Material Safety Data Sheet

Nonflammable Gas Mixture: Ammonia / Nitrogen / Oxygen

Section 1. Chemical product and company identification

Product name : Nonflammable Gas Mixture: Ammonia / Nitrogen / Oxygen

Supplier : Chemtron Science Laboratories Pvt. Ltd.
EL-47, Electronics Zone,
Mahape MIDC,
Navi Mumbai 400710. India

Product use : Synthetic/Analytical chemistry.

MSDS # : CSL-2211

Date of Preparation/Revision : **5/30/2013.**

In case of emergency : +91-22-67847300

Section 2. Hazards identification

Physical state : Gas.

Emergency overview : DANGER!

CAUSES SEVERE RESPIRATORY TRACT, EYE AND SKIN BURNS.
CONTAINS MATERIAL THAT MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA.
CONTENTS UNDER PRESSURE.

Do not puncture or incinerate container. Do not breathe gas. Do not get on skin or clothing. Contains material that may cause target organ damage, based on animal data. Use only with adequate ventilation. Keep container closed. Do not get in eyes, on skin or on clothing. Avoid breathing gas. Wash thoroughly after handling.
Contact with rapidly expanding gases can cause frostbite.

Target organs : Contains material which may cause damage to the following organs: lungs, upper respiratory tract, eye, lens or cornea.

Routes of entry : Inhalation Dermal Eyes

Potential acute health effects

Eyes : Irritating to eyes.

Skin : Irritating to skin.

Inhalation : Severely corrosive to the respiratory system.

Ingestion : Ingestion is not a normal route of exposure for gases

Potential chronic health effects

Chronic effects : Contains material that may cause target organ damage, based on animal data.

Target organs : Contains material which may cause damage to the following organs: lungs, upper respiratory tract, eye, lens or cornea.

Medical conditions aggravated by over-exposure : Pre-existing disorders involving any target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.

See toxicological information (Section 11)

Section 3. Composition, Information on Ingredients

Name	CAS number	% Volume	Exposure limits

Nonflammable Gas Mixture: Ammonia / Nitrogen / Oxygen			
Nitrogen	7727-37-9	67.5 - 80.5	Oxygen Depletion [Asphyxiant]
Oxygen	7782-44-7	19.5 - 23.5	
Ammonia	7664-41-7	0.0001 - 9	**ACGIH TLV (United States, 3/2012).** STEL: 24 mg/m³ 15 minute(s). STEL: 35 ppm 15 minute(s). TWA: 17 mg/m³ 8 hour(s). TWA: 25 ppm 8 hour(s). **NIOSH REL (United States, 1/2013).** STEL: 27 mg/m³ 15 minute(s). STEL: 35 ppm 15 minute(s). TWA: 18 mg/m³ 10 hour(s). TWA: 25 ppm 10 hour(s). **OSHA PEL (United States, 6/2010).** TWA: 35 mg/m³ 8 hour(s). TWA: 50 ppm 8 hour(s). **OSHA PEL 1989 (United States, 3/1989).** STEL: 27 mg/m³ 15 minute(s). STEL: 35 ppm 15 minute(s).

Section 4. First aid measures

No action shall be taken involving any personal risk or without suitable training.If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus.It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

Eye contact : Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.

Skin contact : In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention immediately.

Frostbite : Try to warm up the frozen tissues and seek medical attention.

Inhalation : Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.

Ingestion : As this product is a gas, refer to the inhalation section.

Section 5. Fire-fighting measures

Flammability of the product : Non-flammable.

Auto-ignition temperature : Lowest known value: 651°C (1203.8°F) (ammonia, anhydrous). Greatest

Flammable limits : known range: Lower: 16% Upper: 25% (ammonia, anhydrous)

Products of combustion : Decomposition products may include the following materials:
nitrogen oxides

Fire-fighting media and instructions : Use an extinguishing agent suitable for the surrounding fire.

Apply water from a safe distance to cool container and protect surrounding area. If involved in fire, shut off flow immediately if it can be done without risk.
Contains gas under pressure. In a fire or if heated, a pressure increase will occur and the container may burst or explode.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions : Immediately contact emergency personnel. Keep unnecessary personnel away. Use suitable protective equipment (section 8). Shut off gas supply if this can be done safely. Isolate area until gas has dispersed.

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Methods for cleaning up : Immediately contact emergency personnel. Stop leak if without risk. Note: see section 1 for emergency contact information and section 13 for waste disposal.

Section 7. Handling and storage

Handling : Use only with adequate ventilation. Wash thoroughly after handling. High pressure gas. Do not puncture or incinerate container. Use equipment rated for cylinder pressure. Close valve after each use and when empty. Do not get in eyes, on skin or on clothing. Keep container closed. Do not get on skin or clothing. Protect cylinders from physical damage; do not drag, roll, slide, or drop. Use a suitable hand truck for cylinder movement.

Storage : Cylinders should be stored upright, with valve protection cap in place, and firmly secured to prevent falling or being knocked over. Cylinder temperatures should not exceed 52 °C (125 °F).

Section 8. Exposure controls/personal protection

Engineering controls : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

Personal protection

Eyes : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts.

Skin : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

The applicable standards are (US) 29 CFR 1910.134 and (Canada) Z94.4-93

Hands : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

Personal protection in case of a large spill : Self-contained breathing apparatus (SCBA) should be used to avoid inhalation of the product. Full chemical-resistant suit and self-contained breathing apparatus should be worn only by trained and authorized persons.

Product name

nitrogen
oxygen
ammonia, anhydrous

Oxygen Depletion [Asphyxiant]

ACGIH TLV (United States, 3/2012).
STEL: 24 mg/m³ 15 minute(s).
STEL: 35 ppm 15 minute(s).
TWA: 17 mg/m³ 8 hour(s).
TWA: 25 ppm 8 hour(s).
NIOSH REL (United States, 1/2013).
STEL: 27 mg/m³ 15 minute(s).
STEL: 35 ppm 15 minute(s).
TWA: 18 mg/m³ 10 hour(s).
TWA: 25 ppm 10 hour(s).
OSHA PEL (United States, 6/2010).
TWA: 35 mg/m³ 8 hour(s).
TWA: 50 ppm 8 hour(s).

OSHA PEL 1989 (United States, 3/1989).
STEL: 27 mg/m³ 15 minute(s).
STEL: 35 ppm 15 minute(s).

Consult local authorities for acceptable exposure limits.

Section 9. Physical and chemical properties

Melting/freezing point : -77.7°C (-107.9°F) This is based on data for the following ingredient: ammonia, anhydrous. Weighted average: -201.22°C (-330.2°F)

Critical temperature : Lowest known value: -146.95°C (-232.5°F) (nitrogen).

Vapor density : Highest known value: 1.1 (Air = 1) (oxygen). Weighted average: 0.97 (Air = 1)

Gas Density (lb/ft ³) : Weighted average: 0.07

Section 10. Stability and reactivity

Stability and reactivity : The product is stable.

Incompatibility with various substances : Not considered to be reactive according to our database.

Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Hazardous polymerization : Under normal conditions of storage and use, hazardous polymerization will not occur.

Section 11. Toxicological information

Toxicity data

Product/ingredient name	Result	Species	Dose	Exposure
ammonia, anhydrous	TDLo Oral	Rat	0.095 g/kg	-
	LC50 Inhalation Vapor	Rat	18600 mg/m3	5 minutes
	LC50 Inhalation Vapor	Rat	7040 mg/m3	30 minutes
	LC50 Inhalation Gas.	Rat	17401 ppm	15 minutes
	LC50 Inhalation Gas.	Rat	9500 ppm	1 hours
	LC50 Inhalation Gas.	Rat	2000 ppm	4 hours

Chronic effects on humans : Contains material which may cause damage to the following organs: lungs, upper respiratory tract, eye, lens or cornea.

Other toxic effects on humans : Hazardous by the following route of exposure: of skin contact (corrosive), of eye contact (corrosive), of inhalation (lung corrosive).

Specific effects

Carcinogenic effects : No known significant effects or critical hazards.

Mutagenic effects : No known significant effects or critical hazards.

Reproduction toxicity : No known significant effects or critical hazards.

Section 12. Ecological information

Aquatic ecotoxicity

Product/ingredient name	Test	Result	Species	Exposure
ammonia, anhydrous	-	Acute EC50 29.2 mg/L Marine water	Algae - Sea Lettuce - Ulva fasciata - Zoea	96 hours
	-	Acute LC50 0.53 ppm Fresh water	Daphnia - Water flea - Daphnia magna	48 hours
	-	Acute LC50 25400 ug/L Fresh water	Daphnia - Water flea - Daphnia magna	48 hours
	-	Acute LC50 5210 to	Crustaceans -	48 hours

	6040 ug/L Marine water	Redtail prawn - Fenneropenaeus penicillatus - Zoea	
-	Acute LC50 4980 to 9070 ug/L Marine water	Crustaceans - Kuruma shrimp - Penaeus japonicus - Nauplii - esa:856s:7pt	48 hours
-	Acute LC50 4180 to 6030 ug/L Fresh water	Daphnia - Water flea - Daphnia magna - <24 hours	48 hours
-	Acute LC50 4130 to 5100 ug/L Fresh water	Daphnia - Water flea - Daphnia pulex - <24 hours	48 hours
-	Acute LC50 2710 to 3670 ug/L Fresh water	Crustaceans - Water flea - Ceriodaphnia reticulata - <4 hours	48 hours
-	Acute LC50 2500 ug/L Fresh water	Crustaceans - Aquatic sowbug - Asellus aquaticus - 8 to 10 mm	48 hours
-	Acute LC50 2080 ug/L Fresh water	Crustaceans - Scud - Gammarus pulex - 8 to 12 mm	48 hours
-	Acute LC50 660 ug/L Fresh water	Fish - common carp - Cyprinus carpio	96 hours
-	Acute LC50 450 to 470 ug/L Fresh water	Fish - Chinook salmon - Oncorhynchus tshawytscha - Underyearling - 1 to 7 g	96 hours
-	Acute LC50 440 ug/L Fresh water	Fish - common carp - Cyprinus carpio	96 hours
-	Acute LC50 380 ug/L Fresh water	Fish - Silver carp - Hypophthalmichthys molitrix - Fingerling	96 hours
-	Acute LC50 300 ug/L Fresh water	Fish - Carp - Hypophthalmichthys nobilis	96 hours
-	Chronic NOEC 1 mg/L Fresh water	Algae - Diatom - Skeletonema costatum	3 days
-	Chronic NOEC 0.204 mg/L Marine water	Fish - Sea bass - Dicentrarchus labrax - 131.3 g	62 days
-	Chronic NOEC 550 ug/L Fresh water	Fish - Roach - Rutilus rutilus - Embryo - 6 hours	31 days

Products of degradation : Products of degradation: nitrogen oxides (NO, NO_2 etc.).

Environmental fate : Not available.

Environmental hazards : No known significant effects or critical hazards.

Nonflammable Gas Mixture: Ammonia / Nitrogen / Oxygen

Toxicity to the environment : Not available.

Section 13. Disposal considerations

Product removed from the cylinder must be disposed of in accordance with appropriate Federal, State, local regulation.Return cylinders with residual product to ChemtronDo not dispose of locally.

Section 14. Transport information

Regulatory information	UN number	Proper shipping name	Class	Packing group	Label	Additional information
DOT Classification	UN1956	COMPRESSED GAS, N.O.S.	2.2	Not applicable (gas).		-
TDG Classification	UN1956	COMPRESSED GAS, N.O.S.	2.2	Not applicable (gas).		**Explosive Limit and Limited Quantity Index** 0.125 **Passenger Carrying Road or Rail Index** 75
Mexico Classification	UN1956	COMPRESSED GAS, N.O.S.	2.2	Not applicable (gas).		-

"Refer to CFR 49 (or authority having jurisdiction) to determine the information required for shipment of the product."

Section 15. Regulatory information

United States

U.S. Federal regulations :

TSCA 8(a) IUR: Not determined
United States inventory (TSCA 8b): All components are listed or exempted.
SARA 302/304/311/312 extremely hazardous substances: ammonia, anhydrous
SARA 302/304 emergency planning and notification: ammonia, anhydrous
SARA 302/304/311/312 hazardous chemicals: nitrogen; oxygen; ammonia, anhydrous
SARA 311/312 MSDS distribution - chemical inventory - hazard identification: nitrogen: Sudden release of pressure; oxygen: Fire hazard, Sudden release of pressure, Delayed (chronic) health hazard; ammonia, anhydrous: Sudden release of pressure, Immediate (acute) health hazard

Clean Water Act (CWA) 311: ammonia, anhydrous

Clean Air Act (CAA) 112 accidental release prevention - Toxic Substances:
Ammonia

Clean Air Act (CAA) 112 regulated toxic substances: ammonia, anhydrous

SARA 313

		Product name	CAS number	Concentration
Form R - Reporting requirements	:	Ammonia	7664-41-7	0.0001 - 9
Supplier notification	:	Ammonia	7664-41-7	0.0001 - 9

SARA 313 notifications must not be detached from the MSDS and any copying and redistribution of the MSDS shall include copying and redistribution of the notice attached to copies of the MSDS subsequently redistributed.

State regulations : **Connecticut Carcinogen Reporting**: None of the components are listed.
Connecticut Hazardous Material Survey: None of the components are listed.
Florida substances: None of the components are listed.
Illinois Chemical Safety Act: None of the components are listed.
Illinois Toxic Substances Disclosure to Employee Act: None of the components are listed.
Louisiana Reporting: None of the components are listed.
Louisiana Spill: None of the components are listed.
Massachusetts Spill: None of the components are listed.
Massachusetts Substances: The following components are listed: NITROGEN; OXYGEN (LIQUID); AMMONIA
Michigan Critical Material: None of the components are listed.
Minnesota Hazardous Substances: None of the components are listed.
New Jersey Hazardous Substances: The following components are listed: NITROGEN; OXYGEN; AMMONIA
New Jersey Spill: None of the components are listed.
New Jersey Toxic Catastrophe Prevention Act: The following components are listed: Ammonia.
New York Acutely Hazardous Substances: The following components are listed: Ammonia
New York Toxic Chemical Release Reporting: None of the components are listed.
Pennsylvania RTK Hazardous Substances: The following components are listed: NITROGEN; OXYGEN; AMMONIA
Rhode Island Hazardous Substances: None of the components are listed.

Canada

WHMIS (Canada) : Class A: Compressed gas.
Class C: Oxidizing material.
Class D-1A: Material causing immediate and serious toxic effects (Very toxic).
Class E: Corrosive material

CEPA Toxic substances: The following components are listed: Ammonia dissolved in water
Canadian ARET: None of the components are listed.
Canadian NPRI: The following components are listed: Ammonia (total)
Alberta Designated Substances: None of the components are listed.
Ontario Designated Substances: None of the components are listed.
Quebec Designated Substances: None of the components are listed.

Section 16. Other information

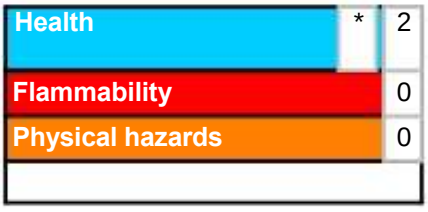
United States

Label requirements : CAUSES SEVERE RESPIRATORY TRACT, EYE AND SKIN BURNS.
CONTAINS MATERIAL THAT MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA.
CONTENTS UNDER PRESSURE.

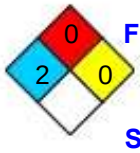
Canada

Label requirements : Class A: Compressed gas.
Class C: Oxidizing material.
Class D-1A: Material causing immediate and serious toxic effects (Very toxic).
Class E: Corrosive material

Hazardous Material Information System (U.S.A.) :



National Fire Protection Association (U.S.A.) :



Notice to reader

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Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.