SECTION 1: Identification

1.1. Identification
Product form: Mixture
Formula: Non-flammable, Non-oxidizing gas mixture containing one or more of the following components: Chlorine, Nitrogen.

1.2. Relevant identified uses of the substance or mixture and uses advised against
Use of the substance/mixture: Calibration / Reference
Use of the substance/mixture: Industrial use. Use as directed.

1.3. Details of the supplier of the safety data sheet
Industrial Scientific Corporation (AU)
Imported By: Scientific Gas Australia Pty Ltd.
Unit 3, 1 Perry Road
Matraville NSW, 2036 - Australia
T PH 1300 880 531

1.4. Emergency telephone number
Emergency number: Emergency Phone: International call (outside USA): +1 813 248 0585; Emergency Phone: International call (outside USA): +1 813 248 058; Australian Fire Brigade: 000; Australian Poison Information Centre: 13 11 26
CHEMTREC: USA 1-800-424-9300, International 001-703-527-3887 (Collect calls accepted, contract 17729)

SECTION 2: Hazard(s) identification

2.1. Classification of the substance or mixture
GHS-US classification
Compressed gas
Acute Tox. 4 (Inhalation: gas)
Full text of H-statements: see section 16

2.2. Label elements
GHS-US labelling
Hazard pictograms (GHS-US):

Signal word (GHS-US): WARNING
Hazard statements (GHS-US):
H280 - CONTAINS GAS UNDER PRESSURE; MAY EXPLODE IF HEATED
H332 - HARMFUL IF INHALED
OSHA-H01 - MAY DISPLACE OXYGEN AND CAUSE RAPID SUFFOCATION.

Precautionary statements (GHS-US):
P261 - Avoid breathing gas
P271 - Use and store only outdoors or in a well-ventilated area.
P304+P340 - If inhaled: Remove person to fresh air and keep comfortable for breathing.
P312 - Call a poison center/doctor if you feel unwell
CGA-PG27 - Read and follow the Safety Data Sheet (SDS) before use.
CGA-PG21 - Open valve slowly.
CGA-PG02 - Protect from sunlight when ambient temperature exceeds 52°C (125°F).
CGA-PG05 - Use a back flow preventive device in the piping.
CGA-PG06 - Close valve after each use and when empty.
CGA-PG10 - Use only with equipment rated for cylinder pressure.
CGA-PG11 - Never put cylinders into unventilated areas of passenger vehicles.
CGA-PG12 - Do not open valve until connected to equipment prepared for use.

2.3. Other hazards
No additional information available

2.4. Unknown acute toxicity (GHS US)
Not applicable
SECTION 3: Composition/information on ingredients

3.1. Substance
Not applicable

3.2. Mixture

<table>
<thead>
<tr>
<th>Name</th>
<th>Product identifier</th>
<th>%</th>
<th>GHS-US classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitrogen</td>
<td>(CAS No) 7727-57-9</td>
<td>&lt;= 99.9999</td>
<td>Compressed gas, H280</td>
</tr>
<tr>
<td>Chlorine</td>
<td>(CAS No) 7782-50-5</td>
<td></td>
<td>Ox. Gas 1, H270 Liquefied gas, H280 Acute Tox. 2 (Inhalation:gas), H330 Skin Irrit. 2, H315 STOT SE 3, H335 Aquatic Acute 1, H400</td>
</tr>
</tbody>
</table>

Full text of H-statements: see section 16

SECTION 4: First aid measures

4.1. Description of first aid measures

First-aid measures after inhalation: Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped. Immediately remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, qualified personnel may give oxygen. Call a physician.

First-aid measures after skin contact: Adverse effects not expected from this product.

First-aid measures after eye contact: Immediately flush eyes thoroughly with water for at least 15 minutes. Hold the eyelids open and away from the eyeballs to ensure that all surfaces are flushed thoroughly. Contact an ophthalmologist immediately.

First-aid measures after ingestion: Ingestion is not considered a potential route of exposure.

4.2. Most important symptoms and effects, both acute and delayed
No additional information available

4.3. Indication of any immediate medical attention and special treatment needed
Obtain medical assistance.

SECTION 5: Firefighting measures

5.1. Extinguishing media
Suitable extinguishing media: Use extinguishing media appropriate for surrounding fire.

5.2. Special hazards arising from the substance or mixture
Reactivity: No reactivity hazard other than the effects described in sub-sections below.

5.3. Advice for firefighters
Firefighting instructions: Evacuate all personnel from the danger area. Use self-contained breathing apparatus (SCBA) and protective clothing. Immediately cool containers with water from maximum distance. Stop flow of gas if safe to do so, while continuing cooling water spray. Remove ignition sources if safe to do so. Remove containers from area of fire if safe to do so. On-site fire brigades must comply with OSHA 29 CFR 1910.156 and applicable standards under 29 CFR 1910 Subpart L—Fire Protection.

Special protective equipment for fire fighters: Standard protective clothing and equipment (Self Contained Breathing Apparatus) for fire fighters.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures: Wear self-contained breathing apparatus when entering area unless atmosphere is proven to be safe. Ensure adequate air ventilation. Evacuate area. Try to stop release. Monitor concentration of released product.

6.1.1. For non-emergency personnel
No additional information available

6.1.2. For emergency responders
No additional information available

6.2. Environmental precautions
Try to stop release. Prevent waste from contaminating the surrounding environment. Prevent soil and water pollution. Dispose of contents/container in accordance with local/regional/national/international regulations. Contact supplier for any special requirements.
SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling: Wear leather safety gloves and safety shoes when handling cylinders. Protect cylinders from physical damage; do not drag, roll, slide or drop. While moving cylinder, always keep in place removable valve cover. Never attempt to lift a cylinder by its cap; the cap is intended solely to protect the valve. When moving cylinders, even for short distances, use a cart (trolley, hand truck, etc.) designed to transport cylinders. Never insert an object (e.g., wrench, screwdriver, pry bar) into cap openings; doing so may damage the valve and cause a leak. Use an adjustable strap wrench to remove over-tight or rusted caps. Slowly open the valve. If the valve is hard to open, discontinue use and contact your supplier. Close the container valve after each use; keep closed even when empty. Never apply flame or localized heat directly to any part of the container. High temperatures may damage the container and could cause the pressure relief device to fail prematurely, venting the container contents. For other precautions in using this product, see section 16.

7.2. Conditions for safe storage, including any incompatibilities

Storage conditions: Store in a cool, well-ventilated place. Store and use with adequate ventilation. Store full and empty containers separately. Use a first-in, first-out inventory system to prevent storing full containers for long periods. OTHER PRECAUTIONS FOR HANDLING, STORAGE, AND USE: When handling product under pressure, use piping and equipment adequately designed to withstand the pressures to be encountered. Never work on a pressurized system. Use a back flow preventive device in the piping. Gases can cause rapid suffocation because of oxygen deficiency; store and use with adequate ventilation. If a leak occurs, close the container valve and blow down the system in a safe and environmentally correct manner in compliance with all international, federal/national, state/provincial, and local laws; then repair the leak. Never place a container where it may become part of an electrical circuit.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

<table>
<thead>
<tr>
<th>Chlorine (7782-50-5)</th>
<th>ACGIH TLV-TWA (ppm)</th>
<th>ACGIH TLV-STEL (ppm)</th>
<th>OSHA PEL (Ceiling) (mg/m³)</th>
<th>OSHA PEL (Ceiling) (ppm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACGIH</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACGIH</td>
<td>0.5 ppm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OSHA</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OSHA</td>
<td>1 ppm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OSHA</td>
<td>3 mg/m³</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OSHA</td>
<td>1 ppm</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

8.2. Exposure controls

Appropriate engineering controls: Provide adequate general and local exhaust ventilation. Alarm detectors should be used when toxic gases may be released. Product to be handled in a closed system. Ensure exposure is below occupational exposure limits (where available).

Personal protective equipment: Gloves. Safety glasses.

Eye protection: Wear safety glasses when handling cylinders; vapor-proof goggles and a face shield during cylinder changeout or whenever contact with product is possible. Select eye protection in accordance with OSHA 29 CFR 1910.133.

Skin and body protection: Wear metatarsal shoes and work gloves for cylinder handling, and protective clothing where needed. Wear appropriate chemical gloves during cylinder changeout or wherever contact with product is possible. Select per OSHA 29 CFR 1910.132, 1910.136, and 1910.138.
Respiratory protection: When workplace conditions warrant respirator use, follow a respiratory protection program that meets OSHA 29 CFR 1910.134, ANSI Z88.2, or MSHA 30 CFR 72.710 (where applicable). Use an air-supplied or air-purifying cartridge if the action level is exceeded. Ensure that the respirator has the appropriate protection factor for the exposure level. If cartridge-type respirators are used, the cartridge must be appropriate for the chemical exposure (e.g., an organic vapor cartridge). For emergencies or instances with unknown exposure levels, use a self-contained breathing apparatus (SCBA).

Thermal hazard protection: Wear cold insulating gloves when transferring or breaking transfer connections.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical state</td>
<td>Gas</td>
</tr>
<tr>
<td>Colour</td>
<td>Colourless</td>
</tr>
<tr>
<td>Odour</td>
<td>No data available</td>
</tr>
<tr>
<td>Odour threshold</td>
<td>No data available</td>
</tr>
<tr>
<td>pH</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Melting point</td>
<td>No data available</td>
</tr>
<tr>
<td>Freezing point</td>
<td>No data available</td>
</tr>
<tr>
<td>Boiling point</td>
<td>No data available</td>
</tr>
<tr>
<td>Flash point</td>
<td>No data available</td>
</tr>
<tr>
<td>Relative evaporation rate (butylacetate=1)</td>
<td>No data available</td>
</tr>
<tr>
<td>Relative evaporation rate (ether=1)</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>No data available</td>
</tr>
<tr>
<td>Explosive limits</td>
<td>No data available</td>
</tr>
<tr>
<td>Explosive properties</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Oxidising properties</td>
<td>None</td>
</tr>
<tr>
<td>Vapour pressure</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Relative density</td>
<td>No data available</td>
</tr>
<tr>
<td>Relative vapour density at 20 °C</td>
<td>No data available</td>
</tr>
<tr>
<td>Solubility</td>
<td>Water: No data available</td>
</tr>
<tr>
<td>Log Pow</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Auto-ignition temperature</td>
<td>No data available</td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>No data available</td>
</tr>
<tr>
<td>Viscosity</td>
<td>No data available</td>
</tr>
<tr>
<td>Viscosity, kinematic</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Viscosity, dynamic</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

9.2. Other information

No additional information available

SECTION 10: Stability and reactivity

10.1. Reactivity

No reactivity hazard other than the effects described in sub-sections below.

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

No additional information available

10.4. Conditions to avoid

No additional information available

10.5. Incompatible materials

No additional information available

10.6. Hazardous decomposition products

No additional information available
## SECTION 11: Toxicological information

### 11.1. Information on toxicological effects

**Acute toxicity**: Inhalation: gas: HARMFUL IF INHALED.

<table>
<thead>
<tr>
<th>Substance</th>
<th>EC50 (ppm)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PTG-4021</strong></td>
<td>14650.000 ppmv/4h</td>
</tr>
<tr>
<td><strong>Chlorine (7782-50-5)</strong></td>
<td>146.5 ppm/4h</td>
</tr>
<tr>
<td><strong>ATE US (gases)</strong></td>
<td>146.500 ppmv/4h</td>
</tr>
</tbody>
</table>

**Skin corrosion/irritation**: Not classified

**Serious eye damage/irritation**: Not classified

**Respiratory or skin sensitisation**: Not classified

**Germ cell mutagenicity**: Not classified

**Carcinogenicity**: Not classified

**Reproductive toxicity**: Not classified

**Specific target organ toxicity (single exposure)**: Not classified

**Specific target organ toxicity (repeated exposure)**: Not classified

**Aspiration hazard**: Not classified

## SECTION 12: Ecological information

### 12.1. Toxicity

Ecology - general: VERY TOXIC TO AQUATIC LIFE.

<table>
<thead>
<tr>
<th>Substance</th>
<th>LC50 (ppm)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Chlorine (7782-50-5)</strong></td>
<td>0.44 mg/l (Exposure time: 96 h - Species: Lepomis macrochirus [flow-through])</td>
</tr>
<tr>
<td><strong>EC50 Daphnia 1</strong></td>
<td>0.017 mg/l (Exposure time: 48 h - Species: Daphnia magna)</td>
</tr>
<tr>
<td><strong>LC50 fish 2</strong></td>
<td>0.014 mg/l (Exposure time: 96 h - Species: Oncorhynchus mykiss [flow-through])</td>
</tr>
</tbody>
</table>

### 12.2. Persistence and degradability

**PTG-4021**

Persistence and degradability: No ecological damage caused by this product.

**Chlorine (7782-50-5)**

Persistence and degradability: Not applicable for inorganic gases.

**Nitrogen (7727-37-9)**

Persistence and degradability: No ecological damage caused by this product.

### 12.3. Bioaccumulative potential

**PTG-4021**

Log Pow: Not applicable.

Log Kow: Not applicable.

Bioaccumulative potential: No ecological damage caused by this product.

**Chlorine (7782-50-5)**

BCF fish 1: (no bioaccumulation expected)

Log Pow: Not applicable for inorganic gases.

Bioaccumulative potential: No data available.

**Nitrogen (7727-37-9)**

Log Pow: Not applicable.

Log Kow: Not applicable.

Bioaccumulative potential: No ecological damage caused by this product.
12.4. Mobility in soil

<table>
<thead>
<tr>
<th>PTG-4021</th>
<th>Mobility in soil</th>
<th>No data available.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chlorine (7782-50-5)</td>
<td>Ecology - soil</td>
<td>Because of its high volatility, the product is unlikely to cause ground or water pollution.</td>
</tr>
<tr>
<td>Nitrogen (7727-37-9)</td>
<td>Mobility in soil</td>
<td>No data available.</td>
</tr>
<tr>
<td>Nitrogen (7727-37-9)</td>
<td>Ecology - soil</td>
<td>No ecological damage caused by this product.</td>
</tr>
</tbody>
</table>

12.5. Other adverse effects

- Effect on ozone layer: None.
- Effect on the global warming: No known ecological damage caused by this product.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

- Waste disposal recommendations: Do not attempt to dispose of residual or unused quantities. Return container to supplier.

SECTION 14: Transport information

Department of Transportation (DOT)

In accordance with DOT

Transport document description: UN1956 Compressed gas, n.o.s., 2.2

UN-No.(DOT): UN1956

Proper Shipping Name (DOT): Compressed gas, n.o.s.

Transport hazard class(es) (DOT): 2.2 - Class 2.2 - Non-flammable compressed gas 49 CFR 173.115

Hazard labels (DOT): 2.2 - Non-flammable gas

DOT Packaging Non Bulk (49 CFR 173.xxx): 302;305

DOT Packaging Bulk (49 CFR 173.xxx): 314;315

DOT Symbols: G - Identifies proper shipping name (PSN) requiring the addition of technical name(s) in parentheses following the PSN.

DOT Packaging Exceptions (49 CFR 173.xxx): 306;307

DOT Quantity Limitations Passenger aircraft/rail (49 CFR 172.101 HMT, Column 9a): 75 kg

DOT Quantity Limitations Cargo aircraft only (49 CFR 172.101 HMT, Column 9b): 150 kg

DOT Vessel Stowage Location: A - The material may be stowed “on deck” or “under deck” on a cargo vessel and on a passenger vessel.

Emergency Response Guide (ERG) Number: 126

Other information: No supplementary information available.

Special transport precautions: Avoid transport on vehicles where the load space is not separated from the driver's compartment. Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency. Before transporting product containers:
- Ensure there is adequate ventilation.
- Ensure that containers are firmly secured.
- Ensure cylinder valve is closed and not leaking.
- Ensure valve outlet cap nut or plug (where provided) is correctly fitted.
- Ensure valve protection device (where provided) is correctly fitted.

TDG

Transport document description: UN1956 Compressed Gas, n.o.s., 2.2

UN-No. (TDG): UN1956
PTG-4021
Safety Data Sheet

TDG Proper Shipping Name: Compressed Gas, n.o.s.
TDG Primary Hazard Classes: 2.2 - Class 2.2 - Non-Flammable, Non-Toxic Gas.

**Transport by sea**
- UN-No. (IMDG): 1956
- Proper Shipping Name (IMDG): COMPRESSED GAS, N.O.S.
- Class (IMDG): 2.2 - Non-flammable, non-toxic gases
- Limited quantities (IMDG): 120ml
- EmS-No. (1): F-C
- MFAG-No: 620
- EmS-No. (2): S-V

**Air transport**
- UN-No. (IATA): 1956
- Proper Shipping Name (IATA): COMPRESSED GAS, N.O.S.
- Class (IATA): 2
- Instruction "cargo" (ICAO): 200
- Instruction "passenger" (ICAO): 200
- Instruction "passenger" - Limited quantities (ICAO): FORBIDDEN

### SECTION 15: Regulatory information

#### 15.1. US Federal regulations

**Chlorine (7782-50-5)**
- Listed on the United States TSCA (Toxic Substances Control Act) inventory
- Listed on the United States SARA Section 302
- Subject to reporting requirements of United States SARA Section 313
- SARA Section 302 Threshold Planning Quantity (TPQ): 100
- SARA Section 313 - Emission Reporting: 1.0 %

**Nitrogen (7727-37-9)**
- Listed on the United States TSCA (Toxic Substances Control Act) inventory

#### 15.2. International regulations

**CANADA**

**Chlorine (7782-50-5)**
- Listed on the Canadian DSL (Domestic Substances List)
- WHMIS Classification: Class A - Compressed Gas
- Class D Division 1 Subdivision A - Very toxic material causing immediate and serious toxic effects
- Class E - Corrosive Material

**Nitrogen (7727-37-9)**
- Listed on the Canadian DSL (Domestic Substances List)
- WHMIS Classification: Class A - Compressed Gas

**EU-Regulations**

No additional information available

### National regulations

**Chlorine (7782-50-5)**
- Listed on the AICS (Australian Inventory of Chemical Substances)
- Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China)
- Listed on the Korean ECL (Existing Chemicals List)
- Listed on NZIoC (New Zealand Inventory of Chemicals)
- Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)
- Japanese Poisonous and Deleterious Substances Control Law
- Listed on the Canadian IDL (Ingredient Disclosure List)
Nitrogen (7727-37-9)

- Listed on the AiCS (Australian Inventory of Chemical Substances)
- Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China)
- Listed on the Korean ECL (Existing Chemicals List)
- Listed on NZIoC (New Zealand Inventory of Chemicals)
- Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)

15.3. US State regulations

Chlorine (7782-50-5)

- U.S. - Massachusetts - Right To Know List
- U.S. - New Jersey - Right to Know Hazardous Substance List
- U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List
- U.S. - Pennsylvania - RTK (Right to Know) List

Nitrogen (7727-37-9)

- U.S. - Massachusetts - Right To Know List
- U.S. - New Jersey - Right to Know Hazardous Substance List
- U.S. - Pennsylvania - RTK (Right to Know) List

SECTION 16: Other information

Revision date: 06/08/2015
Training advice: Users of breathing apparatus must be trained.
Other information: When you mix two or more chemicals, you can create additional, unexpected hazards. Obtain and evaluate the safety information for each component before you produce the mixture. Consult an industrial hygienist or other trained person when you evaluate the end product. Before using any plastics, confirm their compatibility with this product. Praxair asks users of this product to study this SDS and become aware of the product hazards and safety information. To promote safe use of this product, a user should (1) notify employees, agents, and contractors of the information in this SDS and of any other known product hazards and safety information, (2) furnish this information to each purchaser of the product, and (3) ask each purchaser to notify its employees and customers of the product hazards and safety information. The opinions expressed herein are those of qualified experts within Praxair, Inc. We believe that the information contained herein is current as of the date of this Safety Data Sheet. Since the use of this information and the conditions of use are not within the control of Praxair, Inc., it is the user's obligation to determine the conditions of safe use of the product. Praxair SDSs are furnished on sale or delivery by Praxair or the independent distributors and suppliers who package and sell our products. To obtain current SDSs for these products, contact your Praxair sales representative, local distributor, or supplier, or download from www.praxair.com. If you have questions regarding Praxair SDSs, would like the document number and date of the latest SDS, or would like the names of the Praxair suppliers in your area, phone or write the Praxair Call Center (Phone: 1-800-PRAXAIR/1-800-772-9247; Address: Praxair Call Center, Praxair, Inc., P.O. Box 44, Tonawanda, NY 14151-9044). PRAXAIR and the Flowing Airstream design are trademarks or registered trademarks of Praxair Technology, Inc. in the United States and/or other countries.

Full text of H-statements:

- Acute Tox. 2 (Inhalation:gas)
- Acute toxicity (inhalation:gas) Category 2
- Acute Tox. 4 (Inhalation:gas)
- Acute toxicity (inhalation:gas) Category 4
- Aquatic Acute 1
- Hazardous to the aquatic environment — Acute Hazard, Category 1
- Compressed gas
- Gases under pressure : Compressed gas
- Liquefied gas
- Gases under pressure : Liquefied gas
- Ox. Gas 1
- Oxidising Gases, Category 1
- Skin Irrit. 2
- Skin corrosion/irritation, Category 2
- STOT SE 3
- Specific target organ toxicity — Single exposure, Category 3, Respiratory tract irritation
- H270
- MAY CAUSE OR INTENSIFY FIRE; OXIDIZER
- H280
- CONTAINS GAS UNDER PRESSURE; MAY EXPLODE IF HEATED
- H315
- CAUSES SKIN IRRITATION
- H330
- FATAL IF INHALED
- H332
- HARMFUL IF INHALED
- H335
- MAY CAUSE RESPIRATORY IRRITATION
- H400
- VERY TOXIC TO AQUATIC LIFE

ISC Part Numbers: 1810-1758, 1810-5007, 1810-6955, 1810-9082, 1810-9336, 1810-2806, 1810-3697, 1810-9097
This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.