Material Safety Data Sheet

Date Printed: 14/DEC/2004
Date Updated: 21/MAY/2004
Version 1.4
According to 91/155/EEC

1 - Product and Company Information

Product Name	AMMONIA, ANHYDROUS, 99.99+%
Product Number	294993
Company	Sigma-Aldrich Pte Ltd #08-01 Citilink Warehouse Singapore 118529
Technical Phone #	65 271 1089
Fax	65 271 1571

2 - Composition/Information on Ingredients

Product Name	CAS #	EC no	Annex I Index Number
AMMONIA ANHYDROUS	7664-41-7	231-635-3	007-001-00-5

Formula	H3N
Molecular Weight	17.03 AMU
Synonyms	AM-Fol * Ammonia (ACGIH:OSHA) * Ammonia anhydrous * Ammoniac (French) * Ammoniaca (Italian) * Ammonia gas * Ammoniak (German) * Amoniak (Polish) * Nitro-sil * R 717 * Spirit of hartshorn

3 - Hazards Identification

SPECIAL INDICATION OF HAZARDS TO HUMANS AND THE ENVIRONMENT
Flammable. Toxic by inhalation. Causes burns. Very toxic to aquatic organisms.

4 - First Aid Measures

AFTER INHALATION
If inhaled, remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen.

AFTER SKIN CONTACT
In case of contact, immediately wash skin with soap and copious amounts of water.

AFTER EYE CONTACT
Contamination of the eyes should be treated by immediate and prolonged irrigation with copious amounts of water. Assure adequate flushing of the eyes by separating the eyelids with fingers.

AFTER INGESTION
If swallowed, wash out mouth with water provided person is conscious. Call a physician.

5 - Fire Fighting Measures

EXTINGUISHING MEDIA
Suitable: Use water spray or fog nozzle to keep cylinder cool. Move cylinder away from fire if there is no risk.

SPECIAL RISKS
Specific Hazard(s): Vapor may travel considerable distance to source of ignition and flash back. Emits toxic fumes under fire conditions. Flammable gas.
Explosion Hazards: May form explosive mixtures with air Container explosion may occur under fire conditions.

SPECIAL PROTECTIVE EQUIPMENT FOR FIREFIGHTERS
Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.

SPECIFIC METHOD(S) OF FIRE FIGHTING
Do not extinguish burning gas if flow cannot be shut off immediately. Use water spray or fog nozzle to keep cylinder cool. Move cylinder away from fire if there is no risk.

6 - Accidental Release Measures

PERSONAL PRECAUTION PROCEDURES TO BE FOLLOWED IN CASE OF LEAK OR SPILL
Evacuate area and keep personnel upwind. Shut off leak if there is no risk. Shut off all sources of ignition.

PROCEDURE(S) OF PERSONAL PRECAUTION(S)
Wear self-contained breathing apparatus, rubber boots, and heavy rubber gloves.

METHODS FOR CLEANING UP
Ventilate area and wash spill site after material pickup is complete.

7 - Handling and Storage

HANDLING
Directions for Safe Handling: Do not breathe gas. Do not get in eyes, on skin, on clothing. Avoid prolonged or repeated exposure.

STORAGE
Conditions of Storage: Keep tightly closed. Use with equipment rated for cylinder pressure, and of compatible materials of construction. Close valve when not in use and when empty. Make sure cylinder is properly secured when in use or stored Cylinder temperature should not exceed 125˚F (52˚C).

SPECIAL REQUIREMENTS: Contents under pressure.

8 - Exposure Controls / Personal Protection

ENGINEERING CONTROLS
Safety shower and eye bath. Warning: suck-back into cylinder may cause rupture. Use back-flow-preventive device in piping. Use only in a chemical fume hood.

GENERAL HYGIENE MEASURES
Discard contaminated clothing and shoes. Wash thoroughly after handling.

EXPOSURE LIMITS

Country	Source	Type	Value
Poland		NDS	14
Poland		NDSCh	28
Poland		NDSP	-

EXPOSURE LIMITS - EUROPEAN UNION

	Source	Type	Value
	OEL	OEL	14 mg/m3
			20 ppm

EXPOSURE LIMITS - DENMARK

	Source	Type	Value
	OEL	TWA	18 mg/m3
			25 ppm

EXPOSURE LIMITS - GERMANY

	Source	Type	Value
	TRGS 900	OEL	35 mg/m3
			50 ppm

Remarks: =1=
Remarks: Y

EXPOSURE LIMITS - NORWAY

	Source	Type	Value
		OEL	18 mg/m3
			25 ppm

EXPOSURE LIMITS - SWEDEN

	Source	Type	Value
		LLV (Level	18 mg/m3
			25 ppm

EXPOSURE LIMITS - SWITZERLAND

	Source	Type	Value
	OEL	OEL	14 mg/m3
			20 ppm

Remarks: C

EXPOSURE LIMITS - UNITED KINGDOM

	Source	Type	Value
	OEL	OEL	18 mg/m3
			25 ppm
	OEL	STEL	25 mg/m3
			35 ppm

PERSONAL PROTECTIVE EQUIPMENT
Respiratory Protection: Government approved respirator in nonventilated areas and/or for exposure above the TLV or PEL.
Hand Protection: Compatible chemical-resistant gloves.
Eye Protection: Chemical safety goggles.
Special Protective Measures: Faceshield (8-inch minimum).

9 - Physical and Chemical Properties

Appearance Physical State: Gas

Property	Value	At Temperature or Pressure
pH	N/A	
BP/BP Range	-33 ˚C	760 mmHg
MP/MP Range	-78 ˚C	
Flash Point	132 ˚C	Method: closed cup

Flammability	N/A	
Autoignition Temp	651 °C	
Oxidizing Properties	N/A	
Explosive Properties	N/A	
Explosion Limits	Lower: 15 %	
	Upper: 25 %	
Vapor Pressure	4802 mmHg	15.5 °C
SG/Density	0.59 g/cm3	
Partition Coefficient	N/A	
Viscosity	N/A	
Vapor Density	0.6 g/l	
Saturated Vapor Conc.	N/A	
Evaporation Rate	N/A	
Bulk Density	N/A	
Decomposition Temp.	N/A	
Solvent Content	N/A	
Water Content	< 0.03 %	
Surface Tension	N/A	
Conductivity	N/A	
Miscellaneous Data	N/A	
Solubility	N/A	
	Solubility in Water:Soluble.	

10 - Stability and Reactivity

STABILITY
Stable: Stable.
Conditions to Avoid: Tin. Moisture.
Materials to Avoid: Oxidizing agents, Galvanized iron, Zinc, Copper, Silver/silver oxides, Cadmium/cadmium oxides, Alcohols, Acids, Halogens, Aldehydes.

HAZARDOUS DECOMPOSITION PRODUCTS
Hazardous Decomposition Products: Ammonia.

HAZARDOUS POLYMERIZATION
Hazardous Polymerization: Will not occur

11 - Toxicological Information

RTECS NUMBER: BO0875000

ACUTE TOXICITY
LC50
Inhalation
Rat
7,338 - 11,590 ppm
1 HR.
LC50
Inhalation
Rat
2,000 ppm

LCLO
Inhalation
Human
5,000 ppm
5M

LC50
Inhalation
Rat

2,000 ppm
4H

LC50
Inhalation
Mouse
4,230 ppm
1H
Remarks: Behavioral:Tremor. Behavioral:Convulsions or effect on seizure threshold. Behavioral:Ataxia.

LC50
Inhalation
Cat
7,000 mg/m3
1H
Remarks: Peripheral Nerve and Sensation:Flaccid paralysis without anesthesia (usually neuromuscular blockage). Behavioral:Excitement.

LC50
Inhalation
Rabbit
7,000 mg/m3
1H
Remarks: Peripheral Nerve and Sensation:Flaccid paralysis without anesthesia (usually neuromuscular blockage). Behavioral:Excitement.

SIGNS AND SYMPTOMS OF EXPOSURE

Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin. Inhalation may result in spasm, inflammation and edema of the larynxand bronchi, chemical pneumonitis, and pulmonary edema. Symptoms of exposure may include burning sensation, coughing, wheezing, laryngitis, shortness of breath, headache, nausea, and vomiting. To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

ROUTE OF EXPOSURE

Skin Contact: Causes burns.
Skin Absorption: May be harmful if absorbed through the skin.
Eye Contact: Causes burns.
Inhalation: Can cause rapid suffocation. Toxic if inhaled. Material is extremely destructive to the tissue of the mucous membranes and upper respiratory tract.
Ingestion: May be harmful if swallowed.

TARGET ORGAN INFORMATION

Lungs. Central nervous system. Liver. Kidneys.

CHRONIC EXPOSURE - CARCINOGEN

Rat
Route of Application: Oral
Exposure Time: 24W
Result: Tumorigenic:Carcinogenic by RTECS criteria. Gastrointestinal:Tumors.

CHRONIC EXPOSURE - MUTAGEN

Rat
19800 UG/M3/16W
Inhalation
Cytogenetic analysis

12 - Ecological Information

No data available.

13 - Disposal Considerations

SUBSTANCE DISPOSAL
Contact a licensed professional waste disposal service to dispose of this material. Observe all federal, state, and local environmental regulations.
CONTAMINATED CONTAINER DISPOSAL
Caution: no-return cylinder. Do not reuse. Empty cylinder will contain hazardous residue. Follow proper disposal techniques.

14 - Transport Information

RID/ADR
UN#: 1005
Class: 2
Proper Shipping Name: Ammonia, anhydrous

IMDG
UN#: 1005
Class: 2.3
Subrisk: 8
Proper Shipping Name: Ammonia, anhydrous
Marine Pollutant: No
Severe Marine Pollutant: No

IATA
UN#: 1005
Class: 2.3
Subrisk: 8
Proper Shipping Name: Ammonia, anhydrous
Inhalation Packing Group I: No

15 - Regulatory Information

CLASSIFICATION AND LABELING ACCORDING TO EU DIRECTIVES
ANNEX I INDEX NUMBER: 007-001-00-5
INDICATION OF DANGER: T N
Toxic. Dangerous for the environment.
R-PHRASES: 10 23 34 50
Flammable. Toxic by inhalation. Causes burns. Very toxic to aquatic organisms.
S-PHRASES: 9 16 26 36/37/39 45 61
Keep container in a well-ventilated place. Keep away from sources of ignition - no smoking. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear suitable protective clothing, gloves, and eye/face protection. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). Avoid release to the environment. Refer to special instructions/safety data sheets.

COUNTRY SPECIFIC INFORMATION

Germany
WGK: 2

SWITZERLAND
SWISS POISON CLASS: 2

16 - Other Information

WARRANTY
The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Inc., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

DISCLAIMER
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