Safety Data Sheet

Section 1: Identification of the Substance/Mixture and of the Company/Undertaking

1.1 Product identifier

Product Name
- **Enflurane (0.1 - 3%), Carbon Dioxide (0.1 - 6%), Nitrous Oxide (30 - 40%), Oxygen (23.5 - 50%), Argon (Balance)**

Synonyms
- 4733

Product Code
- 90119

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

Relevant identified use(s)
- Calibration Gas

1.3 Details of the supplier of the safety data sheet

Manufacturer
- Air Liquide

  2700 Post Oak Blvd.
  Houston, TX 77056
  United States
  www.us.airliquide.com
  sds@airliquide.com

Telephone (Technical)
- 713-896-2896

Telephone (Technical)
- 800-819-1704

1.4 Emergency telephone number

Manufacturer
- 800-424-9300 - CHEMTREC

Manufacturer
- +1 703-527-3887 - Outside United States

Section 2: Hazards Identification

EU/EEC

According to Regulation (EC) No 1272/2008 (CLP)/REACH 1907/2006 [amended by 453/2010]
According to EU Directive 67/548/EEC (DSD) or 1999/45/EC (DPD)

2.1 Classification of the substance or mixture

CLP
- Oxidizing Gases 1 - H270
  Compressed Gas - H280
  Specific Target Organ Toxicity Single Exposure 3: Narcotic Effects - H336
  Germ Cell Mutagenicity 2 - H341
  Reproductive Toxicity 2 - H361
  Specific Target Organ Toxicity Repeated Exposure 2 - H373

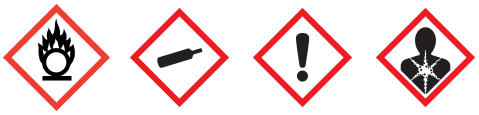
DSD/DPD
- Oxidizing (O)
  Harmful (Xn)
  Substances Toxic To Reproduction - Category 3
  Mutagenic Substances - Category 3

  R8, R48/20, R63, R67, R68

2.2 Label Elements

CLP

DANGER



Hazard statements

- H270 - May cause or intensify fire; oxidizer
- H280 - Contains gas under pressure; may explode if heated
- H336 - May cause drowsiness or dizziness
- H341 - Suspected of causing genetic defects.
- H361 - Suspected of damaging fertility or the unborn child.
- H373 - May cause damage to organs - Nervous System/Bone Marrow through prolonged or repeated exposure

Precautionary statements

Prevention

- P201 - Obtain special instructions before use.
- P202 - Do not handle until all safety precautions have been read and understood.
- P220 - Keep/Store away from clothing and other combustible materials.
- P244 - Keep reduction valves free from grease and oil.
- P260 - Do not breathe gas.
- P271 - Use only outdoors or in a well-ventilated area.
- P281 - Use personal protective equipment as required.

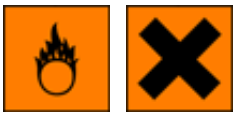
Response

- P370+P376 - In case of fire: Stop leak if safe to do so.
- P304+P340 - IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
- P312 - Call a POISON CENTER or doctor/physician if you feel unwell.
- P314 - Get medical advice/attention if you feel unwell.
- P308+P313 - IF exposed or concerned: Get medical advice/attention.

Storage/Disposal

- P403+P233 - Store in a well-ventilated place. Keep container tightly closed.
- P405 - Store locked up.
- P501 - Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

DSD/DPD



Risk phrases

- R8 - Contact with combustible material may cause fire.
- R48/20 - Harmful: danger of serious damage to health by prolonged exposure through inhalation.
- R63 - Possible risk of harm to the unborn child.
- R67 - Vapours may cause drowsiness and dizziness.
- R68 - Possible risk of irreversible effects.

Safety phrases

- S37 - Wear suitable gloves.

2.3 Other Hazards

CLP

- Inhalation of carbon dioxide can increase respiration and heart rate.
  According to Regulation (EC) No. 1272/2008 (CLP) this material is considered hazardous.

DSD/DPD

- Inhalation of carbon dioxide can increase respiration and heart rate.
  According to European Directive 1999/45/EC this material is considered dangerous.

United States (US)

According to OSHA 29 CFR 1910.1200 HCS

2.1 Classification of the substance or mixture

OSHA HCS 2012

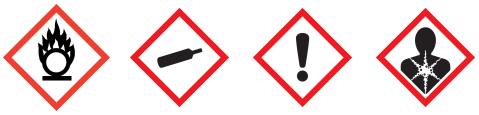
- Oxidizing Gases 1 - H270
  Compressed Gas - H280
  Specific Target Organ Toxicity Single Exposure 3: Narcotic Effects - H336

Germ Cell Mutagenicity 2 - H341
Reproductive Toxicity 2 - H361
Specific Target Organ Toxicity Repeated Exposure 2 - H373

2.2 Label elements

OSHA HCS 2012

DANGER



Hazard statements

- May cause or intensify fire; oxidizer - H270
  Contains gas under pressure; may explode if heated - H280
  May cause drowsiness or dizziness - H336
  Suspected of causing genetic defects. - H341
  Suspected of damaging fertility or the unborn child. - H361
  May cause damage to organs (Nervous System, Bone Marrow) through prolonged or repeated exposure - H373

Precautionary statements

Prevention

- Obtain special instructions before use. - P201
  Do not handle until all safety precautions have been read and understood. - P202
  Keep/Store away from clothing and other combustible materials. - P220
  Keep reduction valves free from grease and oil. - P244
  Do not breathe gas. - P260
  Wash thoroughly after handling. - P264
  Use only outdoors or in a well-ventilated area. - P271
  Wear protective gloves/protective clothing/eye protection/face protection. - P280

Response

- In case of fire: Stop leak if safe to do so. - P370+P376
  IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. - P304+P340
  Call a POISON CENTER or doctor/physician if you feel unwell. - P312
  Get medical advice/attention if you feel unwell. - P314
  IF exposed or if you feel unwell: Call a POISON CENTER or doctor/physician. - P309+P311

Storage/Disposal

- Store in a well-ventilated place. Keep container tightly closed. - P403+P233
  Store locked up. - P405
  Dispose of content and/or container in accordance with local, regional, national, and/or international regulations. - P501

2.3 Other hazards

OSHA HCS 2012

- Inhalation of carbon dioxide can increase respiration and heart rate. Under United States Regulations (29 CFR 1910.1200 - Hazard Communication Standard), this product is considered hazardous.

Canada

According to WHMIS

2.1 Classification of the substance or mixture

WHMIS

- Compressed Gas - A
  Oxidizing - C
  Other Toxic Effects - D2A
  Other Toxic Effects - D2B

2.2 Label elements

WHMIS

- Compressed Gas - A
  Oxidizing - C

Other Toxic Effects - D2A
Other Toxic Effects - D2B

2.3 Other hazards

WHMIS

- Inhalation of carbon dioxide can increase respiration and heart rate.
In Canada, the product mentioned above is considered hazardous under the Workplace Hazardous Materials Information System (WHMIS).

2.4 Other information

NFPA

Section 3 - Composition/Information on Ingredients

3.1 Substances

- Material does not meet the criteria of a substance in accordance with Regulation (EC) No 1272/2008.

3.2 Mixtures

Composition				
Chemical Name	**Identifiers**	**%**	**LD50/LC50**	**Classifications According to Regulation/Directive**
Oxygen	**CAS:**7782-44-7 **EC Number:**231-956-9	23.5% TO 50%	NDA	**EU DSD/DPD:** Annex I: O; R8 **EU CLP:** Annex VI: Ox. Gas 1, H270; Press. Gas - Comp., H280 **OSHA HCS 2012:** Ox. Gas 1; Press Gas. - Comp.
Argon	**CAS:**7440-37-1 **EC Number:**231-147-0	1% TO 46.3%	NDA	**EU DSD/DPD:** Not Classified **EU CLP:** Self Classified: Press. Gas - Comp., H280 **OSHA HCS 2012:** Press. Gas - Comp.; Simp. Asphyx
Nitrous Oxide	**CAS:**10024-97-2 **EINECS:**233-032-0	30% TO 40%	NDA	**EU DSD/DPD:** Self Classified: Muta. 3, R68; Repr. 3, R63; O, R8, R67; Xn, R48/20 **EU CLP:** Self Classified: Muta. 2, H341; Repr. 2 H361; Ox. Gas 1, H270; Press. Gas - Comp., H280; STOT SE 3: Narc., H336; STOT RE 2- Nervous system & Bone Marrow, H373 **OSHA HCS 2012:** Press. Gas - Comp.; Muta. 2; Repr. 2; Ox. Gas 1; STOT SE 3: Narc.; STOT RE 2- Nervous system & Bone Marrow
Carbon dioxide	**CAS:**124-38-9 **EC Number:**204-696-9	0.1% TO 6%	Inhalation-Rat LC50 • 470000 ppm 30 Minute (s)	**EU DSD/DPD:** Not Classified **EU CLP:** Self Classified: Press. Gas - Comp., H280 **OSHA HCS 2012:** Press. Gas - Comp.; Simp. Asphyx.
Enflurane	**CAS:**13838-16-9 **EINECS:**237-553-4	0.1% TO 3%	Ingestion/Oral-Rat LD50 • 5450 µL/kg Inhalation-Rat LC50 • 14000 ppm 3 Hour(s)	**EU DSD/DPD:** Self Classified: R67; Xi, R36/37/38 **EU CLP:** Self Classified: Skin Irrit. 2, H315; Eye Irrit. 2, H319; STOT SE 3: Resp. Irrit., H335; STOT SE 3: Narc., H336 **OSHA HCS 2012:** STOT SE 3: Narc.; Skin Irrit. 2; Eye Irrit. 2A; STOT SE 3: Resp. Irrit.

Section 4 - First Aid Measures

4.1 Description of first aid measures

Inhalation
- IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Administer oxygen if breathing is difficult. Give artificial respiration if victim is not breathing. If signs/symptoms continue, get medical attention.

Skin
- IF ON SKIN: Gently wash with plenty of soap and water. Take off contaminated clothing and wash before reuse. If skin irritation occurs: Get medical advice/attention.

Eye
- IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention.

Ingestion
- Ingestion is not considered a potential route of exposure.

4.2 Most important symptoms and effects, both acute and delayed

- Refer to Section 11 - Toxicological Information.

4.3 Indication of any immediate medical attention and special treatment needed

Notes to Physician
- All treatments should be based on observed signs and symptoms of distress in the patient. Consideration should be given to the possibility that overexposure to materials other than this product may have occurred.

4.4 Other information

- RESCUERS SHOULD NOT ATTEMPT TO RETRIEVE VICTIMS OF EXPOSURE TO THIS SUBSTANCE WITHOUT ADEQUATE PERSONAL PROTECTIVE EQUIPMENT. At a minimum, Self-Contained Breathing Apparatus must be worn. Victim(s) who experience any adverse effect after over-exposure to this gas mixture must be taken for medical attention. Rescuers should be taken for medical attention if necessary. Take a copy of the label and the SDS to physician or other health professional with victim(s). Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

Section 5 - Firefighting Measures

5.1 Extinguishing media

Suitable Extinguishing Media
- Use extinguishing agent suitable for type of surrounding fire.

Unsuitable Extinguishing Media
- No data available

5.2 Special hazards arising from the substance or mixture

Unusual Fire and Explosion Hazards
- May ignite combustibles (wood, paper, oil, clothing, etc.)
  Containers may explode when heated.
  Ruptured cylinders may rocket.

Hazardous Combustion Products
- No data available

5.3 Advice for firefighters

- Structural firefighters' protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations where direct contact with the substance is possible.
  Wear positive pressure self-contained breathing apparatus (SCBA).
  Move containers from fire area if you can do it without risk.
  FIRE: If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.
  FIRE INVOLVING TANKS: Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
  FIRE INVOLVING TANKS: Cool containers with flooding quantities of water until well

after fire is out.
FIRE INVOLVING TANKS: Do not direct water at source of leak or safety devices; icing may occur.
FIRE INVOLVING TANKS: Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
FIRE INVOLVING TANKS: ALWAYS stay away from tanks engulfed in fire.

Section 6 - Accidental Release Measures

6.1 Personal precautions, protective equipment and emergency procedures

Personal Precautions

- Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Do not touch or walk through spilled material. Ventilate the area before entry.

Emergency Procedures

- Stop leak if you can do it without risk. Keep unauthorized personnel away. Keep out of low areas. Stay upwind. Do not direct water at spill or source of leak. LARGE SPILL: Consider initial downwind evacuation for at least 500 meters (1/3 mile)

6.2 Environmental precautions

- Avoid release to the environment.

6.3 Methods and material for containment and cleaning up

Containment/Clean-up Measures

- Stop leak if you can do it without risk.
Keep combustibles (wood, paper, oil, etc.) away from spilled material.
Do not direct water at spill or source of leak.
Use water spray to reduce vapors; do not put water directly on leak, spill area or inside container.
If possible, turn leaking containers so that gas escapes rather than liquid.
Isolate area until gas has dispersed.
Ventilate the area.
Allow substance to evaporate.

6.4 Reference to other sections

- Refer to Section 8 - Exposure Controls/Personal Protection and Section 13 - Disposal Considerations.

Section 7 - Handling and Storage

7.1 Precautions for safe handling

Handling

- Use only with adequate ventilation. Ventilate closed spaces before entering. Be aware of any signs of dizziness or fatigue, especially if work is done in a poorly ventilated area; exposures to fatal concentrations of this gas mixture could occur without any significant warning symptoms, due to olfactory fatigue or oxygen deficiency. Cylinders should be firmly secured to prevent falling or being knocked-over. Do not attempt to repair, adjust, or in any other way modify cylinders. If there is a malfunction or another type of operational problem, contact nearest distributor immediately. Empty containers retain product residue and can be hazardous. Do not cut, weld, puncture or incinerate container.

7.2 Conditions for safe storage, including any incompatibilities

Storage

- Store in a cool, dry, well-ventilated place. Do not store near combustible materials. Protect cylinders against physical damage. Cylinders should be firmly secured to prevent falling or being knocked-over.

7.3 Specific end use(s)

- Refer to Section 1.2 - Relevant identified uses.

Section 8 - Exposure Controls/Personal Protection

8.1 Control parameters

Exposure Limits/Guidelines						
	Result	**ACGIH**	**Canada Ontario**	**Canada Quebec**	**China**	**Europe**
Carbon dioxide (124-38-9)	TWAs	5000 ppm TWA	5000 ppm TWA	5000 ppm TWAEV; 9000 mg/m3 TWAEV	9000 mg/m3 TWA	5000 ppm TWA; 9000 mg/m3 TWA
	STELs	30000 ppm STEL	30000 ppm STEL	30000 ppm STEV; 54000 mg/m3 STEV	18000 mg/m3 STEL	Not established
Enflurane (13838-16-9)	TWAs	75 ppm TWA	2 ppm TWA; 16 mg/m3 TWA	75 ppm TWAEV; 566 mg/m3 TWAEV	Not established	Not established
Nitrous Oxide (10024-97-2)	TWAs	50 ppm TWA	25 ppm TWA; 45 mg/m3 TWA	50 ppm TWAEV; 90 mg/m3 TWAEV	Not established	Not established

Exposure Limits/Guidelines (Con't.)						
	Result	**France**	**Germany DFG**	**Germany TRGS**	**Ireland**	**Israel**
Carbon dioxide (124-38-9)	TWAs	5000 ppm TWA [VME] (indicative limit); 9000 mg/m3 TWA [VME] (indicative limit)	Not established	5000 ppm TWA AGW (exposure factor 2); 9100 mg/m3 TWA AGW (exposure factor 2)	5000 ppm TWA; 9000 mg/m3 TWA	5000 ppm TWA
	STELs	Not established	Not established	Not established	Not established	30000 ppm STEL
	Ceilings	Not established	10000 ppm Peak; 18200 mg/m3 Peak	Not established	Not established	Not established
	MAKs	Not established	5000 ppm TWA MAK; 9100 mg/m3 TWA MAK	Not established	Not established	Not established
Enflurane (13838-16-9)	TWAs	Not established	Not established	20 ppm TWA AGW (The risk of damage to the embryo or fetus can be excluded when AGW and BGW values are observed, exposure factor 8); 150 mg/m3 TWA AGW (The risk of damage to the embryo or fetus can be excluded when AGW and BGW values are observed, exposure factor 8)	50 ppm TWA; 380 mg/m3 TWA	2 ppm TWA
	STELs	Not established	Not established	Not established	Not established	6 ppm STEL
	Ceilings	Not established	160 ppm Peak; 1200 mg/m3 Peak	Not established	Not established	Not established
	MAKs	Not established	20 ppm TWA MAK; 150 mg/m3 TWA MAK	Not established	Not established	Not established
Nitrous Oxide (10024-97-2)	TWAs	Not established	Not established	100 ppm TWA AGW (The risk of damage to the embryo or fetus can be excluded when AGW and BGW values are observed, exposure factor 2); 180 mg/m3 TWA AGW (The risk of damage to the embryo or fetus can	50 ppm TWA; 90 mg/m3 TWA	50 ppm TWA

				be excluded when AGW and BGW values are observed, exposure factor 2)		
	Ceilings	Not established	200 ppm Peak; 360 mg/m3 Peak	Not established	Not established	Not established
	MAKs	Not established	100 ppm TWA MAK; 180 mg/m3 TWA MAK	Not established	Not established	Not established

Exposure Limits/Guidelines (Con't.)

	Result	Italy	NIOSH	OSHA	Portugal	Spain
Carbon dioxide (124-38-9)	STELs	Not established	30000 ppm STEL; 54000 mg/m3 STEL	Not established	30000 ppm STEL [VLE-CD	Not established
	TWAs	5000 ppm TWA; 9000 mg/m3 TWA	5000 ppm TWA; 9000 mg/m3 TWA	5000 ppm TWA; 9000 mg/m3 TWA	5000 ppm TWA [VLE-MP]	5000 ppm TWA [VLA-ED] (indicative limit value); 9150 mg/m3 TWA [VLA-ED] (indicative limit value)
Enflurane (13838-16-9)	TWAs	Not established	Not established	Not established	75 ppm TWA [VLE-MP]	75 ppm TWA [VLA-ED]; 575 mg/m3 TWA [VLA-ED]
	Ceilings	Not established	2 ppm Ceiling (60 min exposure to waste anesthetic gas); 15.1 mg/m3 Ceiling (60 min exposure to waste anesthetic gas)	Not established	Not established	Not established
Nitrous Oxide (10024-97-2)	TWAs	Not established	25 ppm TWA (over the time exposed to waste anesthetic gas); 46 mg/m3 TWA (over the time exposed to waste anesthetic gas)	Not established	50 ppm TWA [VLE-MP]	50 ppm TWA [VLA-ED]; 92 mg/m3 TWA [VLA-ED]

Exposure Limits/Guidelines (Con't.)

	Result	Sweden
Carbon dioxide (124-38-9)	STELs	10000 ppm STV; 18000 mg/m3 STV
	TWAs	5000 ppm LLV; 9000 mg/m3 LLV
Enflurane (13838-16-9)	STELs	20 ppm STV; 150 mg/m3 STV
	TWAs	10 ppm LLV; 80 mg/m3 LLV
Nitrous Oxide (10024-97-2)	STELs	500 ppm STV; 900 mg/m3 STV
	TWAs	100 ppm LLV; 180 mg/m3 LLV

Exposure Control Notations

Portugal

•Nitrous Oxide (10024-97-2): **Carcinogens:** (A4 - Not Classifiable as a Human Carcinogen) | **Carcinogens:** (A4 - Not Classifiable as a Human Carcinogen) | **Simple Asphyxiants:** (Simple Asphyxiant)

Ireland

•Argon (7440-37-1): **Simple Asphyxiants:** (Asphyxiant)

Spain

•Argon (7440-37-1): **Simple Asphyxiants:** (simple asphyxiant)

Germany DFG

•Nitrous Oxide (10024-97-2): **Pregnancy:** (no risk to embryo/fetus if exposure limits adhered to) | **Pregnancy:** (no risk to embryo/fetus if exposure limits adhered to)

8.2 Exposure controls

Engineering Measures/Controls
- Adequate ventilation systems as needed to control concentrations of airborne contaminants below applicable threshold limit values. Use explosion-proof - electrical, ventilating and/or lighting equipment.

Personal Protective Equipment

Respiratory
- Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or symptoms are experienced.

Eye/Face
- Wear safety glasses.

Skin/Body
- Wear leather gloves when handling cylinders.

Environmental Exposure Controls
- Follow best practice for site management and disposal of waste. Controls should be engineered to prevent release to the environment, including procedures to prevent spills, atmospheric release and release to waterways.

Key to abbreviations

ACGIH = American Conference of Governmental Industrial Hygiene

LLV = Limit Level Value is the exposure limit for 8-hour work day

MAK = Maximale Arbeitsplatz Konzentration is the maximum permissible concentration

NIOSH = National Institute of Occupational Safety and Health

OSHA = Occupational Safety and Health Administration

STEL = Short Term Exposure Limits are based on 15-minute exposures

STEV = Short Term Exposure Value

TWAEV = Time-Weighted Average Exposure Value

TWA = Time-Weighted Averages are based on 8h/day, 40h/week exposures

Section 9 - Physical and Chemical Properties

9.1 Information on Physical and Chemical Properties

Material Description			
Physical Form	Gas	Appearance/Description	Colorless gas with a slight ethereal odor.
Color	Colorless	Odor	Slight ethereal odor.
Odor Threshold	Data lacking		
General Properties			
Boiling Point	-183 C(-297.4 F) Oxygen	Melting Point	-219 C(-362.2 F) Oxygen
Decomposition Temperature	Data lacking	pH	Data lacking
Specific Gravity/Relative Density	1.14 Water=1 @ -183 C(-297.4 F) Oxygen	Water Solubility	Soluble Oxygen
Viscosity	Data lacking	Explosive Properties	Not explosive.
Oxidizing Properties:	Oxidizing gas.		
Volatility			
Vapor Pressure	50800 hPa @ -118.4 C(-181.12 F) Oxygen	Vapor Density	1.11 Air=1 Oxygen
Evaporation Rate	Data lacking		
Flammability			

Flash Point	Not relevant	UEL	Not relevant
LEL	Not relevant	Autoignition	Not relevant
Flammability (solid, gas)	Not flammable.		
Environmental			
Octanol/Water Partition coefficient	Data lacking		

9.2 Other Information

- No additional physical and chemical parameters noted.

Section 10: Stability and Reactivity

10.1 Reactivity

- No dangerous reaction known under conditions of normal use.

10.2 Chemical stability

- Stable under normal temperatures and pressures.

10.3 Possibility of hazardous reactions

- Hazardous polymerization will not occur.

10.4 Conditions to avoid

- Excess heat, sparks, open flame.

10.5 Incompatible materials

- Combustible materials, reducing agents.

10.6 Hazardous decomposition products

- No data available

Section 11 - Toxicological Information

11.1 Information on toxicological effects

Component Name	CAS	Data
Nitrous Oxide (30% TO 40%)	10024-97-2	**Mutagen:** dni-hmn-ihl 50 pph/24H; mnt-hmn-ihl 1000 ug/L/18Y-I; **Reproductive:** ihl-rat TCLo:0.1 pph (1-19D preg)
Carbon dioxide (0.1% TO 6%)	124-38-9	**Acute Toxicity:** ihl-rat LC50:470000 ppm/30M; **Reproductive:** ihl-rat TCLo:6 pph/24H (10D preg)
Oxygen (23.5% TO 50%)	7782-44-7	**Reproductive:** ihl-rat TCLo:10 pph/9H (22D preg)
Enflurane (0.1% TO 3%)	13838-16-9	**Acute Toxicity:** orl-rat LD50:5450 uL/kg; ihl-rat LC50:14000 ppm/3H; **Irritation:** eye-rbt 100 mg MOD

GHS Properties	Classification
Acute toxicity	**EU/CLP** • Classification criteria not met **OSHA HCS 2012** • Classification criteria not met
Aspiration Hazard	**EU/CLP** • Classification criteria not met **OSHA HCS 2012** • Classification criteria not met
Carcinogenicity	**EU/CLP** • Classification criteria not met **OSHA HCS 2012** • Classification criteria not met
Germ Cell Mutagenicity	**EU/CLP** • Germ Cell Mutagenicity 2 **OSHA HCS 2012** • Germ Cell Mutagenicity 2

Skin corrosion/Irritation	**EU/CLP** • Classification criteria not met **OSHA HCS 2012** • Classification criteria not met
Skin sensitization	**EU/CLP** • Classification criteria not met **OSHA HCS 2012** • Classification criteria not met
STOT-RE	**EU/CLP** • Specific Target Organ Toxicity Repeated Exposure 2 **OSHA HCS 2012** • Specific Target Organ Toxicity Repeated Exposure 2
STOT-SE	**EU/CLP** • Specific Target Organ Toxicity Single Exposure 3: Narcotic Effects **OSHA HCS 2012** • Specific Target Organ Toxicity Single Exposure 3: Narcotic Effects
Toxicity for Reproduction	**EU/CLP** • Toxic to Reproduction 2 **OSHA HCS 2012** • Toxic to Reproduction 2
Respiratory sensitization	**EU/CLP** • Classification criteria not met **OSHA HCS 2012** • Classification criteria not met
Serious eye damage/Irritation	**EU/CLP** • Classification criteria not met **OSHA HCS 2012** • Classification criteria not met

Target Organs
- Nervous System, Bone Marrow

Route(s) of entry/exposure
- Inhalation, Skin, Eye

Potential Health Effects

Inhalation

Acute (Immediate)
- May affect the central nervous system. Symptoms may include dizziness, drowsiness, lethargy, coma and death.

Chronic (Delayed)
- Repeated and prolonged exposure may affect the Nervous System and/or Bone Marrow.

Skin

Acute (Immediate)
- Under normal conditions of use, no health effects are expected.

Chronic (Delayed)
- No data available

Eye

Acute (Immediate)
- Under normal conditions of use, no health effects are expected.

Chronic (Delayed)
- No data available

Ingestion

Acute (Immediate)
- Ingestion is not anticipated to be a likely route of exposure to this product.

Chronic (Delayed)
- Ingestion is not anticipated to be a likely route of exposure to this product.

Mutagenic Effects
- Repeated and prolonged exposure may cause mutagenic effects.

Reproductive Effects
- Nitrous oxide has been shown to cause birth defects in rats.

Key to abbreviations

TC = Toxic Concentration
LC = Lethal Concentration
LD = Lethal Dose
MOD = Moderate

Section 12 - Ecological Information

12.1 Toxicity

- Material data lacking.

12.2 Persistence and degradability

- Material data lacking.

12.3 Bioaccumulative potential

- Material data lacking.

12.4 Mobility in Soil

- Material data lacking.

12.5 Results of PBT and vPvB assessment

- PBT and vPvB assessment has not been conducted for this material.

12.6 Other adverse effects

- No adverse ecological effects are expected.

Section 13 - Disposal Considerations

13.1 Waste treatment methods

Product waste
- Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

Packaging waste
- Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

Section 14 - Transport Information

	14.1 UN number	14.2 UN proper shipping name	14.3 Transport hazard class(es)	14.4 Packing group	14.5 Environmental hazards
DOT	UN3156	Compressed gas, oxidizing, n.o.s. (Oxygen, Nitrous Oxide, Argon)	2.2,5.1	NDA	NDA
TDG	UN3156	COMPRESSED GAS, OXIDIZING, N.O.S. (Oxygen, Nitrous Oxide, Argon)	2.2,5.1	NDA	NDA
IMO/IMDG	UN3156	COMPRESSED GAS, OXIDIZING, N.O.S. (Oxygen, Nitrous Oxide, Argon)	2.2,5.1	NDA	NDA
IATA/ICAO	UN3156	Compressed gas, oxidizing, n.o.s. (Oxygen, Nitrous Oxide, Argon)	2.2,5.1	NDA	NDA

14.6 Special precautions for user
- Cylinders should be transported in a secure position, in a well-ventilated vehicle. The transportation of compressed gas cylinders in automobiles or in closed-body vehicles can present serious safety hazards. If transporting these cylinders in vehicles, ensure these cylinders are not exposed to extremely high temperatures (as may occur in an enclosed vehicle on a hot day). Additionally, the vehicle should be well-ventilated during transportation.

14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code
- Not relevant.

Section 15 - Regulatory Information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

SARA Hazard Classifications
- Pressure(Sudden Release of), Acute, Chronic

State Right To Know				
Component	**CAS**	**MA**	**NJ**	**PA**
Argon	7440-37-1	Yes	Yes	Yes
Carbon dioxide	124-38-9	Yes	Yes	Yes
Enflurane	13838-16-9	Yes	No	No
Nitrous Oxide	10024-97-2	Yes	Yes	Yes
Oxygen	7782-44-7	Yes	Yes	Yes

Inventory						
Component	**CAS**	**Canada DSL**	**Canada NDSL**	**China**	**EU EINECS**	**EU ELNICS**
Argon	7440-37-1	Yes	No	Yes	Yes	No
Carbon dioxide	124-38-9	Yes	No	Yes	Yes	No
Enflurane	13838-16-9	No	No	No	Yes	No
Nitrous Oxide	10024-97-2	Yes	No	Yes	Yes	No
Oxygen	7782-44-7	Yes	No	Yes	Yes	No

Inventory (Con't.)		
Component	**CAS**	**TSCA**
Argon	7440-37-1	Yes
Carbon dioxide	124-38-9	Yes
Enflurane	13838-16-9	No
Nitrous Oxide	10024-97-2	Yes
Oxygen	7782-44-7	Yes

Canada

Labor

Canada - WHMIS - Classifications of Substances

• Nitrous Oxide	10024-97-2	A, C, D2A
• Oxygen	7782-44-7	A, C
• Carbon dioxide	124-38-9	A; Uncontrolled product according to WHMIS classification criteria (solid)
• Argon	7440-37-1	A
• Enflurane	13838-16-9	Not Listed

Canada - WHMIS - Ingredient Disclosure List

• Nitrous Oxide	10024-97-2	0.1 %
• Oxygen	7782-44-7	Not Listed
• Carbon dioxide	124-38-9	1 %
• Argon	7440-37-1	Not Listed
• Enflurane	13838-16-9	Not Listed

Environment

Canada - 2004 NPRI (National Pollutant Release Inventory)

• Nitrous Oxide	10024-97-2	Not Listed
• Oxygen	7782-44-7	Not Listed
• Carbon dioxide	124-38-9	Not Listed
• Argon	7440-37-1	Not Listed
• Enflurane	13838-16-9	Not Listed

Canada - 2005 NPRI (National Pollutant Release Inventory)

• Nitrous Oxide	10024-97-2	Not Listed
• Oxygen	7782-44-7	Not Listed
• Carbon dioxide	124-38-9	Not Listed
• Argon	7440-37-1	Not Listed
• Enflurane	13838-16-9	Not Listed

Canada - CEPA - Greenhouse Gases Subject to Mandatory Reporting

• Nitrous Oxide	10024-97-2	310 GWP
• Oxygen	7782-44-7	Not Listed
• Carbon dioxide	124-38-9	1 GWP
• Argon	7440-37-1	Not Listed
• Enflurane	13838-16-9	Not Listed

Canada - CEPA - Priority Substances List

• Nitrous Oxide	10024-97-2	Not Listed
• Oxygen	7782-44-7	Not Listed
• Carbon dioxide	124-38-9	Not Listed
• Argon	7440-37-1	Not Listed
• Enflurane	13838-16-9	Not Listed

Canada - DWQ (Drinking Water Quality) - IMACs

• Nitrous Oxide	10024-97-2	Not Listed
• Oxygen	7782-44-7	Not Listed
• Carbon dioxide	124-38-9	Not Listed
• Argon	7440-37-1	Not Listed
• Enflurane	13838-16-9	Not Listed

Other

Canada - Accelerated Reduction/Elimination of Toxics (ARET)

• Nitrous Oxide	10024-97-2	Not Listed
• Oxygen	7782-44-7	Not Listed
• Carbon dioxide	124-38-9	Not Listed
• Argon	7440-37-1	Not Listed
• Enflurane	13838-16-9	Not Listed

Canada New Brunswick

Environment

Canada - New Brunswick - Ozone Depleting Substances - Schedule A

• Nitrous Oxide	10024-97-2	Not Listed
• Oxygen	7782-44-7	Not Listed
• Carbon dioxide	124-38-9	Not Listed
• Argon	7440-37-1	Not Listed
• Enflurane	13838-16-9	Not Listed

Canada - New Brunswick - Ozone Depleting Substances - Schedule B

• Nitrous Oxide	10024-97-2	Not Listed
• Oxygen	7782-44-7	Not Listed
• Carbon dioxide	124-38-9	Not Listed
• Argon	7440-37-1	Not Listed
• Enflurane	13838-16-9	Not Listed

China

Environment

China - Ozone Depleting Substances - First Schedule

• Nitrous Oxide	10024-97-2	Not Listed
• Oxygen	7782-44-7	Not Listed
• Carbon dioxide	124-38-9	Not Listed
• Argon	7440-37-1	Not Listed
• Enflurane	13838-16-9	Not Listed

China - Ozone Depleting Substances - Second Schedule

• Nitrous Oxide	10024-97-2	Not Listed
• Oxygen	7782-44-7	Not Listed
• Carbon dioxide	124-38-9	Not Listed
• Argon	7440-37-1	Not Listed
• Enflurane	13838-16-9	Not Listed

China - Ozone Depleting Substances - Third Schedule

• Nitrous Oxide	10024-97-2	Not Listed
• Oxygen	7782-44-7	Not Listed
• Carbon dioxide	124-38-9	Not Listed
• Argon	7440-37-1	Not Listed
• Enflurane	13838-16-9	Not Listed

Other

China - Annex I & II - Controlled Chemicals Lists

• Nitrous Oxide	10024-97-2	Not Listed
• Oxygen	7782-44-7	Not Listed
• Carbon dioxide	124-38-9	Not Listed
• Argon	7440-37-1	Not Listed
• Enflurane	13838-16-9	Not Listed

China - Dangerous Goods List

• Nitrous Oxide	10024-97-2	(including refrigerated liquid)
• Oxygen	7782-44-7	(compressed or refrigerated liquid)
• Carbon dioxide	124-38-9	(including solid or refrigerated liquid)
• Argon	7440-37-1	(compressed or refrigerated liquid)
• Enflurane	13838-16-9	Not Listed

China - Export Control List - Part I Chemicals

• Nitrous Oxide	10024-97-2	Not Listed
• Oxygen	7782-44-7	Not Listed
• Carbon dioxide	124-38-9	Not Listed
• Argon	7440-37-1	Not Listed
• Enflurane	13838-16-9	Not Listed

Europe

Other

EU - CLP (1272/2008) - Annex VI - Table 3.2 - Classification

• Nitrous Oxide	10024-97-2	Not Listed
• Oxygen	7782-44-7	O; R8
• Carbon dioxide	124-38-9	Not Listed

• Argon	7440-37-1	Not Listed
• Enflurane	13838-16-9	Not Listed

EU - CLP (1272/2008) - Annex VI - Table 3.2 - Concentration Limits

• Nitrous Oxide	10024-97-2	Not Listed
• Oxygen	7782-44-7	Not Listed
• Carbon dioxide	124-38-9	Not Listed
• Argon	7440-37-1	Not Listed
• Enflurane	13838-16-9	Not Listed

EU - CLP (1272/2008) - Annex VI - Table 3.2 - Labelling

• Nitrous Oxide	10024-97-2	Not Listed
• Oxygen	7782-44-7	O R:8 S:(2)-17
• Carbon dioxide	124-38-9	Not Listed
• Argon	7440-37-1	Not Listed
• Enflurane	13838-16-9	Not Listed

EU - CLP (1272/2008) - Annex VI - Table 3.2 - Notes - Substances and Preparations

• Nitrous Oxide	10024-97-2	Not Listed
• Oxygen	7782-44-7	Not Listed
• Carbon dioxide	124-38-9	Not Listed
• Argon	7440-37-1	Not Listed
• Enflurane	13838-16-9	Not Listed

EU - CLP (1272/2008) - Annex VI - Table 3.2 - Safety Phrases

• Nitrous Oxide	10024-97-2	Not Listed
• Oxygen	7782-44-7	S:(2)-17
• Carbon dioxide	124-38-9	Not Listed
• Argon	7440-37-1	Not Listed
• Enflurane	13838-16-9	Not Listed

Germany

Environment

Germany - TA Luft - Types and Classes

• Nitrous Oxide	10024-97-2	Not Listed
• Oxygen	7782-44-7	Not Listed
• Carbon dioxide	124-38-9	Not Listed
• Argon	7440-37-1	Not Listed
• Enflurane	13838-16-9	Not Listed

Germany - Water Classification (VwVwS) - Annex 1

• Nitrous Oxide	10024-97-2	Not Listed
• Oxygen	7782-44-7	ID Number 743, not considered hazardous to water
• Carbon dioxide	124-38-9	ID Number 256, not considered hazardous to water
• Argon	7440-37-1	ID Number 1348, not considered hazardous to water
• Enflurane	13838-16-9	Not Listed

Germany - Water Classification (VwVwS) - Annex 2 - Water Hazard Classes

• Nitrous Oxide	10024-97-2	ID Number 767, hazard class 1 - low hazard to waters

• Oxygen	7782-44-7	Not Listed
• Carbon dioxide	124-38-9	Not Listed
• Argon	7440-37-1	Not Listed
• Enflurane	13838-16-9	Not Listed

Germany - Water Classification (VwVwS) - Annex 3

• Nitrous Oxide	10024-97-2	Not Listed
• Oxygen	7782-44-7	Not Listed
• Carbon dioxide	124-38-9	Not Listed
• Argon	7440-37-1	Not Listed
• Enflurane	13838-16-9	Not Listed

Other

Germany - Specifically Regulated Chemicals in TRGS

• Nitrous Oxide	10024-97-2	Not Listed
• Oxygen	7782-44-7	Not Listed
• Carbon dioxide	124-38-9	Not Listed
• Argon	7440-37-1	Not Listed
• Enflurane	13838-16-9	Not Listed

Portugal

Other

Portugal - Prohibited Substances

• Nitrous Oxide	10024-97-2	Not Listed
• Oxygen	7782-44-7	Not Listed
• Carbon dioxide	124-38-9	Not Listed
• Argon	7440-37-1	Not Listed
• Enflurane	13838-16-9	Not Listed

United Kingdom

Environment

United Kingdom - Pollution Inventory - Schedule 1 - Thresholds for Releases to Air

• Nitrous Oxide	10024-97-2	10000 kg
• Oxygen	7782-44-7	Not Listed
• Carbon dioxide	124-38-9	10000000 kg (qualifying renewable fuel sources are reportable when the total amount of CO2 released is above 10 million kg); 10000000 kg
• Argon	7440-37-1	Not Listed
• Enflurane	13838-16-9	Not Listed

Other

United Kingdom - Workplace Exposure Limits (WELs) - Substances in Review

• Nitrous Oxide	10024-97-2	Not Listed
• Oxygen	7782-44-7	Not Listed
• Carbon dioxide	124-38-9	Not Listed
• Argon	7440-37-1	Not Listed
• Enflurane	13838-16-9	Not Listed

United Kingdom - List of Dangerous Substances in Water

• Nitrous Oxide	10024-97-2	Not Listed

• Oxygen	7782-44-7	Not Listed
• Carbon dioxide	124-38-9	Not Listed
• Argon	7440-37-1	Not Listed
• Enflurane	13838-16-9	Not Listed

United States

Labor

U.S. - OSHA - Process Safety Management - Highly Hazardous Chemicals

• Nitrous Oxide	10024-97-2	Not Listed
• Oxygen	7782-44-7	Not Listed
• Carbon dioxide	124-38-9	Not Listed
• Argon	7440-37-1	Not Listed
• Enflurane	13838-16-9	Not Listed

U.S. - OSHA - Specifically Regulated Chemicals

• Nitrous Oxide	10024-97-2	Not Listed
• Oxygen	7782-44-7	Not Listed
• Carbon dioxide	124-38-9	Not Listed
• Argon	7440-37-1	Not Listed
• Enflurane	13838-16-9	Not Listed

Environment

U.S. - CAA (Clean Air Act) - 1990 Hazardous Air Pollutants

• Nitrous Oxide	10024-97-2	Not Listed
• Oxygen	7782-44-7	Not Listed
• Carbon dioxide	124-38-9	Not Listed
• Argon	7440-37-1	Not Listed
• Enflurane	13838-16-9	Not Listed

U.S. - CERCLA/SARA - Hazardous Substances and their Reportable Quantities

• Nitrous Oxide	10024-97-2	Not Listed
• Oxygen	7782-44-7	Not Listed
• Carbon dioxide	124-38-9	Not Listed
• Argon	7440-37-1	Not Listed
• Enflurane	13838-16-9	Not Listed

U.S. - CERCLA/SARA - Radionuclides and Their Reportable Quantities

• Nitrous Oxide	10024-97-2	Not Listed
• Oxygen	7782-44-7	Not Listed
• Carbon dioxide	124-38-9	Not Listed
• Argon	7440-37-1	Not Listed
• Enflurane	13838-16-9	Not Listed

U.S. - CERCLA/SARA - Section 302 Extremely Hazardous Substances EPCRA RQs

• Nitrous Oxide	10024-97-2	Not Listed
• Oxygen	7782-44-7	Not Listed
• Carbon dioxide	124-38-9	Not Listed
• Argon	7440-37-1	Not Listed
• Enflurane	13838-16-9	Not Listed

U.S. - CERCLA/SARA - Section 302 Extremely Hazardous Substances TPQs

• Nitrous Oxide	10024-97-2	Not Listed
• Oxygen	7782-44-7	Not Listed
• Carbon dioxide	124-38-9	Not Listed

• Argon	7440-37-1	Not Listed
• Enflurane	13838-16-9	Not Listed

U.S. - CERCLA/SARA - Section 313 - Emission Reporting

• Nitrous Oxide	10024-97-2	Not Listed
• Oxygen	7782-44-7	Not Listed
• Carbon dioxide	124-38-9	Not Listed
• Argon	7440-37-1	Not Listed
• Enflurane	13838-16-9	Not Listed

U.S. - CERCLA/SARA - Section 313 - PBT Chemical Listing

• Nitrous Oxide	10024-97-2	Not Listed
• Oxygen	7782-44-7	Not Listed
• Carbon dioxide	124-38-9	Not Listed
• Argon	7440-37-1	Not Listed
• Enflurane	13838-16-9	Not Listed

United States - California

Environment

U.S. - California - Proposition 65 - Carcinogens List

• Nitrous Oxide	10024-97-2	Not Listed
• Oxygen	7782-44-7	Not Listed
• Carbon dioxide	124-38-9	Not Listed
• Argon	7440-37-1	Not Listed
• Enflurane	13838-16-9	Not Listed

U.S. - California - Proposition 65 - Developmental Toxicity

• Nitrous Oxide	10024-97-2	developmental toxicity, initial date 8/1/08
• Oxygen	7782-44-7	Not Listed
• Carbon dioxide	124-38-9	Not Listed
• Argon	7440-37-1	Not Listed
• Enflurane	13838-16-9	Not Listed

U.S. - California - Proposition 65 - Maximum Allowable Dose Levels (MADL)

• Nitrous Oxide	10024-97-2	Not Listed
• Oxygen	7782-44-7	Not Listed
• Carbon dioxide	124-38-9	Not Listed
• Argon	7440-37-1	Not Listed
• Enflurane	13838-16-9	Not Listed

U.S. - California - Proposition 65 - No Significant Risk Levels (NSRL)

• Nitrous Oxide	10024-97-2	Not Listed
• Oxygen	7782-44-7	Not Listed
• Carbon dioxide	124-38-9	Not Listed
• Argon	7440-37-1	Not Listed
• Enflurane	13838-16-9	Not Listed

U.S. - California - Proposition 65 - Reproductive Toxicity - Female

• Nitrous Oxide	10024-97-2	Not Listed
• Oxygen	7782-44-7	Not Listed
• Carbon dioxide	124-38-9	Not Listed
• Argon	7440-37-1	Not Listed
• Enflurane	13838-16-9	Not Listed

U.S. - California - Proposition 65 - Reproductive Toxicity - Male

• Nitrous Oxide	10024-97-2	Not Listed
• Oxygen	7782-44-7	Not Listed
• Carbon dioxide	124-38-9	Not Listed
• Argon	7440-37-1	Not Listed
• Enflurane	13838-16-9	Not Listed

United States - Pennsylvania

Labor

U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List

• Nitrous Oxide	10024-97-2	Not Listed
• Oxygen	7782-44-7	Not Listed
• Carbon dioxide	124-38-9	Not Listed
• Argon	7440-37-1	Not Listed
• Enflurane	13838-16-9	Not Listed

U.S. - Pennsylvania - RTK (Right to Know) - Special Hazardous Substances

• Nitrous Oxide	10024-97-2	Not Listed
• Oxygen	7782-44-7	Not Listed
• Carbon dioxide	124-38-9	Not Listed
• Argon	7440-37-1	Not Listed
• Enflurane	13838-16-9	Not Listed

15.2 Chemical Safety Assessment

- No Chemical Safety Assessment has been carried out.

15.3 Other Information

- WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm.

Section 16 - Other Information

Relevant Phrases (code & full text)

- H315 - Causes skin irritation
  H319 - Causes serious eye irritation
  H335 - May cause respiratory irritation
  R36/37/38 - Irritating to eyes, respiratory system and skin.

Last Revision Date

- 13/January/2014

Preparation Date

- 13/January/2014

Disclaimer/Statement of Liability

- To the best of Air Liquide'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 gas mixture 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.

Key to abbreviations

NDA = No Data Available