Enflurane (1.00% - 5.00%), Oxygen (23.51% - 94.99%) in Nitrogen

Safety Data Sheet

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Product form: Mixture
Product name: Enflurane (1.00% - 5.00%), Oxygen (23.51% - 94.99%) in Nitrogen
Product code: HC-2003-03451

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

Use of the substance/mixture: Test gas/Calibration gas.

1.3. Details of the supplier of the safety data sheet

Air Liquide
2700 Post Oak Boulevard
Houston, TX 77056 - USA
T 1-800-819-1704
www.us.airliquide.com

1.4. Emergency telephone number

Emergency number: CHEMTREC: 1-800-424-9300

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

GHS-US classification

| Ox. Gas 1     | H270 |
| Compressed gas | H280 |
| Repr. 1A       | H360 |
| STOT SE 3      | H335 |

Full text of H-phrases: see section 16

2.2. Label elements

GHS-US labeling

Hazard pictograms (GHS-US): GHS03, GHS04, GHS07, GHS08

Signal word (GHS-US): Danger

Hazard statements (GHS-US):
- H270 - May cause or intensify fire; oxidizer
- H280 - Contains gas under pressure; may explode if heated
- H335 - May cause respiratory irritation
- H360 - May damage fertility or the unborn child (Inhalation)

Precautionary statements (GHS-US):
- P202 - Do not handle until all safety precautions have been read and understood
- P220 - Keep/Store away from combustible materials, clothing
- P244 - Keep reduction valves/valves and fittings free from oil and grease
- P261 - Avoid breathing gas
- P271 - Use only outdoors or in a well-ventilated area
- P280 - Wear eye protection, face protection, protective gloves, protective clothing
- P304+P313 - If inhaled: Remove person to fresh air and keep comfortable for breathing
- P305+P351-353 - If exposed or concerned: Get medical advice/attention
- P403 - Store in a well-ventilated place
- P405 - Store locked up
- P501 - Dispose of contents/container in accordance with local/regional/national/international regulations
- 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-PG14 - Approach suspected leak area with caution
- CGA-PG20 - Use only with equipment of compatible materials of construction
- CGA-PG21 - Open valve slowly
Enflurane (1.00% - 5.00%), Oxygen (23.51% - 94.99%) in Nitrogen
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CGA-PG22 - Use only with equipment cleaned for oxygen service

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 (CAS No)</th>
<th>%</th>
<th>GHS-US classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oxygen</td>
<td>7782-44-7</td>
<td>23.51 - 94.99</td>
<td>Ox. Gas 1, H270, Compressed gas, H280</td>
</tr>
<tr>
<td>Nitrogen</td>
<td>7727-37-9</td>
<td>0.01 - 75.49</td>
<td>Compressed gas, H280</td>
</tr>
<tr>
<td>Enflurane</td>
<td>13838-16-9</td>
<td>1 - 5</td>
<td>Acute Tox. 4 (Inhalation:gas), H332, Acute Tox. 4 (Inhalation:vapour), H332, Skin Irrit. 2, H315, Eye Irrit. 2A, H319, Repr. 1A, H360, STOT SE 3, H336, STOT SE 3, H335</td>
</tr>
</tbody>
</table>

Full text of H-phrases: see section 16

SECTION 4: First aid measures

4.1. Description of first aid measures
First-aid measures after inhalation: Remove victim to fresh air and keep at rest in a position comfortable for breathing. If you feel unwell, seek medical advice.
First-aid measures after skin contact: Adverse effects not expected from this product.
First-aid measures after eye contact: Adverse effects not expected from this product.
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
Symptoms/injuries after inhalation: May cause respiratory irritation.
Symptoms/injuries after skin contact: Adverse effects not expected from this product.
Symptoms/injuries after eye contact: Adverse effects not expected from this product.
Symptoms/injuries after ingestion: Ingestion is not considered a potential route of exposure.
Symptoms/injuries upon intravenous administration: May damage fertility. May damage the unborn child.

4.3. Indication of any immediate medical attention and special treatment needed
If you feel unwell, seek medical advice. If breathing is difficult, give oxygen.

SECTION 5: Firefighting measures

5.1. Extinguishing media
Suitable extinguishing media: Use extinguishing media appropriate for surrounding fire.
Unsuitable extinguishing media: Do not use water jet to extinguish.

5.2. Special hazards arising from the substance or mixture
Fire hazard: The product is not flammable.
Explosion hazard: Product is not explosive. Heat may build pressure, rupturing closed containers, spreading fire and increasing risk of burns and injuries.
Reactivity: None known.

5.3. Advice for firefighters
Firefighting instructions: In case of fire: Evacuate area. Fight fire remotely due to the risk of explosion. Use water spray or fog for cooling exposed containers. Exercise caution when fighting any chemical fire.
Protection during firefighting: Standard protective clothing and equipment (e.g., Self Contained Breathing Apparatus) for firefighters. Do not enter fire area without proper protective equipment, including respiratory protection.
SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures: Ensure adequate ventilation.

6.1.1. For non-emergency personnel

Protective equipment: Wear protective equipment consistent with the site emergency plan.

6.1.2. For emergency responders

Protective equipment: Standard protective clothing and equipment (e.g., Self Contained Breathing Apparatus) for fire fighters. Equip cleanup crew with proper protection.
Emergency procedures: Evacuate and limit access. Ventilate area.

6.2. Environmental precautions

Try to stop release if safe to do so.

6.3. Methods and material for containment and cleaning up

For containment: Try to stop release if safe to do so.
Methods for cleaning up: Dispose of this material and its container in accordance with local regulations.

6.4. Reference to other sections

See also Sections 8 and 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Additional hazards when processed: Pressurized container: Do not pierce or burn, even after use. Use equipment rated for cylinder pressure. Close valve after each use and when empty.
Precautions for safe handling: Do not handle until all safety precautions have been read and understood. Use only outdoors or in a well-ventilated area.
Hygiene measures: Do not eat, drink or smoke when using this product.

7.2. Conditions for safe storage, including any incompatibilities

Technical measures: Comply with applicable regulations.
Storage conditions: Do not expose to temperatures exceeding 52°C (125°F). Keep container closed when not in use. Protect cylinder from physical damage. Store in well ventilated area. Store locked up.
Incompatible products: None known.

7.3. Specific end use(s)

See Section 1.2.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

<table>
<thead>
<tr>
<th>Enflurane (1.00% - 5.00%), Oxygen (23.51% - 94.99%) in Nitrogen</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ACGIH</strong></td>
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<td><strong>OSHA</strong></td>
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<th>Oxygen (7782-44-7)</th>
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<tbody>
<tr>
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</tr>
<tr>
<td><strong>OSHA</strong></td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Nitrogen (7727-37-9)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ACGIH</strong></td>
</tr>
<tr>
<td><strong>OSHA</strong></td>
</tr>
</tbody>
</table>
8.2. Exposure controls

Appropriate engineering controls: Ensure exposure is below occupational exposure limits. Provide adequate general and local exhaust ventilation. Systems under pressure should be regularly checked for leakages. Consider work permit system e.g. for maintenance activities.


Skin and body protection: Wear suitable protective clothing, e.g. - lab coats, coveralls or flame resistant clothing.

Respiratory protection: None necessary during normal and routine operations. See Sections 5 & 6.

Thermal hazard protection: None necessary during normal and routine operations.

Environmental exposure controls: Refer to local regulations for restriction of emissions to the atmosphere. See section 13 for specific methods for waste gas treatment.


SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state: Gas
Appearance: Clear, colorless gas.
Color: Colorless
Odor: Slightly sweet
Odor threshold: No data available
pH: No data available
Melting point: No data available
Freezing point: No data available
Boiling point: No data available
Flash point: Not applicable - not flammable
Relative evaporation rate (butyl acetate=1): No data available
Flammability (solid, gas): See Section 2.1 and 2.2
Explosion limits: Not applicable - not flammable
Explosive properties: Not applicable - not flammable.
Oxidizing properties: Not combustible but enhances combustion of other substances. May cause or intensify fire; oxidizer.
Vapor pressure: No data available
Relative density: No data available
Relative vapor density at 20 °C: No data available
Molecular mass: Not applicable for gas-mixtures.
Relative gas density: Heavier than air
Solubility: No data available
Log Pow: No data available
Log Kow: No data available
Auto-ignition temperature: No data available
Decomposition temperature: No data available
Viscosity: No data available
Viscosity, kinematic: No data available
Viscosity, dynamic: No data available

9.2. Other information

Additional information: Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level.

SECTION 10: Stability and reactivity

10.1. Reactivity

None known.

10.2. Chemical stability

Stable under normal conditions.
10.3. Possibility of hazardous reactions
May react violently with reducing agents. Can form explosive mixtures with flammable materials.

10.4. Conditions to avoid
None under recommended storage and handling conditions (see section 7).

10.5. Incompatible materials

10.6. Hazardous decomposition products
Under normal conditions of storage and use hazardous decomposition products should not be produced.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity : Not classified

<table>
<thead>
<tr>
<th>Enflurane (13838-16-9)</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>LD50 oral rat</td>
<td>5450 µl/kg</td>
</tr>
<tr>
<td>LC50 inhalation rat (ppm)</td>
<td>12124 ppm/4h</td>
</tr>
<tr>
<td>ATE US (gases)</td>
<td>12124.000 ppmV/4h</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Oxygen (7782-44-7)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>LC50 inhalation rat (ppm)</td>
<td>800000 ppm/4h</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Nitrogen (7727-37-9)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>LC50 inhalation rat (ppm)</td>
<td>820000 ppm/4h</td>
</tr>
</tbody>
</table>

Skin corrosion/irritation : Not classified
Serious eye damage/irritation : Not classified
Respiratory or skin sensitization : Not classified
Germ cell mutagenicity : Not classified
Carcinogenicity : Not classified

Reproductive toxicity : May damage fertility or the unborn child (Inhalation).
Specific target organ toxicity (single exposure) : May cause respiratory irritation.
Specific target organ toxicity (repeated exposure) : Not classified

Aspiration hazard : Not classified
Symptoms/injuries after inhalation : May cause respiratory irritation.
Symptoms/injuries after skin contact : Adverse effects not expected from this product.
Symptoms/injuries after eye contact : Adverse effects not expected from this product.
Symptoms/injuries after ingestion : Ingestion is not considered a potential route of exposure.
Symptoms/injuries upon intravenous administration : Not known.
Chronic symptoms : May damage fertility. May damage the unborn child.

SECTION 12: Ecological information

12.1. Toxicity
No additional information available

12.2. Persistence and degradability

<table>
<thead>
<tr>
<th>Oxygen (7782-44-7)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Persistence and degradability</td>
<td>No ecological damage caused by this product.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Nitrogen (7727-37-9)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Persistence and degradability</td>
<td>No ecological damage caused by this product.</td>
</tr>
</tbody>
</table>
Enflurane (1.00% - 5.00%), Oxygen (23.51% - 94.99%) in Nitrogen
Safety Data Sheet
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<table>
<thead>
<tr>
<th>Oxygen (7782-44-7)</th>
<th>Nitrogen (7727-37-9)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Log Pow</td>
<td>Not applicable for inorganic gases.</td>
</tr>
<tr>
<td>Bioaccumulative potential</td>
<td>No ecological damage caused by this product.</td>
</tr>
</tbody>
</table>

12.4. Mobility in soil

<table>
<thead>
<tr>
<th>Oxygen (7782-44-7)</th>
<th>Nitrogen (7727-37-9)</th>
</tr>
</thead>
<tbody>
<tr>
<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 : No known effects from this product.
Effect on the global warming : No known ecological damage caused by this product.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Waste treatment methods : Contact supplier if guidance is required. Do not discharge into any place where its accumulation could be dangerous. Ensure that the emission levels from local regulations or operating permits are not exceeded.

Waste disposal recommendations : Refer to the CGA Pamphlet P-63 "Disposal of Gases" available at www.cganet.com for more guidance on suitable disposal methods.

SECTION 14: Transport information

Department of Transportation (DOT)
In accordance with DOT
Transport document description : UN3156 Compressed gas, oxidizing, n.o.s. (Oxygen, Nitrogen)

UN-No.(DOT) : UN3156
Proper Shipping Name (DOT) : Compressed gas, oxidizing, n.o.s.
Hazard labels (DOT) : 2.2 - Non-flammable gas
                      5.1 - Oxidizer

DOT Packaging Non Bulk (49 CFR 173.xxx) : 302
DOT Packaging Bulk (49 CFR 173.xxx) : 314,315
DOT Symbols : G - Identifies PSN requiring a technical name
DOT Special Provisions (49 CFR 172.102) : A14 - This material is not authorized to be transported as a limited quantity or consumer commodity in accordance with 173.306 of this subchapter when transported aboard an aircraft.
DOT Packaging Exceptions (49 CFR 173.xxx) : 306
DOT Quantity Limitations Passenger aircraft/rail (49 CFR 173.27) : 75 kg
DOT Quantity Limitations Cargo aircraft only (49 CFR 175.75) : 150 kg
DOT Vessel Stowage Location : D - The material must be stowed “on deck only” on a cargo vessel and on a passenger vessel carrying a number of passengers limited to not more than the larger of 25 passengers or one passenger per each 3 m of overall vessel length, but the material is prohibited on passenger vessels in which the limiting number of passengers is exceeded.

Additional information
Other information : No supplementary information available.
Enflurane (1.00% - 5.00%), Oxygen (23.51% - 94.99%) in Nitrogen

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ADR
Transport document description : UN 3156, 2.2 (5.1), (E)
Class (ADR) : 2 - Gases
Hazard identification number (Kemler No.) : 25
Classification code (ADR) : 1O
Hazard labels (ADR) : 2.2 - Non-flammable compressed gas
5.1 - Oxidizer

Orange plates
Tunnel restriction code (ADR) : E
Limited quantities (ADR) : 0
Excepted quantities (ADR) : E0

Transport by sea
UN-No. (IMDG) : 3156
Proper Shipping Name (IMDG) : COMPRESSED GAS, OXIDIZING, N.O.S.
Class (IMDG) : 2 - Gases

Air transport
UN-No. (IATA) : 3156
Proper Shipping Name (IATA) : COMPRESSED GAS, OXIDIZING, N.O.S.
Class (IATA) : 2

SECTION 15: Regulatory information

15.1. US Federal regulations

Oxygen (7782-44-7)
Listed on the United States TSCA (Toxic Substances Control Act) inventory

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

15.2. International regulations

CANADA
No additional information available

Oxygen (7782-44-7)
Listed on the Canadian DSL (Domestic Sustances List)
WHMIS Classification
Class A - Compressed Gas
Class C - Oxidizing Material

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

EU-Regulations
No additional information available

Oxygen (7782-44-7)
Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)

Nitrogen (7727-37-9)
Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)
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Classification according to Regulation (EC) No. 1272/2008 [CLP]
Not classified

Classification according to Directive 67/548/EEC [DSD] or 1999/45/EC [DPD]
No additional information available

National regulations

Oxygen (7782-44-7)
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)

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

Oxygen (7782-44-7)
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

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

Indication of changes : Revised safety data sheet in accordance with OSHA final rule on GHS implementation promulgated March 26, 2012.

Other information : This Safety Data Sheet is offered pursuant to OSHA’s Hazard Communication Standard, 29 CFR, 1910.1200. Other government regulations must be reviewed for applicability to this product.

Full text of H-phrases:

| Acute Tox. 4 (Inhalation:gas) | Acute toxicity (inhalation:gas) Category 4 |
| Acute Tox. 4 (Inhalation:vapour) | Acute toxicity (inhalation:vapour) Category 4 |
| Compressed gas | Gases under pressure Compressed gas |
| Eye Irrit. 2A | Serious eye damage/eye irritation Category 2A |
| Ox. Gas 1 | Oxidizing gases Category 1 |
| Repr. 1A | Reproductive toxicity Category 1A |
| Skin Irrit. 2 | Skin corrosion/irritation Category 2 |
| STOT SE 3 | Specific target organ toxicity (single exposure) Category 3 |
| STOT SE 3 | Specific target organ toxicity (single exposure) Category 3 |
| H270 | May cause or intensify fire; oxidizer |
| H280 | Contains gas under pressure; may explode if heated |
| H315 | Causes skin irritation |
| H319 | Causes serious eye irritation |
| H332 | Harmful if inhaled |
| H335 | May cause respiratory irritation |
| H336 | May cause drowsiness or dizziness |
| H360 | May damage fertility or the unborn child |
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This Safety Data Sheet is offered pursuant to OSHA’s Hazard Communication Standard, 29 CFR, 1910.1200. Other government regulations must be reviewed for applicability to this product. To the best of Air Liquide America Corporation’s knowledge, the information contained herein is reliable and accurate as of this date; however, accuracy, suitability or completeness are not guaranteed and no warranties of any type, either express or implied, are provided. The information contained herein relates only to this specific product. If this product is combined with other materials, all component properties must be considered. Data may be changed from time to time. Be sure to consult the latest edition.