1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name: Nitrous oxide

Product Number: 295590
Brand: Aldrich

CAS-No.: 10024-97-2

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses: Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company: Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO  63103
USA

Telephone: +1 800-325-5832
Fax: +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone #: (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Oxidising gases (Category 1), H270
Gases under pressure (Liquefied gas), H280
Simple Asphyxiant,

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word

Hazard statement(s)
H270 May cause or intensify fire; oxidiser.
H280 Contains gas under pressure; may explode if heated.
May displace oxygen and cause rapid suffocation.

Precautionary statement(s)
P220 Keep/Store away from clothing/ combustible materials.
P244 Keep reduction valves free from grease and oil.
P370 + P376 In case of fire: Stop leak if safe to do so.
P410 + P403 Protect from sunlight. Store in a well-ventilated place.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none
3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances
Synonyms: Laughing gas
Dinitrogen monoxide

Formula: $\text{N}_2\text{O}$
Molecular weight: 44.01 g/mol
CAS-No.: 10024-97-2
EC-No.: 233-032-0

Hazardous components

<table>
<thead>
<tr>
<th>Component</th>
<th>Classification</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dinitrogen oxide</td>
<td>Ox. Gas ; Press. Gas</td>
<td>$\leq 100%$</td>
</tr>
<tr>
<td></td>
<td>Liquefied gas; SA ; H270, H280,</td>
<td></td>
</tr>
</tbody>
</table>

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11.

4.3 Indication of any immediate medical attention and special treatment needed
No data available.

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Nitrogen oxides (NOx)

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. For personal protection see section 8.
6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Keep away from sources of ignition - No smoking.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.
Contents under pressure.
Storage class (TRGS 510): Gases

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
<th>Value</th>
<th>Control parameters</th>
<th>Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dinitrogen oxide</td>
<td>10024-97-2</td>
<td>TWA</td>
<td>50 ppm</td>
<td>USA. ACGIH Threshold Limit Values (TLV)</td>
</tr>
<tr>
<td>Remarks</td>
<td></td>
<td></td>
<td>Central Nervous System impairment</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Hematologic effects</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Embryo/fetal damage</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Not classifiable as a human carcinogen</td>
<td></td>
</tr>
<tr>
<td>TWA</td>
<td></td>
<td></td>
<td>50.000000 ppm</td>
<td>USA. ACGIH Threshold Limit Values (TLV)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Central Nervous System impairment</td>
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</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Not classifiable as a human carcinogen</td>
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</tr>
<tr>
<td>TWA</td>
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<td>25.000000 ppm</td>
<td>USA. NIOSH Recommended Exposure Limits</td>
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<td></td>
<td></td>
<td></td>
<td>46.0000000 mg/m3</td>
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</tr>
<tr>
<td>REL for exposure to waste anesthetic gas</td>
<td></td>
<td></td>
<td>TWA over the time exposed</td>
<td></td>
</tr>
</tbody>
</table>

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.
Full contact
Material: butyl-rubber
Minimum layer thickness: 0.3 mm
Break through time: 480 min
Material tested: Butoject® (KCL 897 / Aldrich Z677647, Size M)

Splash contact
Material: Chloroprene
Minimum layer thickness: 0.6 mm
Break through time: 30 min
Material tested: Camapren® (KCL 722 / Aldrich Z677493, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type AXBEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

| a) | Appearance | Form: Liquefied gas |
| b) | Odour | No data available |
| c) | Odour Threshold | No data available |
| d) | pH | No data available |
| e) | Melting point/freezing point | Melting point/range: -91 °C (-132 °F) - lit. |
| f) | Initial boiling point and boiling range | -88 °C (-126 °F) - lit. |
| g) | Flash point | Not applicable |
| h) | Evaporation rate | No data available |
| i) | Flammability (solid, gas) | No data available |
| j) | Upper/lower flammability or explosive limits | No data available |
| k) | Vapour pressure | 58,500.0 hPa (43,878.6 mmHg) at 20 °C (68 °F) |
| l) | Vapour density | 1.52 - (Air = 1.0) |
| m) | Relative density | No data available |
| n) | Water solubility | No data available |
| o) | Partition coefficient: n-octanol/water | No data available |
p) Auto-ignition temperature No data available
q) Decomposition temperature No data available
r) Viscosity No data available
s) Explosive properties No data available
t) Oxidizing properties The substance or mixture is classified as oxidizing with the category 1.

9.2 Other safety information
Relative vapour density 1.52 - (Air = 1.0)

10. STABILITY AND REACTIVITY
10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Aluminum, Borane/boron oxides, Hydrazine, Strong reducing agents

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION
11.1 Information on toxicological effects

Acute toxicity
No data available
Inhalation: No data available
Dermal: No data available
No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity
This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

IARC: 3 - Group 3: Not classifiable as to its carcinogenicity to humans (Dinitrogen oxide)
NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

Overexposure may cause reproductive disorder(s) based on tests with laboratory animals.

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: QX1350000
anesthetic effects

Stomach - Irregularities - Based on Human Evidence
Stomach - Irregularities - Based on Human Evidence

12. ECOLOGICAL INFORMATION

12.1 Toxicity
No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 1070       Class: 2.2 (5.1)
Proper shipping name: Nitrous oxide
Reportable Quantity (RQ):

Poison Inhalation Hazard: No
15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

Massachusetts Right To Know Components

<table>
<thead>
<tr>
<th>Chemical</th>
<th>CAS-No.</th>
<th>Revision Date</th>
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<tbody>
<tr>
<td>Dinitrogen oxide</td>
<td>10024-97-2</td>
<td>1993-04-24</td>
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Pennsylvania Right To Know Components

<table>
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<th>CAS-No.</th>
<th>Revision Date</th>
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</thead>
<tbody>
<tr>
<td>Dinitrogen oxide</td>
<td>10024-97-2</td>
<td>1993-04-24</td>
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</table>

New Jersey Right To Know Components

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<thead>
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<th>Chemical</th>
<th>CAS-No.</th>
<th>Revision Date</th>
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<tr>
<td>Dinitrogen oxide</td>
<td>10024-97-2</td>
<td>1993-04-24</td>
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California Prop. 65 Components

<table>
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<th>Chemical</th>
<th>CAS-No.</th>
<th>Revision Date</th>
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<tr>
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<td>2013-12-20</td>
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</tbody>
</table>

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

- May displace oxygen and cause rapid suffocation.
- May cause or intensify fire; oxidiser.
- Contains gas under pressure; may explode if heated.
- Oxidising gases
- Gases under pressure
- Simple Asphyxiant

HMIS Rating

<table>
<thead>
<tr>
<th>Category</th>
<th>Score</th>
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<tbody>
<tr>
<td>Health hazard:</td>
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<tr>
<td>Chronic Health Hazard</td>
<td>*</td>
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<tr>
<td>Flammability:</td>
<td>1</td>
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<tr>
<td>Physical Hazard:</td>
<td>3</td>
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NFPA Rating

<table>
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<tr>
<th>Category</th>
<th>Score</th>
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<tbody>
<tr>
<td>Health hazard:</td>
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<tr>
<td>Fire Hazard:</td>
<td>0</td>
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<tr>
<td>Reactivity Hazard:</td>
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<tr>
<td>Special hazard I:</td>
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</tbody>
</table>

Further information

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**Preparation Information**
Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

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