

Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

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

1.1. Product identifier

Product form : Mixture

Product name : Enflurane (0.10% - 0.99%), Carbon Dioxide (3.0000% - 60.7299%), Nitrous Oxide (39.1700% -

96.8999%) in Nitrogen

Product code : HC-2004-03452

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

Classification (GHS-US)

 Ox. Gas 1
 H270

 Compressed gas
 H280

 Repr. 1A
 H360

 STOT SE 3
 H336

Full text of H-phrases: see section 16

2.2. Label elements

GHS-US labeling

Hazard pictograms (GHS-US)









GHS03

IS04

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

H336 - May cause drowsiness or dizziness

H360 - May damage fertility or the unborn child (Inhalation) OSHA-H01 - May displace oxygen and cause rapid suffocation

CGA-HG03 - May increase respiration and heart rate

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+P340 - If inhaled: Remove person to fresh air and keep comfortable for breathing

P308+P313 - 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

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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

CGA-PG22 - Use only with equipment cleaned for oxygen service

2.3. Other hazards

No additional information available

Unknown acute toxicity (GHS US)

Not applicable

SECTION 3: Composition/information on ingredients

Substance

Not applicable

3.2. **Mixture**

Name	Product identifier	%	Classification (GHS-US)
Nitrous oxide	(CAS No) 10024-97-2	39.17 - 96.8999	Ox. Gas 1, H270 Liquefied gas, H280 STOT SE 3, H336
Carbon dioxide	(CAS No) 124-38-9	3 - 60.7299	Liquefied gas, H280
Nitrogen	(CAS No) 7727-37-9	0.0001 - 57.73	Compressed gas, H280
Enflurane	(CAS No) 13838-16-9	0.1 - 0.99	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

Full text of H-phrases: see section 16

SECTION 4: First aid measures

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.

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

Most important symptoms and effects, both acute and delayed

: May displace oxygen and cause rapid suffocation. May cause drowsiness or dizziness. May Symptoms/injuries after inhalation

increase respiration and heart rate.

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 Not known.

administration

Chronic symptoms : May damage fertility. May damage the unborn child.

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

Extinguishing media

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

Unsuitable extinguishing media Do not use water jet to extinguish.

Special hazards arising from the substance or mixture

Fire hazard : The product is not flammable.

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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 fire

fighters. 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.

Emergency procedures : Escape the danger area by the closest safe route. Close doors and windows of adjacent

premises. Keep containers closed. Mark the danger area. Seal off low-lying areas. Keep

upwind.

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.

Incompatible materials : Flammable materials. Combustible materials. Reducing agents.

7.3. Specific end use(s)

See Section 1.2.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Enflurane (0.10% - 0.99%), Carbon Dioxide (3.0000% - 60.7299%), Nitrous Oxide (39.1700% - 96.8999%) in Nitrogen		
ACGIH	Not applicable	
OSHA	Not applicable	

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Enflurane (13838-16-9)			
ACGIH	Not applicable	Not applicable	
OSHA	Not applicable	Not applicable	
Carbon dioxide (124-	38-9)		
ACGIH	ACGIH TWA (ppm)	5000 ppm	
ACGIH	ACGIH STEL (ppm)	30000 ppm	
OSHA	OSHA PEL (TWA) (mg/m³)	9000 mg/m³	
OSHA	OSHA PEL (TWA) (ppm)	5000 ppm	
Nitrous oxide (10024	-97-2)		
ACGIH	ACGIH TWA (ppm)	50 ppm	
OSHA	Not applicable	Not applicable	
Nitrogen (7727-37-9)			
ACGIH	Not applicable	Not applicable	
OSHA	Not applicable	Not applicable	

8.2. Exposure controls

Explosion limits

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. Oxygen

exhaust ventilation. Systems under pressure should be regularly checked for leakages. Oxyger detectors should be used when asphyxiating gases may be released. Consider work permit

system e.g. for maintenance activities.

Hand protection : Wear working gloves when handling gas containers. 29 CFR 1910.138: Hand Protection.

Eye protection : Wear safety glasses with side shields. 29 CFR 1910.133: Eye and Face Protection.

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.

Other information : Wear safety shoes while handling containers. 29 CFR 1910.136: Foot Protection.

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 Hq No data available Melting point No data available Freezing point No data available Boiling point No data available Flash point : No data available Relative evaporation rate (butyl acetate=1) No data available Flammability (solid, gas) See Section 2.1 and 2.2

Explosive properties : Not applicable - not flammable.

Oxidizing properties : Not combustible but enhances combustion of other substances. May cause or intensify fire;

: Not applicable - not flammable

oxidizer.

Vapor pressure : No data available Relative density : No data available Relative vapor density at 20 °C : No data available

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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 : No data available Viscosity : No data available Viscosity, kinematic : No data available Viscosity, dynamic

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

Combustible materials. Flammable materials. Reducing agents.

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

Addic toxicity	. Not diassified
Enflurane (13838-16-9)	
LD50 oral rat	5450 μl/kg
LC50 inhalation rat (ppm)	12124 ppm/4h
ATE US (gases)	12124.000 ppmV/4h
Carbon dioxide (124-38-9)	
LC50 inhalation rat (ppm)	820000 ppm/4h
Nitrous oxide (10024-97-2)	
LC50 inhalation rat (ppm)	250000 ppm/4h
Nitrogen (7727-37-9)	
LC50 inhalation rat (ppm)	820000 ppm/4h
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 drowsiness or dizziness.

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Specific target organ toxicity (repeated

exposure)

: Not classified

Aspiration hazard : Not classified

Symptoms/injuries after inhalation : May displace oxygen and cause rapid suffocation. May cause drowsiness or dizziness. May

increase respiration and heart rate.

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 : Not known.

administration

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

Carbon dioxide (124-38-9)		
Persistence and degradability	No ecological damage caused by this product.	
Nitrous oxide (10024-97-2)		
Persistence and degradability	Not applicable for inorganic gases.	
Nitrogen (7727-37-9)		
Persistence and degradability	No ecological damage caused by this product.	

12.3. Bioaccumulative potential

Carbon dioxide (124-38-9)		
BCF fish 1	(no bioaccumulation)	
Log Pow	0.83	
Bioaccumulative potential	No ecological damage caused by this product.	
Nitrous oxide (10024-97-2)		
Log Pow	Not applicable for inorganic gases.	
Bioaccumulative potential	No data available.	
Nitrogen (7727-37-9)		
Log Pow Not applicable for inorganic gases.		
Bioaccumulative potential	No ecological damage caused by this product.	

12.4. Mobility in soil

Carbon dioxide (124-38-9)	
Ecology - soil	No ecological damage caused by this product.
Nitrous oxide (10024-97-2)	
Ecology - soil	Because of its high volatility, the product is unlikely to cause ground or water pollution.
Nitrogen (7727-37-9) Ecology - soil No ecological damage caused by this product.	

12.5. Other adverse effects

Effect on ozone layer : No known effects from this product.

Effect on the global warming : Contains greenhouse gas(es) not covered by 842/2006/EC.

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SECTION 13: Disposal considerations

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.

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

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.

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) DOT Quantity Limitations Passenger aircraft/rail : 75 kg

(49 CFR 173.27)

DOT Quantity Limitations Cargo aircraft only (49 : 150 kg

CFR 175.75)

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.

ADR

Transport document description : UN 3156, 2.2 (5.1), (E)

Class (ADR) : 2 - Gases

Hazard identification number (Kemler No.) : 25 Classification code (ADR)

Hazard labels (ADR) 2.2 - Non-flammable compressed gas

5.1 - Oxidizer

3156



Orange plates

Tunnel restriction code (ADR) : E

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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

Carbon dioxide (124-38-9)

Listed on the United States TSCA (Toxic Substances Control Act) inventory

Nitrous oxide (10024-97-2)

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

Carbon dioxide (124-38-9)		
Listed on the Canadian DSL (Domestic Sustances List)		
WHMIS Classification	Class A - Compressed Gas	
Nitrous oxide (10024-97-2)		
Listed on the Canadian DSL (Domestic Sustances List)		
WHMIS Classification	Class A - Compressed Gas Class C - Oxidizing Material Class D Division 2 Subdivision A - Very toxic material causing other toxic effects	
Nitrogen (7727-37-9)		
Listed on the Canadian DSL (Domesti	isted on the Canadian DSL (Domestic Sustances List)	
WHMIS Classification	Class A - Compressed Gas	

EU-Regulations

No additional information available

Carbon dioxide (124-38-9)

Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)

Nitrous oxide (10024-97-2)

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)

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

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Carbon dioxide (124-38-9)

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 Japanese ENCS (Existing & New Chemical Substances) inventory

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)

Listed on the Canadian IDL (Ingredient Disclosure List)

Nitrous oxide (10024-97-2)

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 Japanese ENCS (Existing & New Chemical Substances) inventory

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)

Listed on the Canadian IDL (Ingredient Disclosure List)

Nitrogen (7727-37-9)

Listed on the AICS (Australian Inventory of Chemical Substances)

Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China)

Listed on the Korean ECL (Existing Chemicals List)

Listed on NZIoC (New Zealand Inventory of Chemicals)

Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)

15.3. US State regulations

Nitrous oxide (10024-97-2)				
U.S California - Proposition 65 - Carcinogens List	U.S California - Proposition 65 - Developmental Toxicity	U.S California - Proposition 65 - Reproductive Toxicity - Female	U.S California - Proposition 65 - Reproductive Toxicity - Male	No significance risk level (NSRL)
No	Yes	Yes	No	

Carbon dioxide (124-38-9)

- 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

Nitrous oxide (10024-97-2)

- 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.

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Full text of H-phrases:

worth princess.			
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		
Liquefied gas	Gases under pressure Liquefied gas		
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		

SDS US (GHS HazCom 2012)

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.

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