APPENDIX A – MATERIAL SAFETY DATA SHEETS FOR ANHYDROUS AMMONIA

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AMMONIA ANHYDROUS

1. Identification:

Substance Identification:	Ammonia Anhydrous, Liquid Ammonia
Company Address:	**KYNOCHEM** (Pty) Limited Modderfontein, Gauteng, 1645.
Emergency Telephone Number:	(011)608-3300

2. Composition and Ingredients:

COMPONENT	CONCENTRATION	S-Phase	R-Phase
Ammonia	Ca. 100%	S 7/9	R 10
		S 16	R 23

Risk and Safety Phases according to EC Directive 67/548/ECC

3. Hazards:

Toxic by inhalation.
Vapour is irritant to the respiratory tract.
Both the vapour and the liquid cause irritation to the skin and eyes.
Flammable but not readily ignited.

4. First Aid:

Specific Immediate Treatment

Inhalation:	Remove patient from exposure, keep warm and at rest. Apply artificial respiration if breathing has ceased or shows signs of failing. **OBTAIN IMMEDIATE MEDICAL ATTENTION.**
Skin Contact:	Remove contaminated clothing. Wash with copious amounts of water for 20 minutes. Use safety shower if available. **OBTAIN IMMEDIATE MEDICAL ATTENTION.**
Eye Contact:	Immediately irrigate with clean water, holding the eyelids apart, for at least 20 minutes. **OBTAIN IMMEDIATE MEDICAL ATTENTION.** Continue irrigation until medical attention can be obtained.
Ingestion:	Do not induce vomiting. Wash out mouth with water and give 200-300 ml (half a pint) of water to drink. **OBTAIN IMMEDIATE MEDICAL ATTENTION.**

Further professional Medical Assistance

Symptomatic treatment and supportive therapy as indicated.
Administer oxygen if necessary.
Cold wet compresses should be applied to the affected areas to relieve pain. Following severe exposure the patient should be kept under medical review for at least 48 hours as delayed pulmonary oedema may develop.

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5. Fire Fighting:

FLASH POINT:-	AUTOIGNITION TEMP.:650°C	LEL:16%(v/v)	UEL:27%(v/v)
Flammable. Mixtures are difficult to ignite.			
Requirements for fighting a fire caused by the substance			
Extinguishing media:	In case of fire use water spray. Water spray should be used to cool containers.		
Exposure hazards from combustion:	Combustion evolves toxic and irritant vapours (NH_3 and NO_x).		
Special protective equipment:	A self-contained breathing apparatus and full protective clothing must be worn in fire conditions.		
6. Accidental Release:			
Personal protection:	Evacuate the area.		
Environmental precautions:	Use water curtains downwind to reduce vapour emissions.		
Methods for cleaning up:	For small spillages: drench with water and wash to drain (dilute at least 100 times.) For large spillages: contain and cover with foam.		
7. Handling and Storage:			
Handling Avoid contact with skin and eyes. Do not breathe vapour. Use only in well-ventilated areas. **Storage** Liquid Ammonia should not be confined without adequate vapour space or a pressure relief valve with discharge piped to a safe place.			
8. Exposure and Personal Protection:			
TLV-TWA:17mg/m^3	TLV-STEL:24 mg/m^3	(ACGIH 92 to 93)	
Where exposure to levels above the occupational exposure limit is likely; and engineering controls are either not fitted or are not totally effective, wear suitable respiratory protective equipment. Wear suitable protective clothing, gloves and eye/face protection.			

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9. Physical and Chemical Properties:		
Appearance:		Colourless liquified gas.
Odour:		*Characteristically pungent*
Boiling Point (°C):		-33.5
Melting Point (°C):		-78
Density (g/cm^3) at 20°C:		0.61
Vapour Pressure (mm Hg):		7600 at 25°C
Vapour Density (Air=1):		0.6
Odour Threshold (ppm):		5-53
Solubility (water):		ca. 33% at ambient
10. Stability and Reactivity:		
Hazardous reactions and decomposition products: Will react with halogens, hypochlorites, mercury, silver, lead and the oxide of nitrogen to form unstable compounds which are liable to explode.		

Keep away from copper, zinc, tin, cadmium and their alloys.
11. Toxicology:

Inhalation:	*Vapour may cause irritation to the respiratory tract.* High atmospheric concentrations in excess of the occupational exposure limit may cause injury to the mucuos membranes. *Fluid build up on the lung (pulmonary oedema) may occur up* to 48 hours after exposure to extremely high levels and could prove fatal. The onset of the respiartory symptoms may be delayed for several hours after exposure.
Skin Contact:	High concentrations of vapour may cause irritation. By rapid evaporation the liquid may cause frostbite.
Eye Contact:	The vapour is an irritant but the liquid is a severe irritant. Liquid splashes or spray may cause freeze burns. May cause severe damage if eye is not immediately irrigated. The full effect may occur after several days
Ingestion:	Will cause corrosion of and damage to the gastrointestinal tract.
Long Term Exposure:	This material has been in use for many years with no evidence of adverse effects.

12. Ecology:
Users should ensure that they comply with local, provincial and national environmental legislation. *Environmental fate and mobility:* No information available. Persistence, degradation and bioaccumulation: No information available Effect on effluent treatment: Toxic to aquatic organisms.

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13. Disposal:
Disposal should be in accordance with local, state or national legislation. Recover, reclaim or recycle if practicable.
14. Transport:

Hazchem Code:	2PE
UN No.:	1005
IMDG Class:	2 (2.3)
Proper shipping name:	Ammonia, Anhydrous, Liquefied

15. Regulations:
The material is classified as a Group II hazardous substance according to the Hazardous Substances Act, Act 15 of 1973, as amended.
16. Other:
All information is given in good faith but without guarantee in respect of accuracy, and no responsibility is accepted for errors or omissions or the consequences thereof. It is the user's obligation to determine the conditions of safe use of the material.