungent, flammable gas at atmospheric pressure and temperature. It is irritating to the mucous membranes and toxic in high concentrations.										
SYMPTOMS OF EXPOSURE										
<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. <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. <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.										
TOXICOLOGICAL PROPERTIES										
<table> <tr> <td>PEL</td> <td>50 ppm</td> </tr> <tr> <td>LC₅₀RAT</td> <td>7338 ppm</td> </tr> <tr> <td>STEL</td> <td>35 ppm</td> </tr> <tr> <td>TLV-TWA</td> <td>25 ppm</td> </tr> <tr> <td>IDLH</td> <td>500 ppm</td> </tr> </table>	PEL	50 ppm	LC ₅₀ RAT	7338 ppm	STEL	35 ppm	TLV-TWA	25 ppm	IDLH	500 ppm
PEL	50 ppm									
LC ₅₀ RAT	7338 ppm									
STEL	35 ppm									
TLV-TWA	25 ppm									
IDLH	500 ppm									
RECOMMENDED FIRST AID TREATMENT										
PROMPT MEDICAL ATTENTION IS MANDATORY IN ALL CASES OF OVEREXPOSURE TO BLUE AMMONIA. RESCUERS SHOULD BE EQUIPPED WITH ADEQUATE PERSONAL PROTECTIVE APPARATUS. <u>Inhalation</u> : Remove patients to fresh air. Give artificial respiration if not breathing. Qualified personnel may give oxygen if breathing is difficult. <u>Skin Contact</u> : Remove contaminated clothing and flush affected area with water. <u>Eye Contact</u> : Immediately flush eyes with copious quantities of water and continue flushing for at least 15 minutes.										

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES

Blue 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) 0.71g/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	AUTO IGNITION TEMPERATURE 651°C	FLAMMABLE LIMITS % BY VOLUME LEL 16 UEL 25
EXTINGUISHING MEDIA Water, Water Fog, CO ₂ and Dry Chemicals.		
SPECIAL FIRE FIGHTING PROCEDURES If possible, stop the flow of gas. Since Blue Ammonia is soluble in water, it is the best extinguishing media for extinguishing the fire and absorbing the escaped Blue Ammonia gas. Use water spray to cool surrounding containers.		
UNUSUAL FIRE AND EXPLOSION HAZARDS The minimum ignition energy for Blue 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.

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

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

SPECIAL PRECAUTIONS*

SPECIAL LABELING INFORMATION DOT Shipping Name: Blue Ammonia, Anhydrous, Liquefied DOT Shipping Label: Nonflammable Gas		DOT Hazard Class: Division 2.2 I.D. No.: UN 1005
SPECIAL HANDLING RECOMMENDATIONS 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.		
SPECIAL STORAGE RECOMMENDATIONS 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.		
OTHER RECOMMENDATIONS OR PRECAUTIONS Earth-ground and bond all lines and equipment associated with the Blue Ammonia system. Electrical equipment should be non-sparking or explosion proof. Qualified producers of compressed gases should not refill except compressed gas cylinders.		

Information contained in this material safety data sheet is offered without charge for use by technically qualified personnel at their discretion and risk. All statements, technical information and recommendations contained herein are based on tests and data which we believe to be reliable, but the accuracy or completeness thereof is not guaranteed no warranty of any kind is made with respect thereto. This information is not intended as a license to operate under or a recommendation to practice or infringe any patent of this Company or others covering any process, composition of matter or use.

Since the Company shall have no control of the use of the product described herein, the Company assumes no liability for loss or damage incurred from the proper or improper use of such product.