Desflurane (4.00 – 5.00%), Carbon Dioxide (5.00 – 6.00%), Nitrous Oxide (43.00 – 45.00%) in Oxygen

Safety Data Sheet

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

Date of issue: 01/26/2015 Supersedes: 11/12/2014 Version: 1.1

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

1.1. Product identifier

Product form : Mixture

Product name : Desflurane (4.00 – 5.00%), Carbon Dioxide (5.00 – 6.00%), Nitrous Oxide (43.00 – 45.00%) in Oxygen

Product code : SG-2004-00358

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 America Specialty Gases
6141 Easton Rd
Plumsteadville, PA 18949 - USA
T 1.800.217.2688
www.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. 1B	H360
STOT SE 3	H336
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
H336 - May cause drowsiness or dizziness
H360 - May damage fertility or the unborn child
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 clothing, combustible materials
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 protective clothing, protective gloves, eye protection, face protection
P304+P340 - If inhaled: Remove person to fresh air and keep comfortable for breathing
P308+P313 - If exposed or concerned: Get medical advice/attention
P370+P376 - In case of fire: Stop leak if safe to do so
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
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

Name	Product identifier	%	Classification (GHS-US)
Oxygen	(CAS No) 7782-44-7	44 - 48	Ox. Gas 1, H270
Nitrous oxide	(CAS No) 10024-97-2	43 - 45	Ox. Gas 1, H270 Compressed gas, H280 STOT SE 3, H336
Carbon dioxide	(CAS No) 124-38-9	5 - 6	Liquefied gas, H280
Desflurane	(CAS No) 57041-67-5	4 - 5	Skin Irrit. 2, H315 Eye Irrit. 2A, H319 Repr. 1B, H360 STOT SE 3, H335 STOT SE 3, H336

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. May cause drowsiness or dizziness. May increase respiration and heart rate. If you feel unwell, seek medical advice.

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.

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. May intensify fire; oxidizer.

Explosion hazard : Product is not explosive. Heat may build pressure, rupturing closed containers, spreading fire and increasing risk of burns and injuries. Can form explosive mixtures with flammable materials.

Reactivity : May react vigorously or violently with reducing agents.

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.

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 : None known.

Storage conditions : Store locked up. 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.

Incompatible products : None known.

Incompatible materials : Flammable materials. Combustible materials.

7.3. Specific end use(s)

Test gas/Calibration gas.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Desflurane (4.00 – 5.00%), Carbon Dioxide (5.00 – 6.00%), Nitrous Oxide (43.00 – 45.00%) in Oxygen	
ACGIH	Not applicable
OSHA	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

Carbon dioxide (124-38-9)		
OSHA	OSHA PEL (TWA) (ppm)	5000 ppm

Oxygen (7782-44-7)	
ACGIH	Not applicable
OSHA	Not applicable

Desflurane (57041-67-5)	
ACGIH	Not applicable
OSHA	Not applicable

Nitrous oxide (10024-97-2)		
ACGIH	ACGIH TWA (ppm)	50 ppm
OSHA	Not applicable	

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.

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

Molecular mass : Not applicable for gas-mixtures.

Color : Colorless

Odor : No data available

Odor threshold : No data available

pH : No data available

Relative evaporation rate (butyl acetate=1) : No data available

Relative evaporation rate (ether=1) : Not applicable for gas-mixtures.

Melting point : No data available

Freezing point : No data available

Boiling point : No data available

Flash point : No data available

Auto-ignition temperature : No data available

Decomposition temperature : No data available

Flammability (solid, gas) : See Section 2.1 and 2.2

Vapor pressure : Not applicable.

Relative vapor density at 20 °C : No data available

Relative density : No data available

Relative gas density : Heavier than air.

Solubility : Water: Solubility in water of component(s) of the mixture :
• : 2000 mg/l • : 39 mg/l • : Insoluble • :

Log Pow : Not applicable for gas-mixtures.

Log Kow	:	Not applicable for gas-mixtures.
Viscosity, kinematic	:	Not applicable.
Viscosity, dynamic	:	Not applicable.
Explosive properties	:	Not applicable - not flammable.
Oxidizing properties	:	Not combustible but enhances combustion of other substances. May cause or intensify fire; oxidizer.
Explosive limits	:	Not applicable - not flammable

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

May react vigorously or violently with reducing agents.

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

May react vigorously or violently with combustible or flammable materials. 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

Flammable materials. combustible 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

Carbon dioxide (124-38-9)	
LC50 inhalation rat (ppm)	820000 ppm/4h

Oxygen (7782-44-7)	
LC50 inhalation rat (ppm)	800000 ppm/4h

Desflurane (57041-67-5)	
LD50 oral rat	5450 µl/kg

Nitrous oxide (10024-97-2)	
LC50 inhalation rat (ppm)	250000 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.
Specific target organ toxicity (single exposure)	:	May cause drowsiness or dizziness. May cause respiratory irritation.
Specific target organ toxicity (repeated exposure)	:	Not classified
Aspiration hazard	:	Not classified

Symptoms/injuries after inhalation	:	May cause respiratory irritation. May cause drowsiness or dizziness. May increase respiration and heart rate. If you feel unwell, seek medical advice.
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

Ecology - general : Classification criteria are not met.

12.2. Persistence and degradability

Desflurane (4.00 – 5.00%), Carbon Dioxide (5.00 – 6.00%), Nitrous Oxide (43.00 – 45.00%) in Oxygen	
Persistence and degradability	No data available.

Carbon dioxide (124-38-9)	
Persistence and degradability	No ecological damage caused by this product.

Oxygen (7782-44-7)	
Persistence and degradability	No ecological damage caused by this product.

Nitrous oxide (10024-97-2)	
Persistence and degradability	Not applicable for inorganic gases.

12.3. Bioaccumulative potential

Desflurane (4.00 – 5.00%), Carbon Dioxide (5.00 – 6.00%), Nitrous Oxide (43.00 – 45.00%) in Oxygen	
Log Pow	Not applicable for gas-mixtures.
Log Kow	Not applicable for gas-mixtures.
Bioaccumulative potential	No data available.

Carbon dioxide (124-38-9)	
BCF fish 1	(no bioaccumulation)
Log Pow	0.83
Bioaccumulative potential	No ecological damage caused by this product.

Oxygen (7782-44-7)	
Log Pow	Not applicable for inorganic gases.
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.

12.4. Mobility in soil

Desflurane (4.00 – 5.00%), Carbon Dioxide (5.00 – 6.00%), Nitrous Oxide (43.00 – 45.00%) in Oxygen	
Mobility in soil	No data available.

Carbon dioxide (124-38-9)	
Ecology - soil	No ecological damage caused by this product.

Oxygen (7782-44-7)	
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.

12.5. Other adverse effects

Effect on ozone layer : None.

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

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

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 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 Packaging Non Bulk (49 CFR 173.xxx) : 302

DOT Packaging Bulk (49 CFR 173.xxx) : 314;315

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.

Special transport precautions : Avoid transport on vehicles where the load space is not separated from the driver's compartment. Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency. Before transporting product containers: - Ensure there is adequate ventilation. - Ensure that containers are firmly secured. - Ensure cylinder valve is closed and not leaking. - Ensure valve outlet cap nut or plug (where provided) is correctly fitted. - Ensure valve protection device (where provided) is correctly fitted.

ADR

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

Class (ADR) : 2 - Gases

Hazard identification number (Kemler No.) : 25

Classification code (ADR) : 1O

Hazard labels (ADR) : 5.1 - Oxidizer

Orange plates : 

Tunnel restriction code (ADR) : E
LQ : 0
Excepted quantities (ADR) : E0

Transport by sea

UN-No. (IMDG) : 3156
Proper Shipping Name (IMDG) : COMPRESSED GAS, OXIDIZING, N.O.S.
Class (IMDG) : 2.2 - Non-flammable, non-toxic 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

Oxygen (7782-44-7)
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

15.2. International regulations

CANADA

Carbon dioxide (124-38-9)	
Listed on the Canadian DSL (Domestic Sustances List)	
WHMIS Classification	Class A - Compressed Gas

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

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

EU-Regulations

Carbon dioxide (124-38-9)
Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)

Oxygen (7782-44-7)
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)

Classification according to Regulation (EC) No. 1272/2008 [CLP]

Not classified

Classification according to Directive 67/548/EEC [DSD] or 1999/45/EC [DPD]

15.2.2. National regulations

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)

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)

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)

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

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

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

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:

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. 1B	Reproductive toxicity Category 1B
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
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.