## 1 - PRODUCT AND COMPANY IDENTIFICATION

### 1.1 PRODUCT IDENTIFIER:

#### 1.1.1 PRODUCT NAME
Nitrous Oxide, Refrigerated Liquid

#### 1.1.2 SYNONYMS
Nitrous Oxide (Cryogenic Liquid)

#### 1.1.3 CAS NUMBER
10024-97-2

#### 1.1.4 CHEMICAL FORMULA
\( N_2O \)

### 1.2 RELEVANT IDENTIFIED USES OF THE SUBSTANCE OR MIXTURE AND USES ADVISED AGAINST:

#### 1.2.1 RELEVANT IDENTIFIED USES
Synthetic/Analytical chemistry.

#### 1.2.2 USES ADVISED AGAINST
N/A

### 1.3 DETAILS OF THE SUPPLIER:

#### 1.3.1 COMPANY IDENTIFICATION
Sharjah Oxygen Company

### 1.4 EMERGENCY TELEPHONE NUMBER:

#### 1.4.1 EMERGENCY NUMBER(S) PHONE
+971-6-5336481

## 2 - HAZARD(S) IDENTIFICATION

### 2.1 CLASSIFICATION OF SUBSTANCE OR MIXTURE:
- OXIDIZING GASES - Category 1
- GASES UNDER PRESSURE - Refrigerated liquefied gas
- SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Narcotic effects) - Category 3

### 2.2 LABEL ELEMENTS:

---

Read this Safety Data Sheet (SDS) before use or disposal of this product. Pass along the information to employees and any other persons who could be exposed to the product to be sure that they are aware of information before use or other exposure. The SDS information is based on sources believed to be reliable. However, since data, safety standards and government regulations are subject to change and the conditions of handling and use, or misuse are beyond our control, SHARJAH OXYGEN COMPANY makes no warranty, either expressed or implied, with respect to the completeness or continuing accuracy of the information contained herein and disclaims all liability for reliance thereon. Also, additional information may be necessary or helpful for specific conditions and circumstances of use. It is the user’s responsibility to determine the suitability of this product and to evaluate risks prior to use, and then to exercise appropriate precautions for protection of employees and others.
2.2.1 LABELING PICTOGRAMS

2.2.2 SIGNAL WORD

Danger

2.2.3 HAZARD STATEMENT

May cause or intensify fire; oxidizer. Contains refrigerated gas; may cause cryogenic burns or injury. May cause frostbite. May cause drowsiness and dizziness.

2.2.4 PRECAUTIONARY STATEMENT

Read and follow all Safety Data Sheets (SDS’S) before use. Read label before use. Keep out of reach of children. If medical advice is needed, have product container or label at hand. Close valve after each use and when empty. Use equipment rated for cylinder pressure. Do not open valve until connected to equipment prepared for use. Use a back flow preventative device in the piping. Use only equipment of compatible materials of construction. Open valve slowly. Use only with equipment cleaned for Oxygen service. Always keep container in upright position. Do not change or force fit connections. Avoid spills. Do not walk or roll equipment over spills.

2.3 OTHER HAZARDS:

Asphyxiant in high concentrations
Contact with liquid may cause cold burns/frostbite.

3 – COMPOSITION/INFORMATION ON INGREDIENTS

3.1 SUBSTANCES:

3.1.1 CHEMICAL IDENTITY OF THE SUBSTANCE

Substance
3.1.2 COMMON SYNONYM(S) | NAME(S)/
| Nitrous Oxide (Cryogenic Liquid)

3.1.3 CAS NO. | 10024-97-2

3.1.4 IMPURITIES AND STABILIZING ADDITIVES WHICH ARE THEMSELVES CLASSIFIED AND WHICH CONTRIBUTE TO THE CLASSIFICATION OF THE SUBSTANCE

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

3.2 MIXTURES:
Nitrous Oxide: 100%

4 – FIRST AID MEASURES

4.1 DESCRIPTION OF FIRST AID MEASURES:

4.1.1 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.

4.1.2 SKIN CONTACT

The liquid may cause frostbite. For exposure to liquid, immediately warm frostbite area with warm water not to exceed 105°F (41°C). Water temperature should be tolerable to normal skin. Maintain skin warming for at least 15 minutes or until normal coloring and sensation have returned to the affected area. In case of massive exposure, remove clothing while showering with warm water. Seek medical evaluation and treatment as soon as possible.

4.1.3 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. Consult an eye specialist immediately.

Read this Safety Data Sheet (SDS) before use or disposal of this product. Pass along the information to employees and any other persons who could be exposed to the product to be sure that they are aware of information before use or other exposure. The SDS information is based on sources believed to be reliable. However, since data, safety standards and government regulations are subject to change and the conditions of handling and use, or misuse are beyond our control, SHARJAH OXYGEN COMPANY makes no warranty, either expressed or implied, with respect to the completeness or continuing accuracy of the information contained herein and disclaims all liability for reliance thereon. Also, additional information may be necessary or helpful for specific conditions and circumstances of use. It is the user’s responsibility to determine the suitability of this product and to evaluate risks prior to use, and then to exercise appropriate precautions for protection of employees and others.
| 4.1.4 INGESTION | Ingestion is not considered a potential route of exposure. |

| 4.2 MOST IMPORTANT SYMPTOMS AND EFFECTS BOTH ACUTE AND DELAYED : |

| 4.2.1 ACUTE SYMPTOMS AND EFFECTS | Eye contact: Extremely cold material. Liquid can cause burns similar to frostbite. Inhalation: Can cause central nervous system (CNS) depression. May cause drowsiness and dizziness. Skin Contact: Extremely cold material. Dermal contact with rapidly evaporating liquid could result in freezing of the tissues or frostbite. Frostbite: Try to warm up the frozen tissues and seek medical attention. Ingestion: Can cause central nervous system (CNS) depression. Ingestion of liquid can cause burns similar to frostbite. |

| 4.2.2 DELAYED SYMPTOMS AND EFFECTS | Eye contact: Adverse symptoms may include the frostbite. Inhalation: Adverse symptoms may include nausea or vomiting, headache, drowsiness / fatigue, dizziness/vertigo; unconsciousness. Skin Contact: Adverse symptoms may cause frostbite. Ingestion: Adverse symptoms may include frostbite. |

| 4.3 INDICATION OF ANY IMMEDIATE MEDICAL ATTENTION AND SPECIAL TREATMENT NEEDED : |

In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

5 – FIRE FIGHTING MEASURES

| 5.1 EXTINGUISHING MEDIA : |

| 5.1.1 SUITABLE EXTINGUISHING MEDIA | Use an extinguishing agent suitable for the surrounding fire. |

---

Read this Safety Data Sheet (SDS) before use or disposal of this product. Pass along the information to employees and any other persons who could be exposed to the product to be sure that they are aware of information before use or other exposure. The SDS information is based on sources believed to be reliable. However, since data, safety standards and government regulations are subject to change and the conditions of handling and use, or misuse are beyond our control, SHARJAH OXYGEN COMPANY makes no warranty, either expressed or implied, with respect to the completeness or continuing accuracy of the information contained herein and disclaims all liability for reliance thereon. Also, additional information may be necessary or helpful for specific conditions and circumstances of use. It is the user’s responsibility to determine the suitability of this product and to evaluate risks prior to use, and then to exercise appropriate precautions for protection of employees and others.
# SAFETY DATA SHEET

## NITROUS OXIDE, REFRIGERATED LIQUID

**SDS NO.**  PG - 011

**DATE OF ISSUE**  22/09/2009

**DATE LAST UPDATED**  12/04/2017

**REV. NO.**  01

**PAGE NO.**  5 of 19

### 5.1.2 UNSUITABLE EXTINGUISHING MEDIA

None known.

### 5.2 SPECIFIC HAZARDS ARISING FROM THE CHEMICAL:

#### 5.2.1 DURING FIRE

Contains gas under pressure. Contains refrigerated gas. Oxidizing material. This material increases the risk of fire and may aid combustion. Contact with combustible material may cause fire. In a fire or if heated, a pressure increase will occur and the container may burst or explode.

#### 5.2.2 DURING EXPLOSION

If venting or leaking gas catches fire, do not extinguish flames. Vapors may spread from leak, creating an explosive reigniting hazard. Vapors can be ignited by pilot lights, other flames, smoking, sparks, heaters, electrical equipment, static discharge, or other ignition sources at locations distant from product handling point. Contact with combustible materials such as oil, grease, and other hydrocarbon products, especially in the presence of ignition sources such as pilot lights, other flames, smoking, sparks, heaters, electrical equipment, and static discharges may cause fire or explosion. Explosive atmospheres may linger. Before entering an area, especially a confined area, check the atmosphere with an appropriate device.

#### 5.2.3 DURING REACTIVITY

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

### 5.3 ADVICE FOR FIRE FIGHTERS:

---

Read this Safety Data Sheet (SDS) before use or disposal of this product. Pass along the information to employees and any other persons who could be exposed to the product to be sure that they are aware of information before use or other exposure. The SDS information is based on sources believed to be reliable. However, since data, safety standards and government regulations are subject to change and the conditions of handling and use, or misuse are beyond our control, SHARJAH OXYGEN COMPANY makes no warranty, either expressed or implied, with respect to the completeness or continuing accuracy of the information contained herein and disclaims all liability for reliance thereon. Also, additional information may be necessary or helpful for specific conditions and circumstances of use. It is the user’s responsibility to determine the suitability of this product and to evaluate risks prior to use, and then to exercise appropriate precautions for protection of employees and others.

F/OP5/D65 Issue 02 Rev. 01 Issue Date: 15/03/2017
## 5.3.1 FIRE INSTRUCTIONS FIGHTING

**DANGER!** Extremely cold liquid and gas under pressure. Take care not to direct spray onto vents on top of container. Do not discharge sprays directly into liquid; cryogenic liquid can freeze water rapidly.

**DANGER:** High-pressure, oxidizing gas. Evacuate personnel to a safe area. Appropriate self-contained breathing apparatus may be required. Remove all sources of ignition. Vapor can spread from spill. Contact with flammable materials may cause fire or explosion. When containers have cooled, move them away from fire area if safe to do so. Before entering the area, especially a confined area, check the atmosphere with an appropriate device. On-site fire brigades must comply with OSHA 29 CFR 1910.156 and applicable standards under 29 CFR 1910 Subpart L—Fire Protection.

## 5.3.2 PROTECTION DURING FIRE FIGHTING

Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Contact supplier immediately for specialist advice. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

## 5.3.3 SPECIAL EQUIPMENT FIGHTERS PROTECTIVE FOR FIRE

Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode. For incidents involving large quantities, thermally insulated undergarments and thick textile or leather gloves should be worn.

### 6 – ACCIDENTAL RELEASE MEASURES

#### 6.1 PERSONAL PRECAUTIONS, PROTECTIVE EQUIPMENT AND EMERGENCY PROCEDURES:

Read this Safety Data Sheet (SDS) before use or disposal of this product. Pass along the information to employees and any other persons who could be exposed to the product to be sure that they are aware of information before use or other exposure. The SDS information is based on sources believed to be reliable. However, since data, safety standards and government regulations are subject to change and the conditions of handling and use, or misuse are beyond our control, SHARJAH OXYGEN COMPANY makes no warranty, either expressed or implied, with respect to the completeness or continuing accuracy of the information contained herein and disclaims all liability for reliance thereon. Also, additional information may be necessary or helpful for specific conditions and circumstances of use. It is the user’s responsibility to determine the suitability of this product and to evaluate risks prior to use, and then to exercise appropriate precautions for protection of employees and others.

F/OPS/D65 Issue 02 Rev. 01 Issue Date: 15/03/2017

SHARJAH OXYGEN COMPANY
<table>
<thead>
<tr>
<th><strong>6.1.1 GENERAL MEASURES</strong></th>
<th>DANGER: High-pressure, oxidizing gas. Evacuate personnel to a safe area. Appropriate self-contained breathing apparatus may be required. Approach suspected leak area with caution. Remove all sources of ignition. Vapor can spread from spill. Contact with flammable materials may cause fire or explosion. Ventilate area or move container to a well-ventilated area. Before entering the area, especially a confined area, check the atmosphere with an appropriate device.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>6.1.2 PROTECTIVE EQUIPMENT FOR NON-EMERGENCY PERSONNEL</strong></td>
<td>No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing gas. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.</td>
</tr>
<tr>
<td><strong>6.1.3 PROTECTIVE EQUIPMENT FOR EMERGENCY RESPONDERS</strong></td>
<td>If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in &quot;For non-emergency personnel&quot;.</td>
</tr>
<tr>
<td><strong>6.2 ENVIRONMENTAL PRECAUTIONS</strong></td>
<td>Ensure emergency procedures to deal with accidental gas releases are in place to avoid contamination of the environment. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).</td>
</tr>
<tr>
<td><strong>6.3 METHODS AND MATERIAL FOR CONTAINMENT AND CLEANING UP</strong></td>
<td>No additional information available.</td>
</tr>
</tbody>
</table>
6.4 **REFERENCE TO OTHER SECTION:**
See also sections 8 and 13.

### 7 – HANDLING AND STORAGE

#### 7.1 **PRECAUTION 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 **CONDITION FOR SAFE STORAGE, INCLUDING ANY INCOMPATIBILITIES:**

<table>
<thead>
<tr>
<th>7.2.1</th>
<th><strong>SAFE REQUIREMENTS</strong></th>
<th><strong>STORAGE</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Store in accordance with local regulations. Store in a segregated and approved area. Store locked up. Separate from acids, alkalies, reducing agents and combustibles. Keep container tightly closed and sealed until ready for use. 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).</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>7.2.2</th>
<th><strong>KEEP AWAY FROM</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Store away from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>7.2.3</th>
<th><strong>SUITABLE MATERIAL</strong></th>
<th><strong>PACKAGING</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

---

Read this Safety Data Sheet (SDS) before use or disposal of this product. Pass along the information to employees and any other persons who could be exposed to the product to be sure that they are aware of information before use or other exposure. The SDS information is based on sources believed to be reliable. However, since data, safety standards and government regulations are subject to change and the conditions of handling and use, or misuse are beyond our control, SHARJAH OXYGEN COMPANY makes no warranty, either expressed or implied, with respect to the completeness or continuing accuracy of the information contained herein and disclaims all liability for reliance thereon. Also, additional information may be necessary or helpful for specific conditions and circumstances of use. It is the user’s responsibility to determine the suitability of this product and to evaluate risks prior to use, and then to exercise appropriate precautions for protection of employees and others.

F/OPS/D65 Issue 02 Rev. 01 Issue Date: 15/03/2017

SHARJAH OXYGEN COMPANY
8 – EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 CONTROL PARAMETERS:

8.1.1 OCCUPATIONAL EXPOSURE:

**Occupational exposure limits**

<table>
<thead>
<tr>
<th>Ingredient name</th>
<th>Exposure limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitrous Oxide</td>
<td>ACGIH TLV (United States, 3/2015).</td>
</tr>
<tr>
<td></td>
<td>TWA: 90 mg/m³ 8 hours.</td>
</tr>
<tr>
<td></td>
<td>TWA: 50 ppm 8 hours.</td>
</tr>
<tr>
<td></td>
<td>NIOSH REL (United States, 10/2013).</td>
</tr>
<tr>
<td></td>
<td>TWA: 46 mg/m³ 10 hours.</td>
</tr>
<tr>
<td></td>
<td>TWA: 25 ppm 10 hours.</td>
</tr>
</tbody>
</table>

8.2 EXPOSURE CONTROLS:

8.2.1 APPROPRIATE 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.

8.2.2 INDIVIDUAL PROTECTION MEASURES, SUCH AS PERSONAL PROTECTIVE EQUIPMENT:

**8.2.2.1 RESPIRATORY PROTECTION**

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.
8.2.2.2 HAND PROTECTION
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. If contact with the liquid is possible, insulated gloves suitable for low temperatures should be worn. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

8.2.2.3 EYE PROTECTION
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, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side-shields.

8.2.2.4 SKIN PROTECTION
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.

8.3 ENVIRONMENTAL EXPOSURE

<table>
<thead>
<tr>
<th>8.3 ENVIRONMENTAL CONTROLS</th>
<th>EXPOSURE</th>
</tr>
</thead>
</table>
| Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

9 – PHYSICAL AND CHEMICAL PROPERTIES

9.1 INFORMATION ON BASIC PHYSICAL AND CHEMICAL PROPERTIES:

Read this Safety Data Sheet (SDS) before use or disposal of this product. Pass along the information to employees and any other persons who could be exposed to the product to be sure that they are aware of information before use or other exposure. The SDS information is based on sources believed to be reliable. However, since data, safety standards and government regulations are subject to change and the conditions of handling and use, or misuse are beyond our control, SHARJAH OXYGEN COMPANY makes no warranty, either expressed or implied, with respect to the completeness or continuing accuracy of the information contained herein and disclaims all liability for reliance thereon. Also, additional information may be necessary or helpful for specific conditions and circumstances of use. It is the user’s responsibility to determine the suitability of this product and to evaluate risks prior to use, and then to exercise appropriate precautions for protection of employees and others.

F/OPS/D65 Issue 02 Rev. 01 Issue Date: 15/03/2017

SHARJAH OXYGEN COMPANY
<table>
<thead>
<tr>
<th>9.1.1</th>
<th>PHYSICAL STATE</th>
<th>Gas</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.1.2</td>
<td>APPEARANCE</td>
<td>Colorless, non-flammable gas.</td>
</tr>
<tr>
<td>9.1.3</td>
<td>MOLECULAR MASS</td>
<td>44 g/mol</td>
</tr>
<tr>
<td>9.1.4</td>
<td>COLOR</td>
<td>Colorless.</td>
</tr>
<tr>
<td>9.1.5</td>
<td>ODOR</td>
<td>Sweetish.</td>
</tr>
<tr>
<td>9.1.6</td>
<td>ODOR THRESHOLD</td>
<td>Odor threshold is subjective and inadequate to warn for overexposure.</td>
</tr>
<tr>
<td>9.1.7</td>
<td>PH</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>9.1.8</td>
<td>RELATIVE EVAPORATION RATE</td>
<td>N/A</td>
</tr>
<tr>
<td>9.1.9</td>
<td>MELTING POINT</td>
<td>-90.81 °C</td>
</tr>
<tr>
<td>9.1.10</td>
<td>FREEZING POINT</td>
<td>-90.8°C (-131.4°F)</td>
</tr>
<tr>
<td>9.1.11</td>
<td>BOILING POINT</td>
<td>-88.5 °C</td>
</tr>
<tr>
<td>9.1.12</td>
<td>FLASH POINT</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>9.1.13</td>
<td>CRITICAL TEMPERATURE</td>
<td>36.4 °C</td>
</tr>
<tr>
<td>9.1.14</td>
<td>AUTO-IGNITION TEMPERATURE</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>9.1.15</td>
<td>DECOMPOSITION TEMPERATURE</td>
<td>650 °C</td>
</tr>
<tr>
<td>9.1.16</td>
<td>FLAMMABILITY (SOLID/GAS)</td>
<td>Extremely flammable in the presence of the following materials or conditions: reducing materials and combustible materials.</td>
</tr>
<tr>
<td>9.1.17</td>
<td>VAPOUR PRESSURE</td>
<td>5080 kPa</td>
</tr>
<tr>
<td>9.1.18</td>
<td>CRITICAL PRESSURE</td>
<td>7255 kPa</td>
</tr>
<tr>
<td>9.1.19</td>
<td>RELATIVE VAPOR DENSITY</td>
<td>1.53 (Air = 1) Liquid Density@BP: 76.8 lb/ft³ (1230 kg/m³)</td>
</tr>
<tr>
<td>9.1.20</td>
<td>RELATIVE DENSITY</td>
<td>1.2</td>
</tr>
</tbody>
</table>

Read this Safety Data Sheet (SDS) before use or disposal of this product. Pass along the information to employees and any other persons who could be exposed to the product to be sure that they are aware of information before use or other exposure. The SDS information is based on sources believed to be reliable. However, since data, safety standards and government regulations are subject to change and the conditions of handling and use, or misuse are beyond our control, SHARJAH OXYGEN COMPANY makes no warranty, either expressed or implied, with respect to the completeness or continuing accuracy of the information contained herein and disclaims all liability for reliance thereon. Also, additional information may be necessary or helpful for specific conditions and circumstances of use. It is the user’s responsibility to determine the suitability of this product and to evaluate risks prior to use, and then to exercise appropriate precautions for protection of employees and others.

F/OPS/D65 Issue 02 Rev. 01 Issue Date: 15/03/2017  SHARJAH OXYGEN COMPANY
SAFETY DATA SHEET

NITROUS OXIDE, REFRIGERATED LIQUID

9.1.21 SPECIFIC GRAVITY/DENSITY | N/A
9.1.22 RELATIVE GAS DENSITY | 1.5
9.1.23 SOLUBILITY | Water: 2.2 mg/l
9.1.24 VISCOSITY, KINEMATIC | Not applicable.
9.1.25 VISCOSITY, DYNAMIC | Not applicable.
9.1.26 EXPLOSIVE PROPERTIES | Not applicable.
9.1.27 OXIDIZING PROPERTIES | Oxidizer.
9.1.28 EXPLOSIVE LIMITS | Non flammable

9.2 OTHER INFORMATION :
9.2.1 GAS GROUP | Liquefied gas
9.2.2 ADDITIONAL INFORMATION | Gas/vapor heavier than air. May accumulate in confined spaces, particularly at or below ground level.

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. In the presence of catalysts (e.g. halogen products, mercury, nickel, platinum) the rate of decomposition increases and decomposition can occur at even lower temperatures. At temperatures over 575°C and at atmospheric pressure, nitrous oxide decomposes into nitrogen and oxygen. Pressurized nitrous oxide can also decompose at temperatures equal or greater than 300°C. Nitrous oxide dissociation is irreversible and exothermic, leading to a considerable rise in pressure.

Read this Safety Data Sheet (SDS) before use or disposal of this product. Pass along the information to employees and any other persons who could be exposed to the product to be sure that they are aware of information before use or other exposure. The SDS information is based on sources believed to be reliable. However, since data, safety standards and government regulations are subject to change and the conditions of handling and use, or misuse are beyond our control, SHARJAH OXYGEN COMPANY makes no warranty, either expressed or implied, with respect to the completeness or continuing accuracy of the information contained herein and disclaims all liability for reliance thereon. Also, additional information may be necessary or helpful for specific conditions and circumstances of use. It is the user’s responsibility to determine the suitability of this product and to evaluate risks prior to use, and then to exercise appropriate precautions for protection of employees and others.

F/OPS/D65 Issue 02 Rev. 01 Issue Date: 15/03/2017
# SAFETY DATA SHEET

## NITROUS OXIDE, REFRIGERATED LIQUID

**SDS NO.** PG - 011  
**DATE OF ISSUE** 22/09/2009  
**DATE LAST UPDATED** 12/04/2017  
**REV. NO.** 01  
**PAGE NO.** 13 of 19

### 10.3 POSSIBILITY OF HAZARDOUS REACTION

Violently oxidizes organic material.

### 10.4 CONDITIONS TO AVOID

Heat.

### 10.5 INCOMPATIBLE MATERIALS

Flammable materials, Hydrocarbons, Avoid oil, grease and all other combustible materials, Asphalt, Ethers, Alcohols, Acids, and Aldehydes. Alkali metals, Boron (B), tungsten carbide, and powdered aluminum.

### 10.6 HAZARDOUS PRODUCTS DECOMPOSITION

Nitrous oxide decomposes explosively at 1202°F (650°C) into two parts Nitrogen and one part oxygen. In the presence of catalytic surfaces such as Silver, Platinum (Pt), Cobalt (Co), and Copper or nickel oxide, this reaction occurs at lower temperatures.

### 11 – TOXICOLOGICAL INFORMATION

#### 11.1 INFORMATION ON TOXICOLOGICAL EFFECTS:

<table>
<thead>
<tr>
<th>Name</th>
<th>Category</th>
<th>Rout of exposure</th>
<th>Target organs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitrous Oxide</td>
<td>Category 3</td>
<td>Not applicable.</td>
<td>Narcotic effects</td>
</tr>
</tbody>
</table>

#### 11.1.1 ACUTE TOXICITY

Not classified

### NITROUS OXIDE, REFRIGERATED LIQUID (\( f \))10024-97-2  
LC50 inhalation rat (ppm) > 250 ppm/4h

#### 11.1.2 CORROSION/IRRITATION

Not available.

#### 11.1.3 RESPIRATORY/SKIN SENSITIZATION

Not available.

#### 11.1.4 SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE)

<table>
<thead>
<tr>
<th>Name</th>
<th>Category</th>
<th>Rout of exposure</th>
<th>Target organs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitrous Oxide</td>
<td>Category 3</td>
<td>Not applicable.</td>
<td>Narcotic effects</td>
</tr>
</tbody>
</table>

#### 11.1.5 MUTAGENICITY

Not available.

#### 11.1.6 CARCINOGENICITY

Not available.

---

Read this Safety Data Sheet (SDS) before use or disposal of this product. Pass along the information to employees and any other persons who could be exposed to the product to be sure that they are aware of information before use or other exposure. The SDS information is based on sources believed to be reliable. However, since data, safety standards and government regulations are subject to change and the conditions of handling and use, or misuse are beyond our control, SHARJAH OXYGEN COMPANY makes no warranty, either expressed or implied, with respect to the completeness or continuing accuracy of the information contained herein and disclaims all liability for reliance thereon. Also, additional information may be necessary or helpful for specific conditions and circumstances of use. It is the user’s responsibility to determine the suitability of this product and to evaluate risks prior to use, and then to exercise appropriate precautions for protection of employees and others.

F/OPS/D65 Issue 02 Rev. 01 Issue Date: 15/03/2017  
SHARJAH OXYGEN COMPANY
## 11.1.7 REPRODUCTIVE TOXICITY
Not available.

## 11.1.8 CHRONIC EFFECTS FROM SHORT TERM AND LONG TERM EXPOSURE
Not available.

### 12 – ECOLOGICAL INFORMATION

#### 12.1 TOXICITY
Not available.

#### 12.2 PERSISTENCE AND DEGRADABILITY
Not available.

#### 12.3 BIO ACCUMULATIVE POTENTIAL

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>LogPow</th>
<th>BCF</th>
<th>Potential</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitrous Oxide</td>
<td>0.36</td>
<td>-</td>
<td>low</td>
</tr>
</tbody>
</table>

#### 12.4 MOBILITY IN SOIL
Not available.

#### 12.5 OTHER ADVERSE EFFECTS:

##### 12.5.1 GLOBAL WARMING POTENTIAL (GWP)
[CO2=1] : 298

##### 12.5.2 OZONE DEPLETING POTENTIAL (ODP)
None

### 13 – DISPOSAL CONSIDERATIONS

#### 13.1 WASTE TREATMENT METHODS:

##### 13.1.1 PROVISION RELATING TO WASTE
The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements.

##### 13.1.2 DISPOSAL METHODS
Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant.
13.1.3 PACKAGING/ CONTAINER

Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Empty containers or liners may retain some product residues.

14 – TRANSPORT INFORMATION

14.1 ROAD (ADR):

14.1.1 UN NUMBER UN 2201

14.1.2 UN PROPER SHIPPING NAME Nitrous oxide, refrigerated, liquid

14.1.3 TRANSPORT HAZARD CLASS (ES):

14.1.3.1 HAZARD IDENTIFICATION NUMBER 225

14.1.4 CLASS

14.1.4.1 CLASSIFICATION CODE 30

14.1.5 PACKING GROUP:

14.1.5.1 PACKING GROUP -

14.1.5.2 LABELS

14.1.6 ENVIRONMENTAL HAZARDS:

14.1.6.1 ENVIRONMENTAL HAZARDOUS SUBSTANCE MARK N/A
14.1.7 SPECIAL PRECAUTIONS FOR USER:
Transport within user’s premises: always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

| 14.1.7.1 SPECIAL PROVISIONS | Passenger aircraft  
|  | Quantity limitation: 75 kg  
|  | Cargo aircraft  
|  | Quantity limitation: 150 kg |

14.1.7.2 LIMITED QUANTITIES: Yes

14.2 INLAND WATERWAYS (ADN):

<table>
<thead>
<tr>
<th>14.2.1 UN NUMBER</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.2.2 UN PROPER SHIPPING NAME</td>
<td>N/A</td>
</tr>
<tr>
<td>14.2.3 TRANSPORT HAZARD CLASS (ES):</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>14.2.3.1 HAZARD IDENTIFICATION NUMBER</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.2.3.2 CLASS</td>
<td>N/A</td>
</tr>
<tr>
<td>14.2.3.3 CLASSIFICATION CODE</td>
<td>N/A</td>
</tr>
</tbody>
</table>

14.2.4 PACKING GROUP:

<table>
<thead>
<tr>
<th>14.2.4.1 PACKING GROUP</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.2.4.2 LABELS</td>
<td>N/A</td>
</tr>
</tbody>
</table>

14.2.5 ENVIRONMENTAL HAZARDS:

| 14.2.5.1 ENVIRONMENTAL HAZARDOUS SUBSTANCE MARK | N/A |

Read this Safety Data Sheet (SDS) before use or disposal of this product. Pass along the information to employees and any other persons who could be exposed to the product to be sure that they are aware of information before use or other exposure. The SDS information is based on sources believed to be reliable. However, since data, safety standards and government regulations are subject to change and the conditions of handling and use, or misuse are beyond our control, SHARJAH OXYGEN COMPANY makes no warranty, either expressed or implied, with respect to the completeness or continuing accuracy of the information contained herein and disclaims all liability for reliance thereon. Also, additional information may be necessary or helpful for specific conditions and circumstances of use. It is the user’s responsibility to determine the suitability of this product and to evaluate risks prior to use, and then to exercise appropriate precautions for protection of employees and others.
### 14.2.6 SPECIAL PRECAUTIONS FOR USER:

<table>
<thead>
<tr>
<th>14.2.6.1 SPECIAL PROVISIONS</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.2.6.2 LIMITED QUANTITIES</td>
<td>N/A</td>
</tr>
</tbody>
</table>

### 14.3 SEA (IMDG/IMSBC):

<table>
<thead>
<tr>
<th>14.3.1 UN NUMBER</th>
<th>UN2201</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.3.2 UN PROPER SHIPPING NAME</td>
<td>Nitrous Oxide, Refrigerated Liquid</td>
</tr>
</tbody>
</table>

### 14.3.3 TRANSPORT HAZARD CLASS (ES):

<table>
<thead>
<tr>
<th>14.3.3.1 HAZARD IDENTIFICATION NUMBER</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.3.3.2 CLASS</td>
<td>2.2</td>
</tr>
<tr>
<td>14.3.3.3 CLASSIFICATION CODE</td>
<td>N/A</td>
</tr>
</tbody>
</table>

### 14.3.4 PACKING GROUP:

<table>
<thead>
<tr>
<th>14.3.4.1 PACKING GROUP</th>
<th>N/A</th>
</tr>
</thead>
</table>

### 14.3.5 ENVIRONMENTAL HAZARDS:

<table>
<thead>
<tr>
<th>14.3.5.1 MARINE POLLUTANT</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.3.5.2 ENVIRONMENTALLY HAZARDOUS SUBSTANCE MARK</td>
<td>N/A</td>
</tr>
</tbody>
</table>
### 14.3.6 SPECIAL PRECAUTIONS FOR USER:

**Transport within user’s premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

<table>
<thead>
<tr>
<th>14.3.6.1 SPECIAL PROVISIONS</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.3.6.2 LIMITED QUANTITIES</td>
<td>N/A</td>
</tr>
</tbody>
</table>

#### 14.3.7 TRANSPORT IN BULK ACCORDING TO ANNEX II OF MARPOL 73/78 AND THE IBC CODE:

| 14.3.7.1 ANNEX II OF MARPOL 73/78 | Not available. |

### 14.4 AIR (ICAO-TI/IATA-DGR):

<table>
<thead>
<tr>
<th>14.4.1 UN NUMBER</th>
<th>UN2201</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.4.2 UN PROPER SHIPPING NAME</td>
<td>Nitrous oxide, refrigerated liquid</td>
</tr>
</tbody>
</table>

#### 14.4.3 TRANSPORT HAZARD CLASS (ES):

| 14.4.3.1 CLASS | 2.2 |

#### 14.4.4 PACKING GROUP:

| 14.4.4.1 PACKING GROUP | N/A |

#### 14.4.5 ENVIRONMENTAL HAZARDS:

| 14.4.5.1 ENVIRONMENTAL HAZARDOUS SUBSTANCE MARK | N/A |
14.4.6 SPECIAL PRECAUTIONS FOR USER:
Transport within user’s premises: always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

<table>
<thead>
<tr>
<th>14.4.6.1 SPECIAL PROVISIONS</th>
<th>N/A</th>
</tr>
</thead>
</table>

14.4.6.2 PASSENGER AND CARGO TRANSPORT, LIMITED QUANTITIES, MAXIMUM QUANTITY PER PACKAGING
- **Passenger and Cargo Aircraft**
  - Quantity limitation: 75 kg
- **Cargo Aircraft Only**
  - Quantity limitation: 150 kg

15 – REGULATORY INFORMATION

<table>
<thead>
<tr>
<th>15.1 SAFETY, HEALTH AND ENVIRONMENTAL REGULATIONS/LEGISLATION SPECIFIC FOR THE SUBSTANCE OR MIXTURE</th>
<th>Ensure all national/local regulations are observed. Seveso Directive 96/82 EC: Listed</th>
</tr>
</thead>
</table>

15.2 CHEMICAL SAFETY ASSESSMENT

| N/A |

16 – OTHER INFORMATION:
Asphyxiant in high concentrations. May cause frostbite. The hazard of asphyxiation is often overlooked and must be stressed during operator training.

---

Read this Safety Data Sheet (SDS) before use or disposal of this product. Pass along the information to employees and any other persons who could be exposed to the product to be sure that they are aware of information before use or other exposure. The SDS information is based on sources believed to be reliable. However, since data, safety standards and government regulations are subject to change and the conditions of handling and use, or misuse are beyond our control, SHARJAH OXYGEN COMPANY makes no warranty, either expressed or implied, with respect to the completeness or continuing accuracy of the information contained herein and disclaims all liability for reliance thereon. Also, additional information may be necessary or helpful for specific conditions and circumstances of use. It is the user’s responsibility to determine the suitability of this product and to evaluate risks prior to use, and then to exercise appropriate precautions for protection of employees and others.