Safety Data Sheet

1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

Product Name: **AMMONIA PLANT FRONT END PROCESS GAS**

Recommended Use of the Chemical and Restrictions on Use Process gas stream.

Supplier: Orica Australia Pty Ltd
ABN: 99 004 117 828
Street Address: 1 Nicholson Street
Melbourne 3000
Australia

Telephone Number: +61 3 9665 7111
Facsimile: +61 3 9665 7937
Emergency Telephone: **1 800 033 111 (ALL HOURS)**

Please ensure you refer to the limitations of this Safety Data Sheet as set out in the "Other Information" section at the end of this Data Sheet.

2. HAZARDS IDENTIFICATION

Classified as Dangerous Goods by the criteria of the Australian Dangerous Goods Code (ADG Code) for Transport by Road and Rail; DANGEROUS GOODS.

This material is hazardous according to Safe Work Australia; HAZARDOUS SUBSTANCE.

Classification of the substance or mixture:
Flammable Gases - Category 1
Gases under pressure - Compressed Gas
Acute Inhalation Toxicity - Category 4
Specific target organ toxicity (repeated exposure) - Category 1
Toxic to Reproduction - Category 1A

SIGNAL WORD: DANGER

Hazard Statement(s):
H220 Extremely flammable gas.
H280 Contains gas under pressure; may explode if heated.
H332 Harmful if inhaled.
H372 Causes damage to organs through prolonged or repeated exposure.
H360 May damage fertility or the unborn child.

Precautionary Statement(s):

Prevention:
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P210 Keep away from heat / sparks / open flames / hot surfaces. No smoking.
P260 Do not breathe gas/vapours.
P264 Wash hands thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P271 Use only outdoors or in a well-ventilated area.
P281 Use personal protective equipment as required.

Response:
P377 Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
P381 Eliminate all ignition sources if safe to do so.
P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P308+P313 IF exposed or concerned: Get medical advice/attention.
P312 Call a POISON CENTER or doctor/physician if you feel unwell.

Storage:
P403 Store in a well-ventilated place.
P405 Store locked up.
P410+P403 Protect from sunlight. Store in a well-ventilated place.

Disposal:
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

Poisons Schedule (SUSMP): None allocated.

3. COMPOSITION AND INFORMATION ON INGREDIENTS

Components	CAS Number	Proportion	Hazard Codes
Hydrogen gas	1333-74-0	55-75%	H220
Nitrogen gas	7727-37-9	0.7-27%	-
Carbon dioxide	124-38-9	0-18%	-
Methane	74-82-8	0.3-14%	H220
Carbon monoxide	630-08-0	0.2-13%	H220 H360D H331 H372
Argon gas	7440-37-1	0-0.4%	-

4. FIRST AID MEASURES

For advice, contact a Poisons Information Centre (e.g. phone Australia 131 126; New Zealand 0800 764 766) or a doctor.

Inhalation:
Remove victim from area of exposure - avoid becoming a casualty. Remove contaminated clothing and loosen remaining clothing. Allow patient to assume most comfortable position and keep warm. Keep at rest until fully recovered. If patient finds breathing difficult and develops a bluish discolouration of the skin (which suggests a lack of oxygen in the blood - cyanosis), ensure airways are clear of any obstruction and have a qualified person give oxygen through a face mask. Apply artificial respiration if patient is not breathing. Seek immediate medical advice.

Skin Contact:
Caution - material can be very hot. For skin burns, immediately flood burnt area with plenty of water. For skin burns, cover with a clean, dry dressing until medical help is available.

Eye Contact:
If in eyes, wash out immediately with water. In all cases of eye contamination it is a sensible precaution to seek medical advice.

Ingestion:
Not applicable. Treat as for 'Inhalation'.

Indication of immediate medical attention and special treatment needed:
Treat symptomatically. Material is gas under pressure and may be extremely hot and can cause severe thermal burns. Some component gases are asphyxiants. Gas stream contains toxic carbon monoxide.

5. FIRE FIGHTING MEASURES

Suitable Extinguishing Media:
Fine water spray.

Hazchem or Emergency Action Code: 2SE

Specific hazards arising from the substance or mixture:
Extremely flammable compressed gas. Avoid all ignition sources. May form flammable vapour mixtures with air. On burning will emit toxic fumes, including those of oxides of carbon and oxides of nitrogen .

Special protective equipment and precautions for fire-fighters:
Will burn if involved in a fire. In case of fire area must be evacuated and specialist fire fighters called. Fires to be fought from a protected location.

6. ACCIDENTAL RELEASE MEASURES

Emergency procedures/Environmental precautions:
Clear area of all unprotected personnel. Evacuate personnel from downwind areas. Shut off all possible sources of ignition. Increase ventilation. Avoid breathing in vapours. Work up wind or increase ventilation. Isolate spill or leak area immediately. Shut off leak if possible without risk. Work up wind. Use water spray to disperse vapour. Seek specialist advice.

Personal precautions/Protective equipment/Methods and materials for containment and cleaning up:
Wear protective equipment to prevent skin and eye contact and breathing in vapours. Stop leak if safe to do so.

7. HANDLING AND STORAGE

Precautions for safe handling:
Avoid all contact. Vapours may form explosive mixture with air. Vapour may travel a considerable distance to source of ignition and flash back. Take precautionary measures against static discharges.

Conditions for safe storage, including any incompatibilities:
Not applicable.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control Parameters: No value assigned for this specific material by Safe Work Australia. However, Workplace Exposure Standard(s) for constituent(s):

Carbon dioxide: 8hr TWA = 9000 mg/m^3 (5000 ppm), 15 min STEL 54000 mg/m^3 (30000 ppm)
Carbon monoxide: 8hr TWA = 34 mg/m^3 (30 ppm)
Methane: Asphyxiant
Hydrogen: Asphyxiant
Argon: Asphyxiant
Nitrogen: Asphyxiant

As published by Safe Work Australia Workplace Exposure Standards for Airborne Contaminants.

TWA - The time-weighted average airborne concentration of a particular substance when calculated over an eight-hour working day, for a five-day working week.

STEL (Short Term Exposure Limit) - the airborne concentration of a particular substance calculated as a time-weighted average over 15 minutes, which should not be exceeded at any time during a normal eight hour work day. According to current knowledge this concentration should neither impair the health of, nor cause undue discomfort to, nearly all workers.

Asphyxiant - gases which can lead to reduction of oxygen concentration by displacement or dilution. The minimum oxygen content in air should be 18% by volume under normal atmospheric pressure.

These Workplace Exposure Standards are guides to be used in the control of occupational health hazards. All atmospheric contamination should be kept to as low a level as is workable. These workplace exposure standards should not be used as fine dividing lines between safe and dangerous concentrations of chemicals. They are not a measure of relative toxicity.

Appropriate engineering controls:
Ensure ventilation is adequate and that air concentrations of components are controlled below quoted Workplace Exposure Standards. Contains asphyxiant gases which can lead to the displacement or dilution of oxygen.

If in the handling and application of this material, safe exposure levels could be exceeded, the use of engineering controls such as local exhaust ventilation must be considered and the results documented. If achieving safe exposure levels does not require engineering controls, then a detailed and documented risk assessment using the relevant Orica Personal Protection Guide information (refer to PPE section below) as a basis must be carried out to determine the minimum PPE requirements.

Individual protection measures, such as Personal Protective Equipment (PPE):
The selection of PPE is dependent on a detailed risk assessment. The risk assessment should consider the work situation, the physical form of the chemical, the handling methods, and environmental factors.

Orica Personal Protection Guide No. 1, 1998: I - OVERALLS, CHEMICAL GOGGLES, SAFETY SHOES, FACE SHIELD OR AIR MASK, GLOVES (Long).

Avoid contact with escaping gas. Material can be extremely hot. If determined by a risk assessment an inhalation risk exists, wear an air supplied respirator meeting the requirements of AS/NZS 1715 and AS/NZS 1716.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state:	Compressed gas , Hot , (56 - 980 °C)
Colour:	Colourless
Odour:	Not available
Specific Gravity:	Not Available
Relative Vapour Density (air=1):	Not Available
Vapour Pressure (20 °C):	2800 - 3300 kPag

Flash Point (°C):	Not Available
Flammability Limits (%):	Not available
Autoignition Temperature (°C):	Not Available
% Volatile by Volume:	100
Solubility in water (g/L):	Not Available
Boiling Point/Range (°C):	Not Available
pH:	Not Applicable
Evaporation Rate:	Not Available

10. STABILITY AND REACTIVITY

Reactivity: No information available.

Chemical stability: Process gas stream under pressure - may be extremely hot.

Possibility of hazardous reactions: Hazardous polymerisation will not occur. Very flammable and may be extremely hot.

Conditions to avoid: Avoid loss of containment. Avoid electrostatic discharge. Avoid exposure to heat, sources of ignition, and open flame.

Incompatible materials: Not applicable - process gas stream.

Hazardous decomposition products: Oxides of carbon. Oxides of nitrogen.

11. TOXICOLOGICAL INFORMATION

No adverse health effects expected if the product is handled in accordance with this Safety Data Sheet and the product label. Symptoms or effects that may arise if the product is mishandled and overexposure occurs are:

Ingestion: Not a likely route of exposure. Process gas stream under pressure.

Eye contact: Contact with the hot material can result in pain, thermal burns, and permanent injury.

Skin contact: Contact with hot material may cause skin burns.

Inhalation: Harmful if inhaled. Material may be irritant to the mucous membranes of the respiratory tract (airways). Inhalation of vapours may lead to headache, nausea, dizziness and vomiting. Breathing in high concentrations can produce central nervous system effects. An asphyxiant; exposure to high concentrations can eventually lead to a lack of oxygen in the blood, which may cause death. Inhalation of hot gases may result in thermal burns to the respiratory tract.

Acute toxicity: No LD50 data available for the product. However, for constituent(s)
Inhalation LC50 (rat): 1807 ppm/4Hr (carbon monoxide)
Inhalation LC50 (mouse): 50,000 ppm/2Hr (methane)
Inhalation LC50(mouse): 200,000 ppm/2Hr (carbon dioxide)
One component of this material (carbon monoxide) may cause harm to the unborn child. Inhaled carbon monoxide binds to haemoglobin, greatly reducing the red blood cell's ability to transport oxygen to body tissues.

Chronic effects: No information available for the product.

Reproductive toxicity: May damage the unborn child. (carbon monoxide)

Specific Target Organ Toxicity (STOT) - repeated exposure:	Causes damage to organs through prolonged or repeated exposure. (blood) (carbon monoxide)

12. ECOLOGICAL INFORMATION

Ecotoxicity Avoid release to the environment.

13. DISPOSAL CONSIDERATIONS

Disposal methods:
Refer to Waste Management Authority. Dispose of contents/container in accordance with local/regional/national/international regulations.

14. TRANSPORT INFORMATION

Road and Rail Transport
Classified as Dangerous Goods by the criteria of the Australian Dangerous Goods Code (ADG Code) for Transport by Road and Rail; DANGEROUS GOODS.

UN No:	1954
Transport Hazard Class:	2.1 Flammable Gas
Proper Shipping Name or Technical Name:	COMPRESSED GAS, FLAMMABLE, N.O.S. (CONTAINS HYDROGEN, METHANE)
Hazchem or Emergency Action Code:	2SE

Marine Transport
Not applicable.

Air Transport
Not applicable.

15. REGULATORY INFORMATION

Classification:
This material is hazardous according to Safe Work Australia; HAZARDOUS SUBSTANCE.

Classification of the substance or mixture:
Flammable Gases - Category 1
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H360 May damage fertility or the unborn child.

Poisons Schedule (SUSMP): None allocated.

16. OTHER INFORMATION

`Registry of Toxic Effects of Chemical Substances'. Ed. D. Sweet, US Dept. of Health & Human Services: Cincinatti, 2015.

This safety data sheet has been prepared by Ixom Operations Pty Ltd Toxicology & SDS Services.

Reason(s) for Issue:
5 Yearly Revised Primary SDS
Alignment to Safe Work Australia requirements
Alignment to GHS requirements
Change in UN Number: 1953 to 1954

This SDS summarises to our best knowledge at the date of issue, the chemical health and safety hazards of the material and general guidance on how to safely handle the material in the workplace. Since Orica Limited cannot anticipate or control the conditions under which the product may be used, each user must, prior to usage, assess and control the risks arising from its use of the material.

If clarification or further information is needed, the user should contact their Orica representative or Orica Limited at the contact details on page 1.

Orica Limited's responsibility for the material as shipped is subject to the terms and conditions of sale, a copy of which is available upon request.